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### COVER PHOTO

A close-up of the "works" of the popular new 2 metre sideband rig, the IC-202.

Photo: Ken Reynolds VK3YCY

# HAM

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# amateur radio

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## QSP WARC 1979

*During 1975 meetings took place of two of the three IARU regional organisations. Region 2 will be meeting in April.*

*A major subject discussed was the World Administrative Radio Conference scheduled for 1979 some details of which are included in Executive's WIANews this month.*

*In the light of the report of the IARU delegate to the WARC (Space Conference) 1971 the Region 3 Association was unanimous in its decision to finance a delegate from the region to be part of the IARU delegation to WARC 1979 at Geneva.*

*At the 1975 Federal Convention the WIA resolved to press for an amateur to be accredited to the Australian delegation for WARC 1979 as was the case with the late John Moyle VK2JU, for WARC 1959.*

*Discussions have already taken place with the Secretary of the PMG's Department putting the WIA position. We were assured that we will be brought into discussions affecting amateur matters. The question of the accreditation of a delegate is also receiving consideration.*

*What are likely to be the pressures at WARC 1979?*

*It has been estimated that the increasing use of satellites for point to point fixed services could reduce some of the pressures in the HF parts of the spectrum. With this in mind a world-wide logical expansion of amateur HF bands has been planned to accommodate the anticipated increase in the amateur population, bearing in mind that the decisions taken in WARC 1979 might well go through into the next century.*

*However, the VHF/UHF/SHF parts of the spectrum are likely to experience the greatest pressures as the various services adjust to increased requirements. Amateurs must also look to the future and be ruthlessly realistic in their anticipated requirements. At the same time it is essential for amateurs to bear in mind for WARC 1979 the development of new techniques and to plan accordingly.*

*To this end the VHF Advisory Committee has been preparing band plans and other data for the Institute's use. Please give the band plans your greatest support. Much thought, time and energy have gone into their preparation. They directly affect part of the negotiations going on between the Institute and the Frequency Management Branch of the PMG's Department.*

*Yet another important part of our activities must be devoted to EMC matters. It has long been the Institute's firm belief that the inadequacies of one service should not prevent the full utilisation of the frequencies allocated to a properly operated adjacent service. This is part of the name of the game relating to the 50-52 MHz area and the "misallocation" of the Channel 5A frequency.*

*On a broader basis this is the name of the game for internationally-agreed allocations in the VHF and higher regions of the spectrum.*

D. A. WARDLAW, VK3ADW,  
Federal President.

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### PROVOCATION OF THE MONTH

Amateurs are the worst communicators.

### 1976 SUBSCRIPTION NOTICES

All members should have received their 1976 Subscription Notices by now. Please observe the "First and Final Notice" over-stamping in red ink and accept this QSP as a reminder if you have not already paid. The cessation of AR is done automatically for unfinancials and free replacement of missing issues cannot be undertaken — with regret, because of the costs involved. If you are an active amateur debating the value of the Institute contemplate what could happen to amateur radio at WARC 1979 without a strong healthy amateur lobby coupled with what can only be described as costly and protracted preparatory work by your Institute in collaboration with IARU.

### VICTORIAN DIVISION COMPONENTS SECTION

Advice from the Victorian Division is that their Components Section will close on 15th December and re-open from 30th January.

### LDTV

CQ-TV, for Aug. '75, the Journal of the British Amateur Television Club advised the formation of a new Association for Low Definition Television at a meeting in April 1975. In the comments was a

paragraph, "Tribute was paid to the energy and enthusiasm of C. J. Long, the young Australian LDTV worker who provided enormous practical help, and collaborated in establishing the first trans-world LDTV tape-link".

### SATELLITES

In the Telecommunication Journal there is a regular report of new satellite launchings — almost one satellite launched every 2 days. In the issue of Sept. '75 there is listed a USSR Satellite 13th Molnya-2 (International number 1975-63-A) launched 8th July listed as carrying apparatus for transmitting television programmes and multi-channel radio communication, orientation system, orbit correction system and power supplies. The transmission frequencies are shown as 3.4 to 3.9 MHz!!

### GILBERT & ELLICE ISLANDS

Information has been received, via IARU R3 Secretary, from the Secretary, Ministry of Communications Works & Utilities, P.O. Box 487, Betio, Tarawa, G. & E. Islands that from 1-1-1976 the present Colony will be divided into two separate territories having U.K. Crown Colony status. The new Gilbert Islands Crown Colony will comprise the Gilbert Islands and Ocean Island: VR1, the Phoenix Islands: VR1P, Northern Line Islands: VR3, Central

# WIANEWS

A letter has been received from the Secretary of the PMG's Dept. advising that at the 30th Session of the Administrative Council of the ITU held during June 1975 the Council had an exchange of views by Administrations on the holding of a WARC to review, and where necessary, revise the Radio Regulations and Additional Radio Regulations. The Council envisaged that this Conference would take place in the second half of 1979 for a duration of about 10 weeks.

The Secretary went on to say it is anticipated that a Preparatory Group will be formed in due course to formulate Australian requirements and attitude prior to compilation of an Australian Brief for the work of the Conference.

Readers of WIANEWS in December AR will be aware that the Executive have already begun work on this most important matter affecting every amateur. A number of policies directly relating to WARC 1979 deriving from the IARU R3 Conference in Hong Kong last March were adopted at the 1975 Federal Convention. Please see AR June 1975 page 28 onwards.

The November Exams were once again not held because of the continuing industrial dispute. At the time of writing this in November, Executive has decided that certain negotiations going on behind the scenes at present should be given a fair hearing. If nothing positive happens before the new year passes out of its

infancy there is little doubt that consideration will be essential to determine suitable strong action based on developments to that date. The Executive is extremely disturbed about the way this matter has been prolonged so long by the authorities and others.

Unless the examinations are held Novice Licensing will never get off the ground. Through no fault of the Institute this Novice Licensing has been subjected to a delay of over 3 years already. Also the other amateur exams suffered severely during 1975.

It seems we are not the only people suffering under such a handicap. The editorial in Oct. '75 QST looks familiar, thus — "In recent months it hasn't been unusual for a Novice application to take six months to progress from the code test to the actual licence. If you add to that the time it takes to introduce someone to amateur radio in the first place and for him to learn the code, it turns out that a student whose interest is sparked at the beginning of a school year in September will be lucky to be on the air when school lets out the following June". In this case however the cause was an avalanche of CB and other mail.

Talking about mails. A parcel of books from ARRL post-marked 23rd May arrived on 5th November. An exceptional case perhaps.

What will this new year 1976 bring forth? Hopefully a much more productive and harmonious year for amateur radio than 1975.

Finally a correspondent kindly pointed out that RAA-RZZ call sign blocks referred to in Nov. '75 WIANEWS actually belonged to the U.S.S.R. He is correct but perhaps all repeater and beacon users related these to suffix blocks and not prefix blocks. The RAA in this context really means VKxRAA where "x" is the State numeral. ■

and Southern Line Islands: VR7. The Crown Colony of Tuvalu (not the Tuvalu Islands) will consist of what are known now as the Ellice Islands and will use the new prefix VR8. Each of the new Crown Colonies will have its own separate Administrations, stamps, etc.

## ASCI1

FCC has granted special temporary authority for experimental use of the light-level American Standard Code for Information Interchange (ASCI1) by amateurs communicating through Amsat Oscars 6 and 7 for the period ending February 28, 1976". QST, Oct., '75.

## "DO YOU REMEMBER?" — Original Poem by Alan Shawmith VK4SS

When planet Earth stole quietly on, silent as before.  
— instead of now, emitting loud, a man-made RF roar.

When rigs were made of bakelite, busbar, breadboard and brass.  
— instead there's 'little boxes'. Ah, what has come to pass!

When IP charts did not exist: no MUF, no checks  
To choose a band or pick a time for optimum DX.

And when a country was a country — about one hundred plus.  
Now they're made to suit the 'scene', for the likes of Don and Gus.

When 'duck talk' no ears assailed; AM was the thing.  
The whole tone band from end to end with heterodyne did ring.

Then DX was no 'rat race', but a sharing round with all.  
Every OM called to say 'FB', if you too made the 'call'.

When twenty five or fifty watts was really something big  
And DXCC often made with an AM half filled sig.

When thoughts of beams and fixed arrays had not been given birth.  
Now like a winter forest, they're spread across the earth.

When keys were hand and by their 'fists', op's you'd quickly name.  
Now with keyers, boards and 'bugs', 'fists' sadly sound the same.

When no such 'bug' as TVI, the avid Ham oppressed  
With band-pass filters, suppresses, traps — and all the rest.

When DX stations were so rare, they seemed so far away.  
Now in a global city, they're commonplace each day.

'S'max in '58 were sigs from Top to ten,  
With ole Sol two hundred plus; when will that come again?

If you remember all those things, then count yourself a sage.  
You've seen the birth and growth of Hamdom — through its GOLDEN AGE.

## 1976 SUBSCRIPTIONS REMINDER

No final notices will be sent out this year from the Executive Office.

All subscription notices already mailed carry the wording —

"FIRST AND FINAL NOTICE"

Please take note and arrange to pay your 1976 subscription at once if you have not already done so.

AR's will soon cease for unfinancials and missing copies cannot be supplied if your supply ceased because of being unfinancial.

PLEASE TAKE NOTICE.

## AWARDS

The Publications Committee have pleasure in advising the following Awards granted for the year 1975—  
Higginbotham Award — Mr. Jim Payne VK3AZT.

Technical Award — Mr. H. L. Hepburn VK3AFQ for the series on "Amateur Building Blocks".

# FURTHER MODIFICATIONS TO THE FT101B

Geoff Wilson VK3AMK  
7 Norman Ave., Frankston, Vic. 3199

In a previous article (AR March 1975, p.9) I described three modifications to the FT-101B. The following are further modifications I have made since then which have proved well worthwhile.

## Modification 4 RF OUTPUT SOCKET

Using the FT-101B extensively on VHF with an external transverter the low level RF output socket gets a great deal of handling. After a while it was found that the level of 28 MHz signal to the transverter was varying, now and again cutting out completely. This problem was traced to a faulty phono type connector used as the low level output socket. Examination of the insulation showed what appears to be a cardboard material and the connection was far from positive when any strain was placed on the cable. The peak power level at this point is about 500 mW so any loss of signal will drastically affect the performance of the transverter. The phono type connector was replaced with a BNC type connector and since then no further problems have been experienced.

Although this may appear to be a very simple modification there are a number of mechanical problems which have to be watched closely.

I went about the modification as follows: After removing the bottom cover plate of the transceiver and the inner cover under the 6J5Cs, the low level socket and the 10 pF capacitor connecting with the grid of one 6JS6C can be found in one corner of the chassis. At this point I removed the valves and also the internal speaker as subsequent operations might endanger them.

After unsoldering the 10 pF capacitor the phono socket is unscrewed and removed. This may prove a little tricky and care must be taken not to scratch the case. If you do not mind the extra work involved the outer case can be taken off but this then makes handling the FT-101B difficult as the various parts have little protection and further damage may occur unless great care is taken.

The hole used for the phono socket is smaller than the  $\frac{3}{8}$  inch hole required for the BNC connector. Some method must be found to enlarge it without undue vibration which may damage other components of the transceiver or its alignment. As the 6JS6C sockets are too close to the hole there is no chance of using a taper reamer without removing not only the sockets but other surrounding components as well. I decided to drill out the hole a drill size at a time using a SCR speed control to keep the speed of the drill as low as possible.

Before starting each drill in the hole I

used a hand held countersinking bit to taper the edge of the hole. It may take two people to do the drilling as the drill and the transceiver must both be held firmly during the process. The reason for removing the internal speaker now becomes obvious of course, as even with the greatest of care metal chips will otherwise find their way towards the speaker magnet!

When the hole is drilled and cleaned up it is a very good idea to go over the surrounding area with the nozzle of a vacuum cleaner to remove any stray chips which may cause shorts or other damage. The BNC connector was then fitted with a lock washer and nut on the inside of the chassis and tightened by placing a BNC plug on the socket and using heavy slip joint pliers with a thick piece of material in the jaws to tighten the plug. The material (felt etc.) prevents the jaws damaging the knurled ring on the plug and with care a very tight connection can be made between the socket and the chassis. When this is finished the 10 pF capacitor can be replaced and the other components returned to their respective positions. Despite the rather awkward nature of this modification the results were well worth the effort.

## Modification 5 PILOT LAMP VOLTAGE

After a period of operation I found the pilot lamps seemed to have a very short life, especially the miniature lamp with flying leads used to illuminate the O-100 kHz ring on the tuning knob of the VFO. Unlike the other lamps this one is quite difficult to replace as anyone who has had one of these fail will know! I decided to lower the lamp voltage and fortunately all three are supplied from a common lead terminating at the bayonet socket above the VFO dial.

The lead from the 13.5V rail was cut at this point and a 3.9 ohm 1 watt resistor connected in series with the lamps. This lowered the voltage to about 12V and the lamp life is now more reasonable. A three-tag strip was mounted under a screw on the front top edge of the shield plate supporting the balanced modulator board and after fixing the resistor to the strip a short lead was run to the socket where the lead from the 13.5V rail previously terminated.

It should be pointed out here that when mounting the tag strip make sure that the various surrounding boards can still be withdrawn if required.

## Modification 6 ACTIVE MICROPHONE SUPPLY

Reference to the circuit diagram will show that pin 4 on the microphone socket is unused. I had another microphone with an Inbuilt preamplifier operating from 12V and decided to use pin 4 to bring out the necessary supply from the transceiver. The cord on the microphone is a four wire type

with leads for mic, PTT, common earth, and the 12V line.

Firstly a 1K resistor was connected from pin 5 to pin 2 of the octal socket used for the external VFO. Pin 5 is the 13.5V rail, while pin 2 is not used for the VFO and provided a handy mounting point. The idea of using the 1K resistor (which due to the very low current drain of the preamplifier has little effect upon the voltage) was to isolate the external circuit from the transceiver supply in case a short circuit occurred either at the microphone socket or externally. In such circumstances no damage can result from accidental shorts.

A length of hookup wire was then run from pin 2 of the octal socket to pin 4 of the microphone socket around the inside of the case. The hookup wire was run through a length of spaghetti tubing which served two purposes. Firstly it protected the lead from self tapping screws in the case at various points and due to the stiffness of the tubing could be unsupported over some of its length. Where possible it was tied to other wiring with fine string and secured to prevent it moving.

At pin 4 on the microphone socket a 0.01 uF 50V ceramic was added to prevent RF getting back into the transceiver via the microphone cord. Doubtless there are other spots where a 13.5V supply could be found closer to the microphone socket but the octal socket for the VFO is both easy to get at and provides a ready made mounting point for the resistor.

## Modification 7 RF SENSITIVITY

No originally whatever is claimed for this one as several others are already using this idea. If the receiver is a little deaf and it uses a 3SK40M in the RF stage, the addition of a 100 K resistor in parallel with R5 on PB-1 1B may help. This gives R5 an effective value of 50 K but I would not suggest going any lower than this.

Strong local signals may tend to overload and some experimenting with values to give an effective resistance between 50 K and 100 K may be best. I have had good results, especially with VHF converters, using this mod.

## USE OF LINEARS

The following modifications, although not made to the FT-101 itself, may be of interest to the many owners of these units using them with external linears such as the FL-1000, FL-2000 etc.

The first linear I used was the FL-1000 and this had one problem. When operating on 40 or 80 metres often the linear was not required but there was no way of breaking the relay control line other than removing the accessory plug from the FT-101 or turning off the FL-1000 at the mains switch. When only a brief contact was being made without the linear this was inconvenient. By

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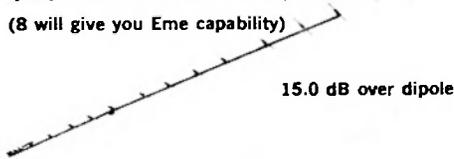
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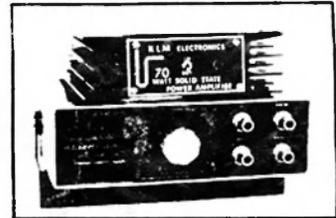
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**MODEL SR-C432**, 2.mtr, 6 channel hand-held FM transceiver, with short helical flexible antenna, leather case and crystals for 432, 432.12 and 435 MHz. Superior construction and performance. Jacks provided for external mic., earphone, antenna, and battery charger. Price \$235.

OPTIONAL ACCESSORIES: **CMPO8** hand-held mic. \$18.50; **AC Charger** \$9.00; **Mobile Adaptor** \$9.00.

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FRED BAIL VK3YS  
JIM BAIL VK3ABA

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	W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147	Ph. 624 2691
S.A.	FARMERS RADIO PTY. LTD., 257 Angas St., Adelaide, 5000	Ph. 223 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph. 60 4379

substituting a switch pot for the relative output pot and running the active return lead for the relay control through this switch it was possible to break the relay line from the front panel control without adding an additional switch to the front panel. Later Yaesu linears overcame this deficiency by adding an Operate/Standby switch.

Even with the above modification added, or where it is a standard feature, another problem can still occur. If the linear is switched off at the power switch, but the

Operate/Standby switch is not in the Standby position, the linear relay will operate as soon as the transceiver PTT switch operates. This is due to the charge held by the capacitor in the relay/bias supply being sufficient to operate the relay. Of course the relay will drop out almost immediately as the relay discharges the capacitor.

I have often found sufficient charge in the capacitor to close the relay even though the linear may not have been used for several days. A very simple solution to

this problem can be made in a few minutes. Add a 12 K ½ W resistor across the relay supply electrolytic. This value was chosen as it is high enough to have no practical effect on the operating voltage to the relay (remember that this is also the bias voltage in Yaesu units) but will discharge the electro within about two minutes of the power supply being turned off. After this time if the transceiver operates in the transmit mode the linear relay will not go "clunk" even if the Operate/Standby switch has been left on. ■

## THE POOCH WHO MADE THE HAM SHACK HER KENNEL

Alan Shawsmith VK4SS  
West End, Brisbane 4101

**A million years ago when man and dog roamed the savannahs in the struggle for survival they found the need for each other. We are now mostly urbanised but the bond between man and his best friend remains as strong as ever. I've been lucky to have a had a smart dog at my side all my life. Let me tell you of the last one.**

Six years ago, there was a knock on the back door. The little girl from across the way stood holding a wriggling bundle of jet black fur. "Mummy says would you like a puppy. She's a girl dog the . . .", she murmured apologetically.

Since losing my last treasured hound, I swore 'no more dogs'. But, as two dark chocolate eyes stared at me from under short drop-down ears, the resolution just faded away.

It turned out to be a case of mutual love at first sight and the relationship developed far beyond my expectations. The family named her MARTI: a Kelpie, black Coilie cross, she grew to medium size — about knee-high — and was strong, energetic and intelligent. Like a woman's hair, her coat was her crowning glory — shiny, thick and black and wavy. Right from the start she was responsive to my obedience instruction — except for one thing — her sleeping quarters.

I built a roomy kennel. She disdained it utterly. Several other places were tried: no go. She had already picked her own spot . . . under the shack divan. This was fine by me but it did present the occasional problem of having to leave the room unlocked. Also the YF complained that the corner was a little 'doggy' at times.

In retrospect I'm now quite certain the Ham Shack had some special significance for her, but the affinity was never solved. Maybe it was the only place in which she felt safe and secure — or was it just my company. Perhaps she was tuned in some way to that cacophony of sound emanating from the rig: It could be that 'imprinting' occurred when she was a very young pup. As long as I stayed DXing or camped on the divan, she stayed too. However, if I went to the typewriter to work, she usually got up and left.

Certain regular habits grew into our relationship. I am an insomniac who sleeps fitfully after midnight, so DXing was the natural solution: but as Marti grew, I found she took over the role of an alarm clock. Somewhere around 2 a.m., my legs through the bed covers would be bunted and nosed. If I was slow to respond a couple of slobbery licks across the face would bring me to consciousness. Next we raided the frig together. She would sit in the beg position and share my snack. Then it was off to the shack where she'd scramble under the divan, turn herself around so as to view the scene — and wait.

Being a CW man, DXing was mostly done in silence but when a good one was snared, I'd share it. "How about that, old girl, 599 from a 9Q5 on 3.5" The response was several thumps of the tail onto the floor from under the bed.

In aural acuteness and discernment, Marti was as sharp as a tack. Teaching her to respond to her name in code, as has been done elsewhere with hi-IQ dogs, would have been a piece of cake. I simply never thought to try it.

Visitors to the shack were quietly growled at, until I gave her the nod, whereupon she emerged and extended a paw in the best Ham spirit of welcome and friendship.

Marti had one great joy and passion — playing soccer with the local kids. In the same manner a sheep dog can pen recalcitrant sheep, so Marti could nose, bunt and swerve a soccer ball around half a dozen feet into the net, with a speed that would have amazed even Pele. Of course, she changed sides when the fancy took her.

On each Friday, a sports day at the nearby school, she was always missing from home. Finally, a note arrived from the headmaster — 'we all love Marti, but every game is brought to a standstill. I must ask you . . .'

Our relationship came to a sudden and traumatic end. I heard the car zoom past — and the sickening crunch. I heard it speed on. Then my ten year old son was racing down the path, screaming "Dad, Dad —"

In the prime of her magnificence, we buried Marti at the rear of the allotment,

amid trees and where the grass is lush and where she used to lie panting madly after fun and games: a place that seemed to suit her free-running nature — within sound of the Ham Shack, the kids' play area and the punt of a football.

Now it's mostly work at the 'mill' rather than DXing. But the Shack, shared and warmed for so long by a pooch who helped me make it through the night, can never be the same again. It's not the solitude but the cold touch of loneliness . . . even after a year . . . and when I finally settle on the divan for a pre-dawn doze, I am wont to reach down for that warm, luxurious coat . . . ■

## AN OT BRASS POUNDERS LAMENT

by Alan Shawsmith VK4SS

(Adapted from the original poem 'My Key and Me' by F. Burage — Published in 'SPARKS' 1974).

*When I was young I dreamt my dreams;  
Made my plans and plotted schemes.*

*A W/O I would be.  
My key and me.*

*In lieu of fun and women's looks.  
I bought and studied wireless  
—and I got my ticket  
My key and me.*

*Intent to visit foreign lands.  
Was another of my plans.  
With ships from sea to sea.  
My key and me.*

*But before the strife that turned to war.  
I was posted 'on the shore'.  
And did not go to sea.  
My key and me.*

*I met a girl and soon her wed.  
So settled down, 'docked' instead.  
No longer was I fancy free.  
My key and me.*

*The children came and grew and went.  
And tho' it's been a life well spent.  
Duty set the destiny.  
Of my key and me.*

*The years have simply sped away.  
But still it seems like yesterday.  
A dreamer, young and fancy free.  
My key and me.*

*Too late to muse, 'It only I —'.  
Life's winter season is close by.  
Now very soon there'll only be.  
My key NOT me.* ■

# ELIMINATION OF OVERLOAD ON THE FT101B

Arn van der Harst VK5XV  
21 Dudley Crescent, Marino, SA 5049

It can be said that the FT-101 has been and still is one of the most popular transceivers available in the Yaesu range. With its many advantages, however, it also has some shortcomings, two of which may be cured easily.

One fault is overload of the second receive mixer resulting in signals, usually high speed teletype signals, which appear on the amateur band but should not be there in the first place. This problem has been fixed by replacing the second receive mixer with a MC 1496 integrated circuit acting as a double balanced mixer.

The second shortcoming, which is easier to recognise, is severe overload on extremely strong signals. It was not until I had the chance to try out the FT-201 that I started to realise what the trouble was. The FT-201, using the same RF amplifier (3SK40M) showed no signs of overload at any stage. Looking at the circuit diagram I found that the AGC system was different and seemed to be much better than the FT-101B. As overload and cross modulation is mostly due to the front-end it was logical to conclude that the AGC voltage range to the RF amplifier was not enough. With the help of John, VK5AV, we devised an AGC amplifier circuit using the very versatile uA 741 op amp.

Referring to Fig. 1 may give you some idea of its operation. R1 adjusts the offset balance of the uA 741 op amp and hence the output of the device as seen at pin 13 of the IF socket. R2 adjusts the overall gain of the op amp and thus the AGC voltage swing between maximum signal input and no signal input.

The output of the op amp goes to pin 9 of the RF socket. An easy way to achieve this is to remove the only wire at pin 13 of the IF socket, which goes to pin 9 of the RF socket, and solder this wire to pin 18 of the IF socket which is an unused pin on all FT-101Bs. Then connect the output of the op amp to pin 18 of the IF socket.

The uA 741 with associated resistors was built on a small piece of matrix board, then sealed. Four wires protrude from it, connected to the appropriate points.

### ADJUSTMENTS

Before installing the device measure the AGC voltage at pin 13 of the IF socket under no signal condition on 14.2 MHz. This should be around 7.8 volts measured with a 20000 ohm/volt multimeter. Connect a signal generator at the antenna input and increase the input until there is 4 volts at pin 13 of the IF socket. Disconnect the wire from pin 13 and solder it on pin 18 as described earlier. Connect the device to the appropriate points as indicated on

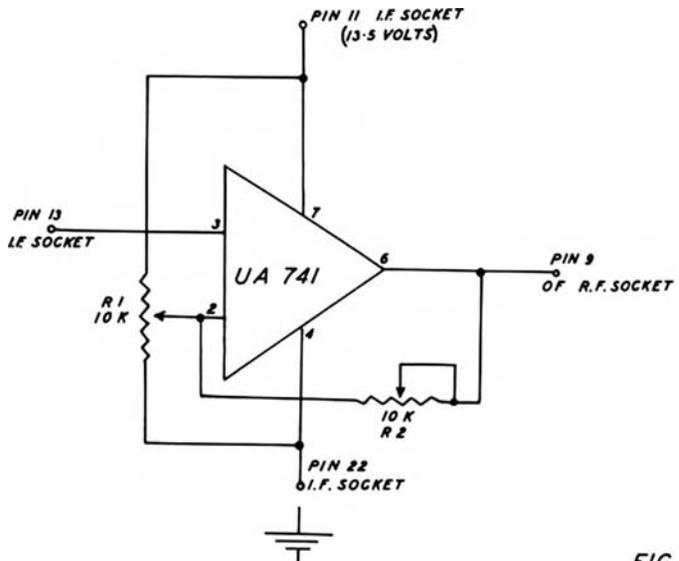
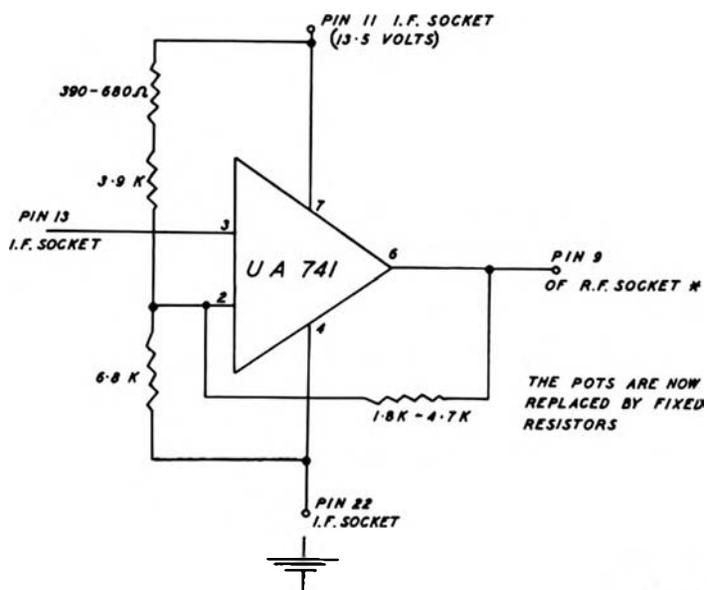


FIG 1



THE POTS ARE NOW REPLACED BY FIXED RESISTORS

FIG 2

\* VIA PIN 18 IF SOCKET - SEE TEXT

Fig. 1. Set the pre-set pots half way. Switch the set on and measure the AGC voltage again at pin 18 of the IF socket under no signal condition. If different, adjust R1 until the reading is as in its unmodified form. Now re-connect the signal generator which is set at the previously calibrated level. Measure at pin 18 of the

IF socket and adjust R2 until the reading is 2.8 volts. Re-check the AGC voltage at pin 18 under no signal condition and make sure it is the same as in the unmodified condition. These two controls, R1 and R2, do interact a small amount. Fig. 2 will give a guideline of approximate fixed values replacing the pots. Re-calibrate the

S-meter to give S9 at 14.2 MHz. Seal the device and all your overload problems are over.

I would like to thank John VK5AV, and his colleagues for allowing me to pick their brains, and Lloyd VK5QI who with his untiring patience did all on-air tests with me. ■

## Try This

with Ron Cook VK3AFW  
and Bill Rice VK3ABP

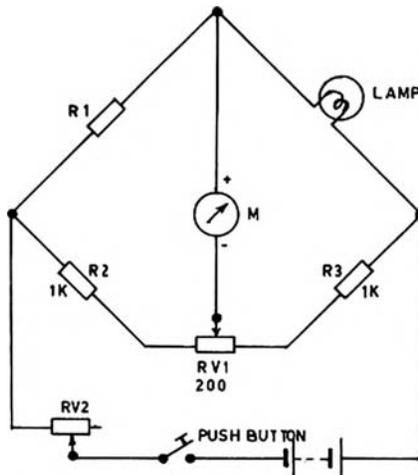
### A SENSITIVE VOLTMETER

B. L. McCubbin VK3SO

The sketch shows the circuit of a sensitive voltmeter useful where rechargeable batteries of the 'Alkaline' or 'Nickel Cadmium' variety are in use.

A low current pea lamp is used as a current sensitive resistor in a conventional Wheatstone bridge circuit.

The value of R1 is chosen to match the resistance of the pea lamp when the filament has a barely visible glow.



R2 and R3 are of equal value, and should be about 1k ohm.

RV1 is 200 ohms and RV2 is a range adjustment which in some cases may be omitted. (Try 500 ohms for RV2 for a start — Ed.)

The meter used in the original circuit was 500 uA.

To avoid unnecessary load on the battery, a pushbutton of the 'Press On' type is used.

Setting up is simple. Apply a voltage equal to the discharge value of the battery and with judicious use of RV1 and RV2, set M near zero then apply normal battery volts, M should now show near full scale. If overscale shunt it back. If the reading is too low reduce RV2 and start again. ■

## THE NOVICE, THE OT, AND

## THOSE BETWEEN

(Extracts of a Muse by Alan Shawsmith VK4SS)

AR is a non-profit service hobby whose membership approaches half a million. It knows no color, class, creed, sex, age or nationality. It is for the young, the old and all those in between.

For the OTs and the OOTs, the sun is at 4 p.m. and the memory of all that is past, lingers in the mind like embers of a fire, far spent. For the NOVICE, the sun is a crimson glow on the eastern rim and every AR dream, every beckoning challenge awaits to be fulfilled with the fresh and burning impatience of youth.

But young op. give thought, take heed, be wise — in spite of instant plug-in gear, ten sec. DX QSOs, twenty-four hr. DXpeditions and everything else that's instant 1970s — AR is an ongoing social and sharing hobby more than a series of personal achievements. So pause and share its pleasure to the utmost today — for there is only today; neither NOVICE nor OT can obtain a mortgage on it, or on tomorrow.

The untempered fingers of the NOVICE who nervously pounds new brass on new bands are like a baby's timid and uncertain steps into a hostile, strange and competitive world. Both must learn that the path to any worthwhile proficiency can only be trod after the fashion of an old style journey — one hundred miles, one step at a time. Somewhere along the way the beginner's cocoon is shed and in the case of AR, there arrives a radio Ham — or hopefully a radio man.

New men in a new age propound new ideas to fit and mould the new environment. It cannot be otherwise if AR is to survive and grow. To stand still is in real truth, to decay. This is nature's law of eternal struggle and change — the only constancy.

But in the midst of NOVICE eagerness and passion to enjoy AR, spare a thought for the OOTs who helped make it possible. The Pathfinders who did what couldn't be done — make DX inter-continental. When each QO and cycle tuned was a new adventure across the vast dimension of the unknown ionosphere. The gear they used and the routes forged were rough and uncertain but from their lonely outposts has grown a global radio village. Their wisdom and patience, tensed by experience is ever needed as much as the unbounded imagination and energy of the young mind.

Let the powers that be decree, deny; AR, the ionosphere and space near and far are for all those qualified to use it. It is part of our birthright in the same manner as are the oceans the lands and all therein. (The earth is given as a common for all men to labor and live in" — Thomas Jefferson. "The earth and its resources belong of right to its people". — Gifford Pinchot).

But while it is our right is also a privilege. A licence extended to those who are skilled and qualified — and every licence carries a responsibility. Our conduct,

NOVICE and OT alike is rightfully under close scrutiny. It is not enough to be the good Ham — to be worthy and of good intent. We must be seen to be the good Ham. The banner of service and commitment needs constant raising and who better to do it than the NOVICE coming on. If this sounds like syrupy idealism in a world where nothing is sacrosanct or seemingly has final value — ponder a while. That which is without ideal, standard, ethic or code, has little worth having and unlikely to persist.

Now, a new age challenge confronts AR. Territory that is rightfully any man's is threatened. Ultimately there is no security, only opportunity. This is the order of things; as yet there is no other way. Our territorial imperative is basic but like the Romans we persist in too many games while the enemy gathers. Superlative rhetoric by our chosen representative in the coming world forum will not avail unless proof of our substance can be amply demonstrated. This is the NOVICE's most urgent role — give AR a new look.

The OOTs have long looked at the heavens and pondered. Now, for the OTs of the future, the NOVICE, the greatest adventures and achievements are at hand. SSTV, the expanding world of VHF and maybe galactic DX. Because of innate curiosity and instinct for challenge, DX for man is a natural. So long as there is a wooded hill, a mountain spur, an ionosphere, a distant star, someone will dare to explore, to cross, to know what lies beyond. ■



# NEWCOMERS NOTEBOOK

with  
Rodney Champness VK3UG  
and David Down VK5HP

## NOVICE TRANSMITTER PART 5, AFTERTHOUGHTS

The transmitter as described in the previous 4 parts is quite functional and needs no modifications to it to overcome design inadequacies. However, builders of this transmitter, or the complete transceiver, may care to try some variants of the original design to suit their particular requirements. The transmitter can easily be put onto 160 metres, slight variations in the CW keying system can be tried, several other types of modulator can be used, and the complete transceiver can be wired so that an external receiver can be used in lieu of the inbuilt one, when deemed desirable. Some of these variants have been tried by the author and do work, the others will work but may require minor variations in component values or voltages applied. The transmitter as was originally described was designed on paper, put together, and tried. Very few components needed alteration.

## VARIATIONS IN THE CW KEYING CIRCUIT

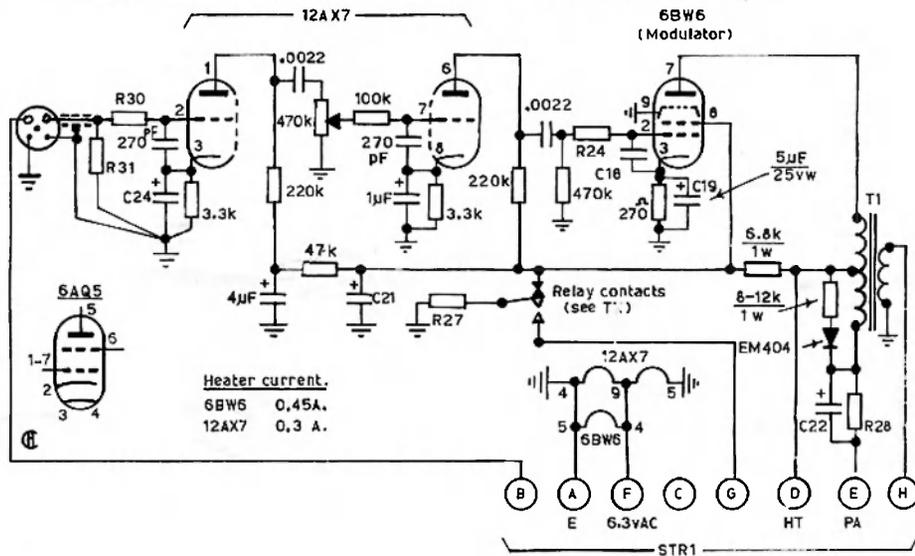
Ken VK3GK advised the author that the CW signal appeared to have a thump on the make. The design of the key click filter was of necessity a compromise as this is in essence a simple transmitter. To reduce the thump R8 was increased from 220 ohms to 410 ohms (2 x 820 ohm 1 watt). This is designed to slow the discharge of C4, and the attack time should now be about 10 milliseconds. It is not absolutely proven that this variation did in fact cure the problem. The effect is, however, minor and this change in value of R8 is not essential. It does have a side effect in that the PA current is kept to a more reasonable figure should the crystal fall out or cease to oscillate. With the increase in cathode to earth voltage drop which is now 21 volts it is in order to decrease R28 to 500 ohms 2 watts (2 x 1000 ohms 1 watt). This increases the total input of the plate circuit to nearly 11 watts and 8 watts output can be expected on AM with some 6GV8 valves. The input on CW remains at about 14 watts. The overall efficiency of 6GV8 valves varies slightly and efficiencies between 65 and 80 per cent can be expected.

The semi-break-in circuit can be slightly improved by replacing R14 with a resistor of 2.7 to 3.3 kilo-ohm. This speeds up the pull-in of the relay by a few milliseconds.

## MODULATOR VARIATIONS

The modulator as it stands is quite satisfactory and will fully modulate the RF section. It has been found that the modulator as previously described has just sufficient gain and the gain control is set in the flat out position at all times. The 6AU6 can be replaced with a variety of valves and prob-

## ALTERNATIVE MODULATOR FOR 10 WATT TRANSMITTER.



ably the best ones to use, that will give increased audio gain and are readily available, are the 12AT7 and 12AX7; the 12AU7 has insufficient gain to be useful in this role. The gain of the 6AU6 in the circuit previously described is about 320, the cascaded stages of the three valves mentioned above are about 900, 5000 and 120. Fig 1 shows the circuit diagram for this new modulator using a 12AX7 and a 6BW6. A 12AT7 can be used in place of the 12AX7 and in most instances is a plug-in replacement.

The cathode resistance might be reduced to 2.2 kilo-ohm for more accurate biasing. If you have a high resistance multimeter you can check the plate voltages of each of the triode stages and adjust the cathode bias resistors so that the voltage drops across the plate load resistors (0.22 meg ohm) are the same as the drops across the valves.

In Fig 1 the modulator output valve is shown as a 6BW6, but a 6AQ5 or a 6V6GT can be used as they are direct equivalents. These valves have less gain than the 6BQ5 so need the extra gain afforded by the twin triode preamplifier section. Other suitable output valves are 6CW5, 6CZ5, 6L6G, 6Y6G, etc. These latter valves would probably require different grid bias to the previously described modulator valves.

The cathode resistors will therefore be different to those originally specified. The plate and screen voltages may also be different.

It will be noticed that a diode and resistor have been wired across part of the modulation choke. In the original design this was not found to be necessary, but is a desirable addition to the circuit as it assists in preventing over-modulation in the negative direction. The common name for this diode/resistor network is a negative cycle loading circuit.

Next month will conclude the description of the transmitter.

## ERRATA

Regrettably some errors crept into the November 1975 instalment of the Novice Transmitter.

In paragraph 3 several components have the wrong numbers quoted and should read as follows: C14 is C23, C15 is C24, R18 is R30 and R20 is R32.

A few points have come to my notice which may be quite clear in the layout description in the December issue but can do with mentioning again.

Earth the centre spigots of each valve as close as practical to the valve socket. Place each of the valve sockets in at least an inch, possibly two inches from the edges of the chassis so that wiring does not become crowded near the chassis edge. The general layout of each section of the transmitter should approximately follow the layout of the schematic diagram.

In the October issue page 25, the third sentence of the last paragraph on the left side of the page should read . . . HT supply via 7:9 and the HT relay contacts.

## REMINDER TO UNFINANCIALS

- If you have not yet paid your 1976 subscription, please note this reminder for personal attention.
- If you have not received any subscription notice please write for a duplicate.

Inserted on behalf of the Divisions  
by the Executive, P.O. Box 150,  
Toorak, Vic. 3142.

**An AR Special**

# A REVIEW OF THE G3LLL RE SPEECH CLIPPER



The G3LLL clipper is designed and produced to be compatible with the popular FT101 series of transceivers. It is of course not usable with the new FT101E as this already has an RF speech processor included.

Full instructions are included for the simple wiring changes needed to hook it up to the 101. It would seem that the unit might be adaptable to other Yaesu transceivers and transmitters that use the same IF frequency of 3180 kHz. However the instructions supplied only apply to the FT101 and FT101B so adaptation to other rigs would be entirely up to the individual.

We received our unit direct from the manufacturers, G3LLL Holdings Ltd., from whom the clippers can be obtained for £45 sterling, air post paid. G3LLL Holdings Ltd. are also current advertisers in this magazine and readers are referred to this.

Firstly we will look at the claims made for this unit by the manufacturers. They state:—

At last a distortion-free radio frequency clipper that really works. The LLL's '101 RF clipper is designed ONLY for use with the FT101 — Blow the Expense — no compromise design. The input filter itself costs nearly £20 and matches the side band filter fitted to the FT101. All FET design using dual stage low level, low impedance clipping. A diode switch on the input control in conjunction with a controlled FET stage adjusts the gain independently on receive and transmit. The gain on receive is set so as to give a boost of two 'S' points. The extra sideband filter gives a noticeable improvement in adjacent channel selectivity, and as the gain is added after the filter, this gives improved AGC action with an apparent improvement of cross modulation performance. The LLL's RF clipper must not be confused with normal clippers, which often are no better than a really good microphone. Run a Kilowatt Mobile? Better than a Linear and a quarter the price".

Well so much for the claims. Now let's see what the clipper will actually do in practice. Included with the clipper was a new microphone insert, an ACOS crystal unit. It was recommended that this be substituted for the dynamic insert in the FT101 microphone. It must be admitted that the normal 101 microphone lacks high frequency response and that the substitution of the crystal unit could be worthwhile.

To connect the clipper to the 101 requires the running of coax cable from the external VFO socket to the IF board socket. The coax is a special low loss type and is supplied with the clipper. If the clipper is disconnected it is necessary to insert an octal plug with a shorting connection to restore normal operation.

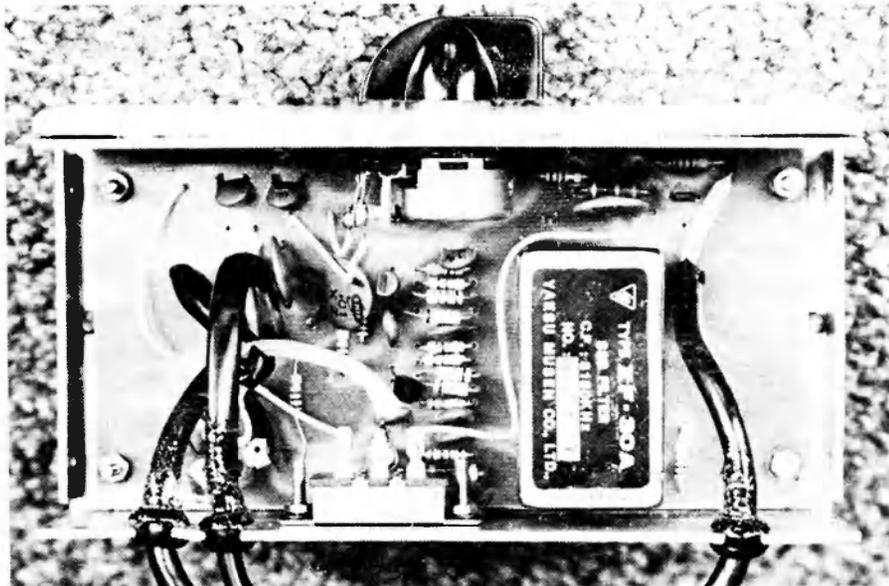
Before proceeding with a resume of results and observations, it must be pointed

out that the use of a clipper or compressor of any sort, this one included, does not increase the actual peak output of a transmitter.

Only a suitable linear amplifier can do this. What a clipper can do is bring up the average output audio level so that it more approximates the peak. The less distortion introduced in the process the better. Before actually testing the G3LLL clipper on air a few points were noted.

Firstly if an external VFO is used, some form of adaptor would have to be made up to accommodate both the clipper and the VFO.

Next, with the clipper disconnected and the shorting plug in, the receiver gain drops by about two "S" points. As the 101 normally has plenty of gain this may not prove a great disadvantage. Also, the IF output socket on the rear panel of the 101 changes



# WHAT IS THE WIRELESS INSTITUTE OF AUSTRALIA

The Wireless Institute of Australia, to give it its full name, is really a combination of eight separate self-governing bodies which are registered companies under various State Corporate Affairs Acts.

Each of the eight bodies has its own Constitution and Rules. In practice many of them have Constitutions which are almost identical to one another having been devised nearly 30 years ago in the form of a Uniform Divisional Constitution.

In each State there is a Wireless Institute of Australia as well as one in the ACT. Each one is known as a Division and looks after amateur radio affairs within the State where it has its headquarters. All the headquarters are in the capital cities except Tasmania which has a special Constitution of its own and three branches within the State.

Every member of the WIA is a member of a Division — ordinarily the one of the State in which he lives. The Federal Wireless Institute of Australia has seven members — the Divisions — but is not itself a Division. The Federal WIA in its present form was set up by the Divisions and came into being early in 1971 to do those things which the Divisions, by agreement, authorised it to do — almost wholly those things which were Australia-wide or which were international and external to Australia.

The Federal WIA has its own Constitution and is registered in Victoria where it has its headquarters so long as the headquarters of the Radio Frequency Management Branch has its headquarters here. Its name is "The Wireless Institute of Australia" as distinct from those registered in the various States and ACT which are named "The Wireless Institute of Australia, Victorian Division", "The Wireless Institute of Australia, New South Wales Division", etc.

The affairs of the Federal WIA — let us call it the WIA to save words — are controlled by the Divisions acting together in

the Federal Council. This Federal Council is made up of a representative, called the Federal Councillor, from each Division. Normally the Federal Council meets once each year at the Federal Convention.

The day to day affairs of each Division are managed by a Divisional Council (commonly of 10 members) which is elected by the Divisional membership annually.

The day to day management of the WIA is done by the Executive assisted by a number of sub-committees. The members of the Executive — six altogether — live in Victoria but are not members of the Federal Council. The Chairman of the Executive is the Federal President and he is usually the Chairman at Federal Conventions. The members of the Executive are elected at the Federal Convention.

When the WIA was formed the Federal Council (i.e. each Division's Federal Councillor) decided that, as it had been decided by all the Divisions that there was a great need for a central office function, Central Office must take over, on behalf of the Divisions, all the work involved in subscriptions and membership records. Then it came about that the Executive office does this work (through EDP) as well as acting as a central point for the Federal Councillors and a host of co-ordinating and other work in the Federal sphere.

In broad terms the Executive carries out the policies laid down by the Federal Council and it is also responsible for the small Executive office in Toorak which is managed by the Secretary of the Company.

The Executive is also responsible for publishing the journal "Amateur Radio" which is wholly owned by the Federal Council. In practice, AR, as we call it, is managed by a Publications Committee under the control of the Editor. This Publications Committee also looks after the publication of the Call Book and the Mag-pubs operations.

Because all the executives of the Insti-

tute at Divisional and Federal levels are volunteers, it is only natural that the paid staff of the Executive office is called upon to perform a wide range of duties, including ghost writing, exchange of information at all levels, preparation of reports, briefs and so on, much of which would have been done by the various executives themselves if they had formed part of a commercial organisation. The Secretary arranges interviews with Government officers and other persons and normally is in attendance for the purposes of co-ordination. He also attends Federal Council, Executive and other WIA meetings, all of which ensures a continuous pool of knowledge, documentation and information to facilitate the operation of the WIA.

Channels of communication by individual members are direct to their Division unless some special subject requires otherwise — for example subscriptions to Executive journals, comments direct to a Federal body, requires you write to the Executive office only on Divisional matters (for example, membership grading) delays will occur because your letter will be sent to the appropriate Division to deal with.

The central WIA's Executive is assisted in its day to day work by a number of Federal sub-committees or persons expert in specialised fields. The Publications Committee is one, the Project Australis Group, VHF/UHF Advisory Committee and Federal Repeater Committee are others.

Other fields are covered either by "Co-ordinators" at a central level — Intruder Watch, YRCS, EMC — or "Managers" — Federal Contests, Federal Awards, Federal QSL, SWL Awards. Additionally, there is the Federal Historian and the IARU Liaison Officer. In theory all these sections correspond with their Divisional counterparts but there is considerable flexibility depending on the subject.

*Next month we will examine various matters in greater detail.* ■

from a wide band point to a narrow band output. If you happen to be using a pan-adaptor such as a Heath SB 620, some delving into the 101 will be necessary to restore the required wide band pass signal.

With the clipper in circuit, the receiver performed somewhat better than original. The overall receiver gain can be adjusted with a preset in the clipper and the overall increase could prove very useful on ten metres for instance.

The increased selectivity was not really noticeable, however it no doubt would be with the earlier 101's using the older six pole filter.

When first used it was noticed that the action of the noise blanker was not quite as

effective. It was realigned according to the Yaesu instructions which restored it to normal — almost. A few odd things were found for which no explanation can be given. In a few cases, switching the blanker in actually increases the noise. This occurs in about 25% of the times the blanker is used.

On transmit, the clipper proved to be most effective. The weaker the report, the better the clipper performed. On an average the apparent increase was about two 'S' points with no audible distortion or loss of quality. Watching the output on a Heath SB610 monitor scope showed no sign of flat topping but instead of the usual Christmas tree pattern, the audio peaks were all

reaching full output.

There is no doubt that when signals are weak, the G3LLL clipper will make a very worthwhile improvement with no loss of quality.

In conclusion it is a pity that the finish does not match the 101. While it is neat in appearance, the hammer tone case and white panel look out of place. Also, the advertising photos show the unit sitting under a 101, but it will not fit there unless the front feet are lengthened. It will sit on top but the stiff connecting leads make it hard to position.

Run a Kilowatt Mobile? Well not quite, but very worthwhile increase in readability for sure. ■

# VICTORIAN RADIO BRANCH SUPERINTENDENT TALKS TO AMATEURS

The following is a resume of an informal lecture given by Mr. Robert (Bob) Crowe, the Superintendent of the Regulatory and Licensing Branch of the PMG (Radio Branch), to approximately 80 members at the Moorabbin and District Radio Club's rooms on 17/10/75.

Mr. Crowe has given his permission for the publication of this material.

Although the details given here relate mainly to Victoria, the Publications Committee feels that due to the interesting subject discussed, we should print the details in AR.

Mr. Crowe commenced by stating the 3 prime functions of the Radio Branch.

They are:—

- (a) issuing of all licences for Radio transmission and reception for both commercial and amateur radio operators.
- (b) providing monitoring service of all HF and VHF frequencies to ensure that specified frequencies and tolerances are maintained.
- (c) ensuring that licence provisions are met.

It is interesting to note that a licence is required for both transmission and reception of signals that do not emanate from commercial broadcasting.

Severe penalties are handed out for breaches of the wireless telegraphy act, and at the present time it is pleasing to report that the courts are taking a more serious outlook on infringements.

As a State Superintendent, Mr. Crowe comes under the direct control of the Federal Minister. He cannot refuse a qualified applicant a licence. However, in cases of doubt, the Minister has absolute discretion.

Mr. Crowe has a mandate to inspect all commercial and amateur radio stations (through the RI's in the field).

A further function of the Radio Branch is to give type approval of Commercial equipment for two-way radios.

## THE COMMERCIAL SCENE

Due to the many hundreds of VHF/UHF commercial stations operating in and around Melbourne, it is becoming increasingly difficult to locate a frequency for a new commercial station applicant, which does not cause interference to other stations.

The Department is helped in this regard by the use of a computer which lists the frequencies in numerical order of these stations likely to be interfered with by the operation of a new service.

The Radio Branch also surveys marine installations annually. Mr. Crowe was dismayed at the apathy of a few of the commercial fishermen and their disregard for the equipment installed in their vessels.

The monitoring station at South Morang, located 13 miles north of Melbourne, is situated on an excellent site and is capable of monitoring all transmissions from the Melbourne area and surrounding country districts. Advice on technical deficiencies is given together with investigation and diagnosis of interference. Frequency measurement is also carried out at South Morang.

## INTERFERENCE

A major activity of the Radio Inspector is the investigation of interference to television reception. A large field staff works day and night to locate interference and resolve complaints.

The main cause of TVI is the State Electrical Reticulation System. (HF amateurs need not be told of the problems caused by residing close to 22kv lines). The introduction of colour TV has doubled the RI's work in that the slightest 'flicker' on the colour set now makes the set owners aware of a possible problem. Naturally, a call is made to the friendly RI.

The Radio Branch always confirms SEC interference by checking poles. An SEC crew is notified and the problem is usually overcome. Sometimes the interference problem recurs with the result that a new investigation has to be instigated.

The commercial operator on HF cannot be given immunity to electrical interference due mainly to the wide and varying causes of interference in this band.

The motor vehicle car radio design area is slowly including proper suppression, however, no set standards have been drawn up.

Solid state technology makes electronic devices vulnerable to electromagnetic radiation, and commercial equipment, stereo amplifiers and electronic organs etc. are the main sufferers.

This is due mainly to the lack of suitable design to alleviate the problem. The Radio Branch recognises this fact, and there has been a gradual acceptance amongst the manufacturers to include the necessary interference rejection circuitry in new designs.

## THE AMATEUR SCENE

Mr. Crowe is not an Amateur Operator — his attitude towards amateurs is "neutral". He regards the amateur service as a responsible and self-regulating body. We are a cross section of the community, reasonable people, and have our own way of disciplining those who infringe the rules. For this we are highly respected.

Amateurs are recognised (in higher official circles also) as a vital link in times of disasters. The WICEN organisation is also well respected.

## WARNINGS

After the above complimentary remarks, Mr. Crowe instilled some "vinegar" into the discussion.

(1) From reports and observations over the past couple of years, it is apparent that the 'technical' part of the amateur service had now largely disappeared. Satisfaction is now being gained from the acquisition of Commercial equipment which leads to a 'Social contact' type of transmission.

This point was hotly disputed by several members, and after much discussion it was re-asserted that this was the type of report his office was receiving.

There were no particular criticisms levelled in this regard and it is reflected as a 'sign of the times'.

(2) The WARC to be held in Geneva in 1979 means that the entire spectrum is to be modified by all representations of the nations attending.

As far as the Amateur Service is concerned, we need solid national representation to maintain our frequencies and privileges.

*We must remain alive and alert*

(3) *Repeaters* — Mr. Crowe is not sure if we can claim that we are in complete control of our repeaters. The licensee is fully responsible for all transmissions emanating from a repeater, and he must be able to satisfy the Department that he is able to control it. That is, switching off the repeater in the event of illegal operation or obscene language. If the licensee lives a ½ hour drive from the repeater site, he is *not* in control of it as far as the Department is concerned, and *will not* be allowed to continue under these circumstances.

Repeaters were originally introduced for mobile to mobile use, and in commercial installations must be able to be switched off by land line. The view is taken that illegal operators could put mobile transceivers in vehicles and run unlicensed services or criminal activities through commercial or amateur repeaters.

Illegal mobile operators are most difficult to detect and this is the main reason for the insistence on land line control.

It is a problem that we as amateur operators must resolve ourselves. If an amateur repeater service is broadcasting illegal or obscene material on a continuing basis, we will get no marks from the community at large if we cannot or will not do anything about it.

## AMATEUR TVI

This is a problem which is dealt with mainly by ourselves. The amateur service does not have 100% protection in this area because it is a 'Hobby Service'. The solution is to switch off the transmitter and investigate, and only re-transmit after the problem is cured (see rule book). Make sure that solutions are dealt with amicably.

## SUGGESTION

Would the amateur fraternity be prepared to limit power to say 5 watts, and then seek allocations in all of the bands?

Utilise and rely on a high degree of technical expertise in regard to antennas, feeders and bandwidth? Make a feature of minimum power — maximum communication, write articles and publicise it in all Amateur Radio journals?

**Comment from floor**

Australian amateurs are doing just that with low power and high efficiency, but HF band conditions are poor for low power at the moment.

**NOVICE LICENCE**

The first novice exams were expected to be held soon. The delays have been caused by Industrial action within the Department and have now apparently been overcome. The industrial action was of a matter entirely divorced from Novice and amateur exams.

**PIRATE ACTIVITY**

Amateurs are expected to set examples to newcomers to alleviate pirate activity.

The Department is very much aware of pirates, particularly in the 27 MHz band, and is active in its prosecutions. Approximately 2 or 3 pirates are prosecuted each week and most of the high power operators have been cleared out from Victoria. The 5 watt base operators being particularly vulnerable.

REPORT BY VK3UV.

# L-NETWORK COUPLER

## FOR 20 METRE END FED WIRE ANTENNA

C. Hagoort VK5YH  
16 Gilbert St., Ingle Farm S.A., 5098

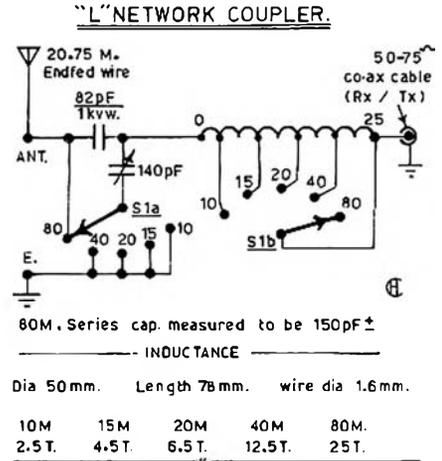
This antenna tuning unit is specifically designed for those who have only limited space to put up an antenna on the HF bands.

It should be used with an end fed wire antenna cut to a length of 20.75 m. The antenna is current fed on 80 m and voltage fed on 40, 20, 15 and 10 m. A good earth is required to ensure that the antenna works on 80 m.

The antenna tuning unit matches the antenna to 50 or 75 ohm co-ax cable. The required band is selected by a 2 pole, 5 position switch which also switches the

140 pF tuning capacitor. Series tuning is required on 80 m, and parallel tuning on the other bands. The 82 pF mica capacitor serves a dual purpose. On 80 m it is connected in parallel to the 140 pF tuning capacitor, and on the other bands it merely works as a coupling capacitor. This antenna system has been in use at the author's QTH for several years and the results on 80 and 40 m are very good. It works satisfactorily on all bands, but a beam would be a better proposition on 10, 15 and 20 m.

At this QTH the antenna is strung up at



an angle of about 45 degrees. The wire runs from the transmitter in the spare bedroom to the eaves of the house and then to a 15 m high telescopic tower in the backyard.

### MAGAZINE INDEX

with Syd Clark, VK3ASC

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**August 1975**  
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**August 1975**  
160 Metre Linear Amplifier; FM Alignment Techniques; Programmable Keyer Memory; Solid State 432 MHz Linear Power Amplifier; Adjustable Voltage Regulator IC's; Calibrated Keyer Time-Base; Latch Circuit for Transmitter Control; FET Controlled Battery Charger; QRP Transmitter; RTTY Audio-Frequency Keyer.

**QST October 1975**  
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**73 MAGAZINE September 1975**  
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**RADIO COMMUNICATION October 1975**  
Digital Frequency Readout for the KW2000A; The Three Element Zygi Beam Aerial; A 160 m SSB Transmitter Using Active and Passive Phasing Techniques; A Wavemeter for VHF and UHF; Technical Topics — Commercial VHF Trends; 144 MHz Converter; G30TK VLF Balanced Mixer for SSB Generation; Extreme Low Angle Sites; D-MOS Dual-Gate FET's; TTL Oscillator; More on the PALO.

**BREAK-IN September 1975**  
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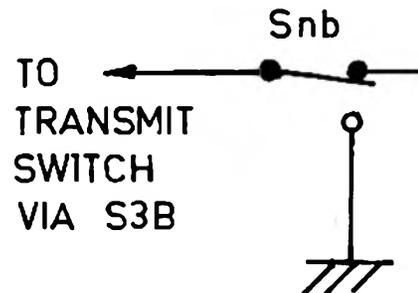
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AMENDED SWITCH CIRCUITRY  
ALTER YOUR COPY NOW



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## QSP

### UNITED WE STAND

Someone's eye caught a little item in Nov. '64 QST which is as apt today everywhere including the U.S.A. It read "An insistent inquiry from an individual amateur about the 50 watt peak power limit on 420-450 Mc led F.C.C. to change the limit to 50 watts input, actually a reduction of permissible power — again underlining the desirability of raising questions about regulations through the League rather than direct to the Commission".

### PLANNING PERMISSION FOR TOWERS

A well known Melbourne member shifted QTH a year or two ago to a house in an area zoned "Reserved living". His application to put up a mast in his garden was refused. The grounds of the refusal were stated to have been that the proposed use was not an appropriate one for the land because of its effect on the amenity of the adjoining properties. With the assistance of his Division in relation to legal representation he appealed to the Town Planning Appeals Tribunal. It appeared as if the opposition to his appeal was immense — legal representatives, almost in droves, appeared for all concerned except the "objectors". The amateur won his appeal and one of the paragraphs in the appellate judgement — appeal X74/1023 is the reference for anyone else affected — is very interesting indeed and reads —

"It seems to us that an amateur radio station conducted as a hobby in and from a detached house would be part of the normal use of such a house. We do not think a planning permit for the proposed mast is required though a building permit under the uniform building regulations would of course be necessary. Whether or not a permit is required, we are, however, of the opinion that the proposed mast would have very little effect on the amenity of the neighbourhood and any slight adverse effect which it may have, is in our opinion more than compensated for by the community benefit given by this radio station".

### I.T.U.

The June 1975 issue of the influential Telecommunications Journal of the I.T.U. contains an important editorial by the Secretary-General of the I.T.U., Mr. M. Mill about the I.A.R.U. Region 1 on its 50th anniversary and concluding with some sage comments about W.A.R.C. 1979. Mr. Mill is not himself a radio amateur but it is very encouraging to read of the obvious interest in the subject by such a distinguished person.

### RADIATION HAZARDS

The editorial in Sept. '75 Ham Radio is interesting in pointing out the rising concern over the possible harmful effects to living tissue due to heating by electromagnetic radiation in the frequency range from 10 MHz to 100 GHz. Various governmental and industrial organisations involved in establishing radiation safety standards, it states, have recommended exposure limits referred to as Radiation Protection Guide Numbers (RPGN) which, at the present time has the value of 10 milliwatts per sq. cm of body area. One tenth the RF power levels (1 mW/cm<sup>2</sup>) do not have any noticeable effect.

The safe distance from an antenna is discussed and concludes with an example of a 30 ft. EME dish with only 10W input at 432 MHz being hazardous at distances of less than 18 feet.

### USA CB GEAR

Ham Radio Sept. '75 comments that continued abuses by CBers using amateur transceivers and manufacturers building "broadband" linears for the "Amateur Radio market" that just happen to deliver full output with only 4 watts input (on ten metres of course) have pretty well forced the FCC to act. This of course is believed to have some application in this part of the world also.

### COMPONENTS SHORTAGES

Amateur gear shortages have been plaguing dealers for some time and are likely to get worse before they get better. The Ham Radio comment in the Sept. '75 issue goes on to say that the major cause of the problem is the CB explosion, since many manufacturers — particularly those in the Far East — supply both the Amateur and CB markets and it pays them to put their major effort in the market with the most money.

# VHF UHF

an expanding world

with Eric Jamieson VK5LP

Forrester, S.A. 5233  
Times GMT

## AMATEUR BAND BEACONS

VK0	VKOMA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
	VK2WI, Sydney*	52.450
	VK2WI, Sydney*	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.800
	VK4RTT, Mt. Mowbrall	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	St. Leonard's*	52.400
	VK7RTX, Devonport	144.900
3D	3D3AA, Suva, Fiji	52.500
JD	JD1YAA, Japan	50.110
VE	VE1ATN, Canada	80.036
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K21RT/KG6, Guam	50.098
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHP, Mt. Stewart	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHF, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

\* Denotes addition or change.

A very welcome letter from Athol VK2ZYT indicates the VK2 beacons have been re-instated into service after a period of the air due to various problems associated with their operation, which have been corrected by Roger VK2ZRH. I also see from the VHF notes in "QRM" the bulletin of the Northern Branches of VK7 that a six metre beacon has been constructed for operation in the northern area of Tasmania. This beacon awaits its licence from the PMG. When operational it will have a power of 25 watts to a dipole aerial, on 52.400 MHz with 850 Hz FSK. Details have been included to make you aware of the possible operation of such a beacon; a starting date is not available to me, nor the callsign.

## CANBERRA NEWS

"Forward Bias" mentions the reception again of VK2 6 and 2 metre Sydney beacons in Canberra. VK1VP, VK1ZAR, VK1MF, VK1MP and VK1DA are all active on 6 metres SSB. It is also interesting to note that in Canberra at least 55 of the 142 call signs in the new call book operate on 2 metres FM; about 42 per cent.

Also in the same bulletin comes advice that the FM repeater at Orange (FRED) is now operating on new Channel 1.

## FROM MOUNT GAMBIER

News comes from Mt. Gambier that the South East Radio Group beacon for 144.650 MHz is making good progress. Chris VK5MC has the keyer working very well with FSK on an exciter unit. Ivan VK5GV has designed an electronic fail-safe unit for the beacon. David VK5ZOO has been concerning himself with the construction of the 2 metre repeater for the area, and this will probably be placed on Channel 8's microwave tower in Mt. Gambier. Possible operation will be channel 2 or 3.

144 MHz conditions have been good in and out of Mt. Gambier during November, particularly 14/11 when Trevor VK5NC worked 7 stations in Melbourne. 15/11 conditions good to Adelaide. Those worked included VK5KK, VK5SV, VK5ZPS, VK5ZPW, VK5LP, VK5ZHR and VK5NA. It seems the country boys within a 50 mile radius of Adelaide are presently setting the pace on 144 MHz SSB. Peter VK5ZPS is a regular from Adelaide, but there are not many others. What about it chaps?

## MOONBOUNCE

From the notes of Lyle VK2ALU via "The Propagator" comes news of the EME tests on 27/10 which provided a first contact with K8UOA on 432 MHz. JA1VDV was heard once more. On 1/11 VK2ZEN operated the receiving equipment to copy signals from WA6LET, using their 150 foot dish at the Stanford Research Institute in California, USA. Signals were consistently 15 dB or so above noise. The next tests from WA6LET are scheduled for 23/11/75.

On 2/11 tests were made in the early hours of the morning with a number of stations in USA and Canada. W1JAA was copied, and later VE4JX, but they could not copy the full calls from VK2AMW. A short circuit then developed in the 20 volt supply cable to the pre-amplifier at the antenna, and steady rain prevented repairs in time for further contacts.

News is also to hand that Les VK3ZUR copied WA6LET on 1/11 using a single loop yagi, 18 to 20 feet long. Chris VK5MC heard them on the same date using a stack of 4 x 13 element yagis. Much interest is centred on the next WA6LET 432 MHz test for 23/11 when it is known in VK5 that at least the following will be listening: VK5MC, VK5NC, VK5ZPS, VK5OR and VK5LP. News of the results next issue.

## GENERAL NEWS

Steve VK3ZAZ writes to say he has skeds running with two stations in Nauru, C21DC and C21KM/MM, on 52.050 or 52.020 from 1900Z each morning. Steve runs 400 watts of SSB to a 7 element yagi 80 feet up. He mentions the difficulty facing the operator of C21KM who is maritime mobile with limited space, but he has a SSB transverter and a small beam on board.

Steve also mentions a continued interest in 144 MHz SSB, and is doing what he can to promote more activity there in VK3. Hope you are successful Steve. For those not wanting to build, small SSB units are now appearing on the market for operation on the low end of the 2 metre band. A number have appeared already in VK5, so we all hope this will be a trend which will be on the increase.

A brief note from Rod VK2BQJ mentions his 1296 MHz gear almost finished, with 100 watts output. 432 MHz seems rather dead in the Sydney area. Rod mentions also that VK2AHC and VK2ZAC are likely to be making a record attempt on 2304 MHz on the weekend of 22 and 23/11, from Mt. Canobolus to Mt. Ginini. Good luck! Thanks Rod.

## SIX METRES

Six metres got away to a rather slow start this year, very little being heard for the first half of the month. This slower start may well indicate 6 metres could remain open more into January than it has for a while, and could possibly indicate some excellent openings just after Christmas. Some of the first stations to be heard in VK5 were from VK6, and during the week commencing 16/11 openings have occurred to VK4 in the main. Consequently, as these notes need to be prepared earlier because of the Christmas break for printers, there is little to really report on 52 MHz so far. I note David VK5KK is keeping the band under regular surveillance, and Kerry VK5SU will have to watch out or David will be taking the Ross Hull Memorial Trophy from him this year!

## TWO METRES

I am sure this will be a good band to watch again this year, particularly at the weekends, and especially when 6 metre openings are evident over a wide area. Monitoring of FM channels and repeaters will help to get the message across. Some upgrading of antenna systems has taken place at my QTH. Now I have a 10 element yagi for 146 FM and a 4 element for 52.525 FM, both vertically polarised at 73 feet, and can feed both with about 60 watts of FM. For 144 MHz SSB I can feed 100 watts or more into an 8 element wide spaced yagi at 57 feet or a 16 element colinear at 58 feet, and on six metres SSB up to 300 watts into the 6 element wide spaced yagi at 50 feet. And of course there is the 13 element yagi at 67 feet for 432 MHz, maybe a contact or two on that band!

## FROM NEW ZEALAND

I was somewhat disturbed to read a letter printed in "Break In" for October 1975, and I think it worthy of your reading.

Here it is with comment to follow: "Dear Sir, I would like to propose the adoption of a standard polarization on 2 metres. I think the adoption of vertical polarization would have the following advantages:

- (1) Compatibility with existing repeater systems.
- (2) Best polarization for simple portable equipment.
- (3) Reduction of station incompatibility — having to cope with AM, FM, SSB is bad enough without having to put up with polarization loss.
- (4) The use of one polarization enables best use to be made of one's antenna erecting ability.

"Any propagation advantages horizontal may have over vertical are small, if detectable, and much less than the natural variability of signals over any given path.

"I would like to see consideration given to this proposal and perhaps the general use of vertical polarization on the next VHF field day". — E. J. Barnes ZL2TAX.

Personally I can think of nothing worse than having one antenna to cover two operating modes and associated equipment. Imagine operating on FM and then desiring to have a look over the low end of 2 metres with your SSB equipment, so we unscrew the coax from the FM gear and screw it into the SSB rig. Then the process is reversed next time FM is needed.

As most operators of FM equipment need only work through a repeater to satisfy their operating requirements, a small vertical antenna fulfils their needs. SSB operating is invariably over longer distances and for this a beam is required. Now if you are going to have a beam to work well, say 144.100 MHz, then it is going to be a poor performer at 146.400 MHz. Straight away you are going to need two antennae. If you are going to need two antennae why not stick to standard practice and have one horizontal and leave it on the SSB gear all the time. This seems a sensible arrangement to me.

The question of propagation and polarization is something which can be discussed at length. Suffice to say there is plenty of evidence to suggest that for long haul working over difficult terrain horizontal polarization will invariably win, all other things being equal. Ask Eddie VK1VP who has tried both on the path to Sydney. I cannot get over my hills here too well vertically, but quite good horizontally. And so we could go on. No, let us leave the whole thing as it is, and make that extra effort to build an antenna for both polarizations.

A comment in "Break In" is a comment from AMUTER NEWS that DX activity through the satellites at 6 and 7 is increasing at an enormous rate. Stations such as 4W1ED, ZB2BL, TU2EF and FY7AS have been worked from Europe. The activity seems to be encouraged by new imported equipment for SSB and CW on 144 MHz. This activity promises fantastic results for users of the AMSAT Phase III high-orbit spacecraft due to be launched in the late 1970s. Full details of the new spacecraft were published in the June 1975 issue of the AMSAT Newsletter. W6CG and W7VEW have been sending experimental ECG (heart-beat) data through the spacecraft and are getting good results, both in receiving the data and decoding it.

"HG5BME from the Technical University of Budapest, Hungary, had planned satellite-to-home broadcast transmission tests on various orbits of both Oscar 6 and 7 during October 1975, through Oscar 6 with SSB with full carrier, speech and music, and Oscar 7 15 kHz FM speech and music. No reports are to hand as to how these tests turned out".

That seems to be the news for this time. Concluding with the thought for the month: "Music expresses that which cannot be put into words and that which cannot remain silent".

The Voice in the Hills

## Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,

Dear Sir,

I have just read Bob Guthberlet's YRS column in AR November '75.

It appears to me that the support for YRS from

amateur ranks is abysmally poor at the present time.

Even if the PMG exams are in a state of uncertainty we, as hams, should all do something to foster the interest in radio of all young people — girls and boys.

There are all too few dedicated teachers and leaders operating YRS courses and clubs around Australia. All amateurs who can spare some time should assist where they can.

Our younger generation need to be shown some worthwhile hobby or career pursuits in a practical way these days. Especially in the light of increasing leisure activities and the all-too-permissive attitude of "let them do what they want".

This only leads to anarchy and kids thus get into trouble; or get nothing useful done.

One example is the fast growing herd of 'CB' band operators who are just going to cause more pollution of our valuable RF spectrum.

We must motivate as many people as possible to get a legitimate amateur's licence and operate with all privileges.

If the WIA divisions are not supporting YRS activities as they should be, then they should be thoroughly ashamed of themselves and ought to stop and re-think their priorities.

It seems to me that there is increasing pressure upon the amateur frequencies by commercial and other services. If we are to defend our bands, we need weight of numbers and more operators occupying them. We need not fear a sudden rush of operators who will clog our bands; diversion of interests and exam standards will take care of that. But I do think we need to be training more young operators in our line of business both as a foundation for a career and to provide a sound hobby interest to keep some of our youth engaged in some creative activity.

The WIA Divisions, and in fact all Radio Amateurs in Australia, deserve a broadside blast for lack of action and general apathy if they are not in some way assisting someone into the fine art of amateur radio.

Take time to re-read what Hiram Percy Maxim has to say in the front of the ARRL handbook or read the foreword in the RSGB handbook. Remember: the amateur is: courteous, helpful, resourceful.

If you help just one youth into the art, then you are contributing something worthy of merit.

Amateur radio promotes international goodwill and gives one something better to do than watching excessive soap-opera on TV.

What are you doing to promote amateur radio and YRCS? Ring or write your State Supervisor, to find out where you can contribute. — Graeme Scott VK3ZR.

The Editor,  
Amateur Radio.

Dear Sir,  
The VK2 beacons have recently been returned to service after a long period out of commission.

They are now operating as before, on 52.450 and 144.010 Mcs using the call-sign of VK2WI, power output being similar to that originally used.

Thank you for your work on the magazine.  
Yours faithfully — A. D. Tilley 2ZYT, Secretary,  
New South Wales Division VHF and TV Group

**NCDXA Members:**

AA — 3AFQ, 3HRV, 3KSO, 3MBQ, 3NGS, 3HNG, 3VOP, 4HPF, 4KJR.

AB — 2EXK.

AC — 2GHK, 3AFM, 3AZD, 3BOV, 3BWZ, 3COR, 3CRE, 3DBT, 3EZT, 3KA, 3NL, 3OW, 3RX, 3SW, 3ZNH, 3ZSR, 4DPS, 4IDG, 4KFC, 4CWA, 4UMF, 4WSF, 4WWG, 9SZR.

AD — 3CHP, 3EH, 3ZAW, 4BEO, 4CFB, 4CTY, 4DXO, 4EBY, 4EKJ, 4GKD, 4KQB, 4OMR, 4WVT.

**1976 OLYMPICS AWARD**

Amateur radio operators (and Short Wave Listeners) worldwide are invited to participate in the celebration of the XXI OLYMPIAD to be held in Montreal, Canada in 1976.

Two different and attractive awards will be issued for working or hearing (for SWLs) amateur radio stations according to the following conditions:

**Canadian '76 Olympics Award**

Communications Canada has authorised the use of the "XJ" prefix for "VE" amateur stations and the "XN" prefix for "VO" stations during the period 1st August 1975 to 31st July 1976.

At least one contact must be made with each of the call areas XJ1-XJ8 and XN1 and XN2 for a total of 10 contacts. Any contact with XJ0 (VE0, Maritime Mobile station) or the special Olympics ham station CZ20 will be allowed as a substitute for any missing call area prefix.

Send certified log data list and \$1 or 7 IRCs to VE3LSS, Radio Club, Listowel District Secondary School, Mr. G. Hammond, 155 Maitland Avenue S., Listowel, Ontario Canada N4W 2M4.

**World '76 Olympics Award**

Work and/or hear amateur radio stations in any fifty countries which will compete at the 1976 Olympics in Montreal, Canada. One contact must be with a Canadian station using an "XJ" or "XN" prefix. A special seal will be affixed for a contact with CZ20 the official amateur radio station on the XXI OLYMPIAD site.

Send certified log data list and \$1 or 7 IRCs to VE3LSS at the above address.

**AUSTRALIAN DXCC**

PHONE		CW	
VK6RU	319/351	VK3AHO	308/331
VK4KS	315/334	VK2QL	303/332
VK5MS	313/343	VK3YL	294/317
VK6MK	306/333	VK2APK	291/304
VK3AHO	304/328	VK4FJ	290/322
VK2APK	300/313	VK3XB	280/300
VK4PX	294/301	VK3NC	268/297
VK5AB	291/314	VK6RU	266/295
VK4UC	288/293	VK3YD	258/281
VK4FJ	287/314	VK4TY	253/272
VK3JW	283/290	VK3TL	248/260
VK4TY	279/288	VK3RJ	245/265

OPEN		VK2SQ	301/311
VK6RU	319/351	VK4PX	301/312
VK4KS	316/340	VK4FJ	300/332
VK4SD	314/335	VK4TY	300/321
VK2APK	311/329	VK4UC	297/303
VK2EO	306/335	VK3XB	286/305
VK6MK	306/333		

New Members	Phone	Tally
	VK2OW	105
	VK2SK	104
	VK5AX	101
	VK5RX	115
	VK2EB	110
Open		
	VK3ZU (now VK2QC)	102
	VK3AUT	105



**JANUARY 1958**  
Democracy At Its Best. The Editorial of the January 1956 Amateur Radio looked at the history and growth of the Boy Scout movement and its connection with Amateur radio operators. The Wireless Institute of course provided communications for the Pan-Pacific Jamboree. During the last twenty years this relationship has grown to a very marked extent. With the advent of television and TVI many

amateurs of the day were redesigning their transmitters to incorporate a PI network final tank circuit.

They provided increased harmonic suppression and an easy method of band switching. However they were a complete mystery to many of us so K. M. Saxon VK7AI produced his article 'PI Network Tank Circuit' at just the right time.

Hans Ruckert VK2AOU described his power supplies in the final part of 'A Transmitter With Low Harmonic Output'.

Methods and results of 'High-Level Clipping and Filtering' was reprinted from QST. Then, as now, it was always the object to get a bit more for your money. This was the brute force method that depended on a higher than normal modulator output.

An Integral Crystal Calibrator for Superhet Receivers. Jim Lloyd VK3AST used a novel method by changing the normal IF frequency from 455 kHz to 500 kHz. Then by crystal locking the BFO to 500 kHz it served as both the BFO and a calibrator.

Three short articles concluded the technical coverage for the month. The Slot Beam reprinted from the RSGB Bulletin, Gated Screen Modulation by S. Burton VK2AYB, and Single Switch Control by H. Wohlers VK3YV.

A photo of several prominent Victorian amateurs attending the State Convention is interesting. Max Hull VK3ZS really doesn't look any older today. ■

**TOWNSVILLE PACIFIC FESTIVAL CONTEST**

Congratulations go to John Roberts VK4TL of Cairns for a fine effort with 493 points in the open section and winning the trophy which was presented to John by last year's winner Les Bell VK4LZ at the North Queensland Convention held 26-27 July, 1975.

Thanks are extended to all amateurs who participated in the contest and congratulations to the section winners.

**Section A: TRANSMITTING ALL BANDS PHONE ONLY**

VK4XZ	229 points
VK7HE	25 points

**Section B: TRANSMITTING ALL BANDS CW ONLY**

VK5DL	242 points
VK2CX	194 points
VK7HE	102 points
VK3CM	85 points
VK7ZO	18 points

**Section C: TRANSMITTING ALL BANDS OPEN**

VK4TL	493 points
VK4LZ	326 points
VK4TE	287 points
VK4YG	259 points
VK4PV	259 points
VK4HE	252 points
VK4ABG	244 points
VK3WW	238 points
VK5GX	225 points
VK4ZLC	222 points
VK4ZEL	168 points
VK2XT	65 points
VK4PS	61 points
VK4CR	53 points
VK5KJ	43 points
VK2WO	26 points
VK4HS	2 points

**Section D: RECEIVING ALL BANDS OPEN**  
Tony Nance 284 points

Hugh C. Barlow VK4AM,  
QUEENSLAND CONTEST MANAGER. ■

**QSP**

**ISLAND COMMUNICATIONS**

"It has always been my dream to see in our country an increase of the (amateur) population, for the simple reason that ours is a nation of 7000 islands which can only be linked together by a network of radio communication. Commercial radio for economic reasons can only serve the most populated areas. Amateurs can fill the gap more efficiently and more economically than by any other means". Part of editorial in QTC of the Philippine Am. Radio Assoc. Vol 2, No. 2.

**Awards Column**

with BRIAN JUSTIN VK5CA  
P.O. Box 7A, Crafters, SA 5152

**NCDXA USA BICENTENNIAL AWARD**

The National Capitol DX Association will award to any amateur radio station in the world this Award under the following condition:

Two way contact with ten different NCDXA members using the special Bicentennial Call Signs (AA, AB, AC, AD) during the period 1st January, 1976 0500Z to 1st January, 1977 0500Z.

**Details**

- 1.8 MHz to 30 MHz, any mode may be used.
- Only the Basic Award will be issued.
- No QSLs required, just send log information.
- Fees: DX Station Free, USA/VE \$0.50 or 4 IRCs.
- Send to:

NCDXA Awards Manager W4QAW  
10013 Coach Road,  
Vienna VA 22180 USA.

# Contests

with Jim Payne, VK3AZT  
Federal Contest Manager,  
Box 67, East Melbourne, Vic., 3002

## REMEMBRANCE DAY CONTEST RESULTS

Sincere apology to VK6 for error in published results. The trophy score for VK6 (column F) should be 4900 which places VK6 third in the contest.

## CONTEST CALENDAR

Dec. 28 Hungarian.  
Jan. 3/4 Nostalgia Radio Exchange.  
Jan. 3 Pacific DX Net Party.  
Jan. 14/15 YL, RL, DX, CW.  
Jan. 10/11 YU 80 metre CW.  
Jan. 23/25 CQ, WW 160 metre CW.  
Jan. 28/29 YL, RL, DX, Phone.  
Jan. 31-Feb. 1 French CW.  
Feb. 7/8 ARRL, DX, Phone.  
Feb. 14/15 John Moyle Field Day.  
Feb. 21/22 ARRL, DX, CW.  
Feb. 28/29 French Phone.  
Mar. 6/7 ARRL, DX, Phone.  
Mar. 20/21 ARRL, DX, CW.  
Mar. 27/28 CQ, WW, WPX, SSB.

## YU 80 METRE CW DX CONTEST

2100 GMT Jan. 10 — 2100 GMT Sunday, Jan. 11.

Exchange RST and QSO number. Score 1 point for contacts between stations in same country, 2 points with other countries on same continent, countries on other continents 5 points. YU stations count for 10 points. Multiplier is one for each DXCC country and each YU prefix worked. Certificates to top scorers in each country with 2nd and 3rd place awards where justified. All VK call areas considered separately for awards. There are also trophies for continental winners. Logs to reach YU DX Club of SRJ, P.O. Box 48, 11001, Belgrade, Yugoslavia by March 15, 1976.

## FRENCH DX CONTEST

CW Jan. 31 - Feb. 1, 1976.  
Phone Feb. 27-28.  
Each 1400 GMT Sat. — 2200 GMT Sunday.

Contest exchange includes continental France, DUF countries and the following prefixes ON, HB, LX, VE2, OD, HH, 3B, 9U, 9Q, 9X. The same station can be worked on each band for QSO and multiplier credit. French stations will give RS (T) and 2 figures identifying their department.

Others give usual RS (T) and OSO number. HB and DN may give 2 letter abbreviation for Canton or Province. Each OSO 3 points. A contact with FBREF is worth 10 points. Multiplier is one point for each French Department (95), Swiss Canton (22), Belgium Province (10) and each DUF country. Plus LX, VE2, OD, HA, 3B, 9U-Q-K. Final score is total OSO points times sum of multiplier from all bands. Logs to REF Traffic Manager, Lucier Aubry, 8FTM, Rue Marceau 53, 91120, Palaiseau, France.

## CQ WW DX 160 CONTEST

2200 GMT Jan. 23 to 1600 GMT Jan. 25.  
Same rules as previous years.

## HUNGARIAN CONTEST

0000 to 2400 GMT Sunday, Dec. 28, 1975. All bands 10-80 both phone and CW. Exchange RST and ITU zone number. Contacts on same continent 1 point, other continents 3 points, with HA stations 4 points. HA5 prefixes worth 5 points. Multiplier is number ITU zones worked. Logs to Budapest Radio Amateur Society, P.O. Box 2, H-1553, Budapest, Hungary by Jan. 15th, 1976.

## PACIFIC DX NET PARTY

0000 to 2359 GMT Sat., Jan. 3. The International Pacific DX Net organised this to celebrate 8th birthday. All bands 10 to 80 SSB only. Work same station once each band for QSO and multiplier credit. Members give RS, NET No and name; others give RS, state and name. Scoring: Members, one point per contact, 2 points if it's a Net member. Others score 2 points per member worked. Multiply total QSO points by sum of states, provinces, countries worked for final score.

Frequencies 3665, 3865, 7065, 7265, 14165, 14265, 21265, 28565.

Logs to Ed deYung, VK4ABA, Box 98, Newstead, Qld., 4006 by March 1, 1976.

## JOHN MOYLE MEMORIAL NATIONAL FIELD DAY CONTEST RULES — 1976

Amateur operators and Short Wave Listeners are invited to make this contest, held in memory of the late John Moyle, a huge success.

Contestants may participate either as Individuals or as part of a group. There are two Divisions in this contest. The first one is for 24 hours continuous operation and the second for any continuous period of six hours. Either period must be within the 26 hours available.

## CONTEST PERIOD

From 0600 GMT, Feb. 14th, 1975 to 0800 GMT, Feb. 15th, 1976.

## OBJECTS

The operators of portable field stations or mobile stations within the VK call areas will endeavour to contact other portable, mobile or fixed stations in VK, ZL and foreign call areas on all bands.

## RULES

- In each Division there are 8 sections.
  - Portable field station, transmitting phone.
  - Portable field station, transmitting CW.
  - Portable field station, transmitting open.
  - Portable field station, transmitting, phone, multiple operation.
  - Portable field station, transmitting, open, multiple operation.
  - VHF portable field station or mobile station, transmitting.
  - "Home" transmitting stations.
  - Receiving portable and mobile stations.
- In each Division, 24 or 6 hour, the operating period must be continuous.
- Contestants must operate within the terms of their licence.
- A portable field station must operate from a power supply which is independent of a vehicle or permanent installation.
- No apparatus may be set up on site more than 24 hours before the contest.
- All amateur bands may be used but cross band operation is not permitted.
- Cross mode is permitted but note rule 21.
- All operators of a multi operator station must be located within approximately an 800 metre diameter circle.
- Each multi op transmitter should maintain a separate log for each band. 2 FM rig may be separate from 2 AM or SSB rig. A separate QSO number series is required for each band.
- All multi op logs should be submitted under one call sign.
- Only one multi op transmitter may operate on a band at a time.
- RS or RST reports should be followed by serial numbers beginning at 001 etc.
- SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.**  
Portable field stations and mobiles, outside

## NOSTALGIA RADIO EXCHANGE

Two Periods (GMT), 1900 Sat., Jan. 3 to 0500 Sun., Jan. 4; 1900 Sun., Jan. 4 to 0500 Mon., Jan. 5.

This is a new and interesting fun activity. The object is to work stations using old rigs with your nostalgic old rig. A Nostalgia Rig will be defined as any gear built since 1945, but must be at least 10 years old. Not required in the exchange, you can participate with your present equipment.

The same station may be worked on each band and mode, but no a.m. Phone below 28 MHz.

Exchange: Name, RS(T), state or DX country and transmitter type (i.e.: home brew using 807 P.A. tube and etc.)

Scoring: Multiply total number of QSOs by number of different transmitters and state and countries worked on each band. Multiply that total by the "Nostalgia Multiplier". Age of your transmitter and receiver. Double the age if its a transceiver.

Different transmitters and receivers may be used by one station. Figure scores separately for each and combine for total score.

Frequencies: C.W. — 1810 and 70 kHz from low

entrants call area — 15 points.  
Portable field stations and mobiles within entrants call area — 10 points.  
Home stations outside entrants call area — 5 points.  
Home stations within the entrants call area 2 points.

## 14. SCORING FOR "HOME" STATIONS

Portable field stations outside entrants call area — 15 points.

Portable field stations within entrants call area — 10 points.

15. Portable field stations may contact any other portable field station twice on each band and mode (10-160) during the period of the contest provided that four hours elapse after the previous contact with that station on that band on that mode.

16. Stations may be worked repeatedly on 52 MHz and above providing two hours have elapsed since the previous contact on that band and mode.

17. Operation via active repeaters or translators is not acceptable for scoring.

18. All logs shall be set out under headings of Date-time in GMT, Band, Emission, Callsign, RST sent, RST received and Points claimed. List contacts in correct sequence. There must be a front sheet to show . . . Name, address, division, Section, call sign, call signs of other operators, location, points claimed, equipment used and power supply. You must also certify that you have operated in accordance with the rules and spirit of the contest.

19. Certificates will be awarded to the highest scorer of each section of the 6 hour and 24 hour divisions. The 6 hour certificate cannot be won by the 24 hour entrants. Additional certificates will be awarded for excellent performance.

20. Entrants in sections a, b, c, d, e and f must state how power for transmitting is derived.

21. All CW-CW contacts count double. Cross mode contacts do not count double.

22. Entries must be forwarded in time to reach the Contest Manager by 21st March, 1976. The address is Federal Contest Manager, Box 67, East Melbourne, 3002.

## RECEIVING SECTION

This section is open to all short wave listeners in VK call areas. Rules are as for transmitting stations but logs do not have to show report and serial number of the second station or station called. Logs must show the call sign of the portable or mobile station heard, the report and serial number sent by that station, and the call sign of the station called. Scoring is as shown in Rule 14 for home stations. A station calling CQ does not count. Portable Mobile stations, which must be listed in the left hand call sign column of your log, alone count for scoring. Stations in the right hand column may be any station contacted. A certificate will be awarded to the highest scorer of each of the 6 hour and 24 hour divisions, individual or multi operator entries. Certificates will be issued for excellent performance.

edge of each band. Phone — 3910, 7280, 14280, 21380, 28580 Novice — 3720, 7120, 21120, 28120.

Awards: Certificates to stations scoring 150,000 points or more, plus Special Citations determined by the Committee.

Send logs, comments, anecdotes, equipment description and large s.a.s.o. to: Southeast A.R.C., c/o WBKAJ, 2386 Queenston Road, Cleveland Heights, Ohio 44118.

## YL-DX TO NORTH AMERICA CONTEST

CW: Jan. 14-15. Phone: Jan. 28-29. Starts: 1800 GMT Wednesday. Ends: 1800 GMT Thursday.

YL's on the North American continent, US states and Canadian provinces, will be working the DX YL's (inc. KH6 and KL7) in this one.

Phone and CW are separate contests and require separate logs. The same station may be worked on each band for QSO credit, net contacts are not permitted and only QSO's with other YL's are valid.

Exchange: QSO no., RS(T) and QTH. State for VK, province for VE and country for DX.

Scoring: One point for each QSO. DX stations count US states and VE provinces for multiplier.

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1.16	1/2	16 3	No. 3003	99c
2.08	5/8	8 3	No. 3006	\$1.16
2.16	5/8	16 3	No. 3007	\$1.16
3.08	3/4	8 3	No. 3010	\$1.40
3.16	3/4	16 3	No. 3011	\$1.40
4.08	1	8 3	No. 3014	\$1.56
4.16	1	16 3	No. 3015	\$1.56
5.08	1 1/4	8 4	No. 3018	\$1.75
5.16	1 1/4	16 4	No. 3019	\$1.75
8.10	2	10 4	No. 3907	\$2.52

Special Antenna All-Band Tuner Inductance

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Craft

## FIXED STATION ANTENNAS FOR 6 AND 2 METRES

**66B 6-ELEMENT 6 METRE YAGI.** Forward gain 15 dB. Boom length 24 ft. Turning radius 12'6". Boom diameter 2 inches. **\$79**

**64B 4-ELEMENT 6 METRE YAGI.** Forward gain 12.7 dB. Front-to-back ratio 20-25 dB. Boom length 12 ft. Turning radius 8 ft. Boom diameter 1 1/4 inches. **\$48**

**215B 15-ELEMENT 2 METRE YAGI.** Forward gain 17.8 dB. Front-to-back ratio 25-30 dB. Boom length 28 ft. Turning radius 14 ft. Boom diameter 1 1/2 inches. **\$69**

**28 8-ELEMENT 2 METRE YAGI.** Forward gain 14.5 dB. Front-to-back ratio 25-30 dB. Boom length 14 ft. Turning radius 7'6". Boom diameter 1 1/4 ins. **\$38**

**A50-5 5-ELEMENT 6 METRE YAGI.** Forward gain 9.5 dB. Front-to-back ratio 24 dB. Boom length 12 ft. Turning radius 7'6". Boom diameter 1 1/2 inches. **\$57**

**A50-3 3-ELEMENT 6 METRE YAGI.** Forward gain 7.5 dB. Front-to-back ratio 20 dB. Boom length 6 ft. Turning radius 6 ft. Boom diameter 1 3/8 ins. **\$37**

**AR-6 6 METRE RINGO.** Gain 3.75 dB (ret. 1/4 wave whip), 1/2 wavelength long, matched using a gamma loop. **\$36**

Prices and specifications subject to change. All prices incl. S.T. Freight extra. Allow 50 cents per \$100 for insurance (min. 50 cents).

The technical data of FT221 in the second column of our advertisement on page 33 in the December issue should read 280 (w) and not 208 (w).

**bail**

**ELECTRONIC  
SERVICES**

FRED BAIL VK3YS  
JIM BAIL VK3ABA

60 Shannon St., Box Hill North, Vic., 3129  
Ph. 89-2213

QLD. MITCHELL RADIO CO. 59 Albion Road, Albion, 4010 Ph. 57 6830  
N.S.W. STEPHEN KUHL, P.O. Box 58, Mascot, 2020 667 1650, AH 371 5445  
W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147 Ph. 624 2691  
S.A. FARMERS RADIO PTY. LTD., 257 Angus St., Adelaide, 5000 Ph. 223 1268  
W.A. H. R. PRIDE, 26 Lockhart Street, Como, 6152 Ph. 60 4379

There is a power multiplier of 1.25 if power input is 150 watts or less (300 PEP on SSB).

Final score: QSO points X multiplier X power multiplier if any.

**Awards:** Trophies to 1st place CW and phone winners, both DX and North America. Plaques to highest combined scores for both and certificates to second and third place winners.

Submit separate logs for each section and a signed declaration. They must be received before Feb. 21.

Beth Newlin WA7FFG, 826 W. Prince Rd., #6, Tucson, Arizona, 85705.

#### ARRL INTERNATIONAL DX COMPETITION

Amateurs throughout the world are invited to participate in the annual ARRL International DX Competition. Certificates of performance will be issued to the top phone and CW scorers in each country in each class. In addition, a handsome plaque will be awarded to the continental high-scorers (non-W/VE), single operator, phone and CW in the all-band class. The top scoring multiplier operator entry will receive a certificate award. Single and multi transmitter entries will be listed separately. Each DX entrant that makes 1000 QSOs or more on either mode will receive a certificate.

Dates — Phone: February 7 and 8, March 6 and 7. CW: February 21 and 22, March 20 and 21.

Times: Start at 0001 GMT Saturday, ends at 2400 GMT Sunday.

Entry — Single Operator: All-band; High-band (20, 15, 10); Low-band (160, 80, 40). Enter only one.

Classes — Multi Operator: Single transmitter or Multi transmitter. All-band only.

Object — DX stations QSO as many stations in the 48 contiguous United States and Canadian call areas as possible. Repeat contacts on additional bands are permitted.

Points — Each complete contact counts 3 points. Incomplete contacts count 2 points.

Exchange — Send RS(T) and DC input power. The W/VE will transmit RS(T) and his state or province.

Multiplier — On each band, your multipliers are the 48 contiguous United States, plus VO and VE1 through VE8; a total of 57. Your final multiplier is the sum of multipliers worked on each band. QSO points times the final multiplier equals the claimed score.

Logs — Logs must contain dates, times in GMT, bands, exchanges and points. Logs, with summary sheet and a multiplier check list must be mailed no later than the last Monday in April to be eligible for QST listings and awards. Enclose your photos, comments, suggestions, etc. and mail to: ARRL, 225 Main Street, Newington, Connecticut, U.S.A. 06111.

## IARU NEWS

With the beginning of a new year it might be an idea to have a look at the ITU Radio Regulations (1968 Edition modified by WARC 1971) under which Australia, as an ITU member, operates. Perhaps we could look at the thing piecemeal as affecting the amateur service bit by bit over the coming months.

Starting at the beginning, there are a great number of definitions in article 1 (RR1-1 to RR103D). It may be interesting to compare these with any others you may know.

"Radio Waves (or Herztian Waves)" are defined as Electromagnetic waves of frequencies lower than 3000 GHz propagated in space without artificial guide.

"Harmful interference" means any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.

"Telecommunication" is any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems, and "Radiocommunication" is telecommunication by means of radio waves.

"Amateur Service" is exactly the same as the

definition in the PMG's Handbook and "Amateur Satellite Service" means a radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.

Whenever the power of a radio transmitter, etc., is referred to, it shall be expressed in one of the following forms:

- peak envelope power (Pp)
- mean power (Pm)
- carrier power (Pc)

For different classes of emissions, the relationships . . . under the conditions of normal operation and of no modulation, are contained in Recommendations of the C.C.I.R., which may be used as a guide.

The PEP of a radio transmitter is set down as the average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the highest crest of the modulation envelope, taken under conditions of normal operation.

"Effective radiated power" is the power supplied to the antenna multiplied by the relative gain of the antenna in a given direction. (The product of the power of an emission as supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna).

"Telephony" is a system of telecommunication set up for the transmission of speech or, in some cases, other sounds, whereas "Television" is a system of telecommunication for the transmission of transient images of fixed or moving objects and "Facsimile" is a system of telecommunication for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.

A "spurious emission" is defined as an emission on a frequency or frequencies which are outside the necessary band, and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions and intermodulation products, but exclude emissions in the immediate vicinity of the necessary band, which are a result of the modulation process for the transmission of information.

The "Mobile service" is a service of radio communication between mobile and land stations, or between mobile stations and a "land station" is a station in the mobile service not intended to be used while in motion. The "Fixed Service" is of course a service of radiocommunication between specified fixed points.

"Experimental Station" is a station utilizing radio waves in experiments with a view to the development of science or technique. This definition does not include amateur stations.

There are of course many definitions relating to satellites and space communications even including "Deep Space" which is space at distances from the earth approximately equal to, or greater than, the distance between the earth and the moon.

Next time we'll have a look at nomenclature and some of the frequency allocations. The former for beginners and the latter for those who may not be quite sure of the international scene.

IARU Headquarters are now producing a monthly news-sheet devoted to developments on WARC 1979. This will be for the use of member societies and should help greatly in co-ordinating the amateur effort.

## BOOK REVIEW

SOS at Midnight (224 pages)

CQ Ghost Ship (192 pages)

DX Brings Danger (208 pages)

by Walker A. Tompkins K6ATX. Published by Saga-more Books 1971, US price \$2.45 each, review copies from Magpups.

These three stories, with a fourth (CQ Death Valley) on the way, were written for a purpose. They are teenage adventure stories, and at least as good as most of the crime dramas one may see on television. In fact the author has written stories for that medium also.

Their purpose is to introduce the world of amateur radio to the reader, assuming he or she, like most of the public at large, has only the vaguest idea of what radio amateurs are and do. The hero of all the stories is Tommy Rockford, aged 17 plus, high-school football-player and radio amateur, whose

call sign K6ATX is really that of his author. Many other amateurs (I counted more than 30) appear in the stories by name or call or both. They are all real people, friends of the author, but the parts they play may perhaps be rather different from their real occupations.

From the technical viewpoint, the facts about amateur radio are presented soundly in language the uninitiated can understand. Some aspects (MARS, phone-patches, etc.) are peculiar to the USA, but generally the potential fun and value of our spare-time way of life are worked into the stories so as to appeal to a world-wide readership. And at the end of each book, when Tommy's radio-based ingenuity has finally placed the drug-smugglers' safe-breakers, or swindlers in the care of the local sheriff, there is a page or so explaining how the reader too may become a radio amateur.

If you have a teenage friend or relative on your list for birthday or Christmas presents, one of these books may well not only serve that purpose, but also spark the interest of another recruit to amateur radio. You may even find entertainment in reading them yourself. I did!

VK3ABP

## QSP

### INTERFERENCE

"The continued swing to UHF reception of television appears at last to be resulting in a worthwhile reduction of interference complaints. Complaints generally have fallen by about 46% on both Bands 1 and 3 for an increase of about 8% on Bands 4 and 5. One can but hope that this means that more attention is being given by receiver manufacturers to making UHF TV sets reasonably immune to out-of-band interference." Pat Hawker writing in Technical Topics in Radio Communication Sept. '75. He quotes 42177 as the total new complaints received by British Post Office during 1974 of which 886 were directly ascribed to amateur stations. This is about 2% for an amateur population of about 20,000 and although no figures are published compares with about 1% of interference complaints being directly ascribed to amateur stations in Australia.

## CALLING BUDDING AMATEURS

Are you about to start studying for your ticket? or do you know someone who is? Do you live where there is no local Radio Club or study group to provide the training?

If this description fits you then take advantage of the VK2 Divisions' Correspondence Course which provides L.A.O.C.P. training.

If you live in Sydney the VK2 Division conducts a personal class. The 1976 class devotes the first term to a "Novice Course" and the remaining 2 terms bring you up to the A.O.C.P. level if you wish.

For details write to:—

Course Supervisor,  
W.I.A. (N.S.W. Division),  
14 Atchison Street,  
CROWS NEST, N.S.W., 2065.

The VK2 Division also has available for loan, tape recorded Morse Training from 5 to 18 w.p.m. Available in either cassettes or reel to reel. There are also some 40 recorded lectures (reel to reel only) available for borrowing. Write (enclosing a SASE) for a list of available tapes to:—

Morse Tape Supervisor  
at the above address.

# PROJECT AUSTRALIS

With DAVID HULL VK3ZDM

## EDUCATION PROGRAMME

Australis has received a request from the ARRL for details of educational uses of the Oscar satellites in Australia. Regrettably this is one aspect that Australis just has not had the personnel to do justice to.

However we are in a position to act as a clearing house for information etc., and ARRL has promised to forward curriculum supplements and other material on request. We would be happy to supply applicants with this material in return for teacher and student reactions, photographs, newspaper clippings etc., that we can forward to the ARRL in return for their effort. We would very much appreciate hearing from educational institutions that are at present using the satellites in an educational role, or from amateurs with knowledge of these activities.

## JANUARY PREDICTIONS

### OSCAR 6

("On" Days Only)

Date	No.	Z	W	Orbit	Time	Long
1	14681	01.44	77	1	5153	A 00.12 53
3	14706	01.39	76	2	5166	B 01.06 66
4	14718	00.39	61	3	5178	A 00.05 51
5	14731	01.34	74	4	5191	B 00.59 65
8	14768	00.29	58	5	5204	A 01.53 78
10	14793	00.24	57	6	5216	B 00.53 63
11	14806	01.19	71	7	5229	A 01.47 76
12	14818	00.18	55	8	5241	B 00.46 61
15	14856	01.08	68	9	5254	A 01.41 75
17	14881	01.03	67	10	5266	B 00.40 60
18	14893	00.03	52	11	5279	A 01.34 73
19	14906	00.58	65	12	5291	B 00.34 58
22	14944	01.48	78	13	5304	A 01.28 72
24	14969	01.43	76	14	5316	B 00.27 56
25	14981	00.43	62	15	5329	A 01.21 70
26	14994	01.37	75	16	5341	B 00.21 55
29	15031	00.32	59	17	5354	A 00.15 69
31	15056	00.27	57	18	5366	B 00.14 53

### OSCAR 7

Date	No.	Mode	Z	W	Orbit	Time	Long
1	5153	A	00.12	53	1	5153	A 00.12 53
2	5166	B	01.06	66	2	5166	B 01.06 66
3	5178	A	00.05	51	3	5178	A 00.05 51
4	5191	B	00.59	65	4	5191	B 00.59 65
5	5204	A	01.53	78	5	5204	A 01.53 78
6	5216	B	00.53	63	6	5216	B 00.53 63
7	5229	A	01.47	76	7	5229	A 01.47 76
8	5241	B	00.46	61	8	5241	B 00.46 61
9	5254	A	01.41	75	9	5254	A 01.41 75
10	5266	B	00.40	60	10	5266	B 00.40 60
11	5279	A	01.34	73	11	5279	A 01.34 73
12	5291	B	00.34	58	12	5291	B 00.34 58
13	5304	A	01.28	72	13	5304	A 01.28 72
14	5316	B	00.27	56	14	5316	B 00.27 56
15	5329	A	01.21	70	15	5329	A 01.21 70
16	5341	B	00.21	55	16	5341	B 00.21 55
17	5354	A	00.15	69	17	5354	A 00.15 69
18	5366	B	00.14	53	18	5366	B 00.14 53
19	5379	A	01.09	67	19	5379	A 01.09 67
20	5391	B	00.08	52	20	5391	B 00.08 52
21	5404	A	01.02	65	21	5404	A 01.02 65
22	5416	B	00.02	50	22	5416	B 00.02 50
23	5429	A	00.56	64	23	5429	A 00.56 64
24	5442	B	01.50	77	24	5442	B 01.50 77
25	5454	A	00.50	62	25	5454	A 00.50 62
26	5467	B	01.44	76	26	5467	B 01.44 76
27	5479	A	00.44	60	27	5479	A 00.44 60
28	5492	B	01.37	74	28	5492	B 01.37 74
29	5504	A	00.37	59	29	5504	A 00.37 59
30	5517	B	01.31	72	30	5517	B 01.31 72
31	5529	A	00.30	57	31	5529	A 00.30 57

## FEBRUARY PREDICTIONS

1	15069	01.22	71	1	5542	B 01.25 71
2	15081	00.22	56	2	5554	A 00.24 56
5	15119	01.12	69	3	5567	B 01.18 69
7	15144	01.06	67	4	5579	A 00.18 54
				5	5592	B 01.12 68
				6	5604	A 00.11 52

## BEACONS

According to a report in RSGB's Radio Communication for Sept. '75 the RSGB's first 10 GHz beacon was established at a permanent site on the Isle of Wight on 3-4-1975. It operates continuously on 10.100 GHz with an omnidirectional aerial and an ERP of 0.8W.

## ATTENTION FT101 OWNERS

At last a distortion-free RF Clipper. Fits in minutes and really works. Yaesu SSB Filter fitted. Only for FT101. Gives up to 6 times or more effective talk power gain plus extra RX selectivity and gain — not to be confused with audio type distortion producing clippers, or compressors.

Price: £45 sterling, air post paid.

Send for details:

**G3LL, HOLDINGS LTD.**  
39/41 Mincing Lane, Blackburn BB2 2AF, England

# Hamads

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

QB3/300 (4/125) Philips Tetrodes (two), one used, one slightly used, \$12 both. OTA60 Branch Solid State SSB Exciter, complete and professionally assembled, plus "Break-In" articles, \$50.00. R. W. Rogers VK3BNG, 16 Werratt Ave., Werribee, 3030.

FT/FP200, excellent condition, complete 10 metre coverage, complete set of spare valves, fan fitted, microphone, cables and manual, \$350 ONO. VK3AYP. Ph. (03) 465 3581.

Radio Clubs — I will donate large collection of equipment and components if you arrange pick-up. Items included: 80-10m AM Tx CW HD PS, 80m AM mobile transceiver CW, transistor DC/DC conv., SCR-522 transceiver, part modified CW, spare Rx, 3-band HF Rx., assorted valves, capacitors, transformers, relays, HD vibrators, etc. A. E. Tobin VK3ATT. OTHR. Ph. (03) 876 1404.

Collins KWM2 with noise blanker and DC power supply, mint condition, manuals and crystals, \$850. Ex VK2VN. Mrs. M. H. Meyers, 109 Springvale Rd., Killara, NSW, 2071. Ph. (02) 498 2956.

FT/FP200, 1 year old, all 10 MHz xtal's and English manuals, \$330. M. Stubbs-Race VK2ASR, 35 Dress-circle Rd., Avalon, NSW 2107. Ph. (02) 918 8163.

Deceased amateur's estate. Yaesu FT200 2m FM, SSB, CW, Transceiver, 3 months old, \$400.00. FT200 with AC and DC PSUs, used only 2 hours, \$400.00. Gelojo G4/214 comm. Rx, with speaker, in good order, \$50.00. ½ wave 2m whip with magnetic base, \$17.50. Grundig GDO, AC model, \$25.00. 50 ft. Hills Telemast w/o, guys, \$20.00. Contact VK3PR, QTHR. Ph. (056) 62 2711.

Drake Rx Model R-4C and a Drake Rx Model R-2C. mint condition, clean, recent productions, late serial Nos. etc. Keith Hatch. Ph. (03) 57 7592.

Heathkit SB401/SB301 HF CW/SSB Transceiver, with SB160 Monitor Scope, S600 matching speaker and handbooks for all units. Features USB/LSB any band 80-10m. Break-In CW, split freq. available, CW and RTTY filters in Rx, 2 tone osc. in mon. scope. 61A6s finals in Tx, built-in VOX, etc., \$550 or nearest offer. VK2BIP, OTHR.

Yaesu FT DX 401 Transceiver, SSB 560 watts, CW 430 watts, with matching speaker, microphone and manual. Mint condition, new 1974, little used, mainly Rx. Moving QTH, must sell, best offer. R. Barnes, 1/21 Baden St., Coogee, NSW 2034.

Yaesu FT DX 401 Transceiver, excellent cond., orig. pkg., with mtc., manual, connecting plugs. limited use, modified switchable CW/SSB filter in CW mode. \$420, buyer must collect. VK2BXP, QTHR. (PC 2113). Ph. (02) 888 2981 AH.

Drake TR3 Tvc., spare finals, manual, complete, excellent cond., \$300. KW107 Supermatch, \$140. DX Engineering Speech Processor, \$100 or \$450 the lot. Lafayette Comm. Rx, \$50. Mini SWR Meter, \$10. Garrard 1000 R/Player, co-ax, tubes, TV chassis. Speakers, Zeiss 8 x 40 Naval Binoculars, \$50. Bing & Grondahl Opera Plates, \$100 ea. VK2ASH, QTHR. Ph. (02) 270 5184 bus.

Compl. Serv. Manual for Rx R5223 and AR88 with compl. details for \$15 each. Com. Rec. SX-190, 3.5 to 30 MHz in 11 xtal contr. bands of 500 kHz each, sensitivity 0.4 microV/10 dB S/N, etc. Brand new in box with matching speaker and manual, for \$315. PO Box 141, St. Kilda West, 3182, Vic. Ph. (03) 699 2400.

Hygain 18V All Band Vertical Portable Antenna — for field days, camping trips or home use, \$27. Alan VK3ASL. Ph. (03) 598 9467.

# Silent Keys

It is with deep regret that we record the passing of—

MR. R. G. THOMAS VK3NU

MR. J. R. G. HARRIS VK3ALX

## HORACE LAPTHORNE 1899/1975

It is with sincere regret that the passing of a truly faithful pioneer of Radio in Australia is recorded. Horrie Laphorne VK2HL/T suffered a heart attack at 1 am on 28th October, 1975. He is survived by his wife Marion, known to many as Min, and three married children Fay, Joy and a son Vic.

Horrie began his exploits in Radio way back in the early 1900 era and achieved many firsts. Most notably he pioneered aeronautical communication for the flying doctor. He was probably the first and only VK2 to work England on 6 metres (one way to UK) before World War Two. His notes show the contact as being approximately 6 metres and verification by mail.

Horrie was born in 1899 and lived in Sydney for the greater part of his life. In later years he moved to Norahville where he encouraged the local ham populous to try their hand at 70 cm ATV. As a result the central coast can boast perhaps the highest concentration of ATV activity in Australia.

Even up to the time of Horrie's death he was up with the state of the art. Only two weeks before he proudly demonstrated his 625 line digital IC Sync pulse generator.

Horrie was and shall continue in the hearts of many Radio Amateurs in Australia and abroad as a source of inspiration and kindly the pioneering spirit that enthuses the true Radio Amateur.

All Radio Amateurs who know Horrie pass on their deepest sympathy to his family at this time of sorrow and loss.

VICTOR G. BARKER VK2ZVV/T.

KW2000E 160/10m Transceiver, only few weeks old, \$400. Marconi Gen. Cov. Receiver, 100 kHz/30 MHz, original and unmodified, \$90. Heath HP23E power supply, \$35. Asahi SWR/power meter, \$20. Icom IC21A with 12 channels, as new, \$300. VK3OM, QTHR. Ph. (03) 560 9215.

Exchange — Cintel 388 AF Gen/Counter (currently selling \$250 S/H) for 3" or 5" scope OR Gen. Cov. Rx OR Antenna Rotator. No cash diff. either way, all offers answered. David VK5HP, 17 Brodie Cres., Christies Beach, 5165.

## WANTED

Gen. Cov. Rx (4 in Number), bandspread amateur bands for members South Coast Radio Amateurs. Cash to \$100 each. Reply per David VK5HP, 17 Brodie Crescent, Christies Beach, 5165.

Replacement Film Scale, Part Number ZA-4011, for Army R210 receiver dial. VK2NW, QTHR but Post Code 2070. Ph. (02) 46 4358.

Small CW HF Transmitter such as Heathkit DX40 for High School Student sweating on Novice Exam. VK2AAB, QTHR. Ph. (02) 487 1428.

14AVQ in serviceable order. VK3AKU, QTHR. Ph. (03) 598 5892.

R101-ARNS Radio Compass Control and Mounting Racks, etc. — I would be delighted to hear from anyone who has, or knows of a source. Lionel L. Sharp VK4NS, OTHR. Ph. (07) 59 1845.

MR20A or MR10C High Band. Prefer not converted. VK2BDT, QTHR.



# Yaesu De-luxe Receiver FR-101D

**SOLID STATE RECEIVER** with Total Spectrum Coverage 160-2m plus provision for major short wave broadcast bands

Advanced communications technology now brings you a total coverage, solid-state communications receiver. The FR-101D has the flexibility that even the most demanding amateur desires — with provision for all mode reception on twenty-one 500 kHz amateur and shortwave bands from 160-2m. This versatile receiver is capable of transceive VFO control with the matching FL-101 transmitter or FT-101B transceiver. New, solid-state technology, with features such as a double-balanced mixer, offer unparalleled performance and rejection of cross-modulation and intermodulation interference. Build your total performance base station with the addition of the FR-101D communications receiver.



## FEATURES

- Total coverage capability: 160-2m plus major short wave broadcast bands
- Provision for all mode reception: SSB, CW, AM, RTTY, and FM
- Complete transceive capability with all 101 series equipment
- Reliable, plug-in circuit boards for service simplicity
- Selectable fast or slow AGC

- Built-in, threshold adjustable, noise blanker
- Better than 1 kHz readout on all bands
- Fixed channel, crystal control operation
- ±5 kHz clarifier
- Built-in calibrator 25 or 100 kHz (selectable)
- Indicator lights for internal VFO and clarifier operation
- Built-in AC power supply and 12V DC operation.

## TECHNICAL DATA

**Frequency Range:** 160m 1.8-2.0 MHz, 80m 3.5-4.0 MHz, 60m 4.5-5.0 MHz, 40m 7.0-7.5 MHz, 31m 9.5-10.0 MHz, 25m 11.5-12.0 MHz, 20m 14.0-14.5 MHz, 19m 15.0-15.5 MHz, 16m 17.5-18.0 MHz, 15m 21.0-21.5 MHz, 13m 21.5-22.0 MHz, 11m 25.5-26 MHz, CB 27.0-27.5 MHz, 10A 28.0-28.5 MHz, 10B 28.5-29.0 MHz, 10C 29.0-29.5 MHz, 10D 29.5-30.0 MHz, VHF6m 50.0-52.0 MHz and 52.0-54.0 MHz, VHF2m 144-146 MHz and 146-148 MHz and additional four bands of 500 kHz segment within 4.0-4.5 MHz, 5.0-5.2 MHz, 7.5-9.0 MHz and 22.0-27.0 MHz (optional extra).

**Mode:** Selectable USB, LSB, CW, AM, FM or RTTY.

**Frequency Stability:** Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.

**Calibration Accuracy:** 1 kHz maximum after 100 kHz calibration.

**Backlash:** Not more than 50 Hz.

**Antenna Impedance:** 50 ohm unbalanced nominal.

**Circuitry:** 20 Transistors, 12 FET, 4 Integrated Circuits and 33 Diodes.

**Power Requirement:** 100/110/117/200/220/234V AC, 50/60 Hz, or 13.5V DC nominal.

**Sensitivity:** 0.3 uV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW. 1 uV for AM on 14 MHz. 12 dB SINAD for FM reception.

**Selectivity:** 2.4 kHz nominal bandwidth at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and RTTY. 600 Hz nominal bandwidth at 6 dB down, 1.5 kHz at 60 dB down with CW filter. 6.0 kHz nominal bandwidth at 6 dB down, 12 kHz at 60 dB down with AM filter. 20 kHz nominal bandwidth at 6 dB down, 45 kHz at 60 dB down with FM filter.

**Harmonic and Other Spurious Response:** Image Rejection better than 60 dB. Internal Spurious Signal below 1 uV equivalent to antenna input.

**Automatic Gain Control:** AGC threshold nominal 1 uV. Selectable AGC time constant, fast or slow. Fast attack time 3 milli-second and slow attack time 4 milli-second. Fast release time 0.5 second and slow release time 2 seconds.

**Audio Noise Level:** Not less than 40 dB below 1 watt.

**Audio Output:** 2 Watts at 4 ohm impedance.

**Audio Distortion:** Less than 10% at 2 Watts output.

**Size:** 340(W) x 153(H) x 285 (D) mm.

**Weight:** 9 kg.

**Price: \$723. FR-101D/Digital (as above but with Digital readout) \$889.**

All prices include sales tax. Freight extra. Price and Specifications subject to change.

**Coming soon . . .** a general coverage SWL communication Receiver, .5 to 3 0MHz, low cost. Details later.

**AUSTRALIAN AGENT:**



## ELECTRONIC SERVICES

FRED BAIL VK3YS  
JIM BAIL VK3ABA

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## A Happy New Year - 1976 to All!! VK2AVA

All items on my regular monthly list of goodies as in the last December 1975 issue are still available at the prices quoted, subject to price changes overseas and-or currency ratio changes.

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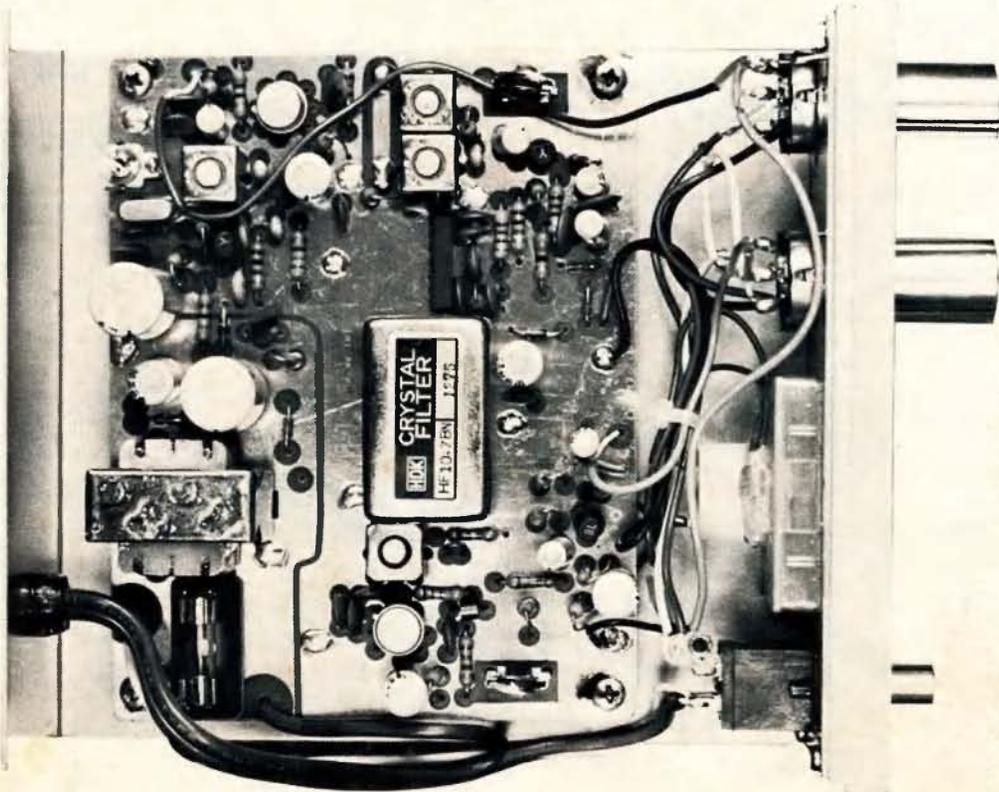
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VOL. 44, No. 2

FEBRUARY 1976

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### COVER PHOTO

*A top view of the KP12A RF Speech Processor with the cover removed. See review on page 18 of this Issue.*

*Photo: Ken Reynolds VK3YCY*

# HAM

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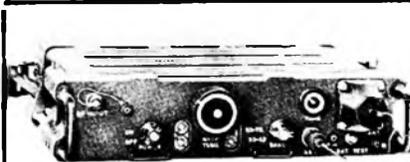
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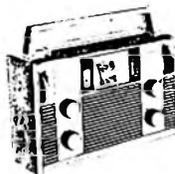
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Post & pack \$1.50 each unit.

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# amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

FEBRUARY 1976

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It so happened the other day my eye fell upon words of wisdom from across the decades.

This is an extract of what H. K. Love, 3BM, wrote as an editorial in the 15th June 1924 issue of the Radio Experimenter —

*"Achievements in long distance transmission and reception of the greatest value are being accomplished almost daily, and it has now become of the greatest importance that these results should be scrutinised and chronicled by some interested body in order that the credit may be held by the right party . . . . we would suggest that the Wireless Institute of Australia, which is the organisation fully representative of Australian experimenters, proceed with the organisation of such scheme without delay . . . ."*

*Whilst it is obvious that the requirements of communication on a commercial basis are widely different from those affecting amateur work it must be admitted that the amateur experimenter has been a decided factor in the rapid progress of this science. It is an acknowledged fact that amateurs are almost solely responsible for the development of apparatus suitable for communication on the short waves which in the early days were assigned to the amateurs more or less to keep them out of mischief.*

*This however, has proved to be the amateur's salvation, since the necessity of concentration on investigation into the peculiarities of these waves has resulted in the development of apparatus eminently suitable for the work and capable of producing the most astounding results.*

*Now that the world of commercial wireless has been awakened to the possibilities of these wavelengths, the experimenter should exert himself to the utmost to retain hold over his position, and should, indeed, also strive after the use of even shorter waves in the region of 50 metres, which would necessitate the development of entirely new methods, pioneering work which would be contributing something new to the science."*

This was written in 1924 — nearly 52 years ago — and is as apt today if 50 cm were substituted for 50m.

Are amateurs today merely becoming another consumer of communications equipment rather than "setting the pace" as was the case during the first two or three decades of this century?

Yes, there are still some fields today in which amateurs can be regarded as pioneering. Free access Oscar Satellites is a good example. Others are EME and Meteor Scatter work. TEP on 6m some years ago created considerable interest in certain professional fields.

To a lesser degree high stability, narrow band transmissions in the amateur bands from 23 cm to 3 cm and ATV in the 70 cm and 23cm bands can also be considered as pioneering work.

The past 10 years has seen many changes and advances in the operating habits of VHF/UHF exponents in Australia. Upgrading of equipment and techniques in the tunable segments of our bands and the almost general acceptance of SSB for 'phone work (where did all those 522s go?) are examples along with the establishment of FM net operations with the aid of repeaters to populate the 2m band. And the 70 cm band is 'just around the corner' too.

Nevertheless one thing is painfully obvious. The number of experimenters appears sadly to be on the decrease if a perusal is made of Australian VHF/UHF/SHF records. No new records have been claimed in some States for 5 to 10 years. The 2300 MHz record took 23 years to break — 1950 to 1973.

Many reasons can be found for this decline in experimentation but where are we heading?

It is known that small groups of amateurs are active throughout Australia experimenting with various modes on exotic or not-so-exotic frequencies. Some records could easily have been broken but pass undocumented and unchronicled in AR or in the WIA's register of Distance Records.

This register is held by myself as Chairman of the VHF/UHF Advisory Committee. Please — If you aim to break a record, send me the full details of the results.

Oh, and by the way, don't forget about the amateur bands — USE THEM OR LOSE THEM.

P. A. WOLFENDEN VK3ZPA  
Member of the Executive. ■

# WIANEWS

At the time of writing this in late December there is still a lack of news about examinations.

A letter was written on behalf of the Institute in mid-December to the Secretary of the PMG's Dept. expressing dissatisfaction that measures to alleviate the problem appear to be having little if any effect.

It was pointed out that 1975 was an extremely poor year for amateur exams. Either the results of the only exam which was held were not notified within a reasonable time, or the others were cancelled.

It was also pointed out that the Institute had already made one suggestion for assisting with the holding of the simpler exam but no response had been forthcoming. Offers of further assistance and advice were made. The R. & L. Branch know as well as we do that in some parts of the world amateur examinations are set and conducted by education authorities — e.g. City and Guilds of London — on which the amateur service is represented on the examination board. They also know, as we do, that in other places exams are conducted by the amateurs themselves — on a selective basis — and even in some cases are also set by amateurs in accordance with stipulated parameters.

Needless to say the Department was reminded that if there exists a statutory requirement for examinations — and there is such a requirement for anyone aspiring to secure an amateur licence — then it is incumbent upon the Government to see that the required examinations are duly set and conducted. A comment on the side could be made that if Government demands the possession of a driving licence before a person may drive a car then it would be wrong if the Government failed to hold the necessary examination — a near enough parallel case. It is extremely bad administration to make a law which nobody can possibly comply with.

Which leads to the last point made in the letter, namely that every encouragement should have been given to those aspiring to take the Novice Exam. Instead of which the exam was cancelled for the first and second times. This has resulted, it is believed, in much loss of faith on the part of those illegal operators who wanted to 'go legit' as the saying goes. Consequently this may well result in additional problems to the administration caused by a probable multiplication in the numbers of 'pirates'.

It is now evident that if the cut-backs in Government spending will be applied to the R. & L. Branch in addition to all other Departments the general situation may reflect a further deterioration not only in the examinations area but also in licensing and other matters.

At this point in time the future does not appear very encouraging unless there is a marked change of attitude in the official sphere. This serves to explain the hardening of Executive's approach to these problems.

Another letter was sent off to the Secretary of the PMGs Dept. in mid-December asking about progress on the 1976 Call Book print, reduced licence fees for pensioners and disabled persons, and the position about the administration's follow-up on intruder reports.

The R. & L. Branch refers back to the contract made in 1970 between the PMGs Dept. and the Institute which was to be in force for 6 years during which time 3 call books were to be issued at two yearly intervals. The 3 call books were duly printed in 1971, 1973 and 1975. The contract expires 31-12-1976. The Institute has submitted that the 1976 call book would be in the nature of an experimental issue using computer information deriving from WIA membership records on the one hand and PMG listings in respect of non-members. This is another question which cannot go unanswered if a 1976 call book is to appear at all. In fact it is already very late to plan such a book.

Yet another letter in mid-December to the Secretary of the PMG's Dept. replied to their letter of 20th October advising that

WARC would be held in the second half of 1979 for a duration of about 10 weeks and stating that studies are now beginning so as to formulate the Australian requirements and attitude prior to compiling an Australian Brief for the work of the Conference. It was anticipated that a Preparatory Group will be formed in due course for these purposes.

The Executive's reply was on the lines already briefly set out in WIANEWS for Dec. 1975 AR and containing the general motions passed at the 1975 Federal Convention as reported on p.26 of AR June '75.

Yet another letter to the R. & L. Branch late in December gave them the details of the WIA 70 cm band plan relating to the 430-440 MHz portion of the band and seeking approval for this with the riders that repeater channels still remain to be finalised and there could be some minor modifications at a later date.

A further letter to the R. & L. Branch is almost finalised relating to repeater conditions. Three specific variations are under consideration. These are that idents for repeaters should not be compulsory since users must identify themselves, that the compulsory submission of circuit diagrams is as archaic as the amateur service itself, and that individual State offices must not impose unilateral conditions without prior approval by Central Office.

A further bone of contention to be taken up is the alleged long delays in obtaining repeater licences.

WIANEWS in Dec. '75 AR quoted extracts from the Novice Licensing Investigation Committee's Report submitted to Federal Council early in April 1971 in which limited tenure was strongly recommended. Since this was a definite 21 page Report there seemed little object in mentioning the supplementary Report submitted by that Committee on 31st Oct. 1971 which reversed that recommendation amongst other modifications. Both Reports were of course carefully considered by the Federal Council in arriving at the ultimate decision at the 1972 Federal Convention.

Four postal votes were circulated by the Executive late in 1975. The first one sought the ratification of Mr. J. Flynn as Federal YRCS Secretary. This was approved. The second one contained the WIA 70 cm band plan and this likewise was adopted by majority vote, VK4 being the only Division to vote in the negative (detailed comments were stated to be under preparation but have not been received) although VK2 wanted certain 'minor' modifications which it was agreed could be brought up for discussion by Agenda Item at the next Federal Convention.

The third postal vote related to a 'gentleman's agreement' band plan for Novice Licensees and this was adopted without dissent. The CW only portions of their band segments will be 3525-3535 kHz, 21125-21150 kHz and 26960-27030 kHz. This leaves the following for telephony and CW:— 3535-3575 kHz, 21150-21175 kHz and 27030-27230 kHz. Prospective Novice Licensees (when this licence comes to fruition) are asked to note these segments very carefully and abide by them.

The fourth postal vote was the postponement of the 1976 Federal Convention by one week — i.e. that it now be held from 7th to 9th May 1976 in Melbourne. The outcome is unknown at the time of writing but a 'straw' vote taken beforehand indicated no opposition.

If you have any Agenda Items to put up for this Convention knock them into proper shape and send them to your Division right away.

At the last Executive Meeting of the year the Federal President reported on his visit to Launceston and Hobart early in December. The proposed WIA Satellite Award for which the necessary paper work was nearly complete was put on ice for the next Convention in view of the new Satellite Award reported on p.48 of Dec. '75 AR. The interesting Public Broadcasting Report of October 1975 made by a Working Group to the Minister of the Media was noted with some approbation relative to amateur radio interests. Also noted, with great appreciation, was the work being done by Brig. Rex Roseblade, VK1QJ, the Federal WICEN Co-ordinator. He also attended the deferred hearing of IAC on 1st December relating to the electronics industry and it appeared that little if anything transpired to upset the customs by-law proposals already reported on pages 3 and 4 of Nov. '75 AR.

The State visit of JY1, King Hussein of Jordan, to Australia has not escaped the notice of Executive. Contact with the appropriate authorities is under way.

And lastly the Executive accepted with regret the resignation of Mr. Russell Kelly VK3NT, caused by possible clash of interests, and expressed appreciation for his work on Executive.

# WHAT IS THE WIRELESS INSTITUTE OF AUSTRALIA - PART 2

We have seen from Part 1 that there are 8 WIA's, namely, 7 autonomous self-governing and independent Divisions (one in each State — VK8 comes under VK5) and an entirely separate Federal WIA supported by and belonging to the Divisions as a whole.

We have seen that the Federal WIA is allowed to do those central functions for Australian amateur radio which no one Division could do without wearing two hats. An agreement exists as well as a Constitution.

We have seen that the 7 Divisions are the members' (with equality of voting) of the Federal WIA. There are no other 'members' of the Federal WIA. You, as a member, are a member of a Division — the Division which has control in the State or Territory in which you reside (usually).

If you have read and understood these facts you will see that it is not much use writing direct to the Federal WIA with the object of changing an existing Federal policy on the books from Conventions and Federal Postal Voting. You must write to your Division about this kind of thing — by all means copy it to the Executive Office if you wish.

The Divisions originate Agenda Items and other business to be debated at Conventions. Executive also can and does originate Agenda Items (etc.) as well as conducting postal polls as required.

There is a great deal of information exchange between Federal Councillors and the Executive throughout the year. The WIA as a whole is very much a living entity and champion of the amateur radio cause through the very close and cordial relationships between the people within itself informing and guiding one another along the guide lines mutually agreed as being the most beneficial. The operative word is 'mutually' even though one Division or another might go off at a tangent on matters of internal policy.

Basically, whatever may be harmful or good to one Division is usually harmful or good for every other Division.

Under the terms of an agreement (29-6-1971) the Divisions acknowledge and agree that the Federal WIA shall have paramount powers to act as the representative of radio amateurs throughout Australia before or on governmental, political or technical bodies within or outside Australia in relation to matters directly or indirectly affecting amateur radio or radio amateurs in more than one Division.

The Federal WIA has also been given paramount powers in relation to a number of other matters which affect amateurs from more than one Division or have effect externally or affect two or more Divisions.

In so short an article as this it is quite impossible to spell out in detail all the Constitutional provisions but it is obvious that control is essential to prevent persons or Groups doing their own 'thing' independently of the WIA. The objectives are to foster and promote amateur radio in the best possible manner for the greatest possible benefit of all who enjoy it.

Hopefully this will help to explain the necessity for the continuation of the centralised functions of the WIA amongst which are representations and dealings with 'Central Office' of the Radio Frequency Management Branch and other Government Depts., etc., IARU matters, all relations with overseas amateur radio societies, Intruder Watch, Federal Contests and Awards, Project Australis, WIA YRCS and others.

The Divisions, as we have seen, look after amateur radio affairs within the respective States and Territories.

Each Divisional Council controls and manages a number of important local matters. Amongst these are dealings with the respective State Radio Branches on State affairs such as local repeaters, Amateur Advisory Committees (which are most important arbitrators, as it were, between the individual and the Radio Branch) and the acquisition and sale to members of disposals, components and equipment.

Many of the Divisions conduct their own classes and courses to prepare people for amateur examinations in theory, regulations and morse code. Some clubs also carry out these functions on their own account. Another local function is the QSL bureau both inwards and outwards for the benefit of members. This has assumed increasing importance as the postage rates go up.

Each Division conducts a broadcast at specified times to disseminate news and items of interest for country members and interested listeners. The broadcasts are usually done on Sunday mornings on most of the lower HF amateur bands as well as on VHF. Every Division issues a bulletin or news sheet (often times as an insert in AR) covering items of Divisional interest so as to free the pages of AR for technical articles and matters of general, as opposed to local, interest.

Yet another important function of Divisions (and indeed the radio clubs as well) is to provide a focus for numerous social activities, lectures, specialised groups, field events and so on. Indeed, the larger Divisions own or rent their own central premises and in two cases have an office manned by a paid clerical assistant.

The Divisions also provide certain other facilities devoted to the advancement and

betterment of amateur radio for their members. One specific item worthy of mention is advice or assistance if an amateur encounters interference problems or difficulties in getting planning permission to erect masts and aerials.

Amateur radio is a truly world-wide activity enjoyed by almost a million people in their own homes, in their 'shacks' on remote islands, as amateur stations in their own cars, boats or caravans, aboard ships at sea and aircraft in flight, through amateur radio's own satellites in orbit and even on foot.

Amateurs represent a wide cross section of the public and are always ready to swing into action for emergencies and disasters. A truly magnificent leisure activity for young and old alike.

## ASJA AWARD

The Publications Committee has pleasure in advising that the winner of the ASJA Award for 1975 is Mr. Bill Rice VK3ABP for his article "On Eyre" in the August issue.

## MAGPUBS

- New subscription rates announced for HAM RADIO
 

1 year	.....	\$7.75
3 years	.....	\$17.00
  - The new rate for NZART's BREAK-IN is —
 

1 year only	.....	\$5.20
-------------	-------	--------
  - VHF Communications: 1969 and 1970 issues are now out of print and not available. It is not known if a re-printing is intended.
 

The price of binders is now \$2.25 each plus postage 60 cents.

Postage rates for single issues of past years is now 40 cents (60 cents for 4 issues in one parcel). No specials are available.
  - Other magazines on direct subscription by surface mail —
 

	1 year	3 years
QST	8.50	25.50
Radio Communication*	8.00	—
CQ	6.50	14.50
73	7.00	13.50

VHF Communications  
1976 price not yet notified but will accept at \$5.00 (Air Mail \$2.00 extra).

CQ-TV\* 2.50 —

\*Please ask for membership proposal form
  - AR is available to PNG subscribers and WIA members by Air Mail on pre-payment of \$14.00.
  - Numerous back issues (from March 1972) of AR are available to members on pre-payment — please send s.a.s.e. for details.
- PLEASE WRITE TO W.I.A. P.O. BOX 150 TOORAK, VIC., 3142 FOR DETAILS AND LISTS.

# CONVERTING THE FT401 TO 160 Mx AND 11 Mx

R. R. Cook VK3AFW  
7 Dallas Ave., Oakleigh, 3168

This article will show owners of the popular FT400/401/560/570 series of transceivers how to make their rig even more versatile. Two simple but effective procedures are described to allow the FT401 to be used on 160 Mx and 11 Mx. The procedure for the FT401 can be used on similar Yaesu transceivers such as the FT400 and the FT570. The operation on the other five bands is unaffected and no holes need be drilled.

## GENERAL REMARKS

Two sets of step by step instructions have been devised to allow even an inexperienced owner to easily and quickly convert his FT401. Before presenting these instructions, which are self-explanatory, a few general comments need to be made.

Firstly, the part numbers quoted apply to the author's FT DX 401. Owners of other models should check their circuit diagram before proceeding. Although it is possible to improve on the conversions described here, it is likely that few amateurs would be prepared to go to the trouble necessary for what may be considered marginal advantages. For example, only the smaller sections of the pre-selector tuning capacitor are used on 1.8 MHz and this allows only an 80 kHz coverage. In VK, however, this does not seem to be a problem worth worrying about as there is still adequate gain to copy ZL stations above 1.9 MHz.

The 11 Mx conversion requires only a crystal and a few short lengths of wire. A light duty soldering iron, a Philips head screw driver, and a pair of side cutters are

the only tools required. This conversion represents a good starting point for anyone who is afraid that he may spoil his new transceiver. It will take you about an hour and you will find it easy to make a very neat job. Use insulated wire for the links and keep all wiring away from the chassis as some of the links carry quite high voltages.

The 160 Mx conversion may take three or four hours and requires the addition of three coils and seven capacitors as well as some wire and a crystal. Both crystals were obtained from Max Howden and the coil formers from Bail Electronic Services.

These formers should be obtained complete with slug and mounting clip. Alternatively, broadcast band coils could be used if of a suitable size and if they can be adjusted to resonate at 2 MHz with 220 pF across them. This will probably require stripping off a few turns. The coils described in the conversion can be made to resonate from 1.6 to 2 MHz by adjusting the slug.

It would be preferable to use close tolerance silver mica capacitors throughout.

However, they may be difficult to buy now and, unless you are very lucky your junk box will not have all of the required values. Styrofoam capacitors are recommended for the low level stages such as the RF amplifier, mixer and driver tuned circuits. The capacitors around the final loading circuit have to carry large circulating RF currents, and this should be kept in mind when choosing them. Under no circumstances use paper dielectric capacitors anywhere in the conversion. The 600 pF 1.5 kV ceramic capacitor was obtained from Bail Electronic Services. Suitable mica capacitors may still be available through disposal sources. Check all these capacitors before installation, however.

On 160 Mx the controls do not peak as sharply as on other bands. This is brought about by the bandspread effect associated with this conversion. The preselector covers only 80 kHz on 1.8 MHz compared to several hundred kHz on 3.5 MHz, thus more degrees of rotation are necessary to tune less kHz.

Although this may not apply to all units it was found necessary on the author's unit to shift the 80 Mx tank tap as described in step 13 of the 160 Mx conversion. It appears that the shorted section of the 160 Mx tank reduces the 80 Mx inductance slightly.

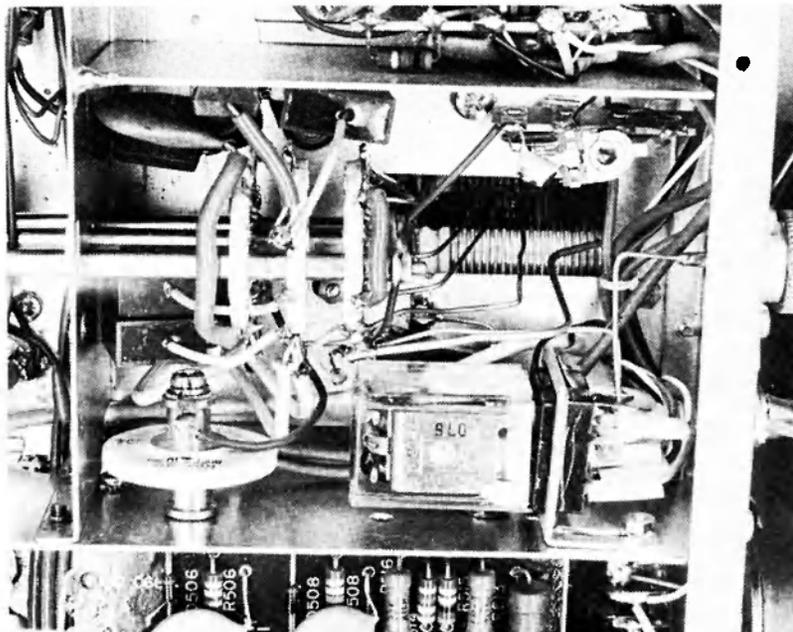
On the 11 Mx band the correct VFO scale is the black 0-500 one while on 160 Mx the red 500-1000 scale is the appropriate one.

## PERFORMANCE

The on-the-air performance is excellent on 160 Mx and adequate on 11 Mx. No loss of performance on the other five bands occurs as a result of the conversions. Output power on 160 Mx was measured at 300 W PEP, the same as on 80 Mx. Noticeably lower input and output occurs on 11 Mx; however this does not seem to be of practical significance.

The reduced performance on 11 Mx is partly due to imperfect tracking of the ganged tuning capacitors over the range 27-30 MHz. If new coils were added for the receiver RF and mixer circuits and for the PA driver circuits, improvements in sensitivity and increased PA drive would result. However, for all but the most enthusiastic 11 Mx operator, the conversion described here should be adequate.

It is possible to increase the receiver and transmitter sensitivity on 160 Mx by increasing the value of the capacitor referred to in step 5, but unless the coils referred to in steps 7, 8 and 9 are shunted with resistors of about 20k ohms, the 'S' metre will give exaggerated readings and the carrier rejection figures will be degraded.



## WARRANTY

Both conversions have been discussed with the Australian Agents for Yaesu. Although no major criticism was made of either conversion (some helpful suggestions were made regarding this article), it was pointed out that any modification to a set by anyone other than the agents would make the 90 day warranty void.

In the unlikely event of a constructor experiencing technical difficulties with either conversion, the author would be glad to correspond with him.

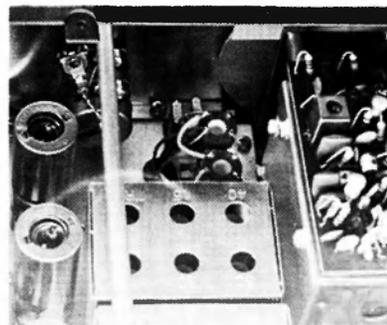
## 11 Mx CONVERSION

1. Remove top panel.
2. Turn transceiver upside down on a towel or blanket spread on the bench. Remove the bottom panel.
3. Check that the AUX 1 crystal socket is wired to switch wafers S1a and S1b. (Note: Switch S1 is the BAND switch. Wafer "a" is nearest the front panel. Wafer "i" is not used and is located in front of wafer "h". That is, the positioning of the wafers from the front panel going towards the back is a, b, c, d, e, f, g, i, h, j, k, l, m).
4. Link AUX 1 contact to 10D contact on switch wafer S1c. This allows the 10 Mx crystal oscillator coil to be used for 11 Mx as well.
5. Wire in links from the AUX 1 contacts to the 10D contacts on switch wafers S1e, S1f, S1g, S1h, S1j and S1m. This connects the 10 Mx coils for the RF amp., mixer, driver and PA stages into circuit when the AUX 1 switch position is selected.
6. Turn transceiver up the right way and fit a 11.007 MHz crystal into the crystal socket (on the top of the chassis) furthest from the side panel. (V2 operates as an electron coupled tripler to 433.020 MHz. The equivalent shunt capacitance across the crystal is about 20 pF). A pair of tweezers may help as the crystal is a small type K and the sockets are placed close to the front panel.

7. Set BAND switch to AUX 1, connect a dummy load, switch the set on and allow 10 minutes warm up.
8. Set the LOADING control to 4 and the PLATE control between the 10 and 15 positions.
9. Turn up the audio gain, switch on the 25 kHz calibrator, and tune to the 27.125 MHz signal. Peak the preselector for maximum signal from the calibrator. Now peak using trimmer TC1108 (far left corner of pcb holding group of small trimmers under chassis near S1). This trimmer tunes the 33 MHz crystal oscillator plate circuit to resonance.
10. Switch to TUNE mode and advance MIC GAIN CARRIER control to obtain 100 mA plate current. Check that PRESELE control is at position that gives maximum current. Adjust PLATE and LOADING controls to obtain maximum output. Switch to receive. The conversion is now complete. Replace top and bottom panels. Connect a suitable antenna, trim all controls for optimum operation and start working those new stations.

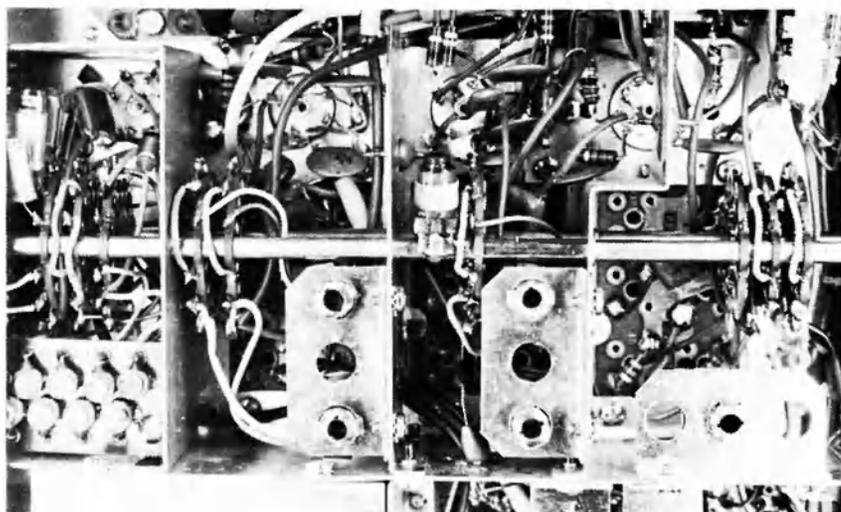
## 160 Mx CONVERSION

1. Remove top panel.
2. Turn transceiver upside down on a towel or blanket spread on the bench. Remove the bottom panel.
3. Check that the AUX 2 crystal socket is wired to switch wafers S1a and S1b. (Refer to note in step 3 of 11 Mx conversion).
4. Wire a link from the AUX 2 contact to the JYJ/WWV contact on wafer S1c. This allows the JYJ/WWV crystal oscillator coil to be used for 160 Mx.
5. Add a 220 pF 600 V styroseal capacitor across TC1109. Solder one end to the earth tag near the tube socket and the other end to the AUX 2 contact on S1d.
6. Wind 3 new coils each of 55 turns using No. 42 SWG enamelled copper



wire. (The gauge size is not critical and thicker wire could be used). Use nail polish to secure the windings. Leave 15 mm of space at the top of the former. Add a winding of 10 turns to the antenna coil. Wire a 220 pF 600 V styroseal capacitor across the main winding of each coil.

7. Remove the screws holding the coil bracket in the same compartment as switch wafers e and f. Relocate existing trap coil in left hand hole and mount new 160 Mx antenna coil in the right hand hole. Wire the common earth connection of the new coil to chassis (the large copper area of the pcb). Wire the antenna link to the AUX 2 contact of S1e and the top of the main winding to the AUX 2 contact of S1f. Replace bracket.
8. The new mixer coil is fitted into the next compartment in a similar manner. Solder one end to the AUX 2 contact of S1g and the other end to the + 180 V rail on the pcb. (Again this is the large copper area).
9. Fit the new driver plate coil into the compartment of wafer h. Connect one end to the AUX 2 contact of S1h and the other end to the + 300 V supply rail on the pcb.
10. Wire a 390 pF 600 V styroseal capacitor between the AUX 2 contact of S1j and the earth lug on the chassis. This is part of the 160 Mx PA neutralising circuit.
11. Solder a 600 pF 1.5 kV disc ceramic capacitor from the AUX 2 contact of S1k to ground. There is a self-tapping screw near the left front corner of the compartment which is well placed. Fit a tinned earthing lug under it for the 600 pF capacitor. You will need this earth point again later. This capacitor is in parallel with the PA tuning capacitor on 160 Mx.
12. Remove the antenna change over relay from its socket. Remove the 1000 pF capacitor (C86) which is wired to the 80 Mx contact on S1m. Connect a 500 pF 600 V mica or similar capacitor in parallel and connect the combination to AUX 2 contact of S1m. A single 1500 pF capacitor may be used if desired. This increases the loading capacitance of the PA pi network.







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Frequency Ranges:

Bands (meters)	Frequency (MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
WWV	15.0



**Mode of Operation:** LSB, USB, CW and AM  
**Input Power:** 180 Watts OC INPUT SSB & CW  
 90 Watts DC INPUT AM

**Carrier Suppression:** 50 dB  
**Sideband Suppression:** 50 dB at 1,000 Hz  
**Spurious Radiation:** Down 40 dB or more  
**Distortion:** Down 35 dB or more  
**Microphone Impedance:** High  
**Modulation Method:** Balanced modulation (SSB)  
 Low power modulation (AM)

**Transmitter Frequency Response:** 300 to 2,700 Hz (down 6 dB)  
**Frequency Stability:** Less than 300 Hz drift in starting  
 Less than 100 Hz drift or less after 30 minutes of warm up

**Antenna Output Impedance:** 50 75 ohms unbalanced  
**Receiver Sensitivity:** 0.3µV S/N 10 dB (at 14 MHz) SSB CW  
 1µV S/N 10 dB (at 14 MHz) AM  
**Image Interference Ratio:** -50 dB and more (at 14 MHz)  
**IF Interference Ratio:** same as above  
**Receiver Selectivity:** SSB/AM  
 2.4 kHz at -6 dB and  
 4.0 kHz at -60 dB  
 CW  
 600 Hz at -6 dB and  
 1.5 kHz at -60 dB

**Audio Output:** 2.5 Watts or more  
 (10% distortion at 4 ohms load)

**Audio Output Impedance:** 4 ohms  
**Power Source:** 100/110/117/200/220/234 Volts  
 AC 50/60 Hz  
 13.8 ± 10% DC  
**Power Consumption:** AC: 350 VA at the maximum final input  
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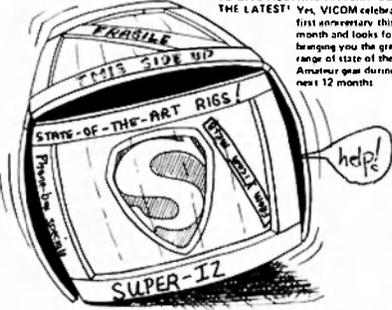
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13. Locate the tinned copper lead from the 80 Mx tap on the final tank inductance. Clip it off where it connects to the wiper of S1m. Unsolder the other end from the 80 Mx tap. Using a screw driver, press the 80 Mx tap turn down in line with the other adjacent turns. Straighten out a paper clip and make a small 90° "hook" at one end. Using a pair of long nose pliers push this hook between the 80 Mx tap and the next winding (toward the back). Pull the next turn up to form the new 80 Mx tap. That is, we increase the 80 Mx PA tank by 1 turn. Tin the new tap and reconnect the 80 Mx lead. Solder the other end of this lead to the 80 Mx contact of S1m.
14. Wire in a new link of 16 or 18 SWG tinned copper wire from the far end of the tank coil to the wiper of S1m. We now have our new 160 Mx tank circuit.
15. Lift the lead from the half of the loading capacitor connected to the 80 and 40 contacts of wafer S11 to the wiper of S11. This means that both sections

- of this capacitor are in parallel on all bands. A slight change in the position of the LOAD control will be noticed on all bands.
16. Cut the link between the 40 Mx and 80 Mx contacts on S11. Wire in a new link between the 80 Mx and AUX 2 contacts. This keeps the 40 Mx loading capacitance at its original value and allows the 80 Mx loading capacitance to be used on 160 Mx as well.
  17. Wire in a 1500 pF 600 V mica capacitor from the 80 Mx contact of S11 to ground. Use the earth lug installed previously. This restores the capacitance of the PA pi network loading circuit to its original value.
  18. Replace the antenna change over relay.
  19. Plug in a 7.520 MHz crystal. (Refer to step 6 of the 11 Mx conversion). Use the socket nearest the side panel.
  20. Set the BAND switch to AUX 2, connect a dummy load, switch the set on and allow 10 minutes warm up.
  21. Turn the audio gain up, switch on the 25 kHz calibrator and tune to the 1.825

- MHz signal. Set the PRESELE control to 2. Peak signal to a maximum by adjusting the slugs in the RF and mixer coils. It should now be possible to peak the calibration signals from 1.800 MHz to 1.875 MHz using the PRESELE controls. If not, set slugs to peak at 1.800 with PRESELE fully in. Repeat PRESELE on 1.825 MHz. Peak 'S' metre indication of calibrators signal using TC1109. This adjustment is quite broad and is not critical.
22. Switch to TUNE mode and advance the MIC GAIN CARRIER control to obtain 100 mA plate current. The gain control should be in about the same position as for 80 Mx. Peak drive using driver plate coil slug. Check that PRESELE control is at (or very close to) position at which maximum drive is obtained. Adjust PLATE and LOADING controls to obtain maximum output. Switch to receive. The conversion is now complete. Replace top and bottom panels. All you need now is an antenna and probably an antenna coupler. (Start looking up those back issues of AR). ■

# DC AMPLIFIER FOR SWR BRIDGE

Cor Hagoort VK5YH  
18 Gilbert St., Ingle Farm, S.A., 5098

This project originated when the author wanted to use on HF, the VHF microstripline SWR bridge published in Electronics Australia April 1971. The coupled line length of 4.5 cm does not produce sufficient output voltage on the HF bands. The answer is to use a DC amplifier to amplify the voltage from the SWR bridge and the popular 741C IC operational amplifier was chosen to do the job.

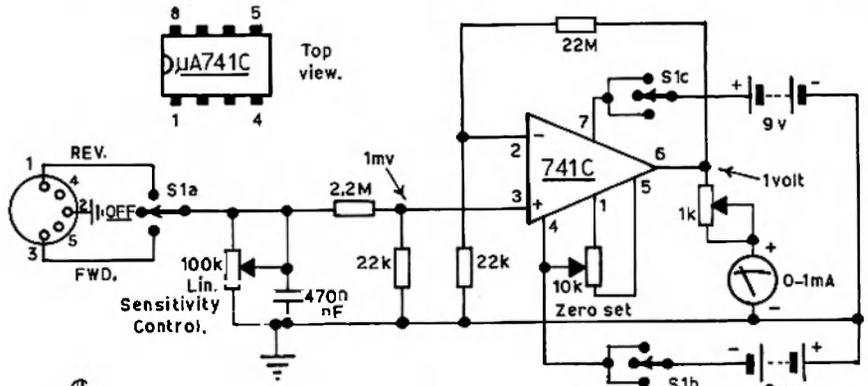
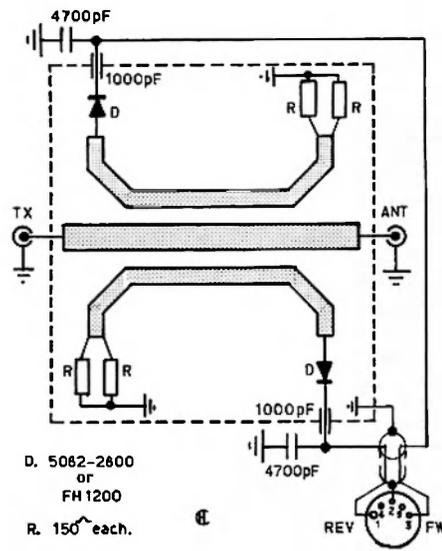
Full scale deflection of the 1 mA meter was easily obtained right down to 40 m. In fact when operating a 250W PEP input transmitter on 40 m, it was necessary to turn the sensitivity control back to half its maximum setting. Even on 80 m it is possible to get nearly full scale deflection.

The 100K linear potentiometer which serves as the sensitivity control is in series with the hot carrier diode and improves the

linearity of the diode output. It must be stressed that the unit must be completely shielded. (Yes, even the 1 mA meter.)

If this is not done the IC will pick up any RF floating around the shack and this will result in full scale deflection of the 1 mA meter.

A 0.1V signal from the SWR bridge will be reduced to approximately 1 mV by the voltage divider made up of the 2.2 m isolating resistor and the 22K resistor between



pin 3 and earth. The gain of the 741C has been set at 1000 by means of the 22 m feedback resistor. Consequently the 1mV input at pin 3 will be amplified to 1V output across a 1K load at pin 6. The 1K load is made up of the internal resistance of the 1 mA meter and the 1K trim pot.

It is possible to increase the sensitivity 10-fold by reducing the 2.2 m isolating resistor to 220K. If this is done however the zero indication of the meter will vary slightly when the setting of the 100K sensitivity control is varied.

NOTE: Printed circuit boards for both the 50 ohm and 75 ohm versions of the microstripline SWR bridge are obtainable from the Victorian Disposals Committee. ■

DC AMPLIFIER FOR S.W.R. BRIDGE.

# THE X BEAM

## A MONO BAND ANTENNA FOR 20 METRES

Sam D. Kaufman VK2SK  
23 Isobel St., Belmont, 2192

Here is an article on what must be the cheapest way of getting your DXCC. It describes the X-Beam, a \$20.00 antenna that puts more "sock" into your signal than a linear.

This article was received as one of the technical editors, VK3AFW, was preparing a similar article. Portions of this latter article are also included here.

The following is not meant to be a Technical Report on X-Beam antennae as there is still much room for experimental work that can be carried out to evaluate more completely its operational potential. Therefore, here are my own experiences, supplemented by the fact that many others, "DX-getters", work this type of antenna with excellent results.

I was compelled to write this article because I feel that the X-Beam antenna is not as widely used as it should be.

Perhaps it is because of the little publicity given to this type of antenna in Australia for the last decade or so. Therefore, if I succeed in stirring some much deserved interest in X-Beam antennae, then my efforts in writing this article would be worthwhile.

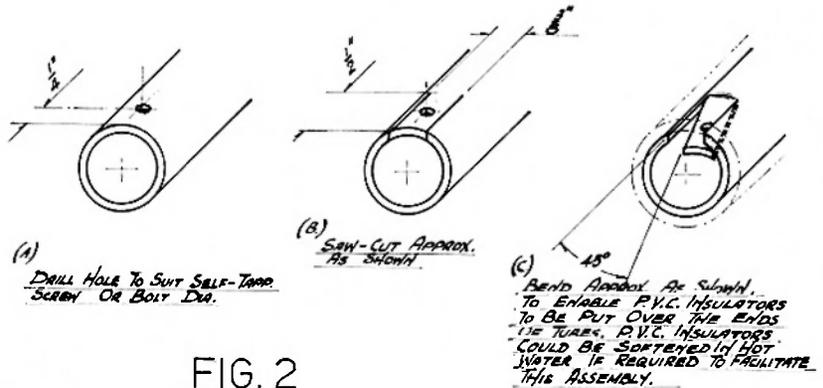


FIG. 2

Due to its comparatively low cost, the X-Beam antenna is referred to as "The poor man's beam". But its performance is by no means poor. Low cost and high performance make this aerial an attractive choice for construction by radio amateurs.

Needless to say, I make no claim for the originality of X-Beam antenna. It is a well-known fact that in the early days of TV in England the X-Beam antennae were used (in the fixed vertical plane) in very large numbers and with great success.

### DESCRIPTION

The X-Beam is a two element 14 MHz beam without a boom. The forward gain

compares very favourably with the usual tri-band 3 element beam. The two elements are supported at the centre and are bent to form two back-to-back Vee shapes. This is shown in Fig 3. The majority of the antenna current flows in the aluminium tubes which have low resistance. Wire "tails" are added to the tubular elements to resonate the beam. The losses in the antenna are lower than would be the case with a wire beam, and much lower than trapped antennae.

Excellent matching can be made to either 50 or 75 ohm feeders.

The antenna may be tuned for maximum forward gain (about 8-9 dB) or for maximum front to back ratio (12-30 dB).

It is not necessary to spend hours tuning it, as adequate performance will be obtained by using the dimensions given in Fig 3.

The construction produces optimum average spacing between the elements and enhances the gain due to the Vee structure.

### CONSTRUCTION

There is more than one way to start building an antenna such as described here. From my own experience I would suggest a start at the centre piece or the Hub Assembly if you would prefer to call it that. The centre piece could be made by welding four 1" angle irons each about 6" long, at 90° angle to a cylindrical hub with a hole in its middle for locating and fixing a mast or an adaptor tube through it. In this case, provision also must be made to clamp the insulated ends of the Radial Arms tubing to the centre piece angle irons and to weather-proof such an assembly. On the other hand, you may wish to please your neighbourhood and make a neat job out of it by purchasing the Centre Piece Hub Assembly complete with the tube insulators and clamping bolts. This CPH assembly was specifically designed and developed just for such a purpose. Made in two

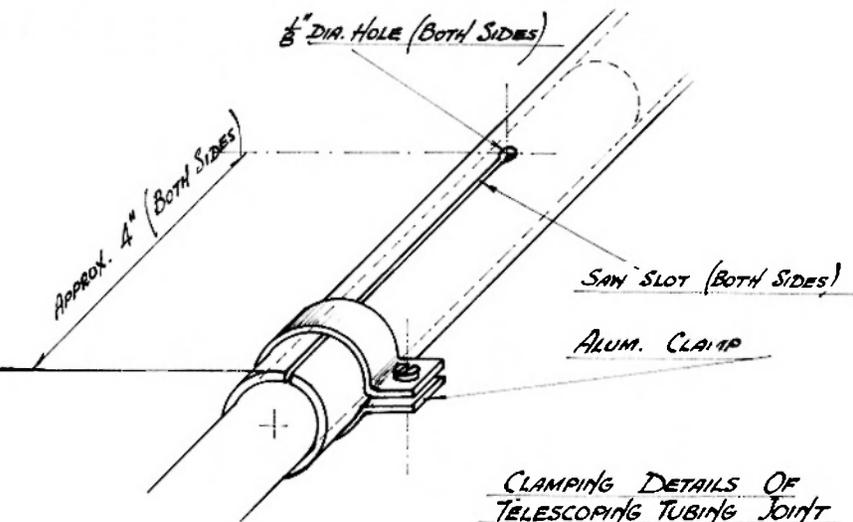


FIG. 1

halves, which are cast in aluminium alloy, the halves are clamped together with (4)  $\frac{3}{8}$ " diameter galvanised steel bolts.

The whole assembly weighs only  $3\frac{1}{2}$  or  $4\frac{1}{2}$  lbs., depending on the size of hole to suit your mast or adaptor tube diameter. (This could vary from 1" to 2" in diameter). To the best of my knowledge, such Centre Piece Assemblies are still being made and are available at what I consider very reasonable prices. (See advertisement in AR July 1972, page 19 — Utility "X" Castings, P.O. Box 55, Smithfield, 2164).

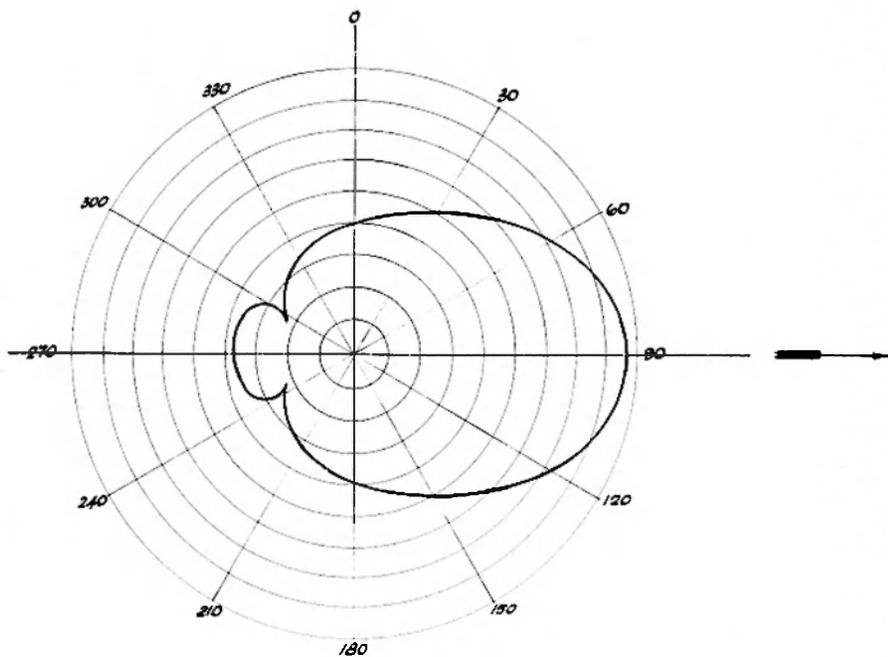
The X-Beam uses a driven element and a director. The linear length of both elements being slightly longer than similar elements in a conventional Yagi aerial. The driven element and the director are fixed securely in the form of two Vs, back-to-back by a centre piece spacing at 90° angle. The total assembled length of each radial arm tubing being 13 feet long. Hard drawn aluminium tubing is best suited for arms construction.

If a "King Post", say 3 feet high and  $\frac{3}{4}$ " OD light gauge tube, is fitted at the top of the Centre Piece to carry four nylon fishing line stays, then the tubing used for the radial arms could be of lesser diameter than when used without stays to support it.

A proven combination of tubing diameters and length used for each of radial arms is:  $\frac{5}{8}$ " OD 12 feet 6" long tubing telescoping into  $\frac{3}{4}$ " OD. 12" long at Centre Piece end. Note that 6" extra length is required to telescope into larger diameter tube on assembly.

If constructing an antenna without the "King Post" and stays, then another proven combination of tubing diameters and length used is  $\frac{1}{2}$ " OD x 4 ft. 6" telescoping 6" into  $\frac{3}{8}$ " OD x 4 ft. 6" telescoping 6" into  $\frac{3}{4}$ " OD x 5 ft. long tubing.

The total assembled length of the radial arms being 13 ft. In either case.



HORIZONTAL RADIATION PATTERN OF AN "X-BEAM" AERIAL

FIG. 4

It is just as well to mention here that in the latter case free radial arms (i.e. without supporting stays) would give about one foot of droop from horizontal but this does not seem to have any detrimental effect whatsoever on performance of the aerial. An even simpler construction uses  $\frac{7}{8}$ " OD tubing of 13 ft. length for the radials. (Support is mandatory here VK3AFW).

Anodised aluminium tubing should be stripped of anodic film where required to make a sound electrical contact.

There are several ways to securely fix a joint of radial arms tubing.

If the telescoping fit in a tubing is very tight, then it will be sufficient to drill a hole of suitable diameter right through the joint and then fix two short stainless steel self-driving screws per joint.

On the other hand, if the telescoping fit is a bit on the slack side, and length adjustment for tuning purposes is desirable, one can clamp the smaller tubing inside the larger diameter slotted tubing. (Refer details Fig 1). All telescoping joints must be thoroughly sealed for weather protection by painting on a suitable varnish or caulking compound when finally assembled.

Radial arms insulators are cut from PVC or nylon tubing having a suitable inside diameter, approximately 4" or 6" in length (4) pieces required. The thickness and quality of the RF insulation is not critical, as this is a low voltage point.

The tapping of radial arms at centre piece ends could be affected as suggested by referring to Fig 2, or any similar arrangement. The radial arms of the Vs being extended and folded back to form 'tails' of the required length for resonance. (Refer Fig 3). Outside ends of the radial arms could be tapped in any convenient way. Again special care has to be taken to protect all joints from water and so prevent galvanic action which may set in when using dissimilar metals for making wire 'tails', brackets and bolts, especially if these parts are made of brass or copper.

Perhaps it would be of interest to note here that it is possible to forgo the use of the wire 'tails' altogether. Naturally, such an arrangement requires corresponding length compensation of radial arms tubing instead.

Some X-Beam enthusiasts, like Mr. Andy Adie ZL30D, favor straight arms — no tails

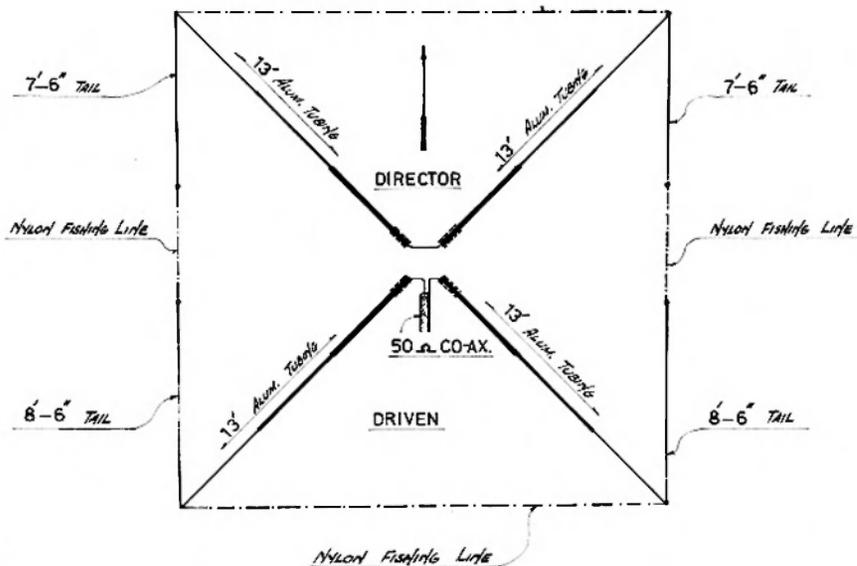
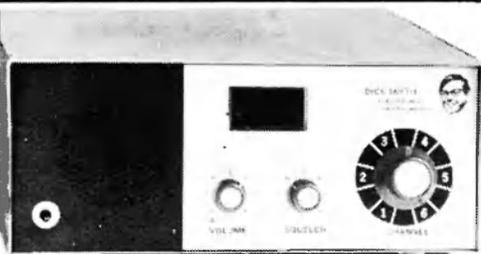


FIG. 3





## Latest 'Dick Smith' 5 watt Base Station:

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The available B 5060 Transceiver gives the advantage of both mobile and base stations in one unit. As a base station you can plug in any of 24V or 12V batteries or use mains. Plus you can have a battery for emergency standby. As a mobile unit you simply connect up your 12V battery. Could this set be more versatile?

**\$140**

**SPECIFICATIONS** 15 transistors 15 diodes. 6 channel capacity. 50cm antenna. 12 to 16V nominal supply or 240V ac. 500/2000 Ohm impedance. 8 ohm speaker. 10W output with 100% duty. Selectivity 50kHz down at 10kHz. Automatic Noise Limiter. 1.5W audio output. 455kHz IF. Power consumption Rx 200mA @ 13.8V, TX 900mA without mod. Transmitter output SW frequency tolerance 0.005%. Signal strength and power meter. Mic has built-in matching transformer. Model 84050 AC/DC unit is supplied complete with hand-book, circuit, installation instructions and a full set of crystals. Additional Channels \$6.50 each. Specify frequency.

## MULTI 7 -- 2 METRE FM TRANSCEIVER

Complete with channels 1,2, 3,4,5,6 and 7. Antirept 1,2,3, 4,5,6 and 7. Simplex 40, 50 and 60. Sensitivity 1 uV for 30 db S/N Radio. Power input 10W.

CAT No. D3007 \$269.



## Experimenters Crystals

We have a large range of local frequency crystals that could suit numerous applications. Crystal frequencies are: 27 320, 27 330, 27 340, 27 390, 27 400, 26 865, 26 875, 26 885, 26 835 and 26 845. These crystals are \$2.50 each or \$4.00 per pair.



## UHF COAX FITTINGS

Plug PL.259 . CAT No. P2310 \$ 1.20 each or 5 for \$ 5.00.  
Reducing Adaptor, CAT No. P2360 \$ 0.40 each or 5 for only \$ 1.75.  
Socket SO-239 CAT No. P2340 \$ 1.20 each or 5 for \$ 5.00  
Joiner PL.259 / PL.259 CAT No. P2380 \$ 1.60 each or get 5 for only \$ 6.50.



**\$9.00 PAIR**

## CRYSTALS

VHF 2 Meters FM -- suit IC-22 FT-2FB, KP.202. Presently in stock are crystals for the following channels : Repeaters 1,2,3,4,5,6 and 7. Simplex 40 & 50. IC-22/FT.2FB CAT No. D6340 \$ 9.00 per pair or \$ 8.50 for two or more pairs. KP.202 CAT No. D6310 \$ 9.00 per pair or \$ 8.50 for two or more pairs.



**\$3.50**

## LIGHTNING ARRESTER TYPE ALA-1500

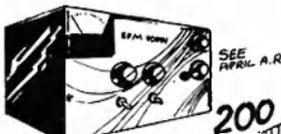
Prevents overload from damaging Radio Equipment. Connects between coax cable lead-in and equipment. Has grounding log, standard PL-259 threads. CAT No. D7152 \$ 3.50



**\$2.50**

## DUMMY LOAD TYPE ADL-1600

5 Watt capacity, for testing and aligning equipment. Perfect 52 Ohm match, standard PL.259. CAT No. D7022 \$ 2.50



## SSM EUROPA B 10M - 2M SSB TRANSVERTER

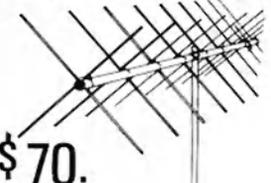
The Europa B is a linear transmit and receive transverter 28-30MHz in 144-148MHz. It is suitable for use with either a transceiver or a separate receive/transmitter. It is ideal for Oscar operation as well as normal tropo work. Although its primary use is for SSB, it will receive and transmit any mode of which the H.F. equipment is capable: SSB, AM, CW, FSK, FM. Once attached to your H.F. equipment, you operate it exactly the same as on the H.F. bands, the Europa B does the rest.

**\$229.00**



## PORCELAIN INSULATORS

SIZE: 1" x 3/4" \$ 1.30  
2" x 1" \$ 1.20  
2 1/2" x 1 1/4" \$ 1.20  
or buy 10 for only \$ 11.0



## 2 METRE ANTENNA EXTRA SPECIAL PRICE !!

9Y2 DXW, 144-148 MHz 9 element Yagi specially designed for Oscar use. CAT No. D4609 AT SPECIAL GIVE AWAY PRICE OF ONLY \$ 70.00 (P & P Road Freight On)

## KAMODEN 360TR MULTIMETER

Transistor checker/multimeter 34 ranges. 5" mirror scale. 8.5uA 10A ac & dc. 10k to 500 ranges. Vpk 0.05 to 510.50 250.1kV. Vxk 0.5 10.50 250.1kV. Avc 0.10 25.500A @ 5.50V 500mA 10A. I ac 0.10A. Ohm 0.5 50k. 5.50M. Size: 180 x 140 x 80 mm. Complete with test leads. **\$45.**



## WILLIS AUTOPHONE U432-5

comes complete with microphone chrome mounting kit, 2 set of high quality crystals & 90 day factory warranty. CAT No. D3432 \$310. **SPECIFICATIONS:** RF power output 45 watts - 12V DC negative ground (max). Rx Sensitivity 0.5 uV for 20 dB quieting. Weight 3.2kg. Height 4.8cm. Width 19.6cm. Depth 20.2cm.

Inc. Rep. 1 & Simplex



**\$310**

## HAM VISION SS-727M SLOW SCAN TELEVISION

1- Receives standard Ham SSTV & Fast TV. 2- Just plug into jack/spkr socket. 3- Provision for remote spkr. 4- Complete station control for SSTV. 5- 240V AC operation. Camera not included. CAT No. D2875 \$ 598.



**\$598**

## LEADER RF IMPEDANCE METER

At last, an accurate calibrated impedance meter for series & shunt impedances. Measures impedance from 0 ohm to 1K Ohm with accuracy markings at 50, 75 & 300 ohms. Frequency range 10-150 MHz. Simple use - in conjunction with ac RF signal source (50 P.P. sig. gen. transmitter etc.) for accurate impedance measurements. Operates from internal 0.5 watt battery (supplied). Dimensions 175H x 65W x 60D (mm). Supplied complete with 50 ohm calibration resistor and circuit.



**\$72.50**

## ANTENNA COUPLER

The unit is solidly constructed ceramic double bearing tune and load capacitors and band switch.



**\$147.50**

Antenna Tuning Unit - Model HC 500 Bands: 80, 40, 20, 15, 11, 10 Meters. Input Impedance: 52 Ohm. Output Impedance: 10i to 600i. Max. Power 500 Watts.

## H. MOUND HK 705 MORSE KEY

Frankly, the instructions are in Japanese, but we can tell from diagrams that this key has real built-in bearings. It is beautifully made and a delight to use. Heavy duty construction throughout. Set in an adjust spring bracket. Works into 180mm x 90mm x 65mm high. A really professional key.



**\$19.75**

AR22L Antenna Rotator. Die-cast construction to take 2,6 & 20M beams. Complete with control box. 2% accuracy only requires 4 wire connection.



**\$59 good value**



**DICK'S HAMS** Richard (Dick) Smith VK2ZIP (Managing Director)  
Ike Bain VK2AIG (Manager)  
Sandy Bruce-Smith VK2AD/T (Communication Manager)

**SPECIAL NOTICE** ICOM TRANSCEIVERS Unfortunately been cut off from ICOM in Japan, who are RAISE our selling price, ( we refused ) had deal exclusively with VICOM.

**YAESU**

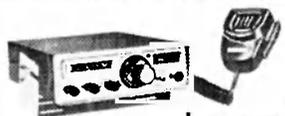
**NOW IN STOCK!**



**FT-101ES  
AT  
\$660**  
YES THE FAB  
NEW "E" Model

**FT-101E THE VERY LATEST OF THE 101 SERIES**  
With speech processing and many many more features.  
Includes FULL 10 metre coverage  
**\$660** Includes Mic & all cables IP & P Road Freight On

**FT-101ES SPECIAL FOR NOVICE OPERATORS**  
The above unit is available to comply with your requirements.  
Unit comes complete with G crystal locked Transmitter frequency  
& can be modified for general use  
**\$660** includes Mic & all cables IP & P Freight on



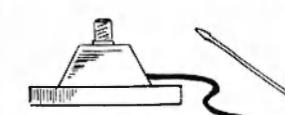
**\$315**

**NEW 2 METRE FM TRANSCEIVER**  
Digital 2M FM. Fully synthesised so no more crystals needed. 10Hz dial up capability from 146 to 148MHz. 600kHz up/down repeater capability. Powerful 2W audio output. Full 10W R.F. output. Operates from 12V DC.



**\$87.50**

**LEADER G.D.O. LDM-815**  
Covers frequency range 1.5MHz to 250MHz in six ranges. Inbuilt modulation and free battery. FANTASTIC VALUE!  
CAT No. Q1322 \$87.50



**MAGNETIC BASE**  
Accepts standard PL.259 plug. Complete with 10' of 52 coax and plug.  
CAT No. D4622 **\$25.**



**NEW \$22.50**

**GA-6020 WHIP ANTENNA**  
1/4 wave on 6M, 5/8 wave on 2M antenna. Uses standard standard PL.259 plug.  
CAT No. D4620 \$22.50



**\$6.50 FOR CRYSTALS**  
11 Metre Band in matched TX/RX pairs. Type K holder. 27.015, 27.035, 27.065, 27.085, 27.105, 27.125.  
ONLY \$6.50 per pair.



**AIR DUX COILS**  
Now there's no excuse! You can easily make antenna loading units and high power links with our high quality air dux coils. Each coil is separately boxed with an incredibly simple chart which shows at a glance the turns No inductance capacitance necessary for resonance at any frequency.

No	Diam (mm)	Wire Diam (mm)	Pitch per Turn	Price
200816	70	0.8	1.6	\$3.40
401016	40	1.0	1.6	\$4.60
402042	40	2.0	4.2	\$4.95
602042	60	2.0	4.2	\$6.50

**HAM HIGH QUALITY LOW NOISE FET RF AMP MODULES**  
These units are designed to be simply connected between the aerial and receiver of any 10, 6, or 2 metre unit. You can even mount them right at the aerial if you require maximum performance. Input impedance 50-75 ohm. noise factor 5-6 db. 20-30 db. operating voltage 9-12 VDC @ 15 MA. Dimensions 70mm x 30mm x 15mm. Fully wired & tested. Circuit supplied, only 4 connections required.

FRB-27 (CB)	27-29 MHz
ERB-6	50-54 MHz
ERB-2	144-146 MHz



**\$18.50**

**HAM 6 & 2 METRE FET CRYSTAL LOCKED CONVERTERS**  
These beautiful little high performance low noise converters are supplied completely wired and tested with high stability crystal to give tuneable 1F output on 28-30 MHz use any communication receiver. Extremely stable and excellent spurs. 50-75 ohm input. Noise factor 5db. gain 30 db. operating voltage 9-12 VDC @ 15 MA. Dimensions 70mm x 30mm x 15mm. Completely tested and pre-aligned. However, further circuits may be simply re-etched to: Top end of hand if you wish to do so. Supplied complete with circuit.

**EXC-6 50-54 MHz  
EXC-2 144-146 MHz**  
**\$27.50 EACH**

**FAMOUS SHINWA RF TVI FILTER 1003**  
In a hard cut front and adjusted low pass filter - output with a wave sheet showing attenuation and VSWR for each individual unit. Typical attenuation is less than 1 db at 28 MHz and more than 25 db at 32 MHz. 52 ohm impedance and a power rating of 100W CW supplied complete with VHF sockets.

**KENWOOD TS520 SSB TRANSCEIVER**  
Month after month Kenwood is proving to be the most popular. 30 db. SSB gain and value equal to all other units. The famous Kenwood quality and value equal for the most SSB set CR on 80 through 10 metres built in A.C. and D.C. power supply. VOX, RT, microphone and all other features you want... all for **\$560** plus freight and

**\$39.50**

**KATSUMI MC701 MICROPHONE COMPRESSOR**  
Yes... up to double your signal strength with very little loss in clarity with this F.E.T. IC compressor. Operates from 6 internal primary cells and is designed with a slip vertical lock to mount inside equipment. Works by the principle of reducing audio peaks of voice modulation thus allowing a higher average level of audio to be used. Specs as follows: 1 X IC (LPC 566) low noise compressor AMPL 1 X F.E.T. 2 x transistors, 2 x diodes. Compression time: 25db max fully variable. Microphone: 100-50K ohms. distortion 1% or less. 10 db output. Freq response: 100-7 kHz - 200-3 kHz with audio filter on. S/N ratio - 60 db. Power: 9 wats @ 15 MA max. Dimensions 50mm W x 170mm H x 110mm D. Complete with circuit and instruction book.  
**\$39.50** Batteries extra

**Sanyo Transceivers**  
**Powerful 5W 6-Channel Hand-Held Transceiver TA395**  
**\$75** TAX INCLUDED  
6 channel capacity, 27.880 fitted. Large 2-1/4" P.O. speaker, speech control and RF power meter. Also external speaker, power, mike, antenna and earphone jack! Power from 10 penlight batteries or rechargeable Ni-Cd batteries. Comes in handsome easy-to-hold weatherproof cabinet with 50' whip antenna.

**SPECIFICATIONS**  
Receiver: Crystal controlled superheterodyne  
Receiving system: 0.5uV at 10 dB S/N  
Sensitivity: 0.5uV at 10 dB S/N  
Search sensitivity: 0.5uV  
Transmitter: 100% (with over modulation limited)  
Modulation: 100% (with over modulation limited)  
RF out power: 5W  
General: Semiconductors  
Frequency control: Crystal  
Channels: 6 channels (1 ch. crystal suppressed)  
Speaker: 2-1/4" sp. 8 ohms, nylon cone  
Weight: 1.4 kg  
Dimensions: 75 x 280 x 87 mm

**Books for the "HAM"**  
A GUIDE TO AMATEUR RADIO \* by Pat Hawker G3VA  
A Guide to Amateur Radio is intended to assist newcomers to learn more about the hobby... and to help them in their choice of equipment. It contains details of the various amateur radio bands, the various types of transmitters, receivers and associated equipment, plus licence details. Every building from an novice must have this book and at only \$2.60!  
**AMATEUR RADIO TECHNIQUES \* by Pat Hawker G3VA**  
A Fantastic book for the home constructor, these are sections on semiconductor Receivers, Transmitters, Aerials and fault finding. An interesting article on the 'Polyphase' methods of SSB operation is given, this method is cheap and easy to get top results with the minimum of parts.  
This book is excellent value at only \$6.50 P&P

**TEST EQUIPMENT FOR THE RADIO AMATEUR \* by H. L. Gibson G8BCA**  
This book will be the best value we presently stock. It covers everything from basic meters to frequency counters, including GPO's, frequency standard generators, sine wave boxes, capacitance meters, oscilloscopes and many more others.  
At only \$5.90 this book should be in every shack!  
**TELEVISION INTERFERENCE MANUAL \* by B. Priddy G3JGO**  
After reading this book and arriving out the good old neighbors have any TVI problems? Get one before the neighbors force you into it! Tremendous value at only \$2.60.  
**RADIO DATA REFERENCE MANUAL by G. R. Jessop G6JP**  
This book gives all the necessary formulas for design of aerials, PI & LPI Networks, coil formers, power supplies plus many more sections too numerous to mention.  
This book would be an asset to an engineer as well as the radio enthusiast. Only \$3.25  
**THE TELEPRINTER HANDBOOK by J. Denny G3NTT and D. Goacher G2LLZ**  
This book is the only book for the information, service details, and circuits for nearly all currently available amateur teleprinters. This book is \$16.00 and represents exceptional value.

**US RADIO AMATEUR CALLBOOK**  
Lists thousands of hams throughout the USA. Covers all States and US citizens overseas. Only \$15.00  
**1976 EDITION ARRL HANDBOOK**  
Just Arrived ..... \$ 8.90

**SWR/Power meter SWR 200**  
Professional through 50 ohm UHF connectors. 4 power ranges: 0-2 20 200W, 2kW. Calibration chart supplied. VSWH 1 to 1.10 and infinity. Move meter 95uA. 76mm x 110mm x 220mm.  
**\$52.00**

**All-Weather 1W 2-Channel Handy Type Transceiver TA303A**  
Easy to use, easy to own. A handy, all-weather model ideal for construction sites, camping, other outdoor activities. Power from 8 tiny penlight batteries or through a plug-in power source socket. Comes in an attractive, lightweight cabinet with controls on top and a microphone whip antenna. Complete with battery, on-earset, self-contained mike, speech control and earphone jack.  
**\$49** TAX INCLUDED

**SPECIFICATIONS**  
Receiver: Crystal controlled superheterodyne  
Sensitivity: 0.5uV  
Search sensitivity: 0.5uV  
Transmitter: 100% (with over modulation limited)  
Modulation: 100%  
RF out power: 1W  
General: Semiconductors  
Frequency control: Crystal  
Channels: 2 channels (1 channel fitted)  
Earphone jack: 2 2 R 1/4 inch, permanent  
Connectors: 50 x 250 x 36 mm  
Dimensions: 68mm

LOOK FOR MY NEW 84 PAGE CATALOGUE IN APRIL E.R.

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162 Pacific Highway Gore Hill N.S.W 2065 tel: 439 531  
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Also at **CITY 125 York St tel: 29126 (N Town Hall)**  
and **BANKSTOWN 361 Hume Hwy tel: 709 6600 (N Chapel Rd)**

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Our new system can save you money! The larger you order the cheaper the packing and postage! Minimum charge is now \$1.00. However, if you order post items, postage to send out and return, if you want your order sent by air mail, C.O.D. or Collect, all at extra cost.  
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To avoid damage, all bulky or fragile articles will be sent by "Guaranteed Transport" (i.e. freight paid by you when you receive the goods).

When the wiper of R1 is shifted, say toward the negative end, then the potential at the base of Q1 will be more negative than its emitter, and Q1 will conduct; if sufficient voltage drop is produced across R5 Q3 will be cut off. Q3 being cut off will release K1 relay and its b (normally closed) switches will close and start the antenna rotator turning. This will shift R2 arm until the voltage at the emitter of Q1 is about equal to the base. Q1 will be cut off turn-

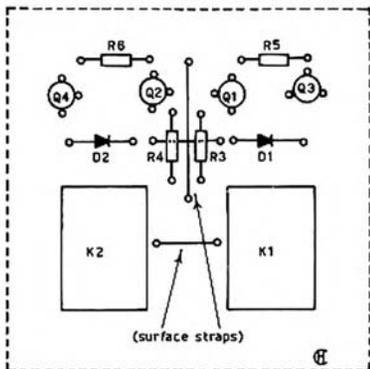
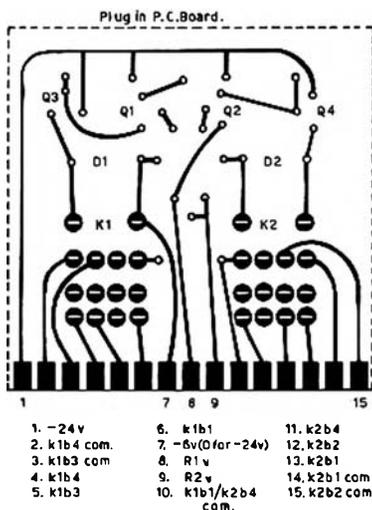
ing Q3 on and energising K1 opening the b switches and turning off the rotator.

If the R1 arm is moved toward the positive end of R1, then Q2 will be turned on because its base has become more negative than its emitter. Q2 on will turn Q4 off because of the resulting voltage drop across R6 and K2 will release. This will start the beam rotator in the opposite direction until the voltage at the base and emitter of Q2 are about equal. Q2 will be

cut off and Q4 will conduct and energise K2 turning off the rotator.

A few things worth watching on this system:

1. R1 and R2 are 50 ohm wire wound.
2. R2 is geared to the antenna shaft at a ratio of 1 to ¼. This will let the beam rotate a few degrees past south in each direction.
3. R2 shaft is coupled to its drive shaft by a spring loaded drive to prevent damage to the pot should the beam try to drive past end of pot.
4. It was found that the dial on the control box had to have a flexible pointer operated by a small stud in the knob and a slightly elongated hole in the pointer, or errors in beam heading of up to 12° will occur. This is necessary because we are dealing in a .2 volt change to turn on Q1 or Q2 and therefore the dial would need 2 sets of calibration on it, one when it was being turned from south through east, north and west, and the other when it was being turned from south through west, north and east. On the demonstration model, two calibrations were used, one in red, the other in black, and a red and black arrow to show which one to select by direction of rotation of knob. On this model they were approximately ½" apart.



R3-R4 5.2k  
R5, R6 24k  
D1-D2 EM404  
Q1, Q2, Q3, Q4 2N404  
K1, K2 380V-18v

## QSP

### PROVOCATION OF THE MONTH

What does the Institute do for me?

### 1976 CONVENTION — AGENDA ITEMS

At the 1974 Federal Convention a Motion (74.17.04) was passed unanimously that Convention Agenda Items should be called for much earlier than hitherto so that they could be published in AR to enable members to examine them and write to their Federal Councillor advising him of their views prior to the Convention. Agenda Items suitable for consideration at Convention level should be sent to your Division as early as possible. If the Divisional Council concerned approves the submission of an Agenda Item advance publicity can then be given through the pages of AR if time permits or via the Divisional insert into AR or other Divisional bulletin.

### CATHODE RAY TUBE EQUIVALENTS

An extensive list of Cathode Ray Tube equivalents was recently received from Lance Harding (VK3AHL); regrettably the list is too long to publish in AR; however, should any reader desire a copy for reference, please forward your request together with a SASE to the WIA office, P.O. Box 150, Toorak, 3142, Vic.

### 6M BAND IN USA

This band may be in trouble according to Prose Walker's comments at the Texas VHF FM Society's Convention. Prose seems to feel that there's a definite push on to add Channel 1 to the VHF TV spectrum and Channel 1 is 6 metre. Ham Radio Oct. '75.

### DUTCH ABOLISH CB SERVICE

Is the heading of an item in Collector and Emitter Oct. '75 with credit to HR Report . . . "in Netherlands after widespread abuses convince officials that cleanup is impractical. All 27 MHz licences have been revoked, and mobile monitoring vans have been shutting down illegal stations by marching in the door and confiscating their equipment. The nation-wide crackdown, reported in Dutch papers as being against "illegal radio amateurs"

(demonstrating that media confusion as to who's a ham and who is something else is not a uniquely American problem) has been understood to be quite effective". The next item continues "How about the Dutch! seems as if the FCC has a tiger by the tail with our 'CB' program. Question, who has the stolen CB and amateur gear? Answer, the criminal!"

### NEW CALL SIGN SERIES

The call sign series D2A-D3Z has been allocated provisionally by ITU to Angola according to Radio Communication Dec. '75

### LICENCE FEES

Radio Communication Dec. '75 contains information that the UK amateur radio transmitting licence has been increased from £3 to £4.80 from 1-12-1975. At the present rates of exchange this is equivalent to a little under \$8.00 in our money. This 60 per cent increase (applicable to all standard radio licences except BC receiving) was said to have become necessary because the income from fees is no longer sufficient to cover the cost of licensing and administering the particular uses of radio. The total number of amateur licences in force at 31-5-1975 was 26,410 according to Rad. Comm. Oct. '75. The RSGB membership at the end of July was shown as 18,516 (15,576 UK corporate plus 1113 UK associates plus 1827 overseas).

### NEW CALL SIGN SERIES

The IARU Region 1 news Sept. '75 advises that the ITU have provisionally allocated the call sign series C8A to C9Z to Mozambique.

### INTERFERENCE

One of the main exhibits at a local exhibition in the UK will be a demonstration by the UK licensing authority of the use of filters to overcome interference to television caused by the high-level field of nearby amateur transmitters. It was also hoped that facilities would be provided for visitors to have their own aerial filters aligned using a spectrum analyser and signal generators. Precise of a news item in "Radio Communication" Oct. '75.

### WARC 1979

Ham Radio Nov. '75 reports that the WARC 1979 Working Group on Amateur Radio in the USA in-

tends striving for more spectrum in the HF bands. In the VHF/UHF spectrum competition is tougher, they said. New bands proposed were reported as 10.1-10.6 MHz, 18.1-18.6 MHz and 24-24.5 MHz. Proposals were also made to extend the 40m band to 7.5 MHz, 20m to 14.5 MHz and 15m to 21.5 MHz, plus a totally new band in the 150-200 kHz region.

### ASCI

Reported in Nov. '75 QST is the news that the FCC issued a special temporary authorization for the experimental use of the American Standard Coll for Information Interchange 8-unit teleprinter c in connection with Oscars 6 and 7.

### MORE MEMBERS

A quote from Director, VK2AKX's end of year message in Westlakes Dec. '75 Newsletter — "Our parliamentary representatives have promised more assistance in the future and, the more members we have, the more assistance we are likely to get because, as our hobby gains greater recognition, we can have a greater impact on the community in the field of community recreation and training in technical skills".

### EMF

"Since 14 Nov. American amateurs have been able to use frequencies within the bands 48-50 GHz, 71-76 GHz, 165-170 GHz and 240-250 GHz and all frequencies above 300 GHz. The RSGB has for some time been trying to get a similar allocation for UK amateurs, but so far without success. However, as was reported in Microwaves last May, the Home Office is prepared to consider requests to work at frequencies above 40 GHz on the basis of individual applications". From "Microwaves" in Radio Communication Jan. '76.

### TEN-TEN INTERNATIONAL NET

A letter from ZL1ARO, Geo. Currie of P.O. Box 57, Ngatea, New Zealand advises he has been appointed a DX Manager for VK-ZL for the Ten-Ten International Net of Southern California, Inc. which promotes amateur activity on the ten metre band as one of its objects. If you already belong to this organisation or if you would like further details why not contact or write to George direct.

# SIDEBAND ELECTRONICS SALES and IMPORTS

UNIDEN 2020 AC-DC transceivers 10 to 80 M.	\$550	ASAHI MOBILE ANTENNAS AS-2-DW-E 1/4 wave 2 M. mobile whip	\$8
TRIO-KENWOOD TS-520 AC-DC transceivers 10 to 80 M.	\$530	AS-WW 1/4 wave 2 M. mobile whip	\$18
YAESU MUSEN FT-101-E AC-DC transceivers 10 to 160 M.	\$650	AS-GM gutter clip mount with cable and connectors	\$10
model YC-335-D digital frequency meter 0-200 MHz	\$250	M-RING body mount and cap for 2 M. whips	\$5
TRIO-KENWOOD model QR-666 170 KHz to 30 MHz AC-DC receivers	\$300	CUSH CRAFT ANTENNAS Model DGPA 52 to 27 MHz adjustable ground plane	\$25
DRAKE model SSR-1 Wadley loop 500 KHz to 30 MHz AC-DC receivers	\$325	LAC-2 lightning arrestors	\$6
BARLOW WADLEY model XCR-30 MK-II receivers	\$225	Model AR-2 RINGO 1/4 wave verticals	\$20
HY-GAIN antennas 14AVQ 10-40 M. verticals, 19' tall, no guys	\$65	AR-2X RINGO double 1/4 waves verticals	\$35
18AVT-WB 10-80 M. verticals, 23' tall, no guys	\$90	ARX-2 extension for AR-2	\$15
TH3JR 10-15-20 junior 3 el. Yagi 12' boom	\$135	A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each	\$60
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom	\$180	A147-11 11 elements 2 M. Yagi	\$30
TH6DX 10-15-20 senior 6 el. Yagi 24' boom	\$225	CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals	\$35
HY-QUAD 10-15-20 cubical quad Yagi 8' boom	\$200	FDK MULTI-7 2 M. FM transceivers 10 W. output with 12 sets crystals available all 7 repeater and anti-repeater frequencies plus channels 40-50 and 52 simplex	\$225
TIGER ARRAY 204BA 20 M. 4 el. Yagi 26' boom	\$190	KEN KP-202 2 M. FM transceivers 2W output with 6 sets crystals	\$150
BN-86 balun for beam purchasers only	\$18	KYOKUTO 2 M. FM transceivers with digital read-out, synthesized 400-1000 5KHz channels, for repeater and anti-repeater and simplex operation, 12 W output	\$300
ANTENNA ROTATORS CDR AR-22 junior for light and vhf beams	\$50	ICOM IC-202 2 M. SSB transceivers 144.0 to 144.0 MHz	\$185
CDR Ham-II senior for all but 40 M. hf beams	\$165	KLM ELECTRONICS 12V DC 2 M. amplifiers 12W output	\$50
KEN KR-400 for all medium hf beams with disc brake	\$100	AUTOMATIC MORSE KEYERS EK-150 with squeeze key paddle built-in AC operated with monitor	\$75
All three models rotators complete with 230V AC indicator-control box.		FERRITE CORE BALUNS cheaper Japanese products for up to 500W	\$12
4-conductor light cable for AR-22	20 cents per yard	COAX CABLES — CONNECTORS — SWITCHES Amphenol PL 259-SO 239	\$1.25
12-conductor light cable for Ham-II	30 cents per yard	3 Position Switch	\$8
8-conductor heavy cable for Ham-II	70 cents per yard	RG-8 U Foam Insulation Cable 3/8" diam. Low Loss	80 cents
6-conductor heavy cable for KR-400	60 cents per yard	RG-58 U Foam Insulation 3 / 16" diam. Cable, solid core	35 cents
DRAKE W-4 SWR-WATT METER 0-200 and 0-2000 Watt scales	\$60	RG-58 U Standard Cable	30 cents
DRAKE TV-1000 TVI Low pass Filter	\$25	Coax Cable Prices per yard. Add \$1 cutting-handling expenses.	
SINGLE METER SWR METER	\$15	P.T.T. MICROPHONES 50 K or 600 Ohm Impedances with 4-pin Japanese plugs	\$10
TWIN METER SWR METER	\$22	DUMMY LOADS 50 OHMS 0-200 MHz 15 W and 0-6 / 0-30 / 0-150 W resp.	\$45 and \$80
MARK MOBILE ANTENNAS Helical 6' long HW-40 for 40 M.	\$18		
High power KW-40 for 40 M.	\$25		
HW-20 for 20 M.	\$16		
Tri-band HW-3 for 10-15-20 M.	\$25		
Swivel mobile mount and chrome plated spring for all	\$12		

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— Mary & Arie Bles.

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## A REVIEW OF THE KEN KP 12A RF SPEECH PROCESSOR



Ken products are produced by the Toyomura Electronics Company of Tokyo, Japan. The Ken name has, of course, become famous in Australia through the KP 202 two metre handi-talkie. The KP12a RF Speech Processor is distributed by Sideband Electronics Sales and Engineering of Springwood N.S.W.

The Ken unit differs from most other RF processors in that it is a complete single sideband system within itself. That is, the microphone feeds directly into the unit, the signal converts to 10.7 MHz double sideband then passes through a multi pole crystal filter which removes one sideband. The signal is then clipped and filtered and returned to audio via a product detector. The resultant audio is fed back into the normal microphone input of the transmitter or transceiver.

However, before we look at what the Ken can do in practice, a look at the unit itself is in order. Considering the complexity of circuitry it is an extremely compact package. Overall it measures 60 mm high, 130 mm wide and 150 mm deep, with a weight of 1.2 kg. Appearance is most attractive. The front panel is a brushed aluminium finish similar to that seen on much of the current Hi-Fi equipment. The cabinet is a smooth gloss black.

The Ken has a built-in AC power supply and a VU meter to indicate the correct operating point.

The manufacturers quote the following specifications:

Talk Power: Better than 6dB improvement.

Clipping Threshold: Less than 2mV at 1 kHz.

Band Width: 2200 Hz at 6 dB down.

Frequency Response: Approx. 300-3000 Hz at 12 dB down.

Distortion: Less than 3 per cent at 1 kHz with 20 dB clipping.

Output Level: More than 80 mV at 1 kHz.

Input Impedance: 5K ohms.

Output Impedance: 2K ohms.

Power Requirements: 230 volts AC at 2.3 watts.

Semi-conductors: Four transistors, 4 diodes and three IC's.

### CIRCUIT DESCRIPTION

The microphone input is via the front panel gain control to a single transistor amplifier. The gain control actually sets the clipping level. Protection is provided against RF feedback affecting this stage. Audio is now fed to a TA7045M IC balanced modulator stage with carrier injection provided by a separate 10.7015 MHz oscillator stage.

This same oscillator is also used as the carrier re-insertion source for the product detector at the other end of the system. The balanced modulator is fed through the six pole 10.7 MHz filter to a TA7061AP IC which provides 69 dB gain and also symmetrically clips the signal. Harmonics of the clipping process are removed with a double tuned passband filter. A second TA7045M operates as the product detector with the audio output going via the output control to the output socket and also to a single transistor stage to drive the level meter. The power supply employs a full wave rectifier feeding a single transistor regulator with 12 volts DC output.

### THE KEN KP12a ON TEST

The following figures were obtained using AWA professional audio test equipment.

Firstly the overall frequency response was measured. In relation to 1 kHz there was a gradual roll off to -7 dB at 300 Hz. At the high end, it was level to 2.5 kHz dropping to -10 dB at 3 kHz. At 4 kHz this had dropped to -32 dB. These figures of course meet the specifications with a little to spare. Measurements of the distortion proved interesting with the highest distortion occurring at the point of no clipping. As the clipping was increased to the 20 dB point the distortion dropped to 3.5 per cent from 7.5 per cent. The 20 dB figure only exceeds the specified figure by .5 per cent. Maximum output was 72 mV, a little down on the rated 80 mV but still more than enough to drive the most insensitive microphone input. In relation to the 72 mV output the noise level was -40 dB.

These are excellent figures with even the highest distortion measurements well below the audible point.

### THE KP12a ON THE AIR

Our on-air tests were carried out with a Yaesu FT101B. The 101B microphone plugs directly into the KP12a. Although other Japanese transceivers use these same connectors, they are often wired in a different way, so check the wiring diagram first. An output lead to suit the 101B is also supplied.

The power On/Off switch of the Ken connects the microphone directly to the transceiver in the Off position; however the input circuitry of the clipper is still in parallel with the microphone. This causes a drop in microphone output of about 6 dB. In the case of the 101B this was no problem but may cause difficulties with other transceivers.

With the power switch On the meter is illuminated, albeit somewhat on the dull side.

On air reports received varied according to the signal strength at the other end. All stations reported a marked increase in 'talk power'. With very weak signals under poor conditions, use of the unit often made a marginally readable signal 100 per cent copy. Local stations reported no noticeable increase in band width so long as the transmitter was not driven beyond its normal linear operating point. With the high output of the Ken this is easy to do and the use of an oscilloscope is recommended.

### CONCLUSION

The use or otherwise of speech processors appears to be very much a matter of opinion. It is not proposed here to say whether you should have one or not. However, this little unit has excellent specifications which are met in every respect. The instruction book is fairly complete with operating instructions, circuit description, internal calibration information, but no printed circuit layout. The AC power cord is only a two wire type with a two pin American plug. It is recommended that this be changed to a three wire cord with suitable plug. ■



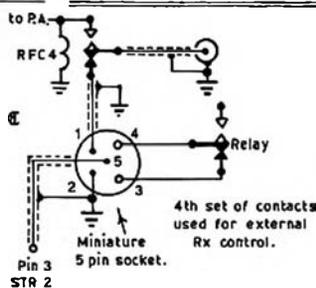
output. The transmitter could no doubt be put on 40 metres but the author believes that the limitations of crystal control on this band may not make it worthwhile when competing with strong commercial stations.

### USING THE NOVICE TRANSMITTER (TRANSCIVER) WITH A SEPARATE RECEIVER

The complete unit has been designed as a transceiver, but it was decided that the transmitter should be able to work with an external receiver. This is quite easily accomplished. A small 5 pin socket is fitted on the rear apron of the chassis not too far from the relay. The wiring of this socket is shown in Fig 2 and is self explanatory. When the internal receiver is to be used a shorting plug with pins 1 and 5 of the wired together is inserted so that the internal receiver has the aerial connected to it. You may remember that the relay specified had 4 sets of change over contacts and that only 3 were used. The fourth set is used for controlling the external receiver.

This is the completion of the description of the 80 metre 10 watt Novice Transmitter. It is hoped that its description has been of assistance with your studies and that if you build it that you find it works as well for you as the author. The description of the receiver will follow in due course.

FIG 2 Connections for external Rx.



### EXAMINATIONS

Exams again this month — some people will pass and some fail. A few tips.

- (1) Read the questions carefully, and mark which to you are the easiest to answer in descending order.
- (2) Allot yourself an equal amount of time per question, with some extra time to revise your answers after you have finished the paper.
- (3) Do not exceed this allotted time if possible.
- (4) Do not answer more than the required number of questions.
- (5) Keep your answers concise, complete and correct.

(6) Keep strictly to the question; do not deviate onto some related subject in the hope that it will get you more marks — it won't.

(7) Do not write a page of waffle in the hope the examiner will understand what you are trying to say. A paragraph of good information is much better than a page of mediocre garbage.

(8) Write or print **LEGIBLY**, the examiners are not mind readers. If the examiner misinterprets your meaning through bad writing you will lose marks and possibly fail.

(9) Draw your diagrams **NEATLY**, plan them so that you do not run out of paper on the right side of the sheet. Make sure that your circuit diagrams are accurate and could possibly work.

(10) If circuit diagrams are required, draw them; if block diagrams are required, draw block diagrams. There is a very real difference.

(11) Keep cool, calm and collected in the exam — easier said than done of course.

(12) If you fail in the exam do not blame the examiner too much, it just could be that you do not know your work as well as you think.

Best of luck with the exam later this month. ■

# IARU NEWS

Article 5 of the ITU Regulations deals with frequency allocations and begins with clause 125 which reads, "For the allocation of frequencies the world has been subdivided into three Regions. These are then delineated. In these articles they are abbreviated to R1 (roughly Europe and Africa), R2 (the Americas) and R3 (the rest).

In the frequency boxes published by the ITU services with names printed in small capitals are the primary services, services with names printed in italics are secondary services and those printed in "grotesque light" are permitted services. Permitted and primary services have equal rights except that in the preparation of frequency plans the primary service, when compared with the permitted service, has prior choice of frequencies.

Stations of a secondary service shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date. Stations of a secondary service cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are already assigned or may be assigned at a later date. Stations of a secondary service can claim protection however from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

Then follow a number of explanations of footnote definitions, such as "additional services" and "alternative allocations" describing the priorities of these services. However article 6 sets out special rules, which do have limited scope, for special circumstances affecting the use of frequencies but there are 'let-outs' in articles 3 and 4 which will be looked at later on.

The table of frequency allocations extends from 10 kHz to 275 GHz. No allocations have been made below and above these limits, but any administration authorising the use of frequencies below 10 kHz for special national purposes must ensure that

no harmful interference is caused thereby to the services above 10 kHz.

The allocations to services is set out for each of the three ITU World Regions. Some of the frequency bands are very narrow, others quite wide. Numerous exceptions to most of the allocations are set out in footnotes which, in the main, apply in specific countries.

The first amateur allocation is the 160 m band. In R1 there is no amateur allocation but in 9 European and 3 African countries administrations may allocate up to 200 kHz to their amateurs (subject to non-interference to 'other' services in other countries; and with a mean power not exceeding 10 W) within the band 1715 to 2000 kHz. In R2 and R3 1800 to 2000 kHz is allocated to Amateur, Fixed, Mobile (except aero mobile) and Radio navigation, all as primary services. In this band in R2 Loran has priority and in R3 other services in this band must not cause harmful interference to the Loran system on 1850 or 1950 kHz (each extends 25 kHz both sides of centre). In the Australian tables (issued by the PMG's Dept. Feb. 1974) the amateur service allocation is only 1800 to 1860 kHz as a secondary service to Radionavigation (Loran) and is based — as so many Australian exceptions are based — on the Report on the Third and Final Stage of the Work of the Frequency Allocation (Space Service) Committee.

The next amateur band — 80 m — extends from 3500 to 3800 kHz in R1 (shared with Fixed and Mobile except aero mobile), 3500 to 4000 in R2 (shared as for R1) and 3500 to 3900 in R3 (shared with Fixed and Mobile). In Australia 3500-3700 kHz is allocated exclusively to the amateur service and 3700-3900 kHz to fixed and mobile services. In India 3890-3900 kHz is the amateur allocation.

In all Regions 7000-7100 kHz is allocated to the Amateur and Amateur Satellite services, shared. In R1 and R3 7100-7300 kHz is allocated to Broadcasting but in ZS land 7100-7150 kHz is allocated to the amateur service. In the Australian tables 7100-7150 is allocated to Broadcasting as the primary service and amateurs as the secondary service with 7150-7300 being Broadcasting alone. There is a Special Resolution (No. 10) from WARC 1959 about the 7000-7300 kHz band which resolved that the broadcasting service should be prohibited from the band 7000-7100 kHz and that BC stations operating in this band should cease operations. A fur-

ther resolution was to the effect that inter-Regional amateur contacts should be only in the band 7000-7100 kHz and that Administrations should make every effort to ensure that the broadcasting service in the band 7100-7300 kHz in R1 and R3 does not cause interference to the amateur service in R2.

There is a Recommendation from WARC 1959 which recognises the urgent need to reduce the pressure on Band 7 (3 to 30 MHz) and recommends administrations to adopt new techniques and recognise the benefits of using higher frequencies, etc.

The 20 m band at least seems clearer, 14,000 to 14250 kHz is allocated to Amateur and Amateur Satellite and 14250-14350 kHz amateur only in all Regions. In USSR 14250-14350 kHz is also allocated to the fixed service.

On 15 m 21000 to 21450 kHz is allocated for Amateur and Amateur Satellite in all Regions. No footnotes for a change.

On 11 m 26100 to 27500 kHz is allocated in all Regions to the Fixed and Mobile (except aero mobile) services but in R2, Australia and New Zealand the amateur service may operate between 26960 and 27230 kHz 27120  $\pm$  0.6% is for IMS; other services must accept any IMS harmful interference.

28.0 to 29.7 MHz is allocated in all Regions to Amateur and Amateur Satellite. More data next time.

It was interesting to note the RI HF band plan published in RI News Sept. '75. The CW only segments are shown as 3.5-3.6, 7-7.04, 14-14.1, 21-21.15 and 28-28.2. The CW and phone segments are 3.6-3.8, 7.04-7.1, 14.1-14.35, 21.15-21.45 and 28.2-29.7. RTTY frequencies are 3.6  $\pm$  20 kHz, 7.04  $\pm$  5, 14.09  $\pm$  10, 21.1  $\pm$  20 and 28.1  $\pm$  50. SSTV recommended frequencies are 3735, 7040, 14230, 21340, 28670 all  $\pm$  5 kHz. Recommended beacon frequency band 28.2 to 28.25 MHz. Downlink recommended for amateur satellites 29.4 to 29.500 MHz. Reserved frequencies for inter-continental contacts are 3.5-3.51 and 3.79-3.80 (3.635-3.65 in USSR).

The Australian 'gentleman's agreement' CW only segments are 3.5-3.535, 7-7.03, 14.0-14.1, 21.0-21.15 and 28.0-28.2 with RTTY on 3.62, 7.04, 14.09 and 21.09.

A further item in this issue of RI news is the Japanese prefectures or territories prefixes. JA1 covers Tokyo, Kanagawa, Chiba, Saitama, Ibaraki,

Tochigi, Gumma and Yamanashi. JA2 (Nagoya area) — Shizuoka, Gifu, Aichi and Mie. JA3 (Osaka area) — Kyoto, Shiga, Nara, Osaka, Wakayama and Hyogo. JA4 (Hiroshima area) — Okayama, Shimane, Yamaguchi, Tottori and Hiroshima. JA5 (Shikoku Is.) — Kagawa, Tokushima, Ehime, and Kochi. JA6 (Kyushu Is.) — Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki and Kagoshima. JA7 (Sendai area) — Aomori, Iwate, Akita, Yamagata, Miyagi and Fukushima. JA8 — Hokkaido Is. JA9 (W. Central Honshu) — Toyama, Fuku and Ishikawa. JA0 — Niigata and Nagano. JD1 — Ogasawara Islands including Kazan Islands (formerly Bonin and Volcano Islands) and Minami Torishima Is. (formerly Marcus Is.). JR6 — Okinawa only. Other prefixes following after JA are JE, JF, JG, JH, JI and JR. 8J1AA — Jap. Antarctic Expedition. Club stations have 3-letter suffixes in the YAA-YZZ and ZAA-ZZZ series.

# VHF UHF

an expanding world

with Eric Jamieson VK5LP

Forreston, S.A. 5233  
Times: GMT

## AMATEUR BAND BEACONS

VK0	VKOMA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	St. Leonard's	52.400
	VK7RTX, Devonport	144.900
JD	JD3AA, Suva, Fiji	52.600
JA	JD1YAA, Japan	50.110
VE	VE1ATN, Canada	50.056
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K2IRT/KG6, Guam	50.068
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHP, Palmerston North*	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

\* Denotes change of location from previous listing.

A note has come from Selwyn ZL2BJO advising of a change of location for their 6 metre beacon ZL2VHP on 52.500 from Mt. Stewart to Palmerston North. He also advises the FSK keying has been changed to +ve, which should be more generally acceptable.

## LETTERS RECEIVED

Claud VK4UX writes from Rockhampton outlining the extent of activity in that region. He lists no fewer than 13 stations active on 6 metres, mostly using SSB, and 18 on 2 metres FM. It is well known that Rockhampton to VK5 is an ideal distance and ensures many 6 metre contacts. However, the real concern is for two metres, and the fact that there are 18 operational even if on FM indicates a chance for contacts on the 2 metre band if conditions permit.

Claud reports a good opening via Ch. 40 and 50 to Mackay, about 300 km north on 21/11 and 22/11 with very strong signals, with a repeat of conditions on 23/11. The Rockhampton repeater is well on the way, and will probably operate on repeater Ch. 1. Those of us in the South hope that the FM boys are beginning to realise they can work further than across town in North Queensland, and that this will lead to reasonable sized rotatable beams which can be pointed South. Further we would hope this same activity leads to an increased

usage of 144 MHz SSB with horizontal polarisation.

The first mention of any JA signals for some time is contained in Claud's letter on 12/10 at 0419 to 0426, a short opening occurred and he worked JA0AGA, JA1RDW and JA1PLI. A seven minute opening! At 0634 JH1 GUL called CQ, and after a quick QSO he faded out also.

From the Wagga District Radio Club, Publicity Officer Frank VK2ZBG writes to say there is no 6 metre activity in Wagga due to Channel 0, but there are indications low power FM might be tried to see what happens. Most of their activity therefore is confined to 2 metres FM using their repeater on Ch. 2, but probably shifting to Ch. 5 around New Year's Day to overcome interference to Ch. 2 repeater in Bendigo by the Murray Valley operators trying to work through Wagga.

The equipment consists of a 1677 base station, suitably converted mostly by Doug VK2ZMP and Sid VK2SW, and located on Mt. Flackney, 17 Km S.E. of Wagga and 550 m. a.s.l. Contacts can be made up to about 170 km and about half that using mobiles.

The Club holds Ch. 40 foxhunts frequently, and there are 6 active members on 2 metres, and 6 more somewhat less active.

So it looks as though Wagga is another area of 2 metre operation to keep in mind, but for direct contacts it will still be a prime requirement for both sides of any DX contact to run reasonable power and a good antenna for all except an occasional outstanding Es type contact. Long haul DX still cannot be undertaken with any reliability unless the above requirements are met, plus correct polarization at both ends.

John VK4UJ included a short note with the news from the Gold Coast Radio Club to say there will be quite a few up there with beams pointing South and operating SSB on 144.1. Excellent, chaps, may the good word spread to other camps and get SSB operating for best results. John mentions contacting C21KM/maritime mobile via the Gold Coast Repeater while he was about 250 Km out to sea heading for Nauru! Just goes to show what you can work if you are around.

Steve VK3ZAZ sends along two interesting letters, and a number of items contained therein are worth passing on. As an Indicator of how the 6 metre DX fared at the start of the "season", he worked on 30/11 2340 P29GR, 2341 P29MJ, 0011 P29GA, 0017 VK6BV, 0041 P29DJ, 0053 heard 3D2AA on 50.100, 0059 VK4ZIT hearing ZK1AA, 0130 VK6 Kalgoorlie, 0159 VK6ZBW Perth worked, 0300 VK8ZGF heard.

On 29/11 too many stations to mention, but Steve comments on the increased strength of backscatter signals this year. This same event has been noted here. Of interest to everyone is VK9ZNG on Norfolk Island who has just become licensed and operates intermittently during the week, and on Saturdays, but not much Sunday due to his work. He uses a long wire antenna and has been worked by several stations in VK5. Apparently he schedules C21DC 1900Z daily on 52.005.

14/12 . . . what a fantastic day for DX, Steve worked over 100 stations, including the P29's twice in 3 hours, and that's good going. Back scatter extremely good, and by that method worked Kerry VK5SU on a round trip approx. 3500 Km for a 1200 Km direct distance! From 7/12 to 12/12 he worked ZL's every night, with several new call signs, including ZL2ARW, ZL2CD and ZL2BGE. VK6BV and VK6ZGO worked ZL2ARW and ZL3OK on 7/12 a distance of about 5000 Km. Good going.

Further on in Steve's letter are a couple of interesting comments which I include as follows: "If every station who could operate 400 watts PEP did, on a wide open band, then it would be bedlam. Pity about the VK4 who did just that on Saturday 31-12 all day. When the DX started to fade out he went back to low power (20W) and was still 20 dB over S9! Bit late then! There is more than 100 kHz on the 6 metre band! (Give it a thought chaps, if you're guilty, think of others, it's nice to be told you are the strongest signal on the band, but the other bloke should also add you are using most of the area too . . . 5LP).

The other comment Steve makes is: "It a station is calling CQ DX Pacific, he is obviously doing it for a reason. The timing is critical for long haul DX, so locals, i.e. VK Sporadic E DX 20 dB over 9 types, please give courtesy to that station and allow him to work that mode. There will be ade-

quate time to contact these people during the summer months and it is proven that long haul DX only appears October-November and March-April, with slight exceptions. Apart from the poor operating technique, breaking in on a station with a "rocker crusher" signal when the station has all the RF gain controls flat out for weak signals, is rather rude to say the least!" (Fair comment, I shouldn't need to add more . . . 5LP).

## SIX METRES

We seem to be hammering 6 metres this month, but I guess it is the right time to hammer it. Up to the time of writing (18/12) there have certainly been some fantastic openings, and with the ever increasing use of SSB, stations are being copied almost down into the noise, which seems to give further proof that 6 metres never ever really closes, only the operators do! From my own observations here, up to now the increased number of P29 contacts has proved interesting, also that VK9ZNG on Norfolk Is. is available, plus Geoff VK8ZGF in Alice Springs, and a report that VK8ZCU is said to be active in Darwin. ZL's have been scarce into VK5 so far, though readily available into VK3 and 7. VK6's have been very active and putting out some extremely strong signals through my 30 dB hill!

## TWO METRES

I am extremely thrilled to hear of all the new SSB equipment being put on the air, either by home building or commercial.

It has been one of my favourite hobby horses to keep pushing SSB on 2, and results seem to be visible. Both Keith VK5SV and David VK5KK, a father and son team, are doing their share to keep the low end of 2 active. I have spent quite a lot of time there too, also Peter VK5ZPS, Peter VK5ZPW, Clarrie VK5NA, Co! VK5RO, Jim VK5ZMJ (Pt. Pirie), and of course that solid gang of enthusiasts around Mt. Gambier, Chris VK5MC, Colin VK5DK, Trevor VK5NC, Trevor VK5TH, David VK5ZOO, Robin VK5TN, Ben VK5RD and others. So that's quite a good start from this way. I tried on two nights to make contact with Fred VK3AZG in Melbourne without success, although I could hear him when he worked Mt. Gambier, Strange. Then of course there are the stations we hear on the Ch. 1 repeater on Mt. William.

I am still hopeful Saturday and Sunday 20/12 and 21/12 will be good 2 metre Es days, with signals from VK2 and VK4 available to VK5 and VK3 and vice-versa. The VK6 boys in Albany are well set up for 2 metres SSB this year, and February could again be a good month in which to work them, 30 dB hill permitting! Geoff VK8ZGF is also set up for 2 metres SSB; what a scramble there will be if he comes through!

30/11 was a good night for fine 2 metre signals to Mt. Gambier from Adelaide and surrounding areas, and from Mt. Gambier to Melbourne. Noted also since then Mt. Gambier has been working VK7 on 2 metres, so there! 27/11 saw contact between VK3YSL and VK2ZAY on 144.1 which was a good QSO.

On 26/11 I was copying Ch. 5A television from Wollongong the best ever here at my OTH, and well the third time ever. During the course of my work I noted at some time of the middle part of that day that it was possible for all television channels on the channel selector to be active, and many channels had more than one signal. Ch. 2 Adelaide swamped by Ch. 2 Brisbane, three North Queensland channels on Ch. 3, and Ch. 10 Adelaide was being interlaced with by another Ch. 10, and that's getting very high in frequency, up to 215 MHz. So anyone with a rotator on their TV antenna and living out in the sticks could have a real ball on such days.

## MOONBOUNCE REPORT

From Lyle VK2ALU comes the monthly report that a new 432 MHz preamplifier was made up and installed in the feed box in time for the WA6LET test on 22/1. The noise figure improvement of 0.3 dB probably helped a little to hear them 18 dB above the noise. The signal report back to VK2AMW for their contact was 555, which was very gratifying. An input isolating relay then developed high contact resistance and terminated this test, but repairs were made for the next scheduled tests on 29/11, with ZESJJ, but who later advised being unable to get on due to heavy rain. SM5LE was not heard. However, JA1VDV

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**MODEL SR-C430**, 10W, 12 channel plus memory channel, Mobile FM 12V DC Transceiver for 420-450 MHz Amateur Band use. A superb compact unit, measures only 84 (w) x 58 (h) x 235 (d) mm, weight .96 kg. PTT microphone has a built-in switch to enable convenient selection of a priority channel (memory channel). Complete with microphone, built-in speaker, snap-clip mobile mount, power cable, DC line filter, stand for base station use, and crystals for 431.88, 432, 432.12 and 435 MHz. Price **\$275.**

**SR-C146A**, 2m FM 2W output, 5 chan. Walkie-Talkie. This superior quality transceiver comes complete with a leather carrying case, and auxiliary jacks are provided for optional external microphone, earphone, antenna and battery charger. Includes built-in mic. and speaker. Whip antenna telescopes down level with top of set. Price **\$162** (incl. 2 U.S. and 2 Aust. channels).

**MODEL SR-C432**, 2.2W, 6 channel hand-held FM transceiver, with short helical flexible antenna. leather case and crystals for 432, 432.12 and 435 MHz. Superior construction and performance. Jacks provided for external mic., earphone, antenna, and battery charger. Includes built-in mic. and speaker. Price **\$239.**

**OPTIONAL ACCESSORIES: CMPO8** hand-held mic. **\$18.50; AC Charger \$9.00; Mobile Adaptor \$9.00. CAT08 2M Rubber Antenna \$8.00. AC Adaptor and Charger \$29.**



Prices include S.T. Allow 50c per \$100 insurance, min. 50c. Freight or postage \$4.00. Prices and specifications subject to change.



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STEPHEN KUHL, P.O. Box 56, Mascot, 2020 667 1650, AH 371 5445  
W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147 Ph. 624 2691  
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700CX 700W SSB PEP Input	\$570.00
Cygnat 300 B (2 only)	\$519.00

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### OSCILLATORS

508 VFO for 700 CX	\$195.00
510 xtal Novice	\$60.00
610 xtal Novice	\$60.00
Wattmeters WM 1500 0/1500 Watts in 4 steps	\$77.00
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### AC POWER SUPPLIES

230XC (with Speaker) for 700CX	\$150.00
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### ANTENNAS

2EL 20/15/10 Mx TB2A	\$139.00
3EL 20/15/10 Mx TB3HA	\$200.00
4EL 20/15/10 Mx TB4HA	\$275.00
Vert. 40/10 Mx 1040V	\$124.00
Vert. 80/10 Mx	\$44.00

### MOBILE ANTENNAS

New Slimline 500W PEP Mobile Antennas complete with Base Section, Coil and Top Section 35-15 SL/20SL 15 Mx/20 Mx	\$35.00
35-40SL 40 Mx	\$45.00
35-75SL 80 Mx	\$10.00
Extra Coils for Slimline range. Coils only 15/20 Mx	\$14.00
40 Mx	\$18.00
80 Mx	\$10.00
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was heard again, 8 db above noise. The VK2AMW echoes were the loudest ever, peaking at one time to 12 db above noise and averaging more than 6 db over.

W6LET was apparently heard by Les VK3ZUR using a single loop yagi 18 to 20 feet long, while Chris VK5MC heard them on his 4 x 13 element yagis. I was only able to use one 13 el. yagi which seemed at best to give me the barest of a signal on two occasions from W6LET, but so poor as to be virtually unintelligible on the tape recorder, but a little better in the phones. However, there will be other days!

#### VK5 FIELD DAY

This event was quite well supported this year, stations out in the field on 8/12 and 7/12 being VK5AD/P, VK5ZPP/P, VK5NA/P, VK5ZPW/P, VK5SV/P, VK5BW/P, VK5KK/P, VK5TV/P, VK5ZCF/P and VK5LP/P. That's not a bad line up for this State. Conditions were generally good, with fine weather and a warm night, most operators had the company of plenty of moths, ants, various insects and mosquitoes, but I found the combination of fly spray and insect repellent kept things within bounds. Although I was a lone operator on Checker's Hill, not far from the home QTH, I had a great time and ran up 190 contacts in 12 hours 17 minutes actual operating time which I guess is not too bad for a VHF contest. 6 metres opened to VK2, 3, 4 and 6, with the VK6's sending over the very strong signals.

Most portable stations were operating 6 and 2 metre SSB, 2 metres FM, and I had one cross-band contact on 432 MHz! Much of the general operating seemed to be confined to SSB, particularly on 2 metres which was surprising, but of course this mode carried bonus points which no doubt helped. All in all, a very good contest, and one which I hope will receive further support next year; perhaps the VK3's might think about running a parallel contest, from some of their good mountain tops.

Finally, I notice in the VHF notes in "Q.R.M." by Joe VK7ZGJ that on Saturday 22/11 ZL TV was watchable in colour for about 3 hours, with QSB, but no sign of their beacon. ZL4LV was worked by Kevin VK7ZAH and Joe VK7ZGJ. No sign of any other ZL stations.

I guess that will have to do for this month. There is just so much that could be written about 6 metres that you already know if on that band, and with the time lag at this period of the year with these notes, the news has long since become stale.

Anyway, remember to keep an ear to the ground for possible long haul DX during March and April, and when listening, don't forget to do some calling, the guy at the other end might only be listening too!

The thought for the month: "This evening is the end of today unless tomorrow is a holiday — in which case tonight is the beginning of tomorrow"

The Voice in the Hills.

stallation; Mobile Operation in Germany; Mobile 2 Metres in Brittany; Conversion of Single Channel Pye AM25B to Multi-Channel Operation.

#### SHORT WAVE MAGAZINE August 1975

Going QRP On Eighty; DX from EDAY Is, Orkney; Noise Bridge for Antenna Measurements; Ten Metre Aerial Amplifier; Cheap RF Output Meter.

#### September 1975

Five Walls on Forty; Frequency Modulator for VHF Transmitters; Half Size Quad for Twenty; Checking FM Deviation.

#### RADIO COMMUNICATION September 1975

NFD 1975; Subjective Selectivity and Stereocode; 2M SSB Transmitter Using the FR400SDX VFO; GB3IOW — A 10 GHz Beacon; A Teleprinter Message Generator; Useful features and 1970-1974 Index.

#### RADIO 25 September 1975

The QTC Saga; Siurnisfilter (Line filter); The Mobile Amateur (On a Combine Harvester). So much of this journal is now in Afrikaans and unreadable by me.



#### THE MAPLE LEAF AWARD

The award consists of two parts:

1. an attractive flag parchment diploma, suitable for display in anyone's radio shack and
2. a Canadian Maple Leaf flag lapel pin, suitable for wearing.

The Maple Leaf Award is for working or hearing, and confirming Canadian amateur radio prefixes as authorised by the Department of Communications for Canada.

QSLs must be in your possession. A GCR (Certified List) must accompany your application. QSLs should not be sent unless specifically requested.

- Class III, 15 different Canadian prefixes.
- Class II, 25 different Canadian prefixes.
- Class I, 30 or more Canadian prefixes.

A special plaque award will be issued free of charge to any radio amateur who works and confirms 50 or more different Canadian amateur radio prefixes.

All contacts for all classes must be made after January 1st, 1965, the year in which the Maple Leaf became the country's official flag.

Application, GCR and 10 IRCs or \$1.50 or equivalent in any foreign currency should be sent to the awards custodian:

Mr. Garry V. Hammond,  
Geography Department, L.D.S.S.  
155 Maitland Ave. S.  
Listowel, Ontario, Canada, N4W 2M4.

Prefixes can come from the CF, CG, CH, CI, CY, CZ, VA, VB, VC, VD, VE, VF, VG, VO, VX, VY, XJ, XK, XL, XM, XN, XO, 3B, 3C, and any other special allocations.

#### DIPLOMA COMARCA DEL VALLES (DCDV) CHC

The "Diploma Comarca del Valles" is issued by the local sections of the U.R.E. in Terrasa, Sabadell and Granollers, Spain. Amateurs need 15 QSLs, and SWLs need 20 QSLs.

Contacts made on any band and mode will count since 1st January 1971.

Log extracts and QSLs should be sent to:  
Delegacion Local de Granollers  
Apartado Postal No. 5  
Granollers, Spain.

The award is granted to qualified applicants free of charge.

List of stations valid for the award:  
EA3DU EJ EK FP GR GT HK HL HU IP JE JR KF KT KZ LQ MS MT MY MZ NB NE OM OY PN QK QZ RC SG SH SI SK TK TN TO TZ UB UC UH UJ UQ UT UV UZ VA VC.

#### DIPLOME DUE DEPARTMENT 35 (DD-35) CHC

The Department 35 (Ille-et-Vilaine) of France issues the DD-35 Award to all licensed amateurs or SWLs of the world who submit proof of contacts with 5 stations located in this department using any mode of transmission.

Two classes: HF bands and VHF bands. Endorsement stickers are available for 10, 15 and 20 stations contacted.

QSL cards need not be submitted provided a list

of claimed contacts, certified by 2 other amateurs or an Official Club is submitted. The fee is 8 IRCs.

Address for the application:  
Jean-Yves Rioult, F5JU  
11, square de Provence  
35 — Rennes, France.

## Contests

with Jim Payne, VK3AZT  
Federal Contest Manager,  
Box 67, East Melbourne, Vic., 3002

#### CONTEST CALENDAR

##### February

- 7/8 ARRL DX Phone
- 14/15 John Moyle Field Day
- 14/15 10-10 Net QSO Party
- 21/22 ARRL DX CW
- 21/22 YL-OM Phone
- 28/28 French Phone

##### March

- 6/7 ARRL DX Phone
- 6/7 YL-OM CW
- 20/21 ARRL DX CW
- 27/28 CQ WW WPX SSB
- 27/29 BARTG Spring RTTY

##### April

- 24/25 VERON Netherlands
- 24/25 Bermuda Phone

##### May

- 1/2 Helvetia
- 8/9 Bermuda CW

#### TEN-TEN NET QSO PARTY

0001 GMT Feb. 14 — 2400 Sunday, Feb. 15.

10 metres only, any mode, one contact only with same station. Exchange name and QTH. Awards to members of net only. For membership write and send log to K5MRU, Grace Dunlap, Box 445, La Feria, USA, TX 78559.

#### BARTG SPRING RTTY

0200 GMT, Mar. 27 to 0200 GMT, Mar. 28.

Send SAE to FCM for details.

#### YL-OM CONTEST

Phone: Feb. 21-22. C.W.: Mar. 6-7

Starts: 1800 GMT Saturday.

Ends: 1800 GMT Sunday

The YL's work the OM's in this one. All bands may be used but cross-band or Net contacts do not count.

Exchange: QSO No., RS(T) and ARRL section or country.

Scoring: One point per QSO. Multiply total by number of ARRL sections and countries worked for final score. The same station may be worked once only regardless of band.

There is also a power multiplier of 1.25 for stations running 150 watts or less input. (300 watts PEP if on SSB). Multiply your final score by above factor.

Phone and CW are separate contests and require separate logs.

Awards: Certificates to the highest scoring YL and OM in each country.

Logs must be received no later than April 18th. (This year they go to: Beth Newlin, WA7FFG, 825 W. Prince Rd. -06, Tucson, Ariz. 85705.)

## COMMONWEALTH CONTEST 1976

This is the new name for the old BERU for which, apart from the name, nothing in the contest rules is changed.

Following on requests from last year's entrants (112 submitted entries including 28 from VK) the HF Contest's Committee of the RSGB agreed to the contest's continuance under exactly the same rules as the BERU with only an updating of the name, aimed at attracting more support from 'newer' Commonwealth countries.

#### TIME

From 1200 GMT Saturday, 13th March.

## MAGAZINE INDEX

with Syd Clark, VK3ASC

#### BREAK IN October 1975

Component Lead Shaper; Plessey SSB Transceiver; A Direct Conversion Receiver; SWR and Feedlines; A 6 Metre Transverter for the FT101; A Dummy Load with Frequency Dependent Metering; A Double Conversion Receiver for the Wellington Walkie.

#### CQ-TV

A Digital Scan Converter for Colour Slow Scan Television; Slow Scan, Where is it Going; A Video Modulator; An Amateur Tripod; A BATC Test Card; BATC Equipment Register.

#### HAM RADIO September 1975

Inductively-Tuned Six Metre Kilowatt; Tunable Notch Filter; Optimizing the Phase-Locked Loop RTTY Terminal Unit; Toroidal Coil Inductance; Single-Sideband Speech Splitter — Its Causes and cure; 100 watt Solid-State Power Amplifier for 432 MHz; Hand-Held Touch Tone; How to Use Meters; Magnet Mount for VHF Mobile Antenna; 300 Hz Crystal Filter for Collins Receivers.

#### MOBILE NEWS Sept./Oct. 1975

Amateur Transmitter Specifications; Automatic Tone Burst for the Trio TS-700; Motor-Cycle Mobile In-

## "WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Turns		L'gth Inch	B & W Equiv.	Price
	Dia. Inch	per Inch			
1.08	½	8	3	No. 3002	99c
1.16	½	16	3	No. 3003	99c
2.08	⅝	8	3	No. 3006	\$1.16
2.16	⅝	16	3	No. 3007	\$1.16
3.08	¾	8	3	No. 3010	\$1.40
3.16	¾	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
5.08	1¼	8	4	No. 3018	\$1.75
5.16	1¼	16	4	No. 3019	\$1.75
8.10	2	10	4	No. 3907	\$2.52

Special Antenna All-Band Tuner Inductance  
(equivalent to B. & W. No. 3907, 7 inch)

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Reference: A.R.R.L. Handbook, 1961

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## FIXED STATION ANTENNAS FOR 6 AND 2 METRES

**66B 6-ELEMENT 6 METRE YAGI.** Forward gain 15 dB. Boom length 24 ft. Turning radius 12'6". Boom diameter 2 ins. **\$79**

**64B 4-ELEMENT 6 METRE YAGI.** Forward gain 12.7 dB. Front-to-back ratio 20-25 dB. Boom length 12 ft. Turning radius 8 ft. Boom diameter 1¼ inches. **\$48**

**215B 15-ELEMENT 2 METRE YAGI.** Forward gain 17.8 dB. Front-to-back ratio 25-30 dB. Boom length 28 ft. Turning radius 14 ft. Boom diameter 1½ inches. **\$69**

**28 8-ELEMENT 2 METRE YAGI.** Forward gain 14.5 dB. Front-to-back ratio 25-30 dB. Boom length 14 ft. Turning radius 7'6". Boom diameter 1¼ inches. **\$38**

**A50-5 5-ELEMENT 6 METRE YAGI.** Forward gain 9.5 dB. Front-to-back ratio 24dB. Boom length 12 ft., Turning radius 7'6". Boom diameter 1½ inches. **\$57**

**A50-3 3-ELEMENT 6 METRE YAGI.** Forward gain 7.5 dB. Front-to-back ratio 20 dB. Boom length 6 ft. Turning radius 6 ft. Boom diameter 1¾ inches. **\$37**

**AR-6 6 METRE RINGO.** Gain 3.75 dB (ref. ¼ wave whip), ½ wavelength long, matched using a gamma loop. **\$36**

**A144-20T 20-ELEMENT 2 METRE CROSSED YAGI.** Forward gain 12.4 dB horizontal and vertical. 13.6 dB circ. polarization. Boom length 12 ft. **\$72**

**A144-7 7-ELEMENT 2 METRE YAGI.** Forward gain 11 dB. Boom length 98 inches. **\$25**

**A147-11 11-ELEMENT 2 METRE YAGI.** Forward gain 13 dB. Boom length 144 ins. Especially cut for FM and vertical polarization. **\$39**

**ARX-2 2-METRE EXTENDED RINGO (RANGER),** 6 dB vertical 3/2 wave, 112 inches. **\$35**

**MS-2 MONITOR RECEIVER ANTENNA, Lo-Hi VHF/UHF.** **\$29.50**

Prices and specifications subject to change. All prices incl. S.T. Freight extra. Allow 50c per \$100 for insurance (min. 50c).

Large range of antennas just arrived, including HF types 18AVT — \$93.00, VS41/80KR, VS-33, and mobile whips. Tell us what you want so that we can tell you if we have it! Stacking kits, phased arrays, and UHF antennas expected next shipment. Rotators now in stock.

Corrections: The technical data of FT221 in the second column of our advertisement on page 33 in the December issue should read 280 (w) and not 208 (w). AS-2HR \$35; 590G \$29.

**bail**

**ELECTRONIC  
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W.A. H. R. PRIDE, 26 Lockhart Street, Como, 6152 Ph. 60 4379

To 1200 GMT Saturday, 14th March.  
Mode CW only 3.5 to 28 MC.

Eligible entrants are radio amateurs licensed to operate in British Commonwealth call areas. VK1-8; Lord Howe VK2; Willis VK4; Christmas VK9; Cocos VK9; Norfolk VK9; Heard VK0; Macquarie VK0; and Australian Antarctica are all separate contest areas. P29 is now a single area.

Two Trophies have been presented for competition between VK stations — a silver medallion for the highest VK scorer in the official RSGB results, and a bronze medallion for a middle placed VK scorer based on total VK entries divided by two i.e. for 26 entries, to 13th placing; for 33 entries, to 17th placing. Overall winner in 1975 was VE3BMV and only 60 points separated the first four. VE, G, VE, G, VK3MR, placed 16th overall, and VK7RY, 81st, won the 1975 medallions.

Scoring: 5 points for contest exchange, plus 20 bonus points for 1st, 2nd and 3rd contact with each call area other than one's own (there are 111 in all, with G, GW, GC etc. counting as a single area) — exotic prefixes are the rule rather than the exception.

Logs: Separate logs are required for each band showing columns — 1. Date and time GMT; 2. Station worked; 3. Nr sent; 4. Nr received; 5. Band; 6. Leave blank; 7. Contact points claimed; 8. Bonus points.

Each band log should be separately totalled and should include at the end, a check list of all as worked on the band. Separate band totals should be added together and the total claimed score entered on a cover sheet giving particulars of station, QTH, equipment, power, and a declaration that the rules and spirit of the contest have been observed.

Entries may be single or multi-band. Single band entries should claim contacts on one band only, but submit details of contacts on other bands for checking purposes only. Entries should be addressed to — D. J. Andrews G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. Closing date 17th May, 1976 (by airmail, please).

## Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,  
Dear Sir,

### QRP IS ALIVE AND WELL!

The purpose of this letter is to kindle some more interest in the low power field, as well as eliciting information from other QRP operators as to what they are up to and with what results.

Recent QRP/QRP QSO's from this QTH, include Marrie ZL2PV, Jim VK2BBO using a G5RV and -7, Snow VK3MR with his 1 watt rig, Drew VK3XU winding down to 500 milliwatts, John VK2LM with his 15 watts and Vee, and Yoshi JH1RUF sporting 10 watts to a 2 element beam. These QSO's were from 40 and 20 metres and all CW.

The author has been experimenting with 40/20 metre directional antennas in order to come up with an effective QRP station, and the list includes 4 element fixed beam, 40/20 X-beam, 40/20m quad and X-Q quad. The CO WW DX CW contest was worked with the 3 watts into the 4 el beam, and resulted in 190 QSO's, 20 zones, 23 countries and a lot of fun, all on 20 and all CW.

Quickest QSLers as I see them are, W0IPU, VK5XD, VK5BS, KV4AA, VK4NL and VE3EWY. Best 20m DX worked so far — A9XU, YV5AE and ZS6ME to complete the QRP WAC, and H21AB.

The old 5763 rig is due for moliballs shortly, as the belated Christmas present, an HW7, is due any day.

Hope to hear from other "Fleapower Men" either by Mail, QSO or on the CWN Sunday Mornings. Till then, best DX and vy 73s.

David S. Down VK5HP/QRP.

Dear Sir,

The article by Alan Shawsmith, "The Golden Years of AR in VK" (AR Dec., 1975) might have been interesting and more convincing had he taken the trouble to check his facts.

It was not to Charles MacIurcan A2CM, that the honour of making either the first VK-W or the first

VK-Europe contact went. That honour belongs to Max Howden, then A3BQ, now VK3BQ and still active on the amateur bands. On Monday, 3rd November, 1924, just after 1900 EAST, Max worked U6AHP (not 6EKY) — see, for example, "Radio in Australia and New Zealand" Vol. 2, No. 45, 10th December, 1924 — and it was Max who wrote in this magazine, "I did my best to answer him, and he certainly managed to read me, although local 'hams' say they never heard such fearful sending. I admit my hand acquired a double phase vibration in place of the usual single, but it couldn't have been too bad". In the 26th November issue of the above magazine, MacIurcan wrote: "Congratulations to 3BQ for being the first Aussie to work U.S.A. 2CM had hopes, but it was not to be".

On Friday, 14th November, at 0500 EAST Max worked G2OD to obtain the double — first to America and first to Europe. The wavelength used for these contacts was about 85 metres.

MacIurcan, who certainly contributed greatly to amateur radio through the 20's was the first Australian to contact England on 20 metres. This was on Saturday, 2nd May, 1925, and G2OD was the other station (see, for example, Radio in Australia and New Zealand, Vol. 3, No. 59, 24th June, 1925).

What Shakespeare wrote was "All the world's a stage, and all the men and women merely players" (As You Like It, Act 2, Scene 7). Pedantic perhaps, but weren't we taught that if inverted commas are used, i.e. the writer is quoting, then the original words must be used and not a paraphrase of them. A careful reading of the story of Nebuchadnezzar as given in Kings, Chronicles, Daniel and Jeremiah fails to reveal anything about "scales". Was Alan thinking about that famous king's son, Belshazzar, at whose feast the mysterious hand wrote on the wall "Mene Mene Tekel Upharsin" (Numbered, numbered, weighted and divided) Tekel being interpreted in more detail as "thou art weighed in the balances and art found wanting". Let us hope that this will not be the fate of amateur radio!

By all means let us remember the past, and the exploits of the men who laid the foundations of amateur radio, but for goodness sake let us have the facts, which may be found in the documents of the time, and not woolly memories which only serve to create confusion.

Yours sincerely,  
F. K. McTaggart VK3NW/2BNW

Dear Sir,

I am interested in using a Parametric Amplifier on 146 MHz and due to my difficulties experienced in obtaining the information required, I would be grateful if one of your readers could assist me.

Yours faithfully,  
Gary Stern VK22BB,  
C/o P.O. Box, 330,  
Hurstville, N.S.W. 2226.

## Trade Review

### NEW TRANSFORMER

Ferguson Transformers P/L. have provided a sample of their new PL50/60VA transformer, a recent addition to their 'low profile' range. This small (10 cm x 6 cm x 5 cm) transformer, which looks somewhat like a 'fluro' ballast choke, has two windings of 25 volts, lapped at 20 volts and rated at 1.2 amps each.

With the two windings in series the off-load voltage of 57V AC only fell to 53V AC at full load.

Connections are made via round 'quick connects' and six 30 cm coloured leads are provided with one end tinned and a connector on the other. A 10 cm lead is also provided with a connector on both ends for linking the windings.

On test the transformer was quiet and met the ratings given. It is claimed that this transformer meets AS C126. — VK3YFF.

### IPSWICH RC 2M PREAMPLIFIER

"If I can get it going, anybody can". Well, I did, but reference to the relevant article in AR was a must. The instructions that came with the kit were poorly printed and vague, and the tinned copper wire provided to wind the coils was only enough for one coil.

Once mounted inside my deaf Pye 789, however, the story was quite different. Channel 40, dead a few moments before, was filled with stations and I found that my rig could now receive much better than it could transmit; reversal of the previous situation.

An A/B test on a recent trip to Ballarat showed that I could hear both 3RML and 3RWZ with the preamp, but not without.

A preamp will not necessarily improve a good rig, but if yours is a bit deaf, then I am sure that you would be pleased with the results of fitting one of these IRC units. — VK3YFF.

## 1976 SUBSCRIPTIONS REMINDER

No final notices will be sent out this year from the Executive Office.

All subscription notices already mailed carry the wording —

"FIRST AND FINAL NOTICE"

Please take note and arrange to pay your 1976 subscription at once if you have not already done so.

AR's will soon cease for unfinancials and missing copies cannot be supplied if your supply ceased because of being unfinancial.

PLEASE TAKE NOTICE.

## Coming Soon NEW EDITIONS



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See your local bookseller for  
these

**Newnes Technical Books**

# CONTEST CHAMPION TROPHY

- The specified first period for this trophy is the calendar year 1976 omitting the Ross Hull VHF UHF Memorial Contest 1976/77 on this occasion.
- Please refer to p.53 AR Dec. '75 for Contest Champion Trophy Rules.
- The qualifying contests will be:—  
John Moyle Memorial MFD — 1976  
Remembrance Day — 1976  
VK/ZL/Oceania DX-phone — 1976  
VK/ZL/Oceania DX-CW — 1976

## QSP

**QSL CARDS**  
In a letter to the Editor in Radio Communication Sept. '75 Arthur Milne G2MI, the RSGB's QSL Manager for a great many years points up the high costs of printing QSL cards, the even worse postal charges and the time spent in the QSL Bureau which is wasted in sorting and storing cards never even collected. He said the RSGB QSL Bureau handles about 1½ million cards each year of which 600,000 are never claimed and have to be destroyed. We suggest the adoption of a "Never QSL" concept unless a card is requested or you want one or you receive one. A very commonsense idea. One day, for a small subscription, someone may come up with a computer bank for log sheets in place of QSL cards.

**PAKISTAN**  
In the month of the Air column in Radio Communications Sept. '75 it was reported that G3NRQ recently spent several weeks in Pakistan and attended a meeting of the Pakistan ARS in Lahore. He was received with great courtesy but was unable to obtain operating permission. It seems that it can take residents 18 months to get a licence, and the severe import restrictions and high duty rates make equipment very scarce.

**SCOUTS SUPPORT**  
The 25th World Scout Conference, comprising delegates from 86 countries unanimously voted to support amateur radio operators in their efforts to retain their present frequency allocations in the following terms — 1. to urge their Governments to resist any attempt to reduce the number and size of frequencies presently allocated to the Amateur Radio Service, and 2. to co-operate with the National Amateur Radio organisations in any actions designed to this end. IARU Region 1 News Sept. '75.

## Around the Trade

**WESTON ELECTRONICS — NEW 1976 LOCATION**  
Weston Electronics, a member company of Kemtron Ltd., has moved to Kingsgrove. The move is part of a program to centralise the operation of companies within the Kemtron Ltd. group. Enquiries and correspondence should now be directed to:—  
Weston Electronics Company,  
The Crescent,  
KINGSGROVE, N.S.W. 2208  
Phone (02) 50-0111 — Telex AA20061 — Cables: Westelec, Sydney.

### ATTENTION FT101 OWNERS

At least a distortion free RF Clipper. Fits in minutes and really works. Only for FT101. Gives up to 6 times or more effective talk power plus extra RX selectivity and gain — not to be confused with audio type distortion producing clippers or compressors. Normal price £45 sterling, air post paid — introductory price \$69 Australian direct from —

G3LL HOLDINGS LTD.,  
39/41 MINCING LANE, BLACKBURN BB2 2AF,  
ENGLAND

# Hamads

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

### FOR SALE

FT101B bought Feb. 75, hardly used, \$500. VK3AXA, QTHR. Ph. (059) 42 7248.  
Heathkit S.B. 400 TX, 80-10m upper and lower sideband, 2 x 8148B finals, 180W PEP power supply built-in, excellent condition \$225. J. Lauten VK4VK, 6 Tosti St., Sorrento, 4217. Ph. (075) 31 6201 (Bus.), (075) 38 4162 (A.H.).  
T8520 purchased new 4 months ago, immaculate condition. Set of Asahi Mobile Whips CW Bumper Mount, \$585. Will consider separating — VK2AA, A.H. Newcastle 21101.  
One Philips R5223 Communications Rx 1.5-30.5 MHz \$200. Another modified with Collins 500 kHz SSB mechanical filter, \$200. Both perfect condition and in current use. Rob Gurr, VK5RG QTHR. Ph. (08) 276 4547.  
FTV850 Transverter as new, rarely used \$150. Midland 27 MHz hand-held \$25. Robot SSTV Monitor Model 70B, new in box \$442. R. G. Gill, P.O. Box 299, Artarmon, N.S.W. 2064. Ph. (02) 412 4791.  
Eddystone 888 Comm. Rx 160-10m amateur bands, complete with xtal calibrator and S meter, VGC \$140. VK3AFE, Ph. (03) 772 1911. 53 Valetta St., Carrum, Vic. 3187.

HP45 Calc. incl. charger and applications book \$150; Comm. Rx all valve, mech. filter, ham bands only, xtal locked front end, 3.5-4.0 IF Geloaso Dial, prod. det. etc. \$100; First year eng. drawing materials and text books over \$200 worth — make an offer; small 3" CRO suit audio buff \$50. VK3ZAZ QTHR. Ph. (053) 41 3777.  
Icom IC60 solid state 6m 10W FM mobile similar to IC22, fitted with 52.525 & 52.656, complete with all cables, brackets, microphone & manual, \$150. VK3ZRG, PO Box 134, Bendigo, 3550.

FT200 Transceiver and Power Supply (March '73), little used last 15 months, microphone and handbook, \$350. VK4UR, QTHR. Ph. (07) 266 7873 A.H.

Comm. Rx realistic DX180 with external speaker, current model, 5 bands 150 Hz-30 MHz, excellent condition, \$140 O.N.O. Katsumi mic. compressor MC22S, "The Poor Man's Linear", good condition, \$20. B. Bathols VK3JUV, QTHR. Ph. (03) 90 6424 evenings only.

Swan 500, good order, new 6HF5 finals, complete with AC supply, speaker and manual, \$200. Yaesu FT200, excellent order, 6Gm6 RF tube fitted, good on 10m, complete with AC supply and manual, \$300. VK3ALM, QTHR. Ph. (053) 39 1703.

One Barker & Williamson RF Coaxial Antenna Switch, brand new, unused, model 550A, single pole, 5 positions 1 kW AM, \$22. VK4WR, 6 Olive Court, Nambour, 4560.

Aluminium Mast Sections, 2 only, 20 ft. long, 2 in. diameter, virtually "as new" condition, \$18 each (less than half replacement cost). Buyer must arrange collection. VK5WD, QTHR. Ph. (08) 380 6093.

A good home required for a clean 400W PEP linear amp., uses pair parallel 4CX-350As in AB1. All power needs are internal, all you need is a 6m 5W PEP exciter and an antenna; have shifted QTH to dense ch. 0 viewing area, unit is going to waste, excellent performer, unlimited potential. Will deliver and install FOC VK1, VK2, VK3, VK5, 2 spare tubes. Others? 20 Landale Ave., Mt. Clear, 3350.

Barlow Wadley Rx XCR30, Mark II, brand new in carton, \$225. VK2BLB Bill (02) 84 2405 A.H.; (02) 270 4232 Bus.

FTDX580, same as FTDX401 but more power, very little use, mint condition, \$400. Galaxy Power Meter, \$50. Mic. high quality, \$15, or the lot for \$450, you freight. VK2RM, QTHR. Ph. (047) 58 6569 after 6 p.m.

# Silent Keys

It is with deep regret that we record the passing of—

- |                      |        |
|----------------------|--------|
| Mr. W. H. WILLCOXSON | L20717 |
| Mr. R. F. DRUMMOND   | VK2BRD |
| Mr. W. L. PEARN      | VK5PM  |
| Mr. N. U. CURLEWIS   | VK2ALI |
| Mr. H. O. WANKE      | VK8XO  |

George S. Samways VK3OG (G6OM), known by all his friends as Sam, passed away suddenly on 25th November from an unexpected heart attack. Sam was active on the HF bands for over fifty years in England and Australia, and will be sadly missed by all who knew him.

20m SSB Transceivers, less mike and PS sell for replacement cost of valves and parts only, 1000V 1a transformers, \$8. 813a 811As, assorted transmitting tubes, cheap. VK2TG, QTHR. Ph. (02) 533 2895.

### WANTED

Transverters — 6m, 2m, 70cm, to suit FT101, also helical or trap verticals anywhere in between 160m to 6m. Bob Yorston, VK2CAN. Ph. (02) 646 0' (8-5).  
FV50, FV50B, VFO Matching Speaker for FR5C 5-25 Henry Swinging Choke, 20 Henry Choke 400 MA ratings. VK3ZAZ QTHR. Ph. (05) 41 3777.  
8B-220 Linear Amplifier — correspondence to G.P.O. Box 3208, Sydney, 2001 or Ph. (02) 92 4698.  
8238 Carbon Anode final tube, prefer unused. C. E. Schmidt VK5WG QTHR.

### SERVICE

Anyone wanting computer print-out for Oscar 6 and 7 for each days orbits, send S.A. Jiffy bag or envelope (large) to VK3ZAZ R.S.D. Buninyong, Vic. 3357 or phone (053) 41 3777.

## ANTENNA PARTS, KITS



QUAD HUB: \$23.00 plus P/P \$2.00  
QUAD KIT: \$120.00. Freight forward.

Consisting of: Hub: 12 ft. solid F/G. Spreaders: Aluminium Extenders. Ferrules. Adaptors. 350 ft. 0.064 Hard Drawn Copper wire. Nylon line and insulators.

**MOBILE ANTENNA PARTS:**  
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# VHF FM FROM THE WORLD LEADERS - YAESU

## FT-224



### ● 24 CHANNEL FM TRANSCEIVER



The FT-224 is an advanced, solid state transceiver, that features 10 watts and 23 channel flexibility plus one priority channel, all in one compact package. Dial is marked in channel frequencies for direct read-out, and three popular channels are installed. Additional plus features include automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. A monitor switch is provided which enables checking of your own transmitter/receiver frequencies. Panel meter functions as "S" meter, transmitter RF output, and centre reading discriminator meter which enables received frequency to be checked. FET RF with five section helical resonator. Three IF filters. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.

#### GENERAL

Frequency Range: 146 to 148 MHz.  
Number of Channels: 23 plus 1 priority channel.  
Mode: FM.  
Frequency Stability:  $\pm 0.001\%$ .  
Circuitry: 30 Transistors, 23 Diodes, 4 IC, 5 FET.  
Power Source: 13.5V DC.

Antenna Impedance: 52 ohm unbalanced.  
Power requirement: 0.4A receive, 2.2A transmit (DC).  
Size: 180(w) x 70(h) x 220(d) mm.  
Weight: 2.5 kg.

#### RECEIVER

Sensitivity: 0.3  $\mu$ V for 20 dB quieting.  
Selectivity: 15 kHz at 6 dB, 25 kHz at 60 dB.  
Audio Output: 2.5 Watts at 4 ohm.

#### TRANSMITTER

RF Output Power: 1 & 10 watts.  
Spurious Radiation:  $-60$  dB or better.  
Deviation:  $\pm 5$  kHz nominal.

FT-224	.....	\$218.00
Extra standard channels	.....	\$8.00
FP-2 Matching AC PS	.....	\$69.00

# Sigmatizer-200R



#### GENERAL

Frequency Range: 146 to 148 MHz.  
Number of Channels: 200 (10 kHz intervals) Simplex and 600 kHz Tx offset for Repeater operation.

Power Source: 13.8V DC (negative ground).  
Power requirement: 0.45A receive, 2.2A transmit.  
Size: 220(w) x 80(h) x 230(d) mm.  
Weight: 3 kg.

### ● 200 CHANNEL SYNTHESIZED TRANSCEIVER

YAESU now offers the FM enthusiast a complete, solid-state, 200 channel 2 metre FM transceiver. The Sigmasizer-200R features advanced, synthesized circuitry for total repeater and simplex coverage of the 146 to 148 MHz FM band. Frequencies are selectable in 10 kHz increments and front panel selectable 600 kHz transmitter offset oscillators give complete flexibility for repeater operation.

RF Output Power: 1 or 10 Watts.  
Spurious Radiation:  $-60$  dB minimum.  
Deviation:  $\pm 5$  kHz nominal.  
Sensitivity: 0.3  $\mu$ V for 20 dB quieting.  
Selectivity:  $\pm 8$  kHz at 6 dB,  $\pm 16$  kHz at 60 dB.  
Audio Output: 2 watts at 4 ohm.

PRICE: \$390.00

Prices include Sales Tax. Freight and insurance extra. Prices and specifications are subject to change. All sets are pre-checked before dispatch and are covered by our 90 Day Warranty.

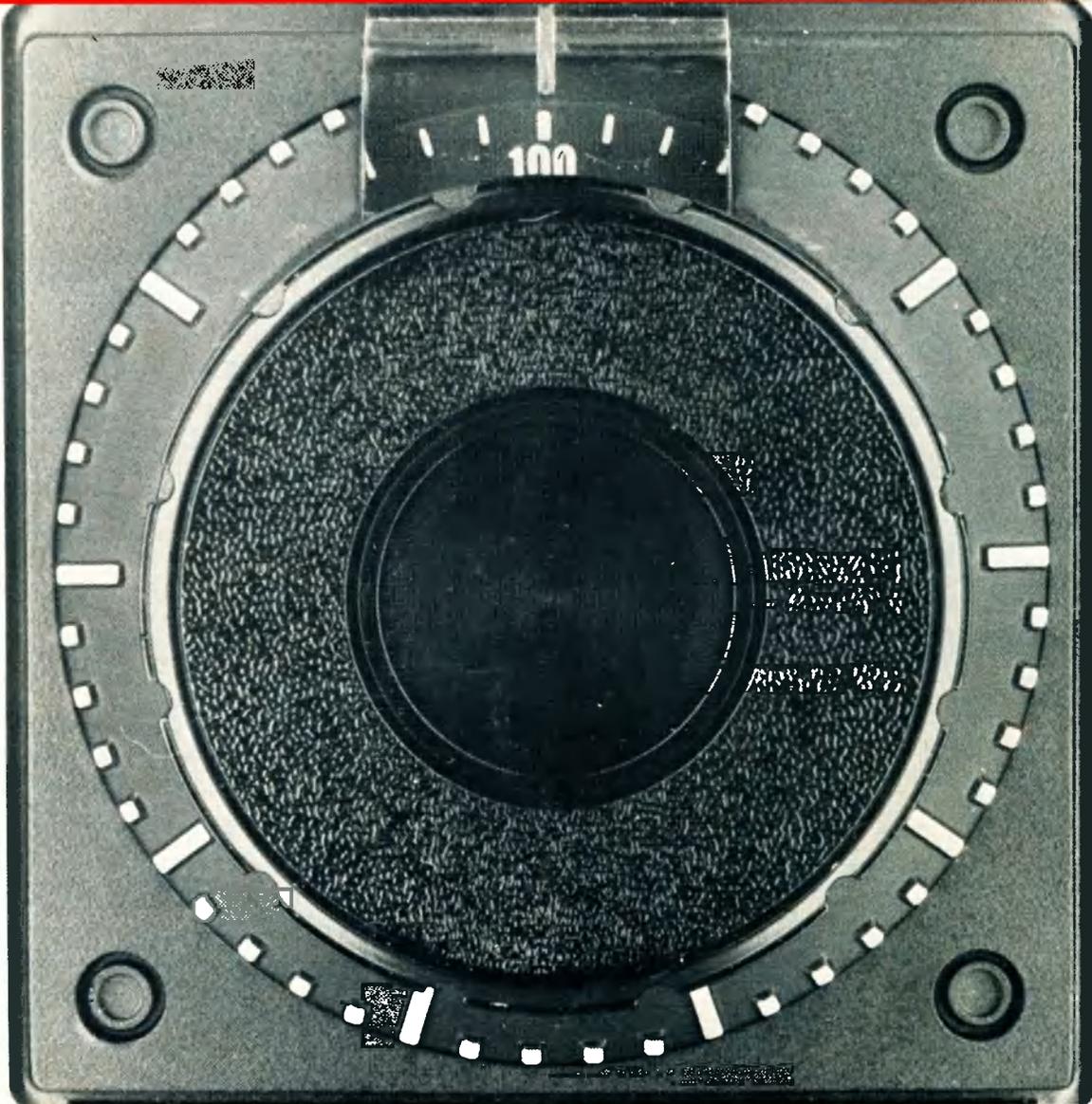
We have now received a large quantity of the latest YAESU five colour catalogue, with all data in English language. It is printed in Japan and certain conditions and specifications may vary for Australia, refer our advertisements. This is a beautifully produced and valuable publication. Send 40 cents PP for your copy by return mail.

## ELECTRONIC SERVICES

FRED BAIL VK3YS  
JIM BAIL VK3ABA

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Ph. 89-2213

QLD.	MITCHELL RADIO CO. 59 Albion Road, Albion, 4010	Ph. 57 6830
N.S.W.	STEPHEN KUHL, P.O. Box 56, Mascot, 2020	667 1650, AH 371 5445
	W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147	Ph. 624 2691
S.A.	FARMERS RADIO PTY. LTD., 257 Angus St., Adelaide, 5000	Ph. 223 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph. 60 4379



VOL. 44, No. 3

MARCH 1976

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### COVER PHOTO

*What is it? Some keen VHF operators will recognise it at once. Others should turn to page 15.*

*Photo: Ken Reynolds VK3YCY*

# HAM

# RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC. 3000

Phones: 67-7329, 67-4286

ALSO AT:

390 BRIDGE RD. RICHMOND. 425174

### TRIO MOBILE TR7200C

2 METRE FM TRANSCEIVER  
22 Channels, fitted with Ch. 1 and 4 repeaters.  
Technical Data: Transmit 10 and 1 watt positions.  
Max. freq. deviation +15 kHz. Spurious response  
-60dB. Receiver less than 1W for 30 dB SW  
selectivity. 20 kHz at 60 dB down; 40 kHz at 70 dB  
down.

**\$235 — Extra Channel Crystals \$10 Set**

LAFAYETTE HA310 WALKIE TALKIES, 27 MHz, 1  
watt, 3 channel. Fitted with 27.240 MHz crystals.  
PMG approved type. **\$69.90 each**

1 WATT 2 CHANNEL TRANSCEIVER with call system  
27.240 MHz. 12 transistor. PMG approved  
type. **\$45 each or \$89 a pair**

LAFAYETTE 27 MHz FIBREGLASS COWL MOUNT  
MOBILE LOADED ANTENNA, 36" ling. **\$23.95**

LAFAYETTE 27 MHz GUTTER MOUNT MOBILE  
ANTENNAS, fitted with 52 ohm coax and PL259

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LAFAYETTE 27 MHz COMBINATION AM RADIO AND  
27 MHz LOADED ANTENNA with RF splitter harness.

**\$28.95**

27 MHz MARINE ANTENNA. Designed for installation  
on fibreglass boats. Does not require any metallic  
earthing. **\$47.95**

1/4 WAVE STAINLESS STEEL 27 MHz ANTENNA  
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**\$35**

1/4 WAVE ROOF MOUNT, 2 metre mobile whip and  
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PONY CB74A 6 CHANNEL 27 MHz 5W AM TRANS-  
CEIVER. PMG approved for 27.880 MHz operation  
and fitted with 27.880 MHz crystals. **\$115**

NEW PORCELAIN EGG INSULATORS

35c each of 10 for \$3

HANSEN FS5 COMBINATION SWR BRIDGE AND  
POWER METER. 2 power ranges 10 and 100 watt,  
52 and 75 impedance switching. **\$28.50**

### THIS MONTH'S SPECIAL SOLID STATE 19 TRANSISTOR MULTI- BAND RADIO — 9 RANGES



AM, SW, FM,  
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1. AM 535 to 1600 kHz, 2. Marine 1-5 to 4  
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to 50 MHz, 6. 88 to 108 MHz, 7, 8 & 9 com-  
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porating weather band.

Slider controls, Dial light, Fine tuning con-  
trol, Flip-up Time Zone map, Telescope  
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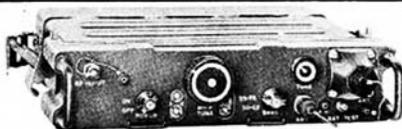


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With exclusive (LED)  
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Battery and electric  
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and FM bands.

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APPROVED BY ELECTRIC SUPPLY DEPT.  
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### RF AMPLIFIER AM-4306/GRC

Originally used in conjunction with PRC25 which  
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gives a nominal 25 watts out. Brand new in sealed  
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**\$19 each**

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a truly portable communica-  
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receivers. A truly crystal-  
controlled highly sensitive  
multiple heterodyne portable  
receiver of exceptional sta-  
bility with continuous, uninterrupted coverage  
from 500 kHz to 31 MHz.

**\$239**

All for F.O.R.

1 watt 2 channel transceiver  
with call system. 27.240 MHz. 12  
transistor. PMG approved type.

### SPECIFICATIONS:

Transmitter — Crystal controlled:  
1 watt input power to RF stage  
Operating frequency — Receiver:  
Crystal-controlled superheterodyne  
circuit with 455 Kc IF Antenna —  
Built-in 60" telescopic whip an-  
tenna. Audio output — 0.8 watt  
maximum. Power supply required  
— 12 volts DC (Eight 1.5 volt DC  
battery cells). Loudspeaker —  
2 1/4" PM type (built-in) function  
as microphone on transmit.



**\$45 each or \$89 a pair**

Post & pack \$1.50 each unit.

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AM 6 TRANSISTOR CIRCUIT BOARDS. All new  
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**\$1.50 each or 3 for \$3.50**

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deep. Calibrated 0-5. **\$3 each**

PANEL METERS 5 7/8" x 4 1/4" with 0-1 MA move-  
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BATTERY ELIMINATORS to suit transistor radios  
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SPEAKER CABLE, colour coded twinflex. 20c yard

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Threaded stud mounting. 25PF. **25c**

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PLAYERS. 2.5 watts per channel at 8 ohms. 12 V  
DC operation. In sealed boxes. **\$15 each**

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PHONES. Desk type with P.T.T. key switch in  
base. Brand new. **Reduced to \$15**

TRANSFORMERS A & R TYPE 5509. Ex equipment  
but as new. PRI 240 V secondary 2 x 12.6 V at  
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2N3055 TRANSISTORS **\$1 each or 10 for 1**

58 OHM COAX. CABLE. 100 yd. rolls, 1/8 in.  
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62 OHM COAX. CABLE. 1/4 in. diameter.  
45c yd., 50c metre

DOW KEY COAXIAL RELAYS. 48 volt DC opera-  
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3" "N" type connectors to suit above. **\$5**

SPLIT STATOR CAPACITORS with screwdriver slot  
drive 9PF-17PF-25PF. Brand new Eddystone type.  
**\$2.50 each**

15 kHz CRYSTAL FILTERS, 10.7 MHz MEW Brand.  
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**\$3 each**

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Communication Receivers, Transceivers, Walkie  
Talkies, Amplifiers and Stereo Equipment. Top prices  
for good clean units. We also accept trade-ins.

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# amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

MARCH 1976

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## QSP

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The WIA, mindful of staff shortages and the cuts that the government has made in money available for all departments, have in their discussions with the officers of the Postal and Telecommunications Department offered several suggestions as to ways and means of assisting in the examination — or certification as qualified — candidates who wish to become Radio Amateurs.

In offering these suggestions the WIA in no way intended a lowering of the standard set by the authorities over the years.

There were different levels of assistance suggested. One was that suitably qualified amateurs could act as supervisors of exams in country areas. Another was that certain WIA conducted YRCS exams of an approved standard could be counted as an exemption for the novice exam.

Yet another was the possible use of an outside education authority such as the City and Guilds as used in the United Kingdom. To date these ideas have been rejected.

However, if the situation does not improve in the examination of candidates for Amateur Certificates in the immediate future, a campaign will be mounted by the WIA at all levels of influence.

If a campaign is launched members are asked to co-operate as fully as possible.

DAVID WARDLAW VK3ADW  
Federal President

## STOP PRESS

## AMATEUR EXAMS ON AGAIN: FIRST EXAM HELD ON 17.2.1976

### DEREGULATION

"I think we are talking about emphasising more and more the self-regulatory aspects of Amateur Radio to provide a framework of rules under which you, the amateur, can have the broadest possible latitude to pursue your own specific areas of interest wherever that might be, whether it be in CW, or it be in sideband, or it be in HF, whether it be in VHF or UHF or whatever. I think that's important and I think you, as amateurs, have to look at that carefully because each of you have different areas of interest. If there is one place this is ever evident to the Commission it's in rule-making proceedings . . . you have to tell us what you need in the way of rules . . . Now, I think we've already made some progress in deregulation . . . we are constantly devising rules to meet specific situations, and that's bad. We think you in the amateur community ought to be able to meet those specific situations. We can provide for, I think, some relaxation in the control operation rules (on repeaters). We have more under study. We have provided for interlinking of repeaters and we think that the time has come to reduce the paper work and the processing time for repeater applications.

Another area of deregulation is in the exam area and this is an area that's very near and dear to me because I think the exam area is the key to a viable amateur service. We have to maintain interest in at least a portion of the youth of this country in Amateur Radio. Now how about instant licences? We are working out details of such a system". Part of speech by Charles Higginbotham W3CAH, Chief, Safety and Special Radio Services Bureau, FCC, given at the ARRL Pacific Div. Conv. 25-10-1975 as reported in Worldradio News, Nov. '75.

### TRAINING PROGRAMMES

The Radio Amateurs column in the Nov. '75 Telecommunications Journal contains an interesting insight into Norwegian methods for training to the licensed radio amateur level. LA1Q writes "It is far beyond our capacity to give private training to everyone who wants to become an amateur. Nothing could, however, be more natural in our long and thinly populated country than to make full use of amateur radio. We have therefore organised a radio course giving instruction in radio theory as well as in CW".

It acts as a normal class, he says, 4 days a week and 2 hours every day from Sept. to May and includes a final 2-week gathering with active personal

training. Writing about the disabled he says "It is difficult to reach, train and assist the disabled who want to become radio amateurs. It is made possible through the active support and co-operation of more than 250 licensed amateurs. These are scattered all over the country and are often enduring a lot of hardship to bring our services to isolated invalids". "Most disabled live an isolated life, unable to take part in normal activities. Amateur radio can overcome this isolation and be an interesting hobby, but we have to take into account that most disabled are, by the nature of their handicap, unable to attend normal radio classes. They are also generally of limited economic means and only a few can afford to buy their own equipment". A special LA5LG aid fund was founded as a division of the NRRL as a project of assistance to disabled persons and works in close co-operation with their licensing administration.

### NOVICE LICENSING

"The first examination leading to a 'D certificate' (Novice) for radio amateurs will take place on 26 Nov. 1975 in Utrecht" — with up to 4000 (yes, 4000) applicants at any one session. The 'D certificate' enables unlicensed amateurs to accede temporarily to the ranks of legal radio amateurs and is valid for two years during which time the holder must successfully pass the examination for an A, B or C certificate. Telecommunications Journal, Nov. '75 which also includes a comment by ARRL President on the FCC re-structuring proposals that ARRL "is deeply concerned that the quality of the amateur radio service in which we take such great pride must in no way be sacrificed for quantity". (Note — the ARRL membership is over 100,000 — Ed.).

### EQUIPMENT EXHIBITION — SYDNEY

A note from the United States Trade Center advises that a major exhibition of telecommunications equipment will be held from 6th to 9th April on the ground floor showroom of the United States Trade Center from 10.00 h to 17.00 h daily at 37 Pitt Street, Sydney.

### REPEATER CROSSBANDING

"The FCC has deleted the restrictions on crossband operation of repeaters from Dec. 15th, 1975" is a stray from QST Dec. '75. "This change", it says, "permits a repeater to have its output frequency in a different band than its input".

### LICENCE FEES

Did you know that you can no longer pay your licence fee to a post office?

# WIANEWS

The main topics of discussion by Executive during January were repeaters, finances and Magpubs.

Both the RSGB and the ARRL produce, print, and sell books for the amateur. This is a valuable source of income. The WIA however does not possess a profit-making undertaking. Readers should refer to the main QSP on p.3 of AR for Nov. '75.

The operations of Magpubs have been confined to processing subscriptions on overseas amateur magazines on behalf of members and acting as a sales outlet for amateur books, badges and some minor items.

Could these activities be expanded as a subsidy for reducing the Federal element of subscriptions? A careful study indicates that at this stage any expansion is not likely to attract any worthwhile profits for many inter-related reasons.

Firstly the storage, packing, documentation and distribution of books on a greatly expanded basis would require the provision of additional accommodation and some additional part-time assistance. If the commercial field is to be exploited this cannot be done except on a commercial scale and the provision of adequate capital to finance the operation.

If, and 'if' is the operative word, if this were to be done the tax aspect would need close examination if sales were to be made to anyone instead of being a membership service as it is now.

An important aspect would be the necessity to offset the income earned by AR from paid advertising in the same field. Only after that could the question of net profitability be considered.

Another important factor is of course the recent heavy increases in postal charges on mail order business. If a purchaser finds he has to pay in posts and packing almost as much again as the books are worth is something which has already exercised the minds of booksellers.

The way the WIA is constituted has meant that Divisions also provide amateur books as a membership service. Since the extent of these operations has some bearing on the Divisional part of WIA subscriptions it could be argued that the centralisation of any commercial activity must first offset these Divisional profits before establishing any net profit to the Institute as a whole. Societies such as the NZART do not of course face this problem.

It was not overlooked that if a good service is to be rendered by an importer adequate stocks must always be held when it takes two or three or more months for fresh supplies to arrive from overseas after an order is placed.

Taking all these and other factors into consideration your Executive decided that the existing membership service should continue without change. Overseas magazine subscriptions will be processed as before and books will be available to members from their Division or from the Executive office as an alternative.

This is not the end of the road in searching for an acceptable money-spinner to subsidise WIA subscription rates. That these rates can be reduced or even stabilised within the means of the Institute is considered to be fundamental to its well-being and expansion.

A meeting was held late in January with the principal officers of the Radio Frequency Management Division of the Posts and Telecommunications Department. A considerable number of outstanding questions were discussed. Not least among these was the standardisation of amateur repeater conditions.

The conditions under which repeaters are authorised to be established and operated are mainly of interest to repeater groups rather than repeater users and will not therefore be detailed here except to say that the mis-use of repeaters can and does affect every user.

The Department believes sufficient data has now accumulated since amateur repeaters were first established to warrant a greater measure of decentralisation over licensing and control under standard conditions of general procedures.

They are naturally very concerned that amateur repeaters should not in any way cause harmful interference to other services. How this can be achieved is of course the concern of the relative repeater group in consultation with the respective Radio Branch

officers of the area where necessary. The Executive extracted this promise of co-operation and hopes that this will materially assist the groups whenever delays in licensing or other problems arise.

The fact was clearly established that the maximum power of a repeater is the same as the maximum power applicable to other amateur service stations hitherto operational — i.e. 150W. However the maximum power can seldom be utilised or authorised except in areas remote from other services. As soon as an amateur repeater is co-sited with stations of other services the problems of interference are usually so great that a suitable lower power limit must be accepted or the repeater must be moved to another location or the aerial systems changed etc. If the proposed frequencies of an amateur repeater cause, or are likely to cause, interference to other services then some other frequencies might resolve this problem. There are seven channels available in the 2m band and a yet-to-be determined number of channels in the 70 cm band. The band plan for 70 cm (in the segment 430 to 440 MHz) already notified by the WIA appears acceptable to the RFM Division and all that now remains, apparently, is to notify them of the repeater channels. The WIA Divisions have already been asked to submit their ideas.

The only other problem relating to 70 cm band usage is that the amateur service is the secondary service in the band 420 to 450 MHz. Consequently any assignments which may be granted to amateur stations in this band will be subject to withdrawal if the primary service wants the frequencies concerned.

Finalised during December and January were three Postal Votes. These were briefly mentioned in WIANEWS Jan. '76. The first was the 70 cm band plan. This was basically identical with the band plan published on p.7 of AR for Aug. '75. All Divisions accepted this band plan except VK4 from which detailed comments are still awaited and VK7 from which no vote was received. The VK2 Division accepted the plan in principle but reserved the right to bring up the following for discussions presumably as an agenda item for the 1976 Convention —

- (a) FM Simplex move from 440-441 MHz to 433-435 MHz;
- (b) 440-441 MHz segment to become experimental;
- (c) Move secondary TV channel down to 441-448 MHz with video on 442.25 MHz, sound on 447.75 MHz and allocate 448-450 MHz as a further experimental segment.
- (d) A modification to the upper limit of the ATV primary channel to reduce possible interference with EME operations.

As already stated this band plan was notified to the RFM Division in accordance with their requirement.

The second postal motion to be approved was the adoption of a frequency-sharing gentleman's agreement for Novice licensee operations. This is in line with the long standing world-wide gentleman's agreement on band-sharing in the HF bands adopted by Australian amateurs through the WIA. The postal motion did establish that the WIA would encourage adherence to the plan which is as follows:—

- (a) CW only — 3.525 to 3.535 MHz  
— 21.125 to 21.150 MHz  
— 26.960 to 27.030 MHz
- (b) Phone & CW — 3.535— 3.575 MHz  
— 21.150—21.200 MHz  
— 27.030—27.230 MHz

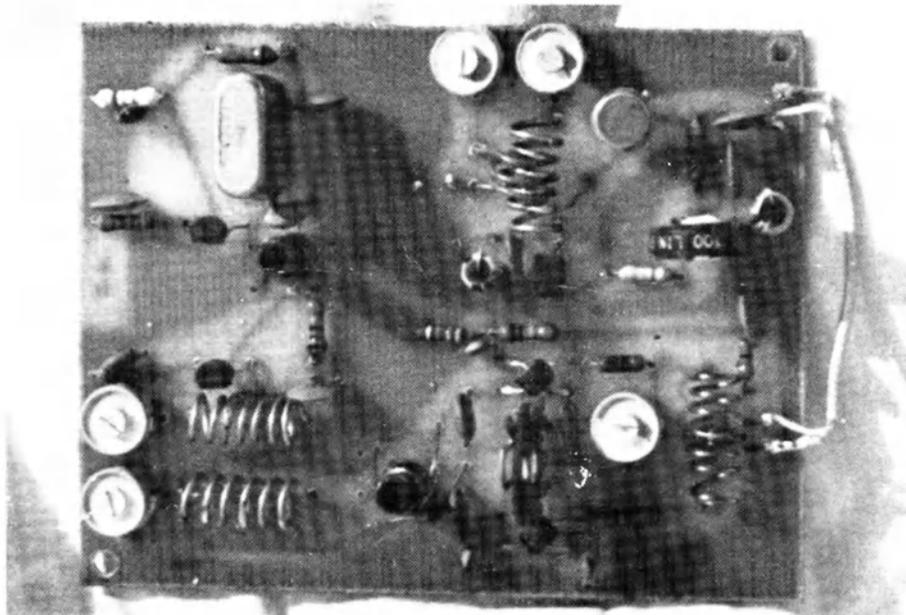
All Divisions voted in favour. VK2 passed on a comment that both ends of the 80m novice segment should be moved say 5 kHz higher in frequency to allow an established international usage of CW in the portion 3.525 to 3.530 MHz. A similar comment was made by VK6 relative to the 3.525 to 3.535 MHz segment on the grounds that existing users of this segment might well be forced to move down to the low end of 80m and thus interfere with inter-continental working therein. Both these Divisions nevertheless voted in favour of the band planning.

The remaining postal motion referred to the dates for the 1976 Federal Convention. All Divisions voted in favour of moving the dates to 7th to 9th May, 1976 in Melbourne with the exception of VK3 and VK7 from whence no votes were received.

The proposed 1976 Call Book is still very much under discussion but since the existing call book contract does not expire till 31st December next a number of problems remain to be surmounted. ■

# TWO METRE SOLID STATE TRANSVERTER

Peter Williamson VK4ZWP/T  
22 Bursaria St., Everton Hills, Qld. 4053



Having just completed a solid state 20m SSB transceiver the author resolved to produce a series of transverters for use on the VHF bands.

Several circuits were considered from various publications; all but one used valves. Although high power output was offered, they were physically large and required a large power supply.

Since most SSB contacts in Brisbane are over distances less than 25 miles, it was considered unnecessary to construct a high power transverter. Also, the convenience of 12 volt operation for field days, without the use of a DC/DC converter or 240 volt alternator, was a desirable feature. Having thus decided on a low power solid state unit a circuit was found in an overseas publication and was duly constructed by the author and Graham VK4ZCL.

Results to say the least were disappointing (and costly). The receiver was unstable, the transverter radiated on several different frequencies, and was generally a beast to align.

Both devices were eventually scrapped and the challenge was taken to produce a unit which could be easily built and aligned using readily available components.

To date, six units have been built, and are operating satisfactorily. These have been driven by homebrew 20m transceivers, 10m from FT200, and 6m from a FT620, with minor coil changes to be detailed later.

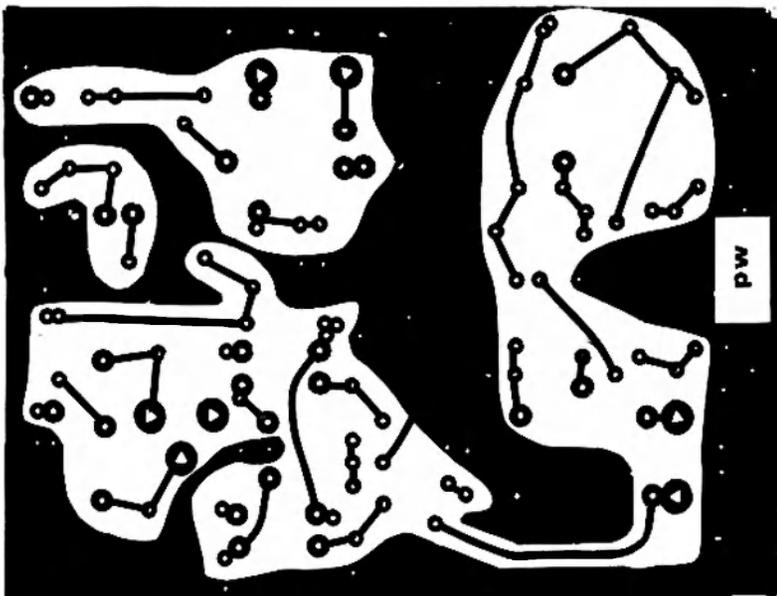
No receiving converter is included on the PC board since most VHF active amateurs will already have at least one 2m converter which can be easily modified to suit. Both VK3 and IGL type converters have been used with complete success. For those who do not possess a converter a circuit is given for one but no further details (e.g. PC boards) are available due to limited space (and time). Also in the works is a linear amp using a 2N5589, producing single tone output of 3 watts, but again no details will be made available until exhaustive tests are completed.

Q1 is a series mode 3rd overtone oscillator operating at 43.3333 MHz (for 14 MHz input) in common emitter configuration. Slight frequency errors in the order of 800 Hz can be corrected by detuning L1/2. Q2 operates as a common emitter tripler with no fixed bias. RF drive is rectified by the BE junction and biases the transistor into conduction. L3/4 constitute a lightly coupled double tuned filter for the local oscillator output at 130 MHz. L4 is tapped to provide a low impedance output for the receiver converter mixer.

Q3/4 form a balanced mixer, capable of quite an acceptable order of power gain along with low intermodulation distortion.

Suppression of the local oscillator is achieved by parallel feed to the mixer input, the SSB being fed in push pull at a typical level of 0.3 volt. A fixed bias of 4 volts is applied to G2 of both FETs. The 22 ohm resistors provide parasitic suppression.

Q5 operates as a class AB linear amplifier and provides about 200 mW output on single tone. RV2 provides adjustment of the bias on Q5 for optimum linearity and output. Bypassing at LF and VHF is necessary to suppress any tendency towards parasitic oscillation. Typical output is 2.5



volts across a 50 ohm load using the RF probe detailed elsewhere.

Construction entails a small fibreglass P.C. board 3 3/4 x 4 1/4 inches which holds all components except the relay. Housing is up to the individual although some form of screening is desirable.

All components are readily available in Brisbane and the situation should be the same in other states. Do not forget the coax link between the mixer and PA!

### ALIGNMENT

(1) Set RV1 and RV2 to mid range and connect a 50 ohm dummy load.

(2) Apply 12 volts to the local oscillator section and tune L1/2 for maximum on TP1. Zero indicates the oscillator is inoperative. A typical value is 0.5 to 1.0 volts; if more, the link L2 should be spaced to achieve a voltage in this range.

(3) Apply 12V to the mixer and LO and with a multimeter on Q3 source, tune C1 and C2 for maximum voltage, typically 0.5V rising to 1.5V. Check the LO output is on the correct harmonic (3rd) using a GDO or wavemeter.

(4) Apply the SSB input by either re-inserting carrier or test tone and tune L5/6 and C4 for an indicated output across the dummy load.

Remove the SSB input and check that

L5/6 is peaking on 144 MHz and not the LO frequency. (If it is tuned to the LO the indicated output will not drop).

(5) Tune C5 and C6 on the PA and retune C4 for maximum output checking the output is on 144 MHz with the GDO.

If available, listen to the signal on a 2m receiver and adjust the SSB drive level and RV2 for maximum output consistent with audio quality.

(6) Finally, remove the SSB input and adjust RV1 for a null at the LO frequency.

The transverter may be now used barefoot or to drive an external PA. Some may scoff at the practicality of a QRP transverter however regular 5 x 9 contacts (using a 4 element yagi) are held between Brisbane and Ipswich. If you really like a lot of power try running it into a 4CX250B or even a 6/40.

### COIL DETAILS 2m TRANSVERTER

#### 14 MHz Input

L1 10 turns 28 B & S on Neosid 722/1 former F29 slug.

L2 1 1/4 turns over L1.

L3 6 turns 0.25 ins. dia. 18 B & S TCW centre tapped.

L4 6 turns 0.25 ins. dia. 18 B & S TCW Tap 1.5 turns.

L5 25 turns 28 B & S Neosid 722/1 former F29 slug centre tapped.

L6 8 turns over L5.

L7 7 turns 0.25 ins. dia. 18 B & S TCW centre tapped.

L8 2 turn link 0.25 ins. dia.

L9 6 turns 0.25 ins. dia. 18 B & S TCW tap 2 turns from 12V rail.

L10 2 turn link 0.25 ins. dia.

L11 5 turns 0.25 ins. dia. 18 B & S tap 1T and 4T.

L12 4 turns 0.25 ins. dia. 18 B & S centre tap.

L13 25 turns 28 B & S on Neosid 722/1 former F29 slug.

L14 8 turns over L13.

#### 28 MHz Input

(1) Remove C3.

(2) Reduce L13 turns to suit.

(3) Xtal 38.6667 MHz.

#### 6m Input

(1) Remove C3.

(2) L5 10 turns centre tapped, L6 3 turns.

(3) Xtal 30.6667 MHz.

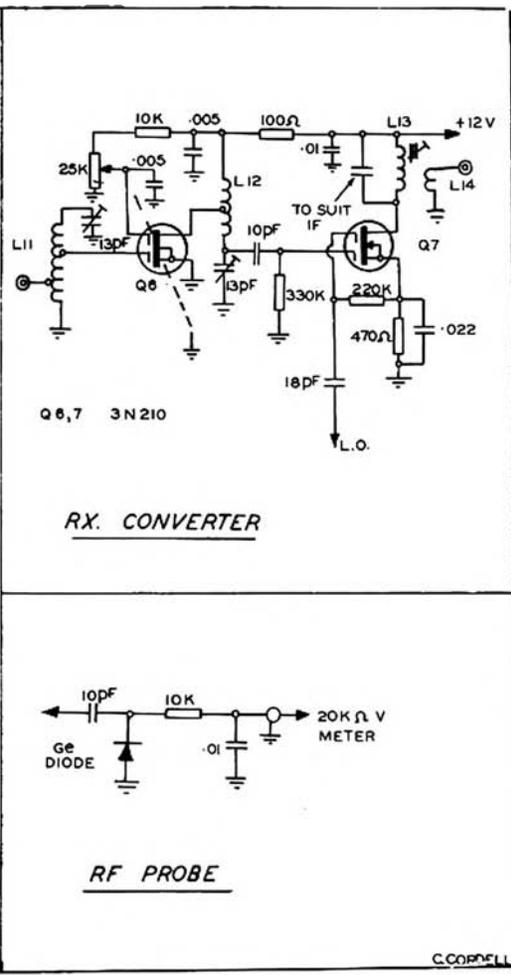
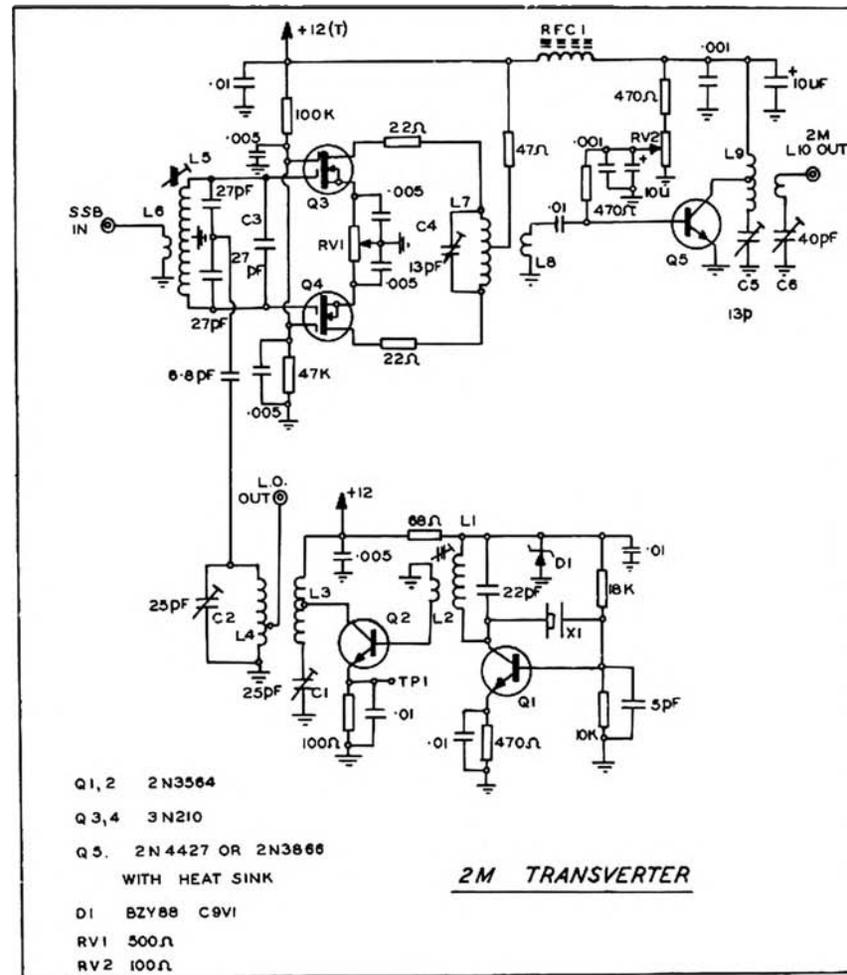
(4) Change 22 pF to 33 pF.

### MODS TO IGL CONVERTER AND VK3 TYPE

(1) Remove volts from existing oscillator Multiplier.

(2) Remove injection coupling capacitor.

(3) Feed LO through 100 pF coupling capacitor to mixer source. Source resistor to be 4700 ohm or 10 K.



# INEXPENSIVE MONITOR RECEIVERS FOR 2 METRE FM

Basil Dale VK2AW  
17/42 Diamond Bay Road, Vaucluse, N.S.W. 2030

The current availability of inexpensive AM/FM circuit boards suggested that these should be investigated to see if they would be capable of conversion to 2 metre FM monitor receivers.(1)

Two boards were purchased. These are designated 155-61209-02. Information from the suppliers indicates that the boards supplied were selected at random from very large stocks. If boards are ordered, there is no guarantee that identical boards will be supplied. However, it is believed that the general approach suggested in this article will be applicable to other types of circuit boards which may be purchased.

The first step is to ensure that the board is working. An inspection of the board indicated that a positive ground was required. If other boards are used, this may be determined by looking at any 100 uF capacitors and noting whether the positive or negative terminal connects to the common ground.

In this case, a 9 volt battery negative lead was connected to the switch on the volume control and the positive lead connected to the common ground. Before connecting the battery it is necessary to find where to connect the speaker. A small 2" speaker was available from a scrapped transistor AM radio. An inspection of the board showed a small output transformer was used. One lead of the secondary connected to the common ground and the other to a position on the board. The speaker leads were connected accordingly and the set switched on. A rewarding 'hiss' came from the speaker, indicating the wave-change switch was in the FM position. A switch to AM resulted in broadcast stations being

received. It is essential that the board be in working condition before any modifications are attempted. The local FM station should be received at reasonable strength.

## MODIFICATION OF COILS

To convert the FM section to the reception of 2 metre signals, only the coils need to be modified. The board should show three airwound small coils; the antenna lead will be connected to one and the coil nearest to this is the mixer. Both these coils will have about 4 turns. The remaining coil should have a smaller number of turns and this is the oscillator. The quickest and easiest way to reduce coil inductance is to cut off the mixer coil and the antenna coil at one end and then cut these coils so that two turns remain. They are then spaced out and soldered to the cut end projecting from the board.

The oscillator coil is cut at both ends leaving about 1/2" wire at each end. A piece of wire is soldered across these two ends to make a small hairpin loop.

## LINING UP ON 2 METRE FM

Having made the coil changes, obtain a 2 metre signal source, such as GDO, signal generator (preferred) etc. and connect to the antenna. Tune in this signal using the main tuning capacitor, then peak up the mixer trimmer for maximum signal. An output meter can be connected across the speaker terminals if desired. Alternatively, if the discriminator circuit can be identified (usually by the two diodes) a suitable centre zero meter can be connected here and used for lining up. The identification of the four trimmers on the tuning gang can be made by switching to AM, identifying the oscillator and mixer trimmers for AM by adjustment and then noting the two remaining trimmers.

Slight adjustments may have to be made to the mixer coil by compressing or extending the spacing between turns so that the inductance comes within the range of the trimmer. Similarly, if the 2 metre signal from the signal generator is not audible, an adjustment of the oscillator trimmer should enable the signal to be received. A small change to the size of the coil may be necessary.

A small adjustment of the slug in the discriminator transformer should be made for the best audio response.

Results should be quite satisfactory for the small amount of time expended and the cost involved. In a poor location, a small antenna enables mobiles using the Sydney repeater to be received. Audio strength could be improved if desired by connecting to an IC audio amplifier.

A suitable case for the board and speaker and a small dial will improve its appearance.

Conversion to 52 MHz FM could be made using the original coils with a small capacitance across each coil. A GDO would be helpful in this case to locate the band.

When activity on FM is at a minimum, one can always switch to the broadcast band!

Additional information concerning the conversion of FM broadcast receivers is contained in an article in Ham Radio Magazine April 1974, pp. 34-38.

(1) Ham Radio Suppliers are offering AM/FM 10 transistor circuit boards at \$2.75 in their current advertisement in "A.R." Their address is 390 Bridge Road, Richmond, Vic. 3121.

## Try This

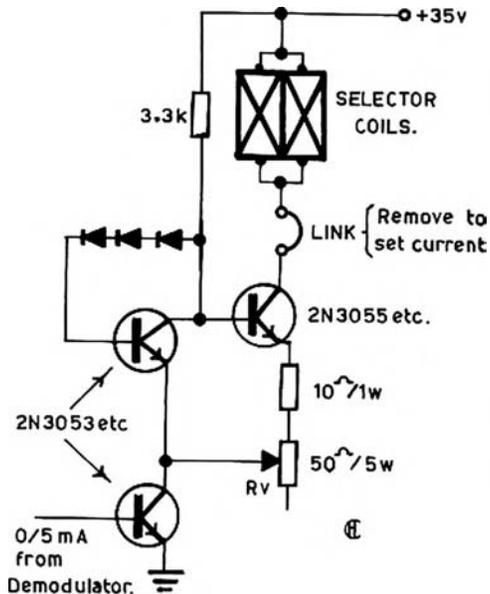
with Ron Cook VK3AFW  
and Bill Rice VK3ABP

### RTTY SELECTOR MAGNET DRIVER

Ron Cook VK3AFW

Conventional drivers use a high voltage, perhaps 120 volts or more. A series resistance is used to limit the static selector coil current within its rating, say 60 mA. While HV transistors are available for switching such voltages, it would be preferable to use a lower voltage more compatible with solid state equipment.

Reducing the selector coil supply voltage, however, produces a sluggish action and often results in poor copy. There is a solution. The constant current driver shown in the diagram allows the use of low voltages and inexpensive medium voltage transistors and provides fast clean operation of the selector.



The driver requires about 5 mA of drive (4.5 volts through 680 ohms). It is necessary to wire the selector's coils in parallel as shown. Any selector with rated (parallel connection) current in the range 30-180 mA can be driven.

To set up the unit apply 5 mA of drive and adjust Rv for the required current (say 120 mA).

Connect up to the demodulator and away you go.

## QSP

### BROADCASTING

In his editorial to Telecommunications Journal of Nov. '75 the Secretary-General of the ITU, Mr. M. Mill, writing about the 1974/75 Conference to revise the Copenhagen Plan, says "The population of Africa, Asia and Europe taken together is 3235 million. And when we consider that broadcasting is directed at the individual listener and that long and medium waves have so wide a range, I wonder whether any international conference has ever before had the task of serving the basic needs of so many . . . low and medium frequency broadcasting is part of the national telecommunication systems. For many countries the role it plays and the priority to be given to it are vital".

**HF TRANSCEIVERS** (we have used gear too!)



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AUSTRALIA'S FASTEST SELLING HF TRANSCEIVER

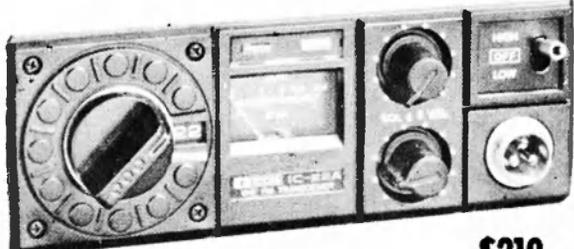
- \* Phase Locked Loop circuitry for optimum stability
  - \* Separate USB/LSB/CW 8-pole crystal filters as standard and no frequency change required when going from USB to LSB
  - \* Maximum accessibility to plug-in PCB modules, even the front panel can be swung out for easy servicing. Full spares catalogue plus parts available.
  - \* Pair 6146B's in final with screen voltage stabilisation for minimum distortion products and a very clean output signal
  - \* 90 day warranty
  - \* Price \$570 including mic, cables, plugs, English manual
- Frequency Ranges:

Bands (meters)	Frequency (MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
wwv	15.0



- Uniden 2020 80-11m transceiver, complete .....\$570
- Uniden external PLL FVO .....\$105
- Uniden matching s. aket .....\$28
- Yaesu FL2100B linear amplifier .....\$430
- Kenwood TS-520 80-10m transceiver .....\$590
- Kenwood TS-900 - out of production
- Atlas 210X 80-10m solid state mobile including noise blander .....\$695
- Atlas AR-230 AC power supply .....\$165
- Atlas delux mobile mount (DMK) .....\$55
- Yaesu FT75B mobile transceiver .....\$280
- FP75B AC power supply .....\$70
- DC75B DC power supply .....\$75

**2 METRES FM**



The IC21A is the 10 watt base station or mobile (146-148MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, power/swr meter, PA protection and modular circuitry . . . In addition:

- \* calibrate position netting switch allows the IC21A to listen to itself on simplex channels.
- \* The RIT control offsets the receiver frequency to bring in signals which are not properly calibrated
- \* complete with mic, cables, manual, 3 channels and the VICOM 12 month warranty.
- \* PRICE: \$298.

**6 CHANNELS and 12 MONTH WARRANTY \$219**

Features:

- \* solid-state T/R relay
- \* PA protection
- \* 5 helical resonators
- \* 10/1 watt

**IC22A**

Complete with cables, mobile bracket, mic, manual and 6 channels from the WIA Bandplan.

- PTT MICROPHONES-
- Yaesu YD-846 High imp \$22
  - Trio MC-15 low imp \$18
  - Trio MC-10 high imp \$18
  - Icom for IC22/21A \$15

**WHERE QUALITY COUNTS!**

Surely, one of the big success stories in Amateur Radio comes from ICOM - Inoue Communication Equipment Corporation with its headquarters and manufacturing plant located at Osaka, Japan. Founded in 1963 by Tokuzo Inoue, the ICOM organisation produces the only VHF transceivers capable of operating in the heavy fields found at the base of the Tokyo tower; actual tests were held and ICOM emerged victorious! Inspiration for the company came from Toku, as his friends call him, beginning at the age of 25 in electrocardiograph design, graduating to Sharp as a design engineer and finally founding his own company. This 43-year-old engineer's versatility and imagination are reflected in the quality products his firm produces.

ed by an on-air check! Performance is checked against specification parameters (3% fail at this stage) and rigs failing to meet the stringent requirements are re-worked. On arrival at VICOM performance is again checked against spec, crystal frequencies "tweaked" and the deviation properly adjusted for Australian conditions.



Tukuzo Inoue (left), founder and owner of ICOM with VICOM General Manager, Peter Williams.



One of the burn-in racks, where all sets are run for at least 24 hours.

The company motto "ICOM where quality counts" is more than just a catch-phrase, it is a way of life. Company pride and spirit can only be described as fierce. Production line testing and quality control is exhaustive: all boards are thoroughly checked and aligned before being assembled into the chassis and again when the set is finished. A further environmental check for 24-48 hours is given to every rig and then follow-

An active Research and Development Section at ICOM is the envy of their competitors and Tokuzo's pride and joy. This is where he can be found day and night. Truly amazing things are done here, with an offhand, casual appearance and an intense feeling of accomplishment. To enter this beehive of activity is bewildering. Test equipment fills the floor space, draftsmen produce drawings of equipment that seems fantastic - yet a short time later, there it is on the bench, operational. Here is where the quality starts and no compromises are allowed. Such rigid specifications are set up, it seems they cannot be met. Yet they are met, and daily. ICOM now has a large share of the world VHF market and its huge success in Australia epitomises attitudes by Amateurs "hooked" all over the globe. VICOM, as the sole Australasian Distributor, is proud to be associated with this excellent product.

**VICOM** PETER WILLIAMS B.Sc. GENERAL MANAGER

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# A FREE RIG EACH MONTH!



Each month\* Vicom will refund the cost of either an IC202 or IC502 portable ssb transceiver to a purchaser (selected by ballot) by mail order or at our Sydney and Melbourne stores. The odds are pretty good on getting a quality ICOM rig free!

### IC202 2M SSB

This popular portable rig runs 3 watts pep output for ssb and 3 watts out for cw. Features noise blanker, RIT, VXO control (crystals supplied for 144.0 to 144.4) with provision for additional coverage for Oscar. Price includes English manual, carry-strap, dry-cells (there is provision for an external 13.8V supply if required) mic and the Vicom 12-month warranty!

### IC502 6M SSB

The newest rig from the ICOM stable has VFO control 52-54 MHz at 3 watts pep output (3w output on cw, too). Includes noise blanker, clarifier, provision for external antenna and power supply, light mass (2.1 kg) with audio output 1 watt. Comes complete with mic, carry-strap, dry cells and the Vicom 12-month warranty!



- IC202 2m SSB/CW portable \$210
- IC502 6m SSB/CW portable \$219
- IC3PS Power Supply \$75
- IC50L 6m linear amp \$85
- IC20L 2m linear amp \$85

## 12 month warranty

\* Offer closes 30th June 1976

### NEW ACCESSORIES

- \* Power Supply to match IC202/502 with facilities for plug-in linear amps – either 6 or 2 metres.
- \* 2 metre ssb linear, 3 watts in for 10 watts output.
- \* 6 metre ssb linear, 3 watts in for 10 watts output.





age gradually drops to about 1.1 before the cell is discharged. Once it reaches this voltage it is essential to remove the load and recharge the cell. If the cell voltage is allowed to drop below about 0.9 volts an irreversible chemical change takes place, making it impossible to recharge the cell. This is completely opposite to the characteristics of the nicad which can be fully discharged without coming to harm.

Another difference between the nicad and the rechargeable alkaline cell is that the alkaline cell cannot be recharged to its original capacity. Size for size this original capacity is higher than that of the nicad but the rechargeable capacity is only about one fifth of this original capacity, and where the nicad can be recharged hundreds or even thousands of times alkaline cells have a life of only between ten and fifty recharges.

### CHARGING DEVICE

The unit shown in the photograph and in the circuit diagram (Fig 2) was a charger to end all chargers, and primarily designed for the nicads in a Ken KP202. It delivers from about 15 to 40 milliamperes and will work from 240 volts AC, 110 volts AC or DC, 30 to 50 volts AC to DC and anywhere between 9 and 15 volts DC. It uses the constant current principle. The rectified voltage is 20 to 25 volts under load and the current is controlled by varying a wirewound pot in series with the 12 volt battery. A 6 volt 50 milliamp torch bulb also in series (not shown) will act as a charging indicator, current control and fuse. The 25 volts at the rectifier is obtained, when using a 9 to 15 volt supply, by a small DC to DC transistorised converter. The transformer is wound on a small ferrite core. Any toroid with about 1/4" by 1/4" section will do.

For good measure, mainly because they were lying around, a couple of small level meters were added and arranged so that when the volt meter shows a pre-established reading with the current meter at half-scale the battery is fully charged. Apart from the mount for the KP202 with its spring loaded fingers, two terminals are provided for charging other batteries.

For charging alkaline cells these terminals could be used and some voltage limiting device, such as a zener should preferably be added to keep the voltage from rising above about 13.5 to 14 volts. The alkaline cell, unlike the nicad, prefers constant voltage charging.

A final warning. Some alkaline cells are not rechargeable and may explode if recharging is attempted. So look carefully at the label!

## ELECTROMAGNETIC COMPATIBILITY

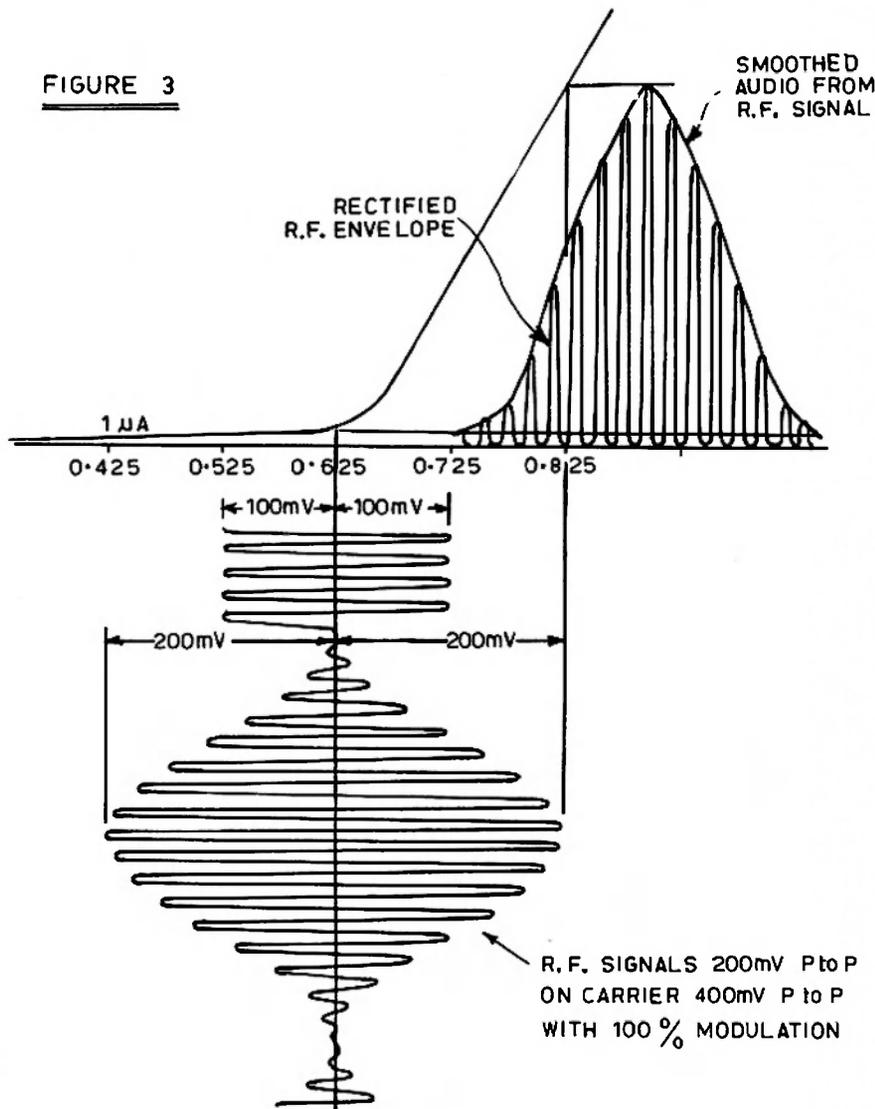
In the September 1974 issue of AR an endeavour was made to show you how audio frequency interference occurred and four diagrams were supposed to tell you all the story. However, Fig 3 may not have been as clear as intended to demonstrate a particular effect. Fig 3 is now re-drawn in a more exaggerated form. This time the offending RF signal is shown as being a 200 mV AM signal. It should now be clear when read in conjunction with the text on page 21 of September 1974 issue. The low level audio amplifier is now acting as an efficient RF detector — in fact like a crystal set feeding a high gain amplifier.

On the subject of *Electromagnetic Compatibility*, in particular *Audio Frequency Interference*, it might be of interest to know that the Regulatory and Licensing Section of the PMG do have small publications dealing with this problem. I am aware that both South Australia and Victoria have publications, the latest Victorian one of three pages is titled "*Electro-magnetic Compatibility of Audio Equipment and Radio Transmitters*" VRL 65. Other States may have information on this and related subjects too. These publications should be of considerable help to those troubled with Audio Frequency Interference.

A closing thought — if we go out into the blazing sun during summer with no protective clothing on we usually get sunburnt, so we take precautions against it. Now consider that the RF from your transmitter is also electro-magnetic energy, you wouldn't put an unprotected audio amplifier out in its field either unless you wish it to be affected by the RF. In other words the audio equipment or any other equipment vulnerable to high level RF fields should be protected by fitting RF suppression, then it can stand the high level RF just as we can stand the sun if we wear protective clothing.

Rodney Champness, VK3UG  
44 Rathmullen Rd., Boronia, 3155

FIGURE 3



# SIDEBAND ELECTRONICS SALES and IMPORTS

UNIDEN 2020 AC-DC transceivers 10 to 80 M.	<b>\$550</b>	CUSH CRAFT ANTENNAS	
TRIO-KENWOOD TS-520 AC-DC transceivers 10 to 80 M.	<b>\$530</b>	Model DGPA 52-27 MHz adjustable ground plane	<b>\$25</b>
YAESU MUSEN FT-101-E AC-DC transceivers 10 to 160 M.	<b>\$650</b>	LAC-2 lightning arrestors	<b>\$6</b>
TRIO-KENWOOD model QR-666 170 KHz to 30 MHz AC-DC receivers	<b>\$300</b>	Model AR-2 RINGO 3/8 waves verticals	<b>\$20</b>
DRAKE model SSR-1 Wadley loop 500 KHz to 30 MHz AC-DC receivers	<b>\$325</b>	AR-2X RINGO RANGER double 3/8 waves verticals	<b>\$35</b>
BARLOW-WADLEY model XCR-30 MK-II receivers	<b>\$225</b>	ARX-2 extension for AR-2	<b>\$15</b>
HY-GAIN ANTENNAS		A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each	<b>\$60</b>
14AVQ 10-40 M. verticals, 19' tall, no guys	<b>\$65</b>	A147-11 11 elements 2 M. Yagi	<b>\$30</b>
18AVT-WB 10-80 M. verticals, 23' tall, no guys	<b>\$90</b>	CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals	<b>\$35</b>
TH3JR 10-15-20 junior 3 el. Yagi 12' boom	<b>\$135</b>	FDK MULTI-7 2 M. FM 10 Watt transceivers with 12 sets of crystals, available all 7 repeater and anti-repeater frequencies plus channels 40, 50, and 52	<b>\$225</b>
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom	<b>\$180</b>	KEN PRODUCTS KP-202 2 M. FM handheld transceivers with crystals for repeaters 1 to 4 incl. and channels 40 and 50	<b>\$150</b>
TH6DX 10-15-20 senior 6 el. Yagi 24' boom	<b>\$225</b>	KYOKUTO 2 M. FM 12 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, 400 5 KHz transmit and 1000 5 KHz receive channels for normal simplex, repeater and anti-repeater operation	<b>\$300</b>
HY-QUAD 10-15-20 cubical quad Yagi 8' boom	<b>\$200</b>	ICOM IC-202 2 M. SSB handy transceivers, 144.0-144.4 MHz	<b>\$185</b>
TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom	<b>\$190</b>	AUTOMATIC MORSE KEYERS EK-150 with built-in squeeze key paddle AC operated with monitor	<b>\$75</b>
BN-86 balun for beam purchasers only	<b>\$18</b>	FERRITE CORE BALUNS cheaper Japanese product for up to 500 W RF	<b>\$12</b>
ANTENNA ROTATORS		COAX CABLE-CONNECTORS-SWITCHES Amphenol type male, female, angle, T-connector, double male, double female, even female cable connectors!!!	<b>all 100 cents each</b>
CDR AR-22 junior for light and vhf beams	<b>\$50</b>	3 Position coax switch, when they at last arrive!	<b>\$8</b>
CDR Ham-II senior for all but 40 M hf beams	<b>\$165</b>	RG-8-U foam insulation cable, low loss 3/8" diameter	<b>80 cents per yard</b>
KEN KR-400 for all medium hf beams with disc brake	<b>\$100</b>	RG-58-U foam and standard insulation 3 / 16" diam.	<b>30 cents per yard</b>
All three models rotators complete with 230V AC indicator-control box.		Add \$1 cutting-handling cost for coax and rotator cable orders.	
4-conductor light cable for AR-22	<b>20 cents per yard</b>	P.T.T. DYNAMIC MICROPHONES 50K or 600 ohms with 4-pin Jap. plugs	<b>\$10</b>
12-conductor light cable for Ham-II	<b>30 cents per yard</b>	DUMMY LOADS, 50 ohms with Watt meters built-in 0-200 MHz, two types 0-15 Watt & 0-6 / 0-30 / 0-150 Watt	<b>\$45 and \$80 resp.</b>
8-conductor heavy cable for Ham-II	<b>70 cents per yard</b>	TRIO-KENWOOD DIP METERS Model DM-800 0.7 to 250 MHz few only	<b>\$60</b>
6-conductor heavy cable for KR-400	<b>60 cents per yard</b>	27 MHz TRANSCEIVERS 5 Watt AM 6 channels with 27.880 MHz crystals	<b>\$75</b>
DRAKE W-4 SWR-WATT METER 0-200 and 0-2000 Watt scales	<b>\$60</b>	1 Watt hand-held 3 channels 27.240 crystals	<b>\$50</b>
DRAKE TV-1000 TVI Low pass Filter	<b>\$25</b>	15 Watt PEP 23-channels AM / SSB model SE-501	<b>\$175</b>
SINGLE METER SWR METER	<b>\$15</b>		
TWIN METER SWR METER	<b>\$22</b>		
MARK MOBILE ANTENNAS			
Helical 6' long HW-40 for 40 M.	<b>\$18</b>		
High power KW-40 for 40 M.	<b>\$25</b>		
HW-20 for 20 M.	<b>\$16</b>		
Tri-band HW-3 for 10-15-20 M.	<b>\$25</b>		
Swivel mobile mount and chrome plated spring for all	<b>\$12</b>		
ASAHI MOBILE ANTENNAS			
AS-2-DW-E 1/4 wave 2 M. mobile whip	<b>\$8</b>		
AS-WW 3/8 wave 2 M. mobile whip	<b>\$18</b>		
AS-GM gutter clip mount with canle and connectors	<b>\$10</b>		
M-RING BODY MOUNT AND CAP FOR 1/4 M. whips	<b>\$5</b>		

All prices quoted are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over \$100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded.

## SIDEBAND ELECTRONICS SALES

P.O. BOX 23, SPRINGWOOD, N.S.W. Post Code 2777

TELEPHONE, DURING BUSINESS HOURS ONLY! STD 047 511-394

# A SIMPLE VXO

Noel Lavelle VK3ABH  
4 Wembley Court, Forest Hill, Vic., 3131

If you have an occasional requirement for external transmit frequency control of your transceiver for split-frequency DX operation on 40 or 80 metres, this VXO for an FT-101B may be of interest.

The design requirements appeared to be:

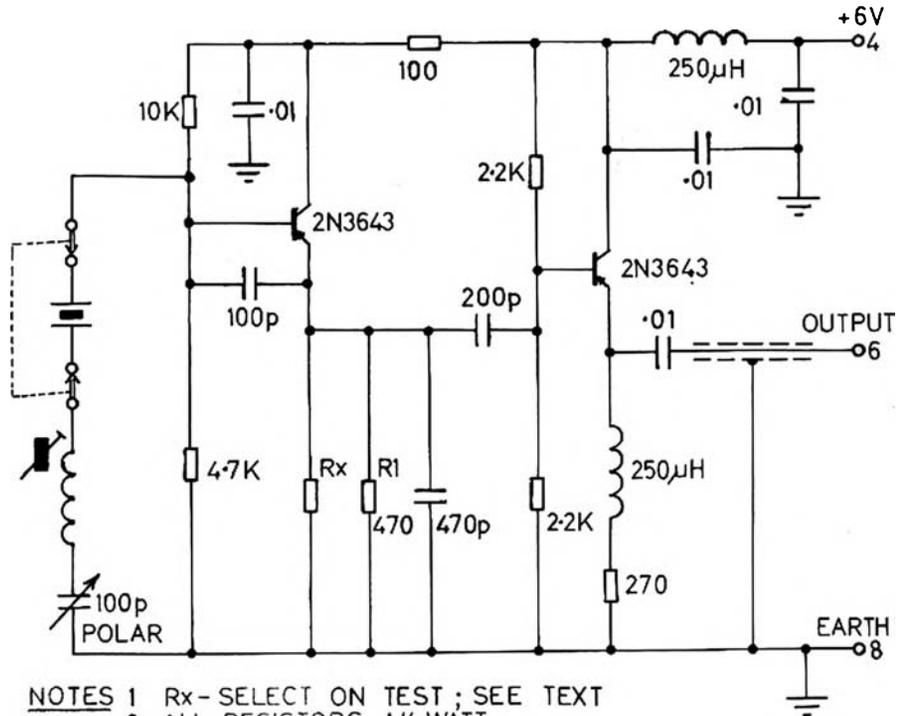
- small size, low cost
- stability: better than 10 Hz in any 10 minute period, including warm-up drift.
- low harmonic content and constant amplitude across tuning range
- compatibility: off; high output impedance. On; 120 mV rms into low impedance.
- frequency coverage: preferably all of the bottom 200 kHz, but, if necessary choose selected portions
- calibration: while direct calibration would be nice, small size dictated the use of a readily available vernier dial and calibration charts. Since the unit is to be used only for transmit this does not seem much of a hardship. Calibration is for LSB.

These requirements made a VXO look a more attractive proposition than a VFO.

The junk box should provide most of the components, but even if all parts were purchased new the cost would be low. Three of the five 3rd overtone crystals required for full coverage of the bottom 200 kHz are available from a large electronics firm at \$1.95 each. 3660-3700 and 7060-7100 kHz can be covered with just 2 of these crystals.

A 4½" x 3½" x 2" Eddystone diecast box makes a rigid shielded "cabinet". A 4½" x 2" side is used as the "front panel" (lid on top). Two tapped holes, just clearing the bottom of the box, are provided to mount the 50-mm vernier dial to the right of the front panel (top dial fastening not used). The 100 pF Polar capacitor is mounted on a heavy steel bracket and carefully aligned with the dial bush. A small low-C 5-position 2-wafer switch is mounted to the left of the front panel. (A slide switch could be used if only two ranges are required). Solder the crystals directly to the switch contacts to minimise stray C.

The coil was wound on a surplus ¾" dia, slug-tuned PTFE former about 1" long, with "feet". (The commonly available nylon



### NOTES

- Rx - SELECT ON TEST; SEE TEXT
- ALL RESISTORS ¼ WATT
- UNMARKED .01's ARE DISC CERAMIC  
REMAINING C's ARE POLYSTYRENE
- CONNECTION NUMBERS ARE FOR FT101B PLUG
- 2N3643 TRANSISTORS MAY BE REPLACED BY  
ANY NPN TRANSISTOR WITH  $F_T \geq 100$  MHz AND  $B \geq 100$

former of similar dimensions with a 900 grade Neosid core should be satisfactory). The coil must have high Q. Mount to the bottom of the case with ¾" spacers. Close wind about ¾" length of the former with about 0.25 mm dia enam. wire (about 30 AWG).

The remainder of the components are mounted on a piece of Veroboard to which are rivetted ¼" long threaded stand-offs for attachment to the back of the box. Component layout is self evident. Mount R1 so that a clip lead can be attached readily to the emitter end. Leave room for Rx. Remember that rigidity in a VXO is just as important as in a VFO.

Once construction is completed, connect a frequency counter to the output, apply 6V, and trim the coil as necessary for the required frequency coverage. (L too small — insufficient frequency swing. L too large — excessive swing and poorer stability). When satisfied with the coil apply a coat of Araldite and allow to harden.

Readjust the coil slug if necessary and the output level may be set. This could be measured on the bench, of course, but the FT101B has about 3000 pF to ground from the common VFO line and provides a built-in level detector.

Plug the VXO into the FT-101B. Using clip leads, connect a decade resistance box (or equivalent) between the emitter end of R1 and ground. Set to maximum resistance. Switch on and tune in a fairly steady

AM broadcast station (not hard to find on 40 metres) using the internal oscillator and the VXO in turn. The S meter will read low when using the VXO. Reduce the resistance of the box until the S meter reads the same for both oscillators. Remove the resistance box and insert a resistor of the indicated value as Rx.

It is unlikely, but if the S meter reads high on VXO resistance is needed in series with R1. If the choke you use in the emitter of the output stage is an unknown from the junk box it may pay to unplug the VXO while tuned to a signal and check that the S meter reading remains constant. If not, try another choke.

The VXO can now be calibrated. The results obtained with 5 crystals are shown below. The crystals in positions 1 and 3 are from the junk box; those in 2, 4 and 5 are new units.

Switch position	Crystal Nom 3rd OT (MHz)	VXO range (kHz)	FT-101B LSB tuning range (3.5 or 7 MHz plus: ) (kHz)
1	27.595	9194.5-9143.5	007-058
2	27.425	9144.5-9096.5	057-105
3	27.3	9105.5-9070.5	096-131
4	27.24	9081.5-9038.5	120-161
5	27.125	9044.5-9002.5	157-199

FT101B LSB Operating Frequency:

80 metres = 12701.5 — Frequency VXO (kHz).

40 metres = 16201.5 — Frequency VXO (kHz). ■

# AN AR SPECIAL

## A REVIEW OF THE ICOM IC 202

The Icom 202 breaks new ground on the two metre scene with a complete SSB package about the same size as the well known IC 22 FM unit. Furthermore the IC 202 has a self contained battery supply making it usable as a hand held portable.

Even though it is compact, all the usual facilities are included. A noise-blanker, "S"/RF output meter, and receiver off-set tuning are all standard features.

The ICOM 202 is distributed in Australia by Vicom International Pty. Limited of 139 Auburn Road, Auburn, Vic. The model used for this review was supplied by them and details of price and delivery can be obtained from them.

As supplied the 202 covers from 144.0 to 144.4 MHz in two bands of 200 kHz each. A normal VFO is not used, instead a stable, variable crystal oscillator (VXO) is employed. As we shall later see this has exceptional stability and also a very accurate and linear dial calibration.

Normal accessories supplied are a good quality PTT dynamic microphone, an over-the-shoulder carry strap, a set of dry batteries, a packet of connectors compatible with the rig, and an instruction manual.

The IC 202 measures 183/61/162 mm and weighs in at 2 kg complete with the internal batteries.

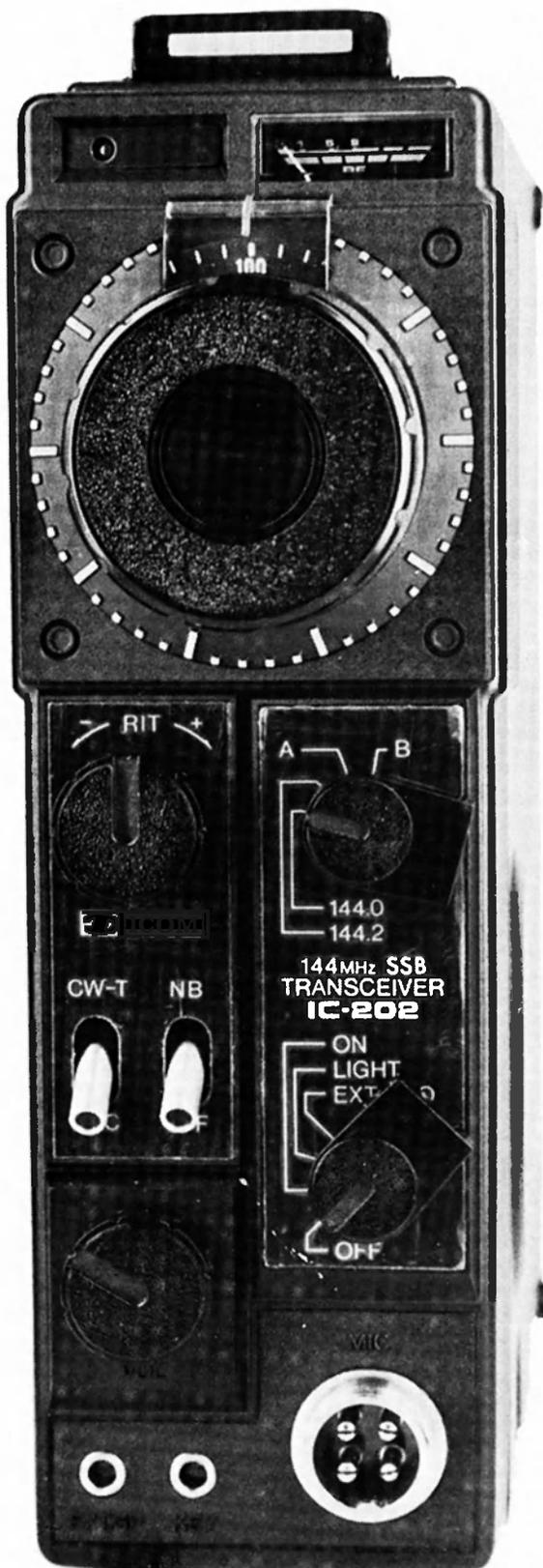
A quarter wave whip antenna is built in and this conveniently telescopes right into the cabinet. Connected in parallel with this is a recessed SO239 coax socket which enables the set to feed an external antenna.

Also provided are 3.5 mm sockets for an external speaker and the CW key. An external power socket is also fitted.

As the advertisements for the IC 202 state that the use of ni-cad batteries is recommended it seems a strange omission that no provision is made to recharge them. It would be necessary to either run temporary connections into the set, or remove the batteries and charge them in an external holder. Also it would appear that overall performance would be reduced by using ni-cads as there is only space for nine cells. With normal dry batteries, the recommended 13.5 volts would be available, but only 11.25 volts with ni-cads.

### IC 202 CIRCUIT DESCRIPTION

A total of 7 FET's, 20 transistors, 27 diodes, 3 zener diodes and 7 IC's are employed.



The circuit is single conversion on both transmit and receive using a 10.7 MHz IF channel with a filter giving a 2.4 kHz band pass.

The VXO operates on a crystal frequency of 14.61 and 14.63 MHz for the two ranges supplied as standard. The band switch has provision for two additional crystals as well as an external VFO input. As far as can be ascertained no matching VFO is built by Icom to suit the 202. Output from the VXO is multiplied by nine with two tripler stages up to 133.7 MHz. In the receiver section, this is mixed with the incoming signal to produce the 10.7 MHz IF. The crystal controlled BFO on 10.6985 MHz is also used as the carrier generator for the transmitter.

The receiver follows current design trends with a dual gate FET RF stage to an FET mixer. The IF channel consists of two FET's and one IC followed by a balanced four diode product detector and an LM380M audio IC. Fast attack slow release AGC is applied to two IF stages and the RF stage.

The receiver BFO is also used as the transmitter carrier generator.

Transmitter audio from an IC amplifier is fed along with RF from the carrier generator to an IC balanced modulator, then via a single FET stage to the 10.7 MHz filter

which is common with the receiver circuit.

Output from the filter goes to the transmitter mixer and combines with the VXO output to give the operating frequency. Four stages take this up to the normal three watt output level.

Full diode switching is used in the IC 202 thereby eliminating the bulk of a relay.

#### THE IC 202 ON THE AIR

Let me say right away that the performance of this little rig is quite superb. The dial mechanism is very smooth although perhaps a little too fast in the tuning rate. Both the dial scale and the "S" meter calibrations are rather small and ageing eyes will need a good pair of spectacles. However, considering the compact nature of the set, it is hard to see how these could be increased in size.

The various control knobs are rather small, but perhaps the worst feature is the very blurred designations for these controls. They are also an odd orange colour which does not stand out against the black panel. Surely white would be better.

Although the dial calibrations are small, their accuracy is surprising. Checked against our frequency counter, the maximum error was less than 1.5 kHz at the

main dial calibration points. As the 202 does not include a calibrator, it is nice to know that dial can be relied on. Stability was excellent also. At a constant temperature the frequency did not vary by more than 100 Hz or so.

Before putting the IC 202 on the air, I had doubts that the three watts output would make a worthwhile impression on the band — but not so. Many times it outperformed a ten watt output FM transceiver over the same path, and several successful contacts were made that would have been difficult on FM.

Unfortunately time was not available to do a full sensitivity check on the receiver but no doubts are held that the published figure of .5 uV would be easily met.

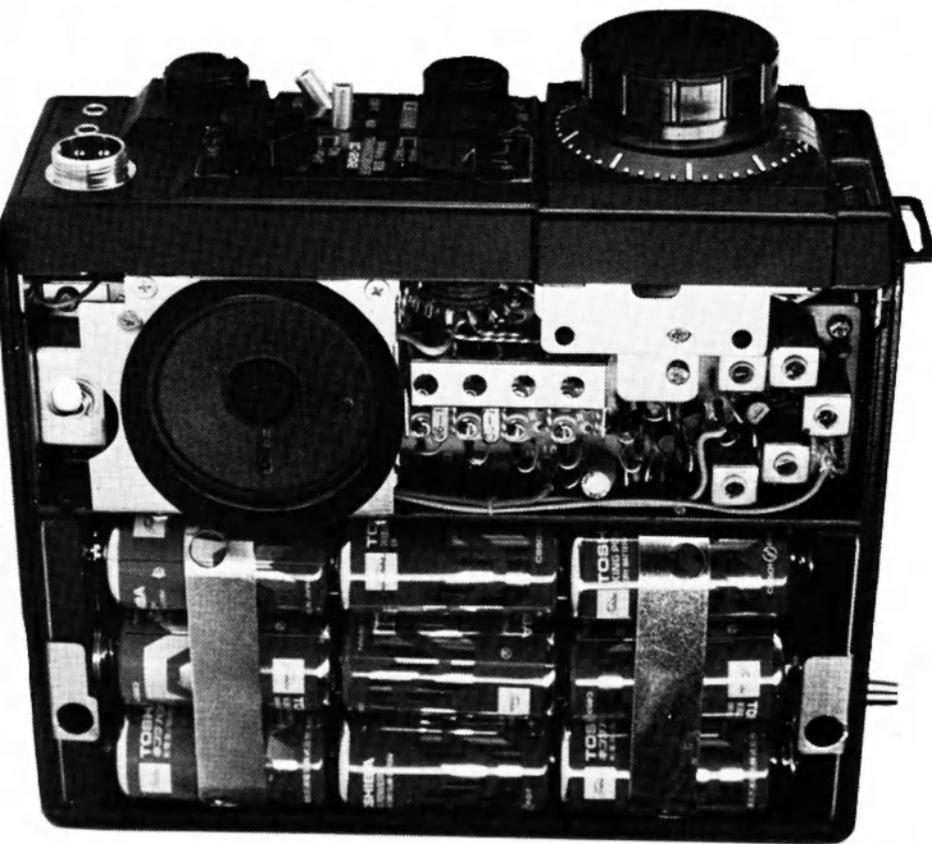
Receive audio was clean and easy to read. In fact it would be difficult to pick it from the sound you expect from your normal HF transceiver.

A set of dry batteries would have rather a limited life and some form of external power supply is recommended. Current drain on receive varied from 85 mA to 140 mA with the noise blanker and dial light switched on. Transmit drain was 165 mA under no output conditions up to 600 mA at full output and 650 mA with the dial light on. This was measured with 13.5 volts input.

#### INSTRUCTION BOOK

The book supplied with our IC 202 was written in Japanese but an English version is now available. However it would appear that little or no service information is included. The circuit diagram is of large size and very easy to follow.

The IC 202 is sold with a full twelve month warranty by Vicom International and of course they have a full back-up stock of spare parts. ■



### REMINDER TO UNFINANCIALS

- If you have not yet paid your 1976 subscription, please note this reminder for personal attention.
- If you have not received any subscription notice please write for a duplicate.

Inserted on behalf of the Divisions  
by the Executive, P.O. Box 150,  
Toorak, Vic. 3142.

#### QSP

##### 900 MHz AMATEUR BAND

According to Ham Radio Jan. '76 a 900 MHz amateur band is receiving consideration both in and out of FCC. Amateur space and satellite communication would find a new band in the 900 MHz region particularly valuable — it's high enough, says Ham Radio, to get away from a lot of noise and low enough that atmospheric absorption is not a problem. ■

# A TWO CRYSTAL 80 CHANNEL SYNTHESISER FOR 2m

Roy Hartkopf VK3AOH  
34 Toolangi Road, Alphington, 3078

This article is a little different from our usual. There are no circuit diagrams available as the system is unfinished. Interested constructors should contact the author.

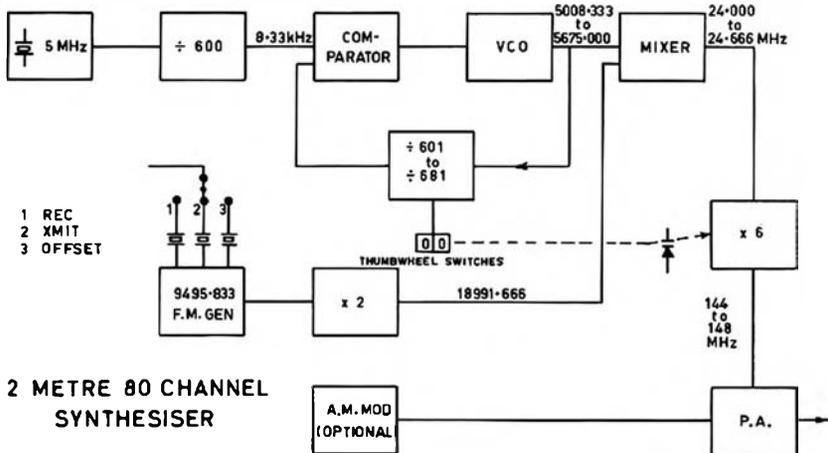
We are always hearing the cry "use them or lose them" with respect to the frequency allocations for the amateur bands. One of the most quoted examples is the 2 metre band. With the popularity of FM channels and repeaters the two metre activity has tended more and more to be confined to a few channels and the rest of the band is virtually unused. There is some justification for this in the fact that it is quite difficult to make a rig which will tune over the band and at the same time have spot frequency facilities for the more popular channels and repeaters. There are commercial synthesisers available at a price beyond most of us and there is a challenge to do something about the situation.

For the last few months the writer has been trying to do something to meet this challenge, and after a lot of disappointments, a workable rig at last seems to be on its way. This is a preliminary descrip-

tion covering the exciter which has already been built and it is hoped to have circuit board layouts in time for a further article. The aim is to have an exciter which will provide eighty channels fifty kHz apart covering the whole of the two metre band. The channels are selected by a thumbwheel switch which reads the channel directly; for example when the switch is set to 65 you are on channel 65. Provision is made for both AM and FM on any of the channels and the whole thing should only cost somewhere about the region of fifty dollars.

One of the great difficulties in making synthesisers for FM is that on the one hand there is a requirement for a phase locked loop which automatically locks on to a frequency and prevents any deviation, and on the other hand deviation is required for the FM signal. The approach used in this case has, as far as the writer knows, not been used before but it seems obvious and practical. This is to generate two signals, one a stable phase locked loop and then to heterodyne it with the standard type of FM signal.

Fig 1 is a block diagram showing the



general layout of the transmitter section. A stable 5 MHz crystal oscillator is divided down to 8.666 kHz to provide a reference frequency for the comparator. Another programmable divider is controlled by the thumbwheel switches and these read the channel directly as mentioned above.

The FM generator is similar to the one described by L. B. Jenkins and H. Hepburn in the April 1971 issue of AR except that the crystal frequency is slightly lower to allow for later mixing. The output from this generator is doubled and then mixed with the 5 MHz signal from the VCO to give an output in 8.333 kHz steps from 24 to 24.666 MHz. When this output is multiplied by six it gives the 50 kHz frequency spacing used through the two metre band. By disconnecting the microphone from the FM generator and providing a modulator it is possible to use AM without any modification to the earlier stages.

Because of the bandwidth covered it is necessary, or at least desirable, that the multiplier stages be tuned and this is done by varicaps which derive the control voltage from the thumbwheel switches. As the switches are changed the voltages on the varicaps is varied and this ensures the stages are peaked on the appropriate frequency.

The system has already been built up to the 24 MHz mixer output stage and appears to work well. For receive, and for offset for repeater work, all that is necessary is to switch two crystals in the FM generator. Alternatively, for receive, a separate oscillator and mixer can be provided if the standard 10.7 MHz IF is to be used.

It is hoped in the near future to write up complete detailed circuit information of the whole system up to the 24 MHz mixer output including circuit board layouts, and in the meantime the writer would be very glad to hear from anyone interested, particularly anyone who could help with the development of the multiplier and PA stages and also the receiver section. ■

# FT101 CRYSTAL CHANNELS

A. K. Head VK3AKZ  
6 Duffryn Place, Toorak, Vic., 3142

The FT101 has two channels for crystal controlled operation. These give crystal control on receive and transmit. It is more useful to have the transmit signal crystal controlled, but to be tunable on receive. This can be done by cutting one wire and adding one wire.

The RF output of the VFO, the crystal oscillator, and the external VFO (if used) are all in parallel. The appropriate oscillator is selected by switching the 6V HT by the six position selector switch. The front wafer (nearest the front panel) is for receive, the rear wafer for transmit. The 6V lead to the crystal oscillator connects to four lugs on the switch, two on the

front wafer and two on the rear wafer. Cut the wire between wafers leaving the crystal oscillator connected to the two lugs on the rear (transmit) wafer. Now add a jumper from the two front lugs you have just disconnected, to the 6V line to the VFO. This can be found at both front and rear lugs at switch position 1, rear lug at position 2 and front lug at position 3. ■

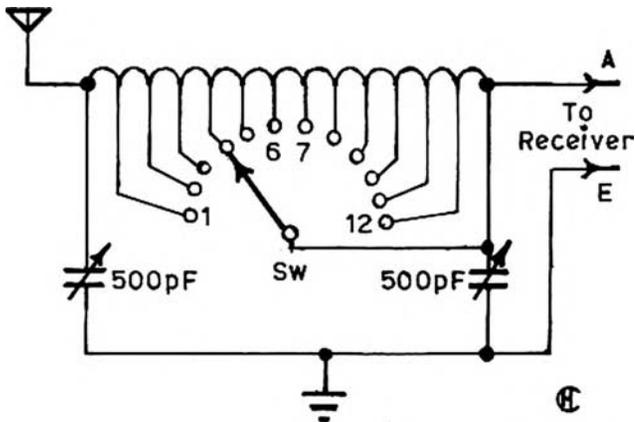
# Try This

with Ron Cook VK3AFW  
and Bill Rice VK3ABP

## EXTENDING VXO RANGE

Geoff Svensen VK2CAS

In many published applications of variable frequency crystal oscillators the tuning range available seems to be less than might be desired. Thus, to cover even a relatively narrow band such as 40 metres, may need several crystals. Here is an idea which enables all of most bands to be covered with a single VXO crystal plus a heterodyne crystal for each band desired. The amount of frequency swing applied to the VXO is relatively modest, only 100 kHz in 10 MHz.



Sw — 1 pole 12 position switch.

The block diagram shows the principle. The VXO frequency is multiplied by 6 and then heterodyned back to the wanted band. Further multiplication by 2 before mixing,

and then selecting the sum rather than difference output could provide VXO control over the whole 144-148 MHz band, so the idea is not limited to HF applications. ■

# NEWCOMERS NOTEBOOK

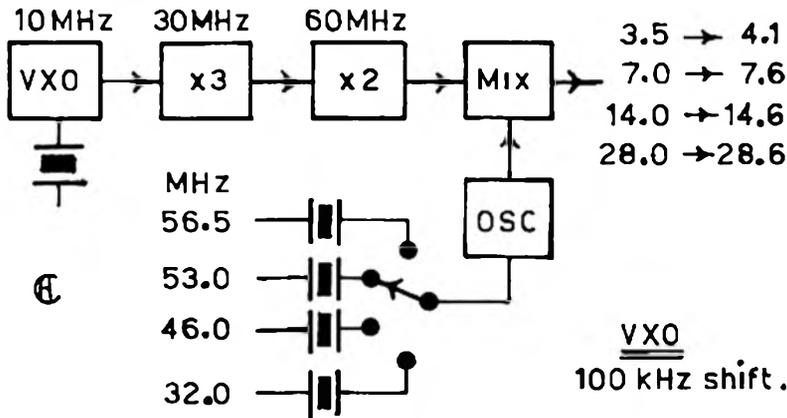
with

Rodney Champness VK3UG  
and David Down VK5HP

## AN ELEMENTARY ANTENNA TUNING UNIT

Following the recent article, Practical Antenna Basics, here is the antenna tuning unit that was to follow on from the simple types of wire antennas and whip dipoles.

For optimum performance, end fed wire and whip-type antennas should be matched to the receiver being used. This unit, although a basic type, is designed to help achieve that match. The coil consists of 24 turns of insulated (enamelled) wire about 16 or 18 gauge (not critical in this unit) wound on an insulated former 3/4" in diameter. Make a small loop on each alternate run, and when the coil winding is complete, scrape the enamel off these loops and solder them to the tags on a single pole, 12 way switch. This permits switching in or out of the circuit the required amount of inductance to achieve the balance required.



The variable capacitors may be of the broadcast replacement type (415 to 500 pF) and when mounting these, equip each with a calibrated knob or dial, and then number the switch positions. Make the necessary adjustments for maximum signal strength on the required frequency, and if it is a frequency that is likely to be tuned again

in the future, then log the capacitor dial and switch position readings for subsequent use.

Note that when tuning for the maximum signal strength that the three adjustments are very much interdependent.

It is hoped to feature an Elementary Electronic Morse Key in the next article. ■

## QSP

### WE ARE NOT ALONE

Writing that 1976 is likely to be a very difficult year the RSGB President for 1976 in a message printed in Radio Communications Jan. '76 continues — "Hopefully the current rate of inflation will have slowed and the present hopeless task of trying to catch up with ever-soaring costs will become easier. . . . I appeal to every member to try to recruit at least one other new member during 1976 — numbers are strength and strong national societies are going to be vital to amateur radio in the period between now and WARC 1979. It is only just that all who benefit from amateur radio privileges should share the cost of their defence. We must also all remember the old saying that 'the amateur is a gentleman' — because it is by our behaviour on the air in the next few years that the world is going to judge us".

### COMPLACENCY — U.S.A. STYLE

"The Ham fraternity is currently facing a potential

crisis because of encroachment attempts into our amateur allocated bands, licence restructuring, and above all, a decrease in our numbers with a corresponding increase in CB operators. If this trend continues, we will have less and less voice in frequency allocations nationally, as well as internationally. Additionally, manufacturers who already realise the monetary value of catering to CB operators will restrict production of amateur equipment or eliminate it entirely because of non-profitability. If we continue to be complacent, continue to be condescending to other groups in the media of communications, continue to sit in our ivory towers immune to the needs and desires of others, and continue to be apathetic in our direct actions, amateur radio will not survive". Quote from ARNS Bulletin Nov. '75 reprinted from W7IO Newsletter.

### INTERFERENCE

"Canada goes after ignition noise with a new Radio Interference Regulation that takes effect next September 1. The new regulation will severely limit

the permissible radiation from any spark ignition engine, includes autos, chain saws and snow mobiles, with the one exception of aircraft engines. The regulation will eventually be extended to include other RFI sources such as power tools and high voltage transmission lines". Ham Radio, Jan. '76.

### PHILIPPINE REPEATER

QTC Vol. 3, No. 1, the magazine issued by PARA of Manila, advises the establishment of "the first amateur repeater station in all of Asia", on 29th November last year. DU1CSC, the Director of the TCB, and also Chairman of the Board of Communications of the Philippines, performed the opening ceremony. Other than the information given in the PARA President's report for 1975 that it is "in the VHF band" no details of input or output frequencies and coverage area were given. Presumably it is located to cover the Manila area and operates in their 2m band. ■

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1.16	1/2	16	3	No. 3003	99c
2.08	5/8	8	3	No. 3006	\$1.16
2.16	5/8	16	3	No. 3007	\$1.16
3.08	3/4	8	3	No. 3010	\$1.40
3.16	3/4	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
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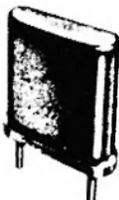
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with Eric Jamieson VK5LP

Forreston, S.A., 5233  
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## AMATEUR BAND BEACONS

VK0	VKOMA, Mason	53.100
	VKOGR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	142.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.800
	VK4RTT, Mt. Mowbrall	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTX, Albany	144.500
	VK6RTV, Perth	145.000
VK7	St. Leonard's	52.400
	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin*	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
VE	VE1ATN, Canada	50.058
KG8	KG6JDX, Guam	50.185
	KG6APP, Guam	50.150
	K21RT/KG8, Guam	50.098
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHF, Palmerston North	52.600
	ZL2VHF, Wellington	145.200
	ZL2VHF, Palmerston North	145.250
	ZL2VHF, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
ZL2	ZL2MHF, Upper Hutt*	28.170

\* Denotes change or addition since last month.

Still no definite news regarding operation or otherwise of the proposed six metre beacon at St. Leonard's, Tasmania, on 52.400 MHz. Will someone please write and confirm by the end of the month or it will have to be deleted. A report came fairly directly to me from VK6ZDY in Perth that he was copying the Darwin beacon VK8VF on 11/1, so presumably it is on the air again, and has been included in the list.

The New Zealand HF beacon on 28.170 will be given monthly listing in future, as it is of interest to VHF operators as an indicator of the trend in band conditions, particularly being a source of constant power output, and its availability or otherwise can indicate a rising MUF. The other overseas beacons are still included as we are now approaching the equinoctial period when one might expect to hear some F2 DX, if not in the lower latitudes of the Continent, certainly in the northern areas.

## THE SUMMER DX SCENE

It's been and gone! The DX that is. Depending on where you live and the number of hours you can be on the various bands will be a guide to what you generally thought of this year's summer DX period. My own observations will not be agreed upon by everyone, but that does not matter really, because they will be substantially correct, and as I have the last say as to what is printed you'll just have to read it!

## SIX METRES:

Overall a much shorter season than usual, started late, with some very good openings early in the piece, went a bit quiet between Christmas and New Year, then brightened briefly, and departed within the first fortnight of the new year, or else the operators got tired!

## TWO METRES:

Generally good, with some excellent openings both from north to south, and west to east. Nothing much offering between VK5 and VK4 and 2 as expected. Quite a lot more operators around who were prepared to give it a try on 2 when 6 metres was really good. The increase in availability of reasonably priced SSB equipment for 2 metres is

helping to populate the lower end of the band which is great news.

## WHAT HAPPENED ON THE BANDS

Plenty happened of course, and it is difficult to sort out what is news and when. In the absence of any letters this month I think the best approach will be to go through my book of notes and tell you some of the things you probably already know, perhaps some you don't, and thirdly you will be able to think about your notes and say "well, he did not know that . . ." I did not, because you did not write!

15/12, heard from Jeff VK8ZGF in Alice Springs good signals on 8, advised he had 2 metre gear 60 watts input and 10 el. beam, so many ears were turned that way for the next few weeks waiting for that elusive 2 metre contact from VK8 . . . 20/12 P29ZKT worked . . . VK5SV and VK5KK worked VK6KJ in Albany on 2 metres on 21/12 at 12152 . . . 25/12 Kerry VK5SU at Ceduna working VK6XY and VK6BE at Albany via Adelaide Ch. 4 repeater . . . 24/12 VK3ZUR and VK3ZCR worked VK6XY and VK6WG and VK6KJ at 2240Z on 144 MHz . . . 1/1/76 I heard that Geoff VK3AMK worked VK6 on 2 metres. Kerry VK5SU through on 2 metres to Albany again. Bob VK5FB and Aub VK6XY used 144.080 to work each other on RTTY — first for both! Good work boys. VK6BE hearing VK5 on 432 MHz. Col VK5RO worked six VK6's on 2 metres. Garry VK5ZK worked VK6XY using a whip antenna on Ch. 40! (You make it sound so easy Garry). Keith VK5SV working on Ch. 40 to VK6. Peter VK5ZPW hearing Ch. 1 Mt. William (Vic.) at 59 all day. Jim VK5ZMJ at Port Pirie worked VK6ZED and VK6ZBW in Perth on 2 metres (believe this is correct). So, what a day the first of 1976 turned out to be, will long be remembered by many operators, including myself. I even worked into Albany myself with six contacts on 2 metres SSB, and that takes doing through my 30 dB hill!

3/1/76 Jeff VK8ZGF observing TV signals on Channel 4 . . . Wally VK2ZNW working into Sydney from Orange using 5 watts of SSB, also note Jim VK2BPC has 2m SSB in Wagga . . . 4/1 Kerry VK5SU working VK6's again on Ch. 40 and SSB, six contacts. Clarrie VK5NA at Angaston worked VK6ZED/8 in Perth on 2m . . . 5/1 Keith VK5SV worked Kevin VK7ZAH via the Ch. 1 at Mt. William repeater at 1250Z . . . 6/1 VK5SU worked Hughie VK5BC via Adelaide Ch. 4. VK2ZI worked into Adelaide also via Ch. 4, and reported good copy direct . . . 7/1 Bob VK5BP flew home from Wagga and noted an inversion at 7500 feet, probably accounting for the signals from that direction being so good . . . Ch. 0 TV from Goulburn very strong at VK5LP QTH, only a translator on 51.740 with vertical polarisation . . . 11/1 Peter VK6ZDY copying Darwin beacon VK8VF . . . 18/1 Kevin VK7ZAH worked Peter VK5ZPS and Clarrie VK5NA on 144.1 at 1930Z . . . 23/1 Colin VK5DK reported their new repeater will probably be on Ch. 3, and that work on the 2 metre beacon is proceeding, and could probably operate on 144.650. John VK5ZJB reported good 2 metre conditions to Ch. 1 repeater, also six 2 metre contacts made to Albany again! Visitor to VK5, VK3YJP/5 went up to our Mt. Lofy with his 202 rig (3W) and worked Fred VK3AZG on 144 SSB using the whip antenna on the small rig; not a bad effort! All this occurring on 28/1.

There you are. That's a pretty fair coverage of the best bits. Probably one of my more interesting contacts was on 20/12 at 0432Z when I worked Allan VK4ZRF on 52 MHz who was running 20 milliwatts of power. He was a good strength 7, which is quite remarkable even for 6 metres, not much attenuation of signals on such days obviously.

Two observations from the VK5 arena this year include the lack of ZL stations worked from this area. Many were worked in VK3 and VK7, also in VK6, but scarce here. First time ever since being on VHF that I have never ever worked a ZL at some time during the summer period. Almost as elusive were VK7's to VK5 this year, very silent indeed. So it can probably be presumed the south east path for 6 metres did not suit us at any rate, quite an unusual situation.

Very few AM stations seemed to be operating on 6 or 2 this year, mostly SSB, with an occasional CW signal. Operating manners were very good all round, I could not really complain about anyone. I did get asked nicely by someone one day to reduce the audio level a bit as I was causing a few problems in VK2 due to the excellent band con-

ditions. This I immediately did, and was thanked for it. No one should mind being told in a pleasant manner to reduce their power under such conditions, and I did observe this same request being made on two other occasions to other operators with similar results. Later that same day when the band closed I did something I was going to do for a long time, and that was to re-arrange the relay switching to allow me to run barefoot at 10 watts on those days when the band is wide open, and using the 150 watts when band conditions require it. Thanks fellas for the advice, no problem this end.

Bruce Kendall L3057B writes briefly to mention his reception of GLV10 in Mildura-Swan Hill area on 10/1 on his colour TV, and asks if it can be related to any 2 metre DX at the time. Reference to my books indicated a good day for 6 metre DX, in fact the band was open for at least 11 hours, so it is quite possible the MUF did rise high enough to permit short skip reception of such signals. I have observed many times that TV signals can be received at very high frequencies often around 0100Z on days of intense six metre activity, but these high channel signals mostly only last for half an hour or so. Thanks for writing anyway Bruce, and glad you enjoy reading the notes.

## MICROWAVES

For those of you who may have been giving some thought to entering the world of microwave transmission, there is a very extensive and interesting article in the December 1975 issue of "Break In" from New Zealand by ZL2HI, with duplex operation on 3300 MHz using Klystrons. There are photographs, drawing and circuits. The Klystron is type CV237. Three foot dishes are used, plus a 30 MHz receiver. The equipment detailed was used during the successful world record bid for 3.3 GHz over a distance of 238 miles between Mt. Murchison and Mt. Ruapehu in February 1975. So go to it!

There is not a lot of other news to impart at the moment, with everyone working so much DX not many other things are being done. I hope that 1976 continues to see the present increase in SSB operation on 2 metres go on, and it probably will while there is equipment available.

Closing with the thought for the month: "Don't put off for tomorrow what you can do today, because if you enjoy it today you can do it again tomorrow".

The Voice in the Hills.



Continuing the examination of the ITU Regulations where we left off last month we come to the amateur band on 6m.

In Regions 2 and 3 there is an exclusive amateur allocation from 50 to 54 MHz with numerous footnotes. In R1 47 to 68 MHz is allocated to broadcasting but by footnotes 50 to 54 MHz is allocated to the amateur service in Rhodesia (and presumably Zambia and Malawi), Zaire, Rwanda, Burundi, South Africa and S.W. Africa. Strangely in Australia 50 to 54 MHz is allocated to the fixed, mobile and broadcasting service and the band 56 to 58 MHz is allocated to the amateur service. However the Australian PMG's booklet shows 45 to 52 MHz as being allocated to broadcasting (TV) as the primary service and fixed/mobile as secondary services; 52-54 MHz is shown as exclusively amateur service, 54-56 for fixed and mobile and 56-70 as Broadcasting (TV) primary and fixed/mobile as secondary.

In New Zealand 51-53 MHz is also allocated to the fixed and mobile services and 53-54 MHz is allocated to these two services. 50-54 MHz is allocated to fixed and mobile services in India, Indonesia, Iran and Pakistan. The band 50 to 51 MHz is allocated to the fixed, mobile and broadcasting services in Malaya, Singapore and New Zealand.

As soon as you reach the VHF regions you come up against non-conformity by footnotes with apparent internationally-accepted allocations.

Although nothing seems to be shown in the ITU Regulations the UK possesses an amateur band on a secondary basis from 70.025 to 70.7 MHz

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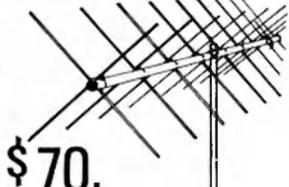
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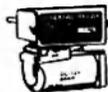
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SWR: 1:1 to 1:3  
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Indicator: 100 uA DC Full Scale  
Antenna: 5 section collapsible  
Dimensions: 145 x 50 x 60 mm  
Weight: 500 g  
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provided no interference is caused to the primary services of Fixed and Mobile (except aeronautical mobile).

In all Regions the band 144 to 146 MHz is allocated to the amateur and the amateur satellite services whilst in R2 and 3 the band 146 to 148 MHz is allocated to the amateur service although, by footnote, this allocation is applied to the fixed and mobile services in China, India and Japan. In R1 the band 146 to 149.9 MHz is allocated to the Fixed and Mobile (except aero mobile (R)) services. In South Africa, Rhodesia (and presumably Zambia and Malawi) and S.W. Africa the band 146 to 149.9 MHz is also allocated to the aeronautical mobile service.

In Region 2 there is a shared Amateur and Radiolocation band at 220 to 225 MHz. This band is also allocated to the amateur service in Rhodesia (and presumably Zambia and Malawi).

The next amateur band is 70 cm. In Regions 2 and 3 the band 420 to 450 MHz is allocated to Radiolocation as the primary service with amateur as the secondary service. In R1 both Amateur and Radiolocation share the band 430 to 440 MHz. There are the usual flood of footnotes. In the UK the radiolocation service is primary and the amateur service is secondary. 449.75 to 450.25 MHz may be used for space telecommand and space research (earth to space) by agreement between countries concerned and a similar arrangement exists for 434 MHz + or -0.25 MHz in France and Guyana.

to 438 MHz is the band authorised for the amateur-satellite service provided no harmful interference is caused to other authorised services. In Indonesia 420-450 MHz is also allocated on a secondary basis to the fixed and mobile services (except aero mobile). In Australia 420 to 450 MHz is also allocated to the fixed service until the frequency assignments are transferred elsewhere but this is not mentioned in the Australian booklet of tables. However radio altimeters are continued to be allowed in the 420-460 MHz band as a secondary service according to the booklet. There are many other footnotes about this band. The UK has for amateurs 430-432 (in part) and 432-440 MHz only.

In R3 the band 470 to 585 MHz is allocated to the broadcasting service but the Australian booklet allocates 576-585 MHz to the amateur service until required by the broadcasting service.

There are no other ascertainable amateur allocations below 1000 MHz anywhere.

#### WARC 1979

At this early stage there are bound to be rumours floating about, straws in the wind and all kinds of speculation afoot. Latest items to come from overseas are that some European administrations are suggesting that any references to the training or educational aspects of amateur radio should be deleted. Another rumour has it that several ITU delegates expressed the opinion that the definition of amateur radio should be deleted from the Radio regulations. If this happened there would be no amateur radio because frequencies could not be allocated to a non-existent service.

Another aspect which may cause much concern is the simple fact that each country at ITU conferences possesses one vote. The ITU is, or was, basically a technical co-ordination organisation designed to provide a forum for general agreements internationally on the use of the strictly limited frequency spectrum.

A considerable number of member countries, such as the 'third world' countries (newly independents and other less developed countries in particular), cannot afford delegations comprising both technical and diplomatic or administrative officers. Consequently many of them are represented at ITU Conferences by staff from their nearest diplomatic offices. Most of these people could be entirely devoid of technical training relating to radio and electronics.

## VK3 WESTERN ZONE ANNUAL CONVENTION 1975

The 1975 VK3 Western Zone Convention was held at Wannambool on the weekend of 1st and 2nd November. The Lady Bay Hotel was the venue for Saturday's activities which included a very comprehensive display of amateur and test gear provided by some of the major suppliers. LARA took

the opportunity to extend and publicise its activities.

During the dinner which followed a presentation was made to "Woody" VK3AGD for his extended service to amateur radio and radio communication in general. "Woody" was for once speechless on discovering his IC22A. Other presentations were made to Tim VK3TW and Bert VK3EF for hosting the 2m and 80m call backs and to Brian VK3ZBS for his lecture course at the Lake Bolac Novice Class. Don VK3AKN was presented with a very special timer to commemorate his efforts on "Bill on the Hill" Ch. 1 Mt. William.

Sunday activities were based at the Wangoon Hall. Those successful in the competitions were VK3HY, VK3ZKH, VK3YER, VK2ZED, VK3YFF, VK3BCH, VK3NM and VK3BMD. The children's scramble was won by Neil, son of VK3AIZ, the YL scramble by Irene YF/VK3YER with Robyn YF/VK3ZYG and Mavis YF/VK3BER equal second and Jenny PXYL/VK3AQO won the lucky door prize.

Attendance at the dinner was 168 people with more than 200 attending the Sunday barbecue. This included 93 amateurs with 5 from VK5 and 4 from VK2 making this a very successful convention.

## BOOK REVIEW

### NBFM MANUAL

R. S. Hewes G3DFR  
G. R. Jessop G6JP

This RSGB publication is not up to their usual high standard and appears to have been put together in a hurry.

The book is devoted to NBFM which is defined as an FM system using a deviation less than that used by hi-fi broadcasters.

FM theory, transmitters, receivers and auxiliary equipment are covered in 60 pages. There are nearly 70 circuit diagrams, most of which use transistors or integrated circuits. Unfortunately some of the circuits are not discussed at all in the text.

The operator of a commercial FM transceiver will find little of interest, other than the chapter on FM theory. Most constructors will find something of interest. For example, there are 9 different types of FM detectors. Unfortunately, some important topics such as antenna, high power transmitters (more than 1 watt output) mobile operation and complete transmitters are not covered. Operation at frequencies other than 145 MHz receive scant attention.

Nevertheless, the book is still worth a place on your bookshelf.

VK3AFW

## Contests

with Jim Payne, VK3AZT  
Federal Contest Manager,  
Box 67, East Melbourne, Vic., 3002

### CONTEST CALENDAR

#### March

6/7 ARRL DX Phone  
6/7 YL-OM CW  
20/21 ARRL DX CW  
27/29 BARTG RTTY  
27/28 CQ WW WPX SSB

#### April

24/25 VERON Netherlands  
24/25 Bermuda Phone

#### May

1/2 Helvetia  
8/9 Bermuda CW

### BARTG SPRING RTTY CONTEST

When — 0200 GMT Saturday, March 27th until 0200 GMT Monday, March 29th, 1976.

The total contest period is 48 hours but not more than 30 hours of operation is permitted. Times spent in listening count as operating time. The 18 hour non operating period can be taken at any time during the contest, but off periods may not be less than 3 hours at a time. Times on and off the air must be summarised on the Log and score sheets.

Who — There will be separate categories for Multi Operator Stations and SWL's.

Bands — 3.5, 7.0, 14.0, 21.0 and 28.0 MHz Amateur Bands.

Stations — Stations may not be contacted more than once on any one Band, but additional contacts may be made with the same station if a different band is used.

Country Status — ARRL countries list and in addition each W/K and VE/VO call area will be counted as a separate Country. (But W/K and VE/VO counted once only for QCA).

Messages — Messages exchanged will consist of:

A. Time GMT. This must consist of a full 4 figure group. The use of the expression "Same" or "Same as yours" will not be permitted.

B. RST and Message Number. The message number must consist of a 3 figure group starting with 001 for the first contact made.

Points — A. All two-way RTTY contacts with Stations within one's own Country will earn TWO points.

B. All two-way RTTY contacts with Stations outside one's own Country will earn TEN points.

C. All Stations will receive a BONUS of 200 Points per Country worked including their own.

NOTE: Any one Country may be counted again if worked on another Band but Continents are counted once only.

Scoring — A. Two way exchange points times total Countries worked.

B. Total Country points times Bonus points times number of Continents worked.

C. Add (A) and (B) together to obtain your final score.

Sample Score:

Exchange Points (302) x Countries (10) = 3020  
Country Points (10) x Bonus Points (200) x  
Continents (3) = 6000

(A) and (B) added together to give a score of 9020

Logs and Score Sheets — Use one Log for each Band and indicate any rest periods. Log to contain:

Date, Time GMT, Call sign of Station worked, RST report and message number as sent, RST report and message number as received and exchange points claimed. All Logs must be received by May 31st, 1976 to qualify.

Certificates will be awarded to: The leading Stations in each class and to the top Stations in each Continent and each W/K VE/VO Call area. The final positions in the Results Table will be valid for entry in the "World Champion of RTTY" Championship.

The Judges decision will be final and no correspondence can be entered into in respect of incorrect or late entries.

Send your Contest Logs to:

Ted Double (G8CDW)  
89 Linden Gardens,  
ENFIELD,  
Middlesex,  
England EN1 4DX.

### ADDITIONAL NOTES

(A) If a contestant manages to contact 25 or more different Countries on two way RTTY during this contest a claim may be made for the QUARTER CENTURY AWARD issued by the British Amateur Radio Teleprinter Group and for which a charge of 2 dollars U.S. or 8 IRC's is made. Make your claim at the same time as you send in a Contest Log. Holders of existing OCA Awards will automatically have any new additional new Countries added to their records.

(B) If any contestant manages to contact Stations on two way RTTY with all six Continents and the BARTG Contest Manager receives Contest Logs from the operators in those six Continents a claim may be made for the WAC Award issued by the RTTY Journal. The necessary information will be sent on to the RTTY Journal who will issue the WAC Award free of charge.

## COMMONWEALTH CONTEST 1976

A reminder is given that this CW contest will run from 1200Z Saturday, 13th March until 1200Z Sunday, 14th March, 1976.

Rules are as published on page 22 of last month's AR. There are medallions to be won by the VK winner and VK middle placing.

# IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP

Greetings for 1976. Hope you worked your share of the DX over the past few months. Since last writing I have had the opportunity to look at the scene a little closer.

Both Frank VK2QL and myself have pointed out the valuable information available daily on WWV/H, namely the solar flux and A index. I know quite a few listen for it and discuss it on air. However, when plotted into simple graph form it is amazing how quickly they start to tell a story. Whilst the actual predictions are for average conditions, taking into account season, projected smoothed sunspot number, they do not allow for the wide variation from average that can occur daily during the sunspot minima period.

In 1968 Arthur Covington Ex-VE5CC, a pioneer in the development of solar flux measurements, made a projection for the ending of cycle 20. His detailed records dating back to 1947 show the low of cycle 18, early 1954 reading 65. Cycle 19 reached its low of 67.2 in October 1964, some 10.5 years later. Projecting 10.5 years from that low, Covington gave March-April 1975 as cycle 20 minimum. Recorded figures show March 71, April 70.7, May 70.1, June 70, July 77.

From observations, it appears Covington went very close. April produced the "lowest high" while June produced the "lowest low" 73.8 and 66.1 respectively. My charts during the period show May 10 to June 25 not rising above 70 until a sizeable spot group appeared around June 30, raising the flux to the high 70's, mid-July to 88, then early August to 125 the highest since Oct. '74 when it rose to 140. However, a word for the band watchers. Follow carefully the A index for a downward movement just prior to a geomagnetic storm. When it reaches the 2-5 region, the WWV 14 past K index says 2 or less and tending to decrease — you can usually find, within the predicted times, higher than normal conditions just before storm commencement. Depending on which portion of our planet is in the sunlit part when the storm arrives the effect will be shown either first on WWV or earlier (by a sudden or gradual change in general conditions) and be verified by WWV within 24 hours.

Once the A has risen above 12-15 conditions generally are poor for 3-5 days. Once again peculiar conditions do exist over various paths and propagation will exist for limited periods. During this pre-storm period and in our daytime the bands will often open from 28 MHz down — even 52 MHz featured in Dec. '75.

Whilst WWV and WWVH at 18 and 45 mins. past the hour give yesterday's (GMT) figures for solar flux and A, the 14 past from WWV (male voice with minute announcements) still gives valuable information about today from 0700Z onwards.

Approx. conversion from K to A for that period is 1 = 2-5, 2 = 7-10, 3 = 4-20, 4 = 27-40, 5 = 48-70, 6 = 80-120. 0-2 K being average for non storm readings. The highest K I have heard is 6 at 0600 Z giving a daily mean of A52. Perth often records K7 in severe storms.

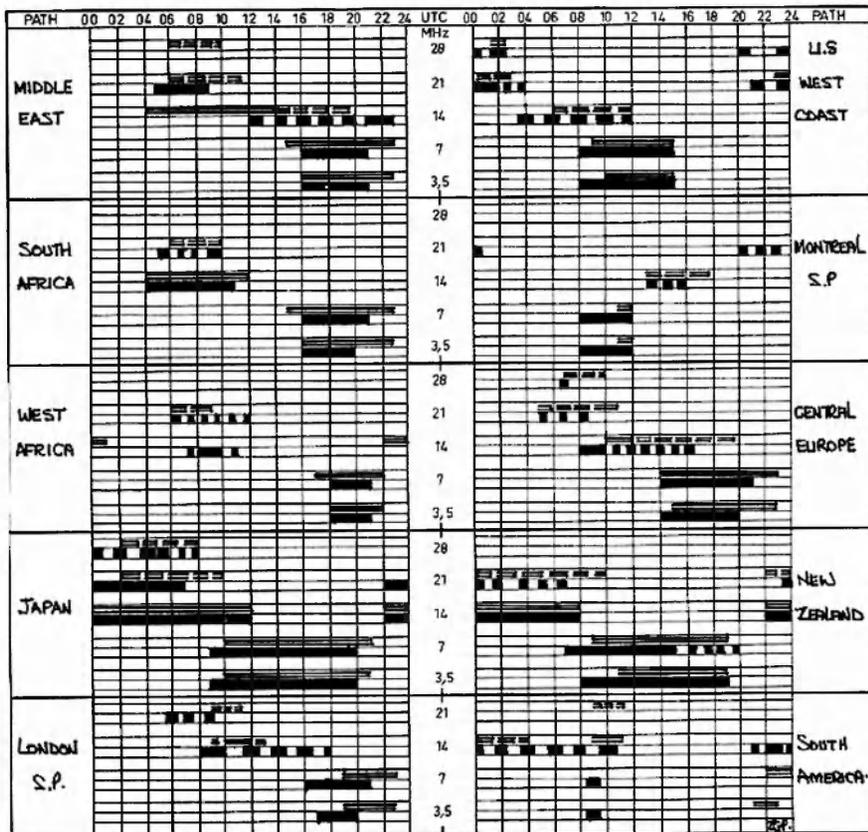
Those that start suddenly often end likewise. The slow starters linger for up to 5-7 days. You will appreciate them both when they happen.

I use the Bartels solar rotation periods for recording each 27-day rotation of the sun. Commencing dates to come are March 7 period No. 1950, April 3 period No. 1951. The storm commencement day usually drops back 1 day each period i.e. period A starts 10th day, next period will start on 9th day. If you use graphs, then the picture comes a little clearer. Try your own observations and keep records and make your own predictions.

## LATEST INDICES AVAILABLE (late Jan. '76)

Observed:  
Solar Flux: monthly means 8/75 — 90, 9/75 — 80.  
Sunspots: Prov mean 11/75 — 19.3, 12/75 — 7.5.  
Smoothed mean 5/75 — 16.8, 6/75 — 16.0.

Predictions:  
Solar Flux: monthly mean 4/76 — 71, 5/76 — 70, 6/76 — 70.



LEGEND FOR CHART — ALL TIMES — UNIVERSAL (GMT).  
LINES = FROM WEST AUSTRALIA.  
BARS = FROM EASTERN AUSTRALIA.  
SOLID LINES OR BARS = BETTER THAN 50% OF THE MONTH.  
BROKEN LINES OR BARS = LESS THAN 50% OF THE MONTH.

Sunspots: smoothed mean 4/76 — 8, 5/76 — 7, 6/76 — 6.

### Acknowledgements:

Sunspot Data — Dr. Waldmeier, Swiss PED OBS, Zurich.

Solar Flux — ITU Journal WWV.

A-Indices — Bureau of Min. Resources, Toolang (Melb.), Munding (Perth), WWV.

Predictions — IPS Sydney.

## Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

It is of importance to all Region 3 Amateurs that, through the representations of the WIA Executive, our Radio Administration is now more aware and thus more co-operative of the role being played by your Intruder Watch. All persistent intruders are now being monitored by our monitoring stations, and will in due course, as soon as sufficient evidence has been accumulated, be reported to their respective Administrations. Your Co-ordinator is very gratified by this step forward because it is by his and by the VK3 Co-ordinator's efforts that the improvement has been brought about.

At the same time I often wonder at the apathy shown by most members in reporting intruders. I can talk to practically any Amateur and the response verbally to any request regarding IW is excellent, but when it comes to doing anything concrete the response is normally nil. This puzzles me considerably, although in 50 years of amateur activity, I should know the apathy of the average amateur.

Part quotations from the ARRL IW memo are hereunder embodied — "The level of IW activity continues to be high and many complaints of harmful interference have been acted upon by the FCC. The point to emphasise is that a great deal has been going on. With the World Administrative Radio Conference four years away, we need a strong Intruder Watch now more than ever".

There seems to be some confusion as to which modes of transmission other than amateur are intruders in the 3.5 MHz band. Thus, the following taken from the ITU Allocations, serves to put things in perspective. Although we are only concerned with Region 3 I shall quote the other regions also — "In Region 1 3500 to 3800 is amateur, fixed and mobile, except aeronautical mobile. In Region 2, 3500 to 4000 is amateur, fixed and mobile, except aeronautical mobile. In Region 3 3500 to 3900 is amateur, fixed and mobile, but a footnote says, in Australia the band 3500 to 3700 is allocated to the amateur service; the band 3700 to 3900 is allocated to the fixed and mobile services".

When observing and reporting intruders in the 3.5 MHz band it is necessary to ascertain the country of origin of fixed or mobile stations in the band 3500 to 3700 before reporting them.

Unless they originate in Australia all fixed and mobile stations in the band 3500 to 3700 are not intruders. On the other hand all the broadcast stations are intruders and we need all the reports we can get on them so as to be able to make up a dossier to present to our authorities. Reference, though the facsimile F4 transmissions on 3600 and 3623 kHz which are originated in Japan, although not actual intruders (refer to 3500 to 3700 allocations in Region 3) these stations have been reported by the FCC in Region 2, and more details are needed to forward to the FCC via ARRL. "The Commission desires to approach the Japanese

Administration again in this matter and solicits help. In particular, needed are details as to specifically where the interference is being caused, and its severity. Our reports so far show that the interference occurs mainly between the hours of 1200 and 1600 GMT. Is the interference being experienced over a greater area during different hours? Note that the above facsimile stations are not categorised as 'Intruders' since the 3.5 MHz band is shared with the fixed service, but the Japanese Administration does, in good conscience, want to avoid interfering with the Amateur Service".

## Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,  
Dear Sir,

We were delighted to read the review of our Clipper, but would like to take this opportunity of clearing up one or two ambiguities.

The standard version of our clipper as sent for review is suitable for use with the FT101 Mark 2 (i.e. the one with the noise blanker panel on top of the VFO) the FT101B, and the FT101EE. It may also be used with the FT101E and full instructions for disconnecting the internal clipper are included.

The standard version of our clipper is not suitable for use with other Yaesu models, but readers might like to note that we do a "Special version" at the same price for use with the early FT101 Mark 1, although this is slightly more difficult to wire in.

Regarding the noise blanker comments. The apparent reduction in performance has a simple explanation. On receive very large noise pulses are reduced in amplitude by the diodes in the clipper, and hence with the clipper in circuit noise is to some extent already "blanked". When the noise blanker is switched in its work has already been "half done", and hence while the total effect of the interference should be no worse, the noise blanker switch has less effect on it.

Finally readers might like to note that we have made arrangements with our bank to accept Australian currency and so cheques or bankers drafts for \$69 Australian will be accepted for an experimental period.

Best regards to all those down under 73's. G3LLL.  
Harry Leeming, FSERT, T. Eng. (CEI).

Dear Sir,

Now that the PMG has ceased to exist as such there is an opportunity for the Wireless Institute of Australia to refrain from transferring its attitude of abject servility to the new Commission and instead to stand up for the interests of the members.

I have long been disgusted by this attitude and gave up attending annual dinners because the sight of members fawning on the PMG representative literally gave me indigestion.

The Institute has been repaid as one might have expected by being used as a doormat in the present internal squabble. The harm that has been done to the amateur movement by the strike over examinations is incalculable. The incredible mess the new call book is in shows the general incompetence of the organisation.

I have written to the Prime Minister on a personal basis as an amateur, pointing out that since the new Government is anxious to cut costs and believes in free enterprise, and the PMG has proved incapable of either running the examinations or doing anything about the mass of illegal operators who have virtually taken over the 11 metre band, that the amateurs should be appointed on a voluntary basis to run their own affairs. A similar arrangement has worked well enough in America for many years as far as the novice licences are concerned.

I would strongly urge every interested amateur to write a similar letter. The economy drive of the Government and the impasse over the examinations and the chaos on the 11 metre band gives us a unique opportunity to get rid, once and for all, of official incompetence and bumbledom.

Yours faithfully,  
Roy Hartkopf VK3AOH.

The Editor.

Dear Sir,

I would like to raise a couple of ideas for consideration by Amateurs in general, and perhaps the WIA Executive in particular. These are:—

(1) With due regard to the already complex nature of the regulations governing Amateur Licences, and the administrative problems of the controlling authority, would it be possible for Limited Licence holders ("Z" calls) to use CW on the 2 metre band? Perhaps by passing the Novice Morse exam, we could have our licences endorsed accordingly, and be able to use F2 transmissions on one of the secondary simplex channels.

(2) Would it be worthwhile publishing a pamphlet containing stories of amateur involvement in the Darwin disaster, the Brisbane flood etc., and a general explanation of amateur radio. This pamphlet could then be made available for distribution to the public at amateur radio displays (of which there probably should be more), at Agricultural Shows etc. This may help to dispel the public view of a bunch of crack-pots who spend a lot of money duplicating the public telephone system.

(3) With reference to the articles "Amateurs assist in Air Race" (AR Oct. '73), and "1973 Red Cross Murray River Marathon" (AR April '74), is it feasible to extend this type of activity? That is, would it be possible to suggest to the Licensing Authority that we could supply voluntary communications facilities to non-profit, outdoor hobby type organisations, to the benefit of all concerned.

I hope that these ideas might provoke some comment from other Amateurs, and the WIA Executive as well.

Ian Tinney VK4ZIT.

(1) The Executive has made many attempts, without success so far, for Limited Licencees to use CW on their frequencies. This has been very relevant in relation to satellite repeater users.

(2) A useful brief explanation of Amateur Radio appeared on p.5 of AR July '75. A publicity package for use in amateur radio displays was discussed at the 1975 Federal Convention — see p.28 AR June '75.

(3) This will doubtless be noted by Divisions.

Thanks for a thoughtful, helpful letter. — Ed.

## Awards Column

with BRIAN AUSTIN VK5CA  
P.O. Box 7A, Craters, SA, 5152.

### ADDITIONS TO COUNTRIES LIST

#### TUVALU — VR8

On 1/1/1976 an administrative separation was made in what was the Gilbert and Ellice colony. The Ellice Islands will become a Crown Colony, completely separate and no longer a part of the Gilbert and Ellice Colony. The name will be known as Tuvalu. The prefix for stations operating from Tuvalu will be VR8. DXCC credits for Tuvalu will be for contacts made 1/1/1976 or after.

#### OH SERIES — FINLAND

- The series of awards is available to licensed amateurs except those in Finland.
- Contacts on and after 10/6/1947 are valid.
- Do not send QSL cards. A list, showing the call signs in call area and alphabetical order should be certified by a club official, two amateurs or a notary public.
- Awards are issued for all CW, all Phone, and mixed modes.
- The fee for OHA, OH-100 and OH-300 is 5 IRCs. There is no fee for OH500.
- The address for application is:  
SRAL,  
Awards Manager,  
Post Box 306  
SF 00101 Helsinki 10, Finland.

Notes — Finnish Maritime Mobile stations do not count as "Different stations" (see below). Care should be taken to ensure that stations are not duplicated when counting. OH2AD, OH2AD/1 and OH2AD/0 are the same station. The rules regarding duplication should be read carefully.

The following stations count as OH 9 if contacted BEFORE 1/6/1954: OH8ND NJ NS NV NX OA. OB OC OG OI ON OP OO OR OU OX OZ PA PB PD PF PL PM and OH8PO.

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361 Hume Hwy  
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## TECHNICAL DATA

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Mode: Selectable USB, LSB, CW or AM.  
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.  
Calibration Accuracy: 2 kHz maximum after 100 kHz calibration.  
Backlash: Not more than 50 Hz.  
Antenna Impedance: 50 ohm unbalanced nominal.  
Circuitry: 35 Transistors, 7 FET, 2 Integrated Circuits and 40 diodes.  
Power Requirement: 100/110/117/200/220/234V AC, 50/60 Hz, 60 watts maximum, or 13.5V DC nominal, 0.3 A for receive and 2 A for transmit.  
Size: 280 (W) x 125 (H) x 295 (D) mm.  
Weight: 8 kg.

**RECEIVER**  
Sensitivity: 0.5 uV for 10 dB Noise plus Signal to Noise Ratio on SSB and CW. 1 uV on AM.

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Harmonic and Other Spurious Response: Image Rejection better than 60 dB. Internal Spurious Signal below 1 uV equivalent to antenna input.  
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TRANSISTOR SUBSTITUTION HANDBOOK (The Howard W. Sams Engineering Staff). Fifteenth Edition .....	\$5.75
IC OP-AMP COOKBOOK (Walter G. Jung) .....	\$16.60
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**Requirements:**

OHA — The applicants from non-European countries need 15 DIFFERENT OH stations in at least 5 call areas. Contacts on 3.5 MHz count double points.

OH-100 — The applicant (whatever location) needs 100 DIFFERENT OH stations, including all 10 call areas on each of TWO bands. In order to meet the CALL AREA requirement the same station may be worked on different bands. In this case, extra stations must be worked to bring the total to 100 DIFFERENT Stations.

OH-300 — The applicant needs 300 DIFFERENT OH stations, including all 10 call areas on THREE bands. In order to meet the CALL AREA requirement the same station may be worked on different bands. In this case, extra stations must be worked to bring the total to 300 DIFFERENT stations.

OH-500 — This award is given for working 500 DIFFERENT OH stations regardless of time/band/mode.

**HEC AWARD — HOLLAND**

- The award is available to shortwave listeners.
- OSL cards dated on or after 1/6/1945 are valid.
- Do not send OSL cards. A list showing full details of the stations heard should be certified by the Awards Manager of a National Society.
- The fee for the award is 7 IRCs.

The address for applications is:  
Traffic Bureau VERON C/o PA0AAC  
Post Box 1166  
Arnhem, Holland.

Requirements — Confirmed reception of 15 different European countries.

**LISTENERS CENTURY CLUB**

1-5 same as for the HEC Award.

Requirements — Confirmed reception is required of 100 different PA/PI stations.

**PROJECT AUSTRALIS**

**With DAVID HULL VK3ZDH**

Australis has now received copies of the revised ARRL space science involvement curriculum for schools etc., and would be pleased to send a copy to educational institutions interested. Please write under school letterhead to the call book address of VK3ZDH. At the moment we have about a dozen copies on hand. There will be some delay when these are exhausted.

Difficulties with advanced orbit predictions for AR etc., have now been resolved with the acquisition of an ASR-33 model teletype at VK3ZDH allowing my computer (microprocessor actually) to calculate, and print, all requirements. The programs are available on request for anybody also using an Intell 8008.

**MARCH PREDICTIONS**

OSCAR 6				OSCAR 7			
Date	No.	Z	W	Date	No.	Time	Long
1	15432	01.05	70.45	1	5905	00.50	62.34
2	15444	00.05	55.45	2	5918	01.44	75.96
3	15457	01.00	69.20	3	5930	00.43	60.84
4	15469	00.00	54.20	4	5943	01.38	74.46
5	15482	00.54	67.95	5	5955	00.37	59.34
6	15495	01.49	81.70	6	5968	01.31	72.96
7	15507	00.49	66.70	7	5980	00.30	57.84
8	15520	01.44	80.45	8	5993	01.25	71.46
9	15532	00.44	65.45	9	6005	00.24	56.34
10	15545	01.39	79.20	10	6018	01.18	69.96
11	15557	00.39	64.20	11	6030	00.18	54.84
12	15570	01.34	77.95	12	6043	01.12	68.46
13	15582	00.34	62.95	13	6055	00.11	53.34
14	15595	01.29	76.70	14	6068	01.06	66.96
15	15607	00.29	61.70	15	6080	00.05	51.84
16	15620	01.24	75.45	16	6093	00.59	65.46
17	15632	00.24	60.45	17	6106	01.53	79.08
18	15645	01.18	74.20	18	6118	00.53	63.96
19	15657	00.18	59.20	19	6131	01.47	77.58
20	15670	01.13	72.95	20	6143	00.46	62.46
21	15682	00.13	57.95	21	6156	01.41	76.08
22	15695	01.08	71.70	22	6168	00.40	60.96
23	15707	00.08	56.70	23	6181	01.34	74.58
24	15720	01.03	70.45	24	6193	00.34	59.46
25	15732	00.03	55.45	25	6206	01.28	73.08
26	15745	00.58	69.20	26	6218	00.27	57.96
27	15758	01.53	82.95	27	6231	01.21	71.58

28	15770	00.53	67.95	28	6243	00.21	56.46
29	15783	01.48	81.70	29	6256	01.15	70.08
30	15795	00.48	66.70	30	6268	00.14	54.96
31	15808	01.43	80.45	31	6281	01.09	68.58

**APRIL PREDICTIONS**

1	15820	00.43	65.35	1	6293	00.08	52.04
2	15833	01.37	79.10	2	6306	01.03	65.66
3	15845	00.37	64.10	3	6318	00.02	50.54
4	15858	01.32	77.85	4	6331	00.56	64.18
5	15870	00.32	62.85	5	6344	01.51	77.78
6	15883	01.27	76.60	6	6356	00.50	62.66
7	15895	00.27	61.60	7	6369	01.44	76.28
8	15908	01.22	75.35	8	6381	00.44	61.16
9	15920	00.22	60.35	9	6394	01.38	74.78
10	15933	01.17	74.10	10	6406	00.37	59.66
11	15945	00.17	59.10	11	6419	01.31	73.28
12	15958	01.12	72.85	12	6431	00.31	58.16
13	15970	00.12	57.85	13	6444	01.25	71.78
14	15983	01.07	71.60	14	6456	00.24	56.66
15	15995	00.06	56.60	15	6469	01.19	70.28
16	16008	01.01	70.35	16	6481	00.18	55.16
17	16020	00.01	55.35	17	6494	01.12	68.78
18	16033	00.56	69.10	18	6506	00.12	53.66
19	16046	01.51	82.85	19	6519	01.06	67.28
20	16058	00.51	67.85	20	6531	00.05	52.16
21	16071	01.46	81.60	21	6544	00.59	65.78
22	16083	00.46	66.60	22	6557	01.54	79.40
23	16096	01.41	80.35	23	6569	00.53	64.28
24	16108	00.41	65.35	24	6582	01.47	77.90
25	16121	01.36	79.10	25	6594	00.47	62.78
26	16133	00.36	64.10	26	6607	01.41	76.40
27	16146	01.31	77.85	27	6619	00.40	61.28
28	16158	00.31	62.85	28	6632	01.34	74.90
29	16171	01.25	76.60	29	6644	00.34	59.78
30	16183	00.25	61.60	30	6657	01.28	73.40

**20 Years Ago**

with Ron Fisher VK3OM

**MARCH, 1956**

How often should Federal Conventions be held. It appears that money was rather short in 1956 and it was decided that "Annual Conventions were an unnecessary financial drain on the Divisions. Council therefore resolved that the next convention would not be held until business was of sufficient importance to warrant the expense".

An experiment that appears to be unique in Australian amateur history was described by Pearce Healy VK2APQ. Four walkie-talkies and one mobile unit operating in the 144 MHz band were used to test communication in the Jenolan Caves. Apparently good results were obtained and, when one considers the equipment used, were perhaps remarkable. The portable units ran all of .4 watt input and used super-regen superhet receivers. I wonder if any similar tests have been conducted in the intervening twenty years. With the portable gear available today perhaps some interesting comparisons could be made.

Ron Henderson VK3ARV described how he had "Bandspread" the Super-Pro on all Bands. The Super-Pro was of course the Australian made version, the AMR 200. These were made in Melbourne by the Astor Company. Only a very few were actually factory built but enough parts came on to the disposals market to enable many amateurs to build their own set up. The original band spread system did not operate on the 80 metre band and covered a bit too much on the other bands. Ron provided the answers.

Phil Williams VK5ZAD (that name sounds familiar) described his low loss antenna switching system for VHF rigs, and Hans Ruckert VK2AOU presented further notes on his transmitter with low harmonic output. Ron Fisher VK3OM (sounds familiar too) described his 40 metre mobile transmitter and centre loaded whip antenna. A rather mathematical article on transformer theory and practice by V. J. McMillan VK2AWN rounded out a very interesting issue.

**QSP**

**ARRL DXCC**

Looking through the hundreds who are listed in QST for Dec '75 as having submitted confirmations for contacts with 300 or more countries the top most is 355 countries. Only two VK's appear in the list — VK4QM with 351 and VK3YL with 314 — of those with 300 or more.

**DO NOT FORGET THE RADIO AMATEURS'**

**OLD TIMERS DINNER**

**Wed., 10th March, 1976**

from 18.00 h at

**SCIENCES CLUB**

**CLUNIES ROSS NATIONAL SCIENCE CENTRE, 191 Royal Parade, Parkville**

Contact VK3ML, QTHR  
Ph. (03) 20 7780 A.H.

**Hamads**

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is advertised.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

**FOR SALE**

Swan 350 with 230V power supply and speaker, 5 bands incl. full 28-29.7 MHz. Exc. cond., good performer, little used, \$300. Accept Oscilloscope as part. Want "Antenna Handbook" (Glanzer) Vol. 2. 3. VK2KR, QTHR, Ph. (02) 449 4524

One Heathkit HR-10 Rx, complete speaker spare valves manual, \$100. M. Wright, P.B. 72, St. Arnaud. Ph. (054) 95 1579.

Carphone MR10A, 2-channel, good condition and re-valved, operating on 2m, Ch. A crystals. VK3ZKS. QTHR, Ph. (03) 38 6793.

Swan 350 Transceiver with AC PSU, mike and plug in VOX \$250. BC1421 VHF Rx, 100 to 150 MHz, \$80. Bendix frequency meter with AC and DC power supplies, \$25. Acitron heavy duty mobile PSU, suit all transceivers, \$80. EA digital counter 200 MHz, \$75. VK2BOA, QTHR.

Hi-Fi 30 W Stereo Amp., solid state with scratch and rumble filters, includes tuner, tape, xtal/mag. switching, \$40 o.n.o. VK3ZR, QTHR, Ph. 89 4645 A.H.

Collins Kwm 2A Tcwr, w/AC supply, new late model. Drake R4C Rx T4XC Tx w/AC supply, new 2 metre FM IC21A w/digital VFO DV21, new. Ph. (03) 24 1231, A.H. (03) 20 6135.

TCA1675, with 4 ch. switch. Ch. 40, 50 and R4 fitted, complete with mic., circuits and infor. Works well, \$70. Also 11m rig B5060, operates AC mains or 12V DC, has 27.065, 27.085 and 27.125 MHz xtals, new and complete in original packing, \$80. VK2HS, 9 Moore Cres., Faulconbridge, 2776.

## HAMADS — continued

Yaesu FT501 with FP501 power supply complete, purchased September 1974. As new condition, \$500. Genuine reason for selling. VK2OW, QTHR, Ph. (069) 82 2003.

Valves new QOE06/40, \$10 ea. QOE03/20, \$8 ea. DG7-36 CRO tube, \$5.00. VK3 144 MHz converter \$8. 6-9 Command Rx with power supply, \$10. VK2BWH, QTHR, Ph. (02) 667 2291.

Yaesu FLDX400, 80-10m Tx, excellent cond., orig. pkg., with mic., manual and connecting cables, \$300 o.n.o. Allan Mason VK2GR, QTHR, Ph. (02) 47 4344.

I.G.L. 2m FM Transceiver (2) in excellent condition, both 12W solid state in 2" x 8½" x 8½" extruded aluminium cases with xtals and circuits. One 5 channel \$130, the other single channel, \$110. Brian VK2ZOW, QTHR, Ph. (02) 452 1257.

Gonset GSB100 Tx 10/80m, mini cond., drive any linear CW manual \$190. Homebrew Linear GG 2 811As, with B & W turret (HD) AC filter, meter, 2 DC mA meters, \$100, 10/80m. Pair Salsen motors \$10. Heath type VTVM \$20. Tranpro VCT \$40. Asahi mobile ant. 10m, 15m, 20m, 40m, 80m. CW ball mount and spring, mint cond., new price \$108, sell \$75. Heath DX60 Tx \$30. VK2DA, QTHR, Ph. (02) 94 1039.

FT DX 401, mint condition with microphone and matching speaker. Bought new August 1974, \$400 or deal for FT101B. VK4UX, QTHR, Ph. (079) 33 1381.

Communications Rx, model QR666, range 170 kHz to 30 MHz, in 6 bands, press button operation for AM-ANL-CW/SSB/SEL, BFO control for LSB/USB, plus S meter, use for AC/DC with service manual, new in box \$260. Contact J. C. van Ooijen, Phone A.H. (03) 699 2400, P.O. Box 141, St. Kilda West, 3182.

I.G.L. 2m FM 1W Exciter and Speech Amp. New, complete, \$30 o.n.o. VHF Rx Hallcrafters with man., \$30. 40 and 80m converters with xtals, \$10 each. 6 over 6 skeleton slot 2m Yagi, \$15. 5 el. 2m Yagi, \$8. 2m corner reflector, \$15. AR2 2m Ringo with extension (as new), \$30. 6m 3 el. Yagi (as new), \$30. BTR6 2m FM mini base Ch. 1 and Ch. B, \$35. MTR12 6 FM with 52.525 xtals, \$25. Pye Leader 6 AM 4 ch. inc. 53.032, \$30. MTR21 6 AM semi-conv. 032 xtal, \$20. Also 6 + 2m AM Tx and converters, \$30 lot. STC 1674 6 FM base, 6/40 final with xtals, \$40. Many more bits and pieces. Rob McNabb VK3YBC, QTHR, Ph. (03) 630 7631 or A.H. (03) 232 9237.

MR20B FM Transceiver, converted to 52.525 MHz, mint condition, \$45. MR10B channel B, all new tubes, FET pre-amp \$20. HW32 Heathkit 20m SSB transceiver \$100. All with circuits etc. 6m AM Carphone 12V 10W, xtal locked x unit, timeable Rx 52-54 Mc/s with crystals, excellent performer \$15. Hills 50 ft. five section tubular telescopic antenna mast \$40. VK3CCD Lloyd Davies, 311 9199 B.H., 7/35 Pine Ave., Elwood, Vic., 3184.

FT200 Transceiver (just overhauled), plus AC supply, plus acitrion DC DC supply, plus spare PA valves (new) \$380. VK2KI, QTHR, Ph. (02) 78 4237.

8 Metre Converter, 3 tubes, commercial robust constr., no PS \$25. Command Rx 7-9 MHz, exc. cond., no mods., good condition \$25. Command Tx 7-9 MHz, original, with PS on original chassis \$30. Command Tx 3.5 MHz, mod., with one 1625 as mod., \$20. Pye Reporter AM with 53.892 xtal, Rx var. tuning, 12V DC/AC \$20, Rx faulty. AWA FM carphone 60-85 MHz, VIB P/s, good clean, complete with cables, handset and control unit and handbook \$25. As above, Rx faulty, no handbook \$15. VK4LN, QTHR, Ph. (071) 82 2675.

## ATTENTION

### FT101 OWNERS

At last a distortion-free RF Clipper. Fits in minutes and really works. Yaesu SSB Filter fitted. Only for FT101. Gives up to 6 times or more effective talk power gain plus extra RX selectivity and gain. Not to be confused with audio type distortion producing clippers, or compressors. Price: £45 sterling, air post paid.

Send for details:

### G3LL, HOLDINGS LTD.

39/41 Mincing Lane, Blackburn BB2 2AF, England

Swan 350 U and L Sideband 100 kHz xtal callibrator, AC PSU, \$300. Also late model Swan SW-240 U and L sideband, 12V neg. earth PSU, \$175. Both in good condition with manuals. PSU are inter changeable. Opportunity purchase much sought after no nonsense transceivers, will consider offer for both TRX VK2OR, QTHR, Ph. (02) 86 4558.

Heathkit VFO model VFIU 160-10m (England), with handbook, new and used cond., no P/s \$30. Bendix BC 348 Rx 1.8-18 MHz, 200 to 500 kHz, built in P/s, no speaker (no SSB), BFO needs attention \$45. TA12 D Trans., 100W AM output 807s ARL, mod. 807s, B/SW, 80/40/25/10, 2 VFOs, no P/s \$25. Swan 240 P/s, 800/300/100/12 V AC, 12V DC, with speaker, ex. cond. \$40. Western electric audio amp., 100W, unit consists 3 amp and monitor works from 110V all "Western" metering, in rack, wt. 200 lbs. \$50 o.n.o. Barlow Wadley Rx XCR-30, mint cond., handbook and service manual \$200. Galaxy V, excellent cond., VOX, calib., P/s, 240V, clean with handbook \$350. VK4LN, QTHR, Ph. (071) 82 2675.

FT/FP 200, in excellent condition, complete with desk mike and manual \$345. VK3BHN, Ph. (03) 467 2131 Bus.

Creed 7B Teleprinter, answer back and sound proof wooden cabinet, VGC \$65. VHF Tx Rx type ARC1 and matching rack \$35. W. Babb VK3AOB, Ph. (03) 337 4902.

FT DX 401, 80-10m metres, 560 watts, CW filter, noise blanker, etc., little used, mint condition in original carton, complete with matching speaker, desk microphone, Akai headphone, \$445 o.n.o. VK3ARZ, QTHR (03) 232 9492 A.H.

RTTY all excellent A1 condition, Creed 7B page printer, Creed typing Reparatator, Mainline TU, CRO, stroke, balance meter, rolls of tape and paper. The lot for \$170 nett. I need the room! Collect at VK3YS, QTHR, Ph. (03) 89 2213.

KW2000A transceiver, 1600 to 10m, complete with mic., AC and DC power supplies. Recently revalved. \$350. VK3ML, QTHR.

FT75, TXCR, FP75 AC PSU, FV50c VFO and home brew digital dial in matching size case. Dial also useable as a digital freq. meter to 20 MHz with accuracy at .1 or 0.1 kHz. \$360 o.n.o. Nell Osborne VK3YEI, QTHR, Ph. (03) 24 0331 bus., (03) 763 0256 A.H.

## WANTED

Hellax or similar low loss coax cable 75 to 100 ft., 3/8"-½", 50 ohms type preferred. Max Rieper, VK2DT, 2 Patya Close, Epping, N.S.W., 2121, Ph. (02) 868 1131.

Any old radio, gramophones, or parts thereof, up to the early 1930s. Also can anyone help me with information on Marconi Spark transmitter/receiver used by the Army as a portable field set. Max Rieper, VK2DT, 2 Patya Close, Epping, N.S.W., 2121, Ph. (02) 868 1131.

Transverters — 6m, 2m, 70 cm to suit FT101, also helical or trap verticals anywhere in between 160m to 6m. Bob Yorston VK2CAN, Ph. (02) 646 0317 (9-5).

Electron Tubes, type 446A, 464, 2C39, 2C40, 2C42, 2C43, 2C46, RL18, 955 or any VHF UHF type tubes, including Klystrons and magnetrons. I am also interested in obtaining old UHF Rxs and Txs. R. Sugden VK2ZHS, QTHR, Ph. (02) 59 5390 A.H., (02) 92 6051 Bus.

Tuning Gang, gearing and escutcheon panel for BC348 or BC224 or buy incomplete set. Command Rx top and bottom covers plus output transformers. W. Babb VK3AOB, Ph. (03) 337 4902.

Vertical all band antenna in good order. M. Wright, P.B. 72, St. Arnaud, Ph. (054) 95 1579.

Collins 30L-1 Linear Amp. Pay top price for mint unit. A. C. Hawker, Box 35, Dimboola, Vic., 3414.

Private collector interested in old time commercial cinema material as well as old time radio and TV transcriptions. Interested in exchanging taped broadcast type material. Thomas King, VK2ATJ, P.O. Box 45, Kensington, N.S.W., 2033.

Any surplus as BC342, 348, 314 ROs, SX28, AR88 command sets, also Tx etc. Also tower, Hills or similar, VK5OQ, QTHR.

Stolle Antenna Rotator, in good condition. Contact J. Cordingley, 41 Jillico Avenue, Tallangatta, 3700.

Manual for AT5, AHR, to buy or to borrow. W. Smith, 17 Creswick Street, Glen Iris, Ph. (03) 20 3456.

# Silent Keys

It is with deep regret that we record the passing of—

VK2ABZ

**WILLIAM FREDERICK BARDIN, 1899-1976**

The passing of Bill Bardin has broken yet another link joining Amateur Radio of today with the early days of wireless communication as it was known.

When still a youth Bill passed through the Marconi School of Wireless then joined the Queensland Radio Service where he served for five years at the same time operating amateur station 4AB. In turn he served as engineer at broadcasting stations 4BH, 4QG and 4BC. It was whilst Bill was operating in Queensland that the contest for "Old Bills" Cup Trophy for amateur competition was started — It would be interesting to know who now has this trophy.

Prior to World War Two Bill Bardin joined A.W.A. and, when Japanese invaders were rapidly advancing southwards, was sent to New Guinea to dismantle Government radio installations and arrange for their return to Australia — after the war it was Bill's first job to take all back and organise re-installation.

Bill, a foundation member of the MIRE, then transferred to the N.S.W. branch of the OTC where he served until his retirement. After a long illness Bill mercifully passed away, survived by a son and daughter — who have the deepest sympathy from all who knew Bill. — VK2CE.

VK4JW HERB LARSEN

With the passing of Herb Larsen on January 13th last, amateur radio has lost another old timer, something that will be regretted by many amateurs. Herbert Peter Christian Larsen was born at Charlars Towers in April 1901. Apart from 20 years when employed in Cairns, he had spent his lifetime at Charlars Towers, also serving 14 months with the Australian Military Forces in 1942-43 before being discharged on medical grounds. Herb became interested in radio when in his early 20s, homebrewing loose-couplers and later regenerative valve receivers for broadcast reception, long before the official commencement of broadcasting in Australia. In March 1928, he secured his Amateur Licence VK4JW, then followed an active association with amateur radio until a few days before his passing.

Being one of nature's gentlemen, Herb will be missed by a large circle of personal friends and a larger group of amateur friends. — VK4LK.

Theosophists, or similarly-inclined, Tom House, BA, VK2BTH, would welcome hearing from you. Skeds, preferably CW, eyeball OSOs or correspondence, 34 Wolsey Road, Lindfield, 2070, Ph. (02) 467 2773.

Wanted for a new SWL Glosco Amateur Band Receiver, Model G4/216. Price and relevant details to Maurice Batt, Box 1, Rokewood Junction, Victoria, 3351.

Potential Amateurs with disabilities for novice/AOCP daytime classes forming now at the Disabled Radio Amateurs Club VK3ZZ in South Melbourne. The building is easily accessible. For application form ring Rod Bishop, Secretary/Treasurer, Ph. (03) 92 4591, 7 p.m. to 9 p.m.

## WANTED KNOWN

Amateur Operator Courses to be held at Box Hill Technical College on Wednesday evenings from 5.30-9.30 p.m. AOCP, limited and novice catered for. Further enquiries, Graeme Scott VK3ZR, QTHR, Ph. Bus. 89 0231, private 89 4645.

**DRAKE****R. L. DRAKE**

# COMMUNICATIONS GEAR

**DSR2** Digital readout communications **RECEIVER** 10 kHz-30 MHz continuous coverage, fully synthesised, for AM-USB-LSB-CW reception. **\$3495.**

**SPR4** communications **RECEIVER** for AM-USB-LSB-CW reception. Direct frequency dialling 150-500 kHz plus any 23 x 500 kHz ranges between 0.5 and 30 MHz. **\$697.**

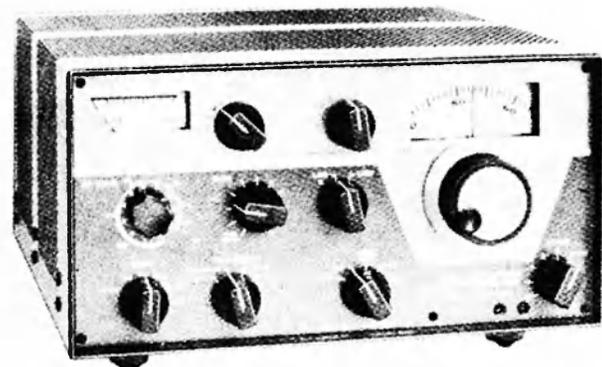
**R4C** Amateur **RECEIVER** covers HF ham bands plus any 15 x 500 kHz ranges between 1.5 and 30 MHz except 5.0 to 6.0 MHz. **\$640.** (Transceives with T4XC.)

**SSRI** Synthesised communications **RECEIVER.** Provides continuous coverage 500 kHz to 30.0 MHz for AM-USB-LSB reception. Operates from AC Mains or internal batteries. **\$290.**

**TR4C** sideband **TRANSCEIVER** full amateur band coverage 10 through 80 metres. **\$630.**

**T4XC** sideband **TRANSMITTER** full amateur band coverage 10 through 80 metres plus 160 metres accessory crystal plus 4 fixed frequency positions. **\$609.** (Transceives with R4C.)

**MN4** and **MN2000** **MATCHING NETWORKS** — enable Feedline SWRs of up to 5:1 to be matched to the Transmitter. Built-in Wattmeter. MN4 handles 200 Watts. MN2000 handles 1000 Watts continuous and 2000 Watts PEP. MN4 **\$115,** MN2000 **\$230.**

**T4XC TRANSMITTER**

**TV — 42 — LP FILTER** for Transmitters below 30 MHz — 100 Watts continuous. **\$11.50.**

**TV — 300 — HP FILTER** — TV Sset protection from transmitters 6 — 160 metres. **\$9.00.**

**TV — 3300 — LP FILTER** 1000 Watts continuous to 30 MHz with sharp cut off above 30 MHz. **\$24.00.**

**RP500** — Receiver **PROTECTOR** for Receiver front end protection from close proximity high power transmitters. Less than 0.5 dB Insertion Loss to 30 MHz. **\$77.00.**

**W4 WATTMETER/SWR METER 2** — 30 MHz with 200 Watt and 2000 Watt ranges. **\$65.00.**

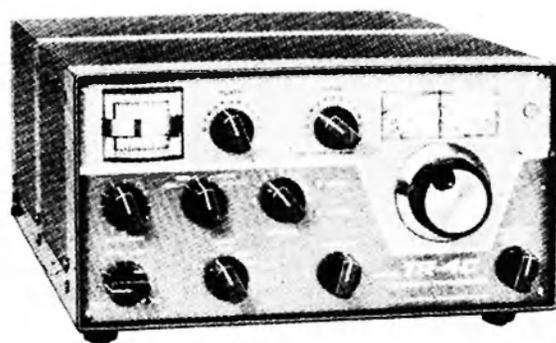
**WV4 WATTMETER/SWR METER 20** — 200 MHz with 100 Watt and 1000 Watt ranges. **\$78.00.**

**AC4 POWER SUPPLY** for mains operation of TR4C or T4XC. **\$175.00.**

**DC4 POWER SUPPLY** for battery operation of TR4C or T4XC. **\$187.00.**

**NIPPAN FC3A FREQUENCY COUNTER** — 15 Hz - 250 MHz, operates from mains or battery, **\$258**

PRICES SHOWN INCLUDE SALES TAX.

**TR4C TRANSCEIVER****ELMEASCO INSTRUMENTS PTY. LTD.**

P.O. BOX 334, BROOKVALE, N.S.W. 2100 — 939-7944.

MELBOURNE — 26-6658

ADELAIDE — 42-6666

BRISBANE — 36-5061

WELLINGTON, N.Z. — 69-7566



## HF, VHF BASE AND MOBILE ANTENNAS FROM B.E.S.

**AS-303A HF MOBILE ANTENNA SET**, centre loaded 3.5-28 MHz, telescoping up to approx. 7', with heavy duty spring and ball mount. **\$108**

**AS-NK** matching SS Bumper Mount for AS-303A. **\$14**

**HOPE-10R** 10/11 metre adjustable Gutter Mounted helical, 1.42 metres long, includes RG-58/U cable and connector. **\$38**

**HOPE-10B.** Same as HOPE-10R but equipped with adjustable ball and spring mount (no cable or connector). **\$35**

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APRIL, 1976

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Part of the equipment at the Royal Observatory, Herstmonceaux, from whence emanates Greenwich Mean Time. See story on page 5.

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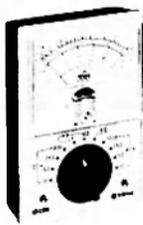
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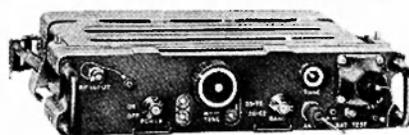
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# amateur radio QSP THE INVESTIGATOR'S REPORT AND YOU

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Printed in full in this issue of AR is the report by Mr. Bob Arnold, the investigator who was commissioned by the 1975 Federal Convention to enquire into the administrative, financial, and constitutional organisation of the WIA.

This report is of considerable importance to the Institute and I hope you will give it the consideration it deserves.

Do not forget that this report was commissioned to investigate the present organisation of the Institute and to offer recommendations as to any changes the author may feel appropriate and desirable, and to give us guidance in our future planning.

It is quite possible that there are some aspects of this report you do not agree with; however, because of this, do not condemn all of it.

This report advocates some very drastic changes in our organisation. Give due consideration to the object of these changes. Do you think they will be successful? What are their shortcomings? It is feasible to move away from the historic federation of State organisations to a different basic unit in an attempt to eliminate duplication of function?

At this stage it is possible that many of the implications of the report have not been realised. Do not let this deter you.

The main thing to do now is to discuss this report as widely as possible and feed back your thoughts to the WIA in order to give the Federal Council as much guidance as possible when they come to consider the report at the Federal Convention in May.

David Wardlaw VK3ADW, Federal President. ■

## IARU WORLD CONFERENCE

The President of the International Amateur Radio Union, Noel Eaton VE3CJ, announced at the Region 3 Conference in Hong Kong last year that he was proposing to invite representatives of Region 1 and Region 3 to meet in Miami, Florida for an Inter-Regional Conference on April 16th and 17th, following the conclusion of the Region 2 Conference.

This will be the first time that there has been a formal meeting of the three Regional IARU Societies. It will be particularly concerned with preparations for the 1979 World Administrative Radio Conference.

In addition to representatives of the three Regions, the Conference will be attended by representatives of a number of the more important national societies including RSGB, the Italian Society and the Japanese Amateur Radio League. The WIA, which is already involved in preparations for the 1979 WARC, has decided to also be represented at that Conference by its Federal President, Dr. David Wardlaw VK3ADW.

The President of IARU has expressed the hope that the meeting will be a rather informal and free-wheeling discussion of the past and future.

The WIA's participation in the Conference is an expression of the importance that is attached to co-ordination and liaison with other national societies in the protection of the amateur services' position at the 1979 WARC. ■

## EDITOR'S DESK

Bill Roper, VK3ARZ

Eight new articles were received during February for consideration for publication in AR. There are now almost thirty articles undergoing preparation but bottlenecks in technical editing have caused some lengthy delays. These delays have now been overcome, only to be replaced with some drafting delays.

Whether you are for or against repeaters, or whether you are completely indifferent, repeaters are becoming an increasingly important part of the growth and advancement of amateur radio. A new, active, and much needed Federal Repeater Committee has been formed and in this issue of AR appears the first column of a monthly series devoted entirely to REPEATERS.

Bob Arnold's report on his investigation into the organisation and management of the WIA is printed in full in this issue. It takes up a lot of space, but it is essential reading for everybody.

It is with regret, and with my deepest

thanks for his past efforts, that I farewell Jim Payne VK3AZT as contributing editor to the Contests Column. Jim has done an excellent job and, particularly during the past few months, has performed under rather adverse conditions. Ken Phillips VK3AUQ has stepped into his shoes. I am sure that you will give Ken every assistance.

Deane Blackman VK3TX has had to resign as contributing editor to the Key Section column due to study leave. Thank you for your work Deane; I hope your eventual replacement does not prepare his copy on a teletype machine. It is rather hard to mark up for typesetting. Hi.

A criticism levelled against the WIA for a long time was that, for an organisation of so called communicators, we were unable to advise our members of what was happening on the national scene. I am sure that you will agree that WIANEWS, written by Business Manager Peter Dodd, is now successfully keeping you informed on what is happening in your Institute.

Next month I hope to introduce a new, periodical column devoted to information

on where to find difficult to obtain components for construction projects. Vic Pleuger VK3AVP will be compiling the

material and would welcome your help. I am sure all readers will have realised immediately that the diagrams on page 17

of March AR were accidentally interchanged. Just one of the many happenings that ages editors prematurely. ■

# WIANEWS

February was a busy month for the Executive and March appears likely to be equally as busy.

The Executive established a Repeater Sub-Committee on an ad hoc basis to get repeater matters moving. This was composed of a member of the Executive as Chairman and two Melbourne amateurs well acquainted with repeater operations. The first meeting of this sub-committee was held towards the end of February to consider a range of outstanding problems and to organise liaison with Divisional repeater groups.

On January 29th members of the Executive met with Central Office for a detailed discussion on repeater conditions. Some of the long delays in obtaining licences for repeaters, methods of identifying repeaters in use, security, and access to repeaters were the major items discussed. The Department insisted upon repeater idents and suggested a preferred method. When a repeater is co-sited at a location where other services operate or will be operating it was accepted that somewhat more stringent conditions had to be applied to avoid RFI than would be necessary for a repeater located far distant from any other services.

The Department committed their requirements to writing on 3rd February advising also that measures were being implemented by which it expects that delays in obtaining licences for this class of station will be minimised. At the same time they slipped in a new condition that applications for repeater licences must be accompanied by evidence that a significant number of licensees in the service area support the application.

At least the WIA succeeded in having removed the requirement that circuit diagrams must accompany applications. In place of this the requirement is that the repeater shall be of high standard and in accordance with good engineering practice. Log keeping was clarified in relation to repeaters as meaning maintenance log keeping.

The WIA now has to make a decision on some of these questions and advise the Department accordingly.

February saw the beginning of a most important activity. On the 25th the Federal President attended the first meeting of the Government's Preparatory Group relating to WARC 1979. Representatives attended from most of the frequency user services including broadcasting, maritime, aeronautical and defence. This was almost wholly concerned with administrative arrangements. Committee No. 2 was designated for the amateur and amateur satellite services.

In this same month much thought was given to the impending meeting in Miami during April, after the IARU Region 2 Conference, of representatives from all IARU Regions and many Societies to finalise numerous matters relating to WARC 1979. The importance of this meeting for the whole of the amateur service and the necessity to organise a strong IARU team for WARC 1979 assumes greater significance day by day. Some details of the frequency tables to be considered by R2 are set out in IARU News herein. A brief resume of the R3 plans is to be found on p. 28 of AR June 1975.

The Investigator, Mr. Bob Arnold, VK3ZBB, handed down his Report during the month. This is published in full in this issue.

Two other complex matters also received attention. The first one refers to the desirability and possibility of producing an EDP-based call book this year. This question is still under discussion. The second refers to the possibility of a WIA integration of educational instruction on a national level for all age groups by various organisations. This was linked with examination levels, syllabuses and exemptions. "What can the Institute do in the widest possible sense in this field towards meeting the undoubted demand by the public to learn about amateur radio" was the theme. A Federal Convention agenda item was approved

for the suggested appointment of a qualified amateur to undertake an investigation and make recommendations.

Another Executive agenda item dealt with the establishment and adoption of WICEN net frequencies. It is anticipated that a motion arising would specify the frequencies. Some years ago the primary WICEN net frequency was 7060 kHz with the secondary frequency at 7040 kHz and national guard frequencies on 3501 and 7002 kHz.

Two Agenda items were received from the VK4 Division. One put forward the proposal that WIA membership should be a requisite for persons nominated to fill any positions on the YRCS Federal organisation. The other was an administrative suggestion relating to stamp duties on constitutionally-required legal documents.

The VK2 Division submitted 10 Agenda Items. No. 1 was that the WIA should determine uniform conditions in all Divisions for Novice membership and No. 10 that the Radio Branch be requested to alter the 2-year Novice Licence tenure so that it may be possible to grant an extension of time to some Novices if circumstances warrant it. The WIA incidentally already has a verbal assurance on this matter.

VK2's No. 3 agenda item proposed that the Radio Branch allocate new amateur bands at 48-50 GHz, 71-76 GHz, 165-170 GHz and 240-250 GHz. Their No. 4 proposed that the WIA request the removal of the lower age limit on AOLCP and AACP licences and certificates.

Their No. 7 proposed the policy that the transmitter in any repeater installation be audibly identified while in use either by on carrier MCW or taped voice ident. Their No. 6 asked that the Federal Repeater Committee be reconstituted so that it is a "Working Committee" in one State and that a liaison person from each State Repeater Committee be a part of this FRC. No. 8 proposed that a national beacon committee similar to the FRC be set up to provide co-ordination etc. Note: The VHF Advisory Committee is already almost inundated with beacon matters.

The VK2's No. 5 proposes that the WIA undertake to advertise in other journals to promote the WIA as a recruitment aid. No. 2 proposed that a limited segment of Divisional Notes should be re-introduced into AR and finally their No. 9 suggested that the format of future call books be expanded to be similar to the NZART call book so that WIA policies, guidelines and information may be distributed to amateurs.

One of the motions laid on the table in the 1975 Federal Convention proposed that the Federal Council should determine WIA policy for amateur station operation on the 27 MHz band and provide guidelines for members in regard to co-operation with the Radio Branches for the location, identification and eventual apprehension of unlicensed stations using amateur frequencies. The VK1 Division has now provided suggested guidelines for discussion at the 1976 Federal Convention.

The Executive, having received agreement from the President of the VK3 Division, approved the appointment of Mr. K. L. Phillips VK3AUQ as Federal Contest Manager to take over from VK3AZT who is heavily involved with business commitments. It is understood that Kev. Phillips expects to receive some assistance from interested members of the Eastern and Mountain Districts Radio Club.

The distributors of the proposed IARU Region 3 bulletin asked advice about a suitable recipient of this in PNG in the absence of an IARU Society in that country. This is being researched.

The VK4 Division suggested that a special prefix for amateurs should be sought for the period July 1976 to July 1977 to celebrate 75 years of Australian Federation.

The Executive were pleased to note the resumption of amateur examinations during February and the scheduled Novice Exam for March 16th. Although a second Novice Morse exam was scheduled to be held along with the AACP Morse exam on 18th May it was observed that the next complete Novice exam would not be held before November.

Arising from representations carefully detailed by the Moon-bounce experts in Dapto it is anticipated that a further VK2 Agenda Item will come forward proposing some peripheral modifications to the WIA 70 cm band plan. The question of selecting suitable repeater channels for 70 cm is yet another item presently under discussions at Divisional levels presumably for injection into the 1976 Federal Convention before offering suitable advice to the P & T Department.

And finally, as if all this were insufficient for digestibility, a very detailed letter of 2nd February came from the Secretary of the ABCB in reply to the Institute's complaints in October relating to FM and TV transmitter/transponder interference problems and measures which ought to be examined to overcome these in proper design of receivers and additionally the unilateral use by Australia of TV frequencies such as Channel 5A. Copies of this letter have been circulated to Divisions. The Executive still lacks an EMC (RFI) Co-ordinator.

With excellent co-operation from the Department a temporary reciprocal licence VK1JY was obtained for State visitor JY1 for presentation to him on arrival in Canberra. Unfortunately the itinerary for JY1 did not permit time for any amateur function in Melbourne.

During a brief eyeball QSO with him at a Government House reception in Melbourne attended by the Federal and VK3 Presidents on 5th March, HRH King Hussein bin Jalal, JY1 desired that greetings be conveyed to Australian amateurs and also to IARU President Noel Eaton. At that time his temporary reciprocal licence VK1JY had not yet filtered through the system to him from Canberra, but his attention was drawn to its existence.

The Secretary of the Cyprus Amateur Radio Society writes that their Vice-President, Totos Theodossiou 5B4AP, will be visiting Sydney for four weeks from 5th April.

The editor of the NZART journal Break-In, Don Mackay ZL2RW, will be visiting Melbourne during April. ■

# GREENWICH MEAN TIME

Contemplating a trip to the U.K. If so, you may be interested enough to take the time to visit Flamsteed House, at Greenwich, on the bank of the Thames River about 15 km from London.

Here, you will witness a small daily traditional ritual that has come to mean so much to all those whose communication, livelihood and safety depend on the accurate co-ordination of time.

At precisely 1300 hrs. London LT, a colored metal sphere drops down a mast. This signifies to all in view that the time is exactly 1 p.m. This event first occurred one hundred and forty-three years ago: i.e. in 1833, when it was recorded as the FIRST ACCURATE TIME SIGNAL IN THE HISTORY OF THE WORLD. It became known as the Greenwich Mean Time (GMT) and is now the norm against which all standard time zones are measured.

Flamsteed House, the first Royal Observatory, was named after a young amateur astronomer who was appointed by King Charles II in 1676. This famous house, in the U.K., is now an astronomical museum. In recent years, the air around it became so polluted that the operations centre of the Royal Observatory was moved to a site in Herstmonceaux in Sussex. However, the Greenwich meridian — a brass strip laid in the ground — still remains in its original position at Greenwich and if your mood is one of whimsy, you may care to straddle this strip and thereby, man-made timewise, divide yourself into two segments, 24 hours apart.

The dropping of the ball down the flagpole was done so that mariners about to set to sea could synchronize their chronometers. From this crude beginning, the world's time is now measured at Herstmonceaux, by an array of caesium atomic clocks accurate to within a few parts in ten quadrillion — such is the staggering progress in astronomy, technology and science.

From the very beginning, the Royal Observatory worked hard to establish ever more accurate daily time, in an effort to assist all those who travelled on land and

A. Shawsmith VK4SS

sea. Soon, most of the world's ships had the zero longitude through Greenwich on their charts and finally in 1884, despite opposition from France, an international agreement was drawn up declaring the Greenwich meridian as the standard longitude and GMT as the standard time.

Much of the credit for the establishment of GMT and the bringing of it to the precise state of the art it is today, must go to the Royal Astronomer Appointees at Flamsteed House. For a period of 300 years, they were without exception, a brilliant, dedicated group, from Flamsteed who worked with one or two simple telescopes in 1676, to the present Radio Astronomer, Sir Martin Ryle.

Maintaining accurate time requires the work and effort of a large number of astronomers and scientists the world over. The staff at Herstmonceaux has continued to grow, in spite of the aid of computers. Innumerable observations are made of countless planets and stars and exacting calculations have to be made daily, for the planet Earth does not spin at a constant rate. At some periods of the year it speeds up and at other times slows down; it also wobbles slightly on its axis, from time to time. There are several reasons for this: viz. seasonal winds, tides and the 'pull' effect of sun and moon and turbulence in the Earth's core, etc. These effects and vagaries are now accurately measured and GMT is adjusted accordingly.

Besides GMT, the reader may come across GCT (Greenwich Civil Time) and also UTC (Universal Co-ordinated Time). For Amateur use, these can be regarded as one and the same, although there are periods when UTC differs very fractionally from GMT and GCT. Except for specialised tests, Hams generally in their working do not require split second accuracy but even so, next time you fill out your QSLs, give a thought to the past work at Greenwich and consider that QSO checking would be difficult without accurate UTC or Greenwich Mean Time. ■

## GSP

### PROVOCATION OF THE MONTH

Note on a subs notice by a resigning member — "I do not wish to continue subscribing to this magazine".

### VICTORIAN DIVISION ADDRESS

Notification has been received from the Divisional Secretary of the WIA Victorian Division that the Divisional address via P.O. Box 36, East Melbourne is no longer valid. This post box will be relinquished very shortly and therefore the Divisional address for all mail is 412 Brunswick St., Fitzroy, 3065.

### MAGAZINE SIZES

You may have already noticed the change in sizes of the USA amateur journals and also the W. German CO DL from 1st January 1976. OST is now about the same size as our AR at 28 cm x 21 cm (AR is 21.5 cm wide). The editorial in Jan '76 QST said "over a two-year span, the cost of producing an issue of QST increased nearly 75%. almost all of that increase caused by the higher price of paper. These increased costs helped to create a loss in ARRL operations of over \$130,000 in 1974". Many of the magazines have gone over to the 3 column format which has been used so successfully in AR for many years.

### USA VOLUNTEER EXAMINERS

"The (FCC) rules permit the examination for an Amateur licence to be administered by a volunteer examiner selected by the applicant when it is shown by a physician's certificate that the applicant is unable to appear for an FCC supervised examination because of protracted disability. The volunteer must be at least 21 years of age and the holder of a class of amateur operator licence equal to or higher than the class of licence for which the applicant is being examined". World Radio News Jan. '76.

### USA REPEATERS

A note in Jan. '76 QST mentions that 220 MHz repeater activity is booming and is inevitable given the saturation of 146 MHz in many areas. "This move has been slowed by the recurring spectre of class E CB" was the comment. Incidentally the IARU R2 conference this month will be asking for 220-225 MHz as an amateur (shared) allocation for WARC 1979.

### REPEATERS IN SOUTH AFRICA

The Dec. '75 issue of Radio ZS lists 34 repeaters operating in South Africa. Of these there are 33 in the 2m band where they have 9 channels with inputs between 145.000 to 145.250 MHz and outputs between 145.600 and 145.850 MHz; 25 kHz spacing and their first channel is shown as 82/130 input 145.025 output 145.625 MHz. One repeater is shown in the 6m band (which extends from 50 to 54 MHz in South Africa) for which 9 channels are allocated starting at 162/210 being 52.025 in 52.625 MHz out and ending at 178/226 being 52.225 in 52.825 out — again at 25 kHz spacing. On 70 cm no repeater is shown as operative in the 7 allocated channels beginning with 84/692 being 431.050 in, 438.650 MHz out ending at 108/176 being 431.350 in 438.950 MHz out.

### NEW PREFIX

From "Radio Communication" Dec. '75 comes information that the call sign series D2A-D3Z has been allocated provisionally to Angola by the I.T.U. ■

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Photo shows FR-101D Digital

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- 340 mm x 153 mm x 285 mm

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# An Investigation into the Organisation and Management of the Wireless Institute of Australia

At the 1975 Federal Convention the Federal Council approved the appointment of Mr. Bob Arnold VK3ZBB as the investigator to enquire into and submit a report upon the administrative, financial and constitutional organisation of the whole of the Institute. This was reported on page 28 of AR for June 1975.

Mr. Arnold has now produced his report despite severe pressures of his own duties and has submitted it to the Federal President at no cost whatever to the Institute.

Due to changed circumstances my enquiries into the affairs of the Wireless Institute of Australia took a different course from that originally envisaged. As it was impossible to visit all States it was considered it would be invidious to hold discussions with a relatively small group of interested persons particularly as these would be concentrated in the southern part of Australia. To give each State equal opportunity it was therefore decided to obtain the opinion of various groups by correspondence. Accordingly, two different questionnaires were prepared. The first was sent to the President by each of the seven Divisions, and it was most disappointing to find that only three Divisions — Queensland, South Australia and Tasmania — forwarded a reply although personal comments of the Secretary of the New South Wales Division were received.

It is hard to understand this lack of interest when —

- The investigation was promoted by Federal Council which is made up of representatives from all Divisions.
- Verbal intimations were that the Divisions were not satisfied with the conduct of the Federal Body.
- An opportunity was available to fully present in confidence, the views of the Division on the future of the Institute, and point out present weaknesses.

The second questionnaire was sent to sixty radio Clubs throughout the Commonwealth, and here again the response was not encouraging as indicated.

Letters Forwarded	Replies Received	
	O.C.	R.C.
VK1	—	1
2	13	5
3	7	11
4	11	4
5	2	2
6	4	2
7	—	—
8	1	—
9	3	—

- Note:
1. O.C. represents Open Clubs.
  2. R.C. represents Restricted Clubs, i.e. affiliated with a College, School or similar organisation.
  3. VK9 includes PNG and other territories outside Australia.

Four of the Victorian replies were from Restricted Clubs which could hardly be considered representative of the licensed amateur.

This lack of response has therefore necessitated an impartial view of the whole organisation of the WIA with little recourse to the views of the Members, and the following conclusion and recommendations are submitted —

## RECOMMENDATIONS

Many persons associated with the Institute appear to place undue emphasis on its historical significance. Whilst one should be proud of history and historical associations, to survive in today's world an organisation whatever it may be, must be in tune with today's events and philosophies. This is particularly so when related to radio, the growth in science and practice of which has probably exceeded most other industries during the past fifty years.

The amateur radio movement is also closely allied with national and international affairs and must therefore be geared to meet the challenges of

This Report is now printed in full for the information of members. A reminder is given that the Report is advisory and will come before the Federal Council at the 1976 Federal Convention during May.

It is hoped this Report will receive careful consideration by each member and that constructive comments will be sent to the Member's Division as early as possible to enable the Federal Council to deal with it in an informed manner. ■

modern political thought which has changed completely in the last 30 years not only in Australia but in the total world scene. The Institute's management structure and its policies must therefore be geared to the closing decades of the 20th century so far as events can be predicted.

The structure of the Institute has developed on State lines based on Constitutions drawn up in the 1920s when the international radio industry was in its infancy. The present structure would appear to be cumbersome and possibly unwieldy, and it is therefore suggested that consideration should be given to a gradual reconstitution of the Institute on the following lines:—

1. Re-vitalise the WIA through the introduction of a new name. Use of the word "Institute" is somewhat Victorian and the adoption of a name such as "The Amateur Radio Association of Australia" would attract more public relations appeal.
2. Re-constitute the Federal body as an entity, the Members of which would be Individual Corporate Members.
3. Wind up the Divisional corporate entities as such, and re-constitute them as metropolitan Clubs affiliated to the Federal body. Further detail on this matter is contained in the main report.
4. Have the sixty or more radio clubs throughout the country affiliated to the Federal body, the Members of each being Members of the Federal body.
5. Devise a scheme of regional representation, whereby Clubs, whilst having direct access to the Federal body, would, through regional representatives, have a spokesman at Federal Conferences, etc. The regional representation system would ensure that each State would be represented.
6. Appoint an appropriate number of directors of the Federal body from the regional representatives. Additional directors if required, could be appointed on an agreed basis, e.g. pro rata to membership, licensees or population.
7. In the light of the above recommendations, review the function of the Federal office. It may be desirable to appoint additional permanent staff with an amateur radio background rather than part-time employees.

In addition to the organisational matters mentioned, the following recommendations are in respect of Federal office operations:—

- (a) Set up working parties to examine the legal, administrative and financial implications of introducing trading activities, i.e. the sale of components, kits, imported equipment and publications.
- (b) Approach the Postal and Telecommunications Department with a view to obtaining its co-operation to provide a closer link between the WIA and the licensed amateur. Examples of such co-operation could include:—
  - Amateurs assisting the policing of legislation.
  - The WIA acting as a collecting agency for licence fees.
  - The provision of a levy on the licence fee to provide WIA with funds for national and international liaison activities.
- (c) Examine the possibilities of decentralising some of the WIA work-load from Melbourne. This would be appropriate if suggestions such as (a) were adopted.

(d) Consider liaison with a magazine publisher to incorporate "Amateur Radio" as a supplement to a commercial magazine. If this is not feasible, concentrate on the publication of one national journal with supplementary regional news rather than the multiplicity of magazines produced by various sections and clubs of the Institute.

(e) Improve communications between WIA and members by widening broadcast facilities and providing broadcast stations with tapes on WIA activities.

(f) Improve communications between WIA, Divisions and Clubs by the issue of news letters from time to time.

(g) Introduce a new approach to the publication of the Call Book, using EDP print out facilities for the publication.

(h) Consider the appointment of additional permanent staff to the Federal Office, preferably through the ranks of radio amateurs and adopt a more formal approach by the Federal office.

(i) Emphasise in every possible way, the importance of the Member and the desirability of securing virtually 100% membership of the licensed amateurs in Australia.

The bases for these recommendations are elaborated in the following examination of activity functions:—

## 1 PREAMBLE

There is no question that for many years the burden of organising and managing the WIA has fallen on the Victorian Division. Not only does Victoria have to provide a Divisional Club — a common function in all States — but it additionally provides the Federal Executive and an Editorial Board for the production of "Amateur Radio". Thus the available volunteers in Victoria, although keen to further the ideals of the Institute, are widely spread over three fairly distinct functions.

Not only has this created a certain amount of resentment in other States, but it has placed an undue burden on the Victorian Members who are no greater percentage of licensed operators than elsewhere. Without implying any criticism of the excellent work undertaken by these Victorian enthusiasts, it would probably be advantageous to spread the load of WIA affairs across the country where this is feasible.

In the context of recreative Clubs, of which there are an infinite variety, the Wireless Institute and its kindred associations overseas have a certain uniqueness —

- It is a Club, the membership of which seeks to deploy its spare time interests in pursuit of knowledge and social contact between Members.
- It is affiliated with world-wide organisations with whom direct communication can be simultaneously made.
- It is above barriers of race, creed, colour and political allegiance.
- It can, from time to time, provide valuable service to the community.
- Its membership is indirectly a national asset being a nucleus of trained personnel available to serve in the Armed Forces.
- Its membership is trained to an internationally acceptable technical standard.
- Its membership is licensed to undertake its hobby.
- Its membership pursues its hobby in accordance with legislative requirements.
- The local legislation requirements are based on international agreements.

Whilst radio amateurs conduct their operation in accordance with the criteria outlined which may be an advantage or a penalty according to one's philosophy, it is not possible to divorce the radio amateur from the international scene as the basic rules of radio communication are formulated on an international basis. International deliberations may not operate in the best interests of the radio ama-

leur or those of the countries which promote close co-operation with the radio amateur. It is in the interest of all radio amateurs who wish to retain facilities presently granted to them to maintain a solidarity both on the local scene and internationally to ensure that their rights and privileges are maintained in the future.

It has been shown that approximately 50% of amateurs are Members of the WIA. Allowing for a small proportion of inactive licensed amateurs, membership of the Institute should be much higher. It is hard to see why membership of an organisation actively promoting the interests of amateurs, is not more widely supported.

Possibly the reason for this is the lack of communication. Without doubt one of the most surprising features of the Wireless Institute — an organisation comprising Members who have the fullest facilities for communicating — is its lack of communication, and this is probably the most fundamental reason why its membership is not greater and why there is dissention among its membership today.

This report seeks to examine areas of influence within the WIA and to suggest changes which can be made to improve its effectiveness.

To carry out this study, recourse was made to available documents, although these were not comprehensive of the activities of all Divisions and Clubs. The Memorandum and Articles of Association of the Federal body together with one typical Divisional Memorandum & Articles of Association, were studied; letters were circulated to Divisions and to Clubs, requesting information on specific questions and inviting comment.

Limited discussions were held with officers within the organisation and individual Members. This information was allied with that of organisations of a similar nature both in Australia and overseas, and reference was made to the situations obtaining in amateur radio organisations particularly the RSGB and ARRL. The areas of influence are now discussed in detail.

The name of the Association — "The Wireless Institute of Australia" — has virtually been used for over 60 years. The name was obviously coined in an era where this was applicable but today the use of the word "Institute" is somewhat Victorian and hardly in keeping with modern times. Whilst a change in name is not vital, consideration should be given to this aspect to improve the image of the membership, particularly to the general public and to the media.

## 2 THE CORPORATE STRUCTURE

When compared with most organisations of a similar nature the Institute through its Divisions and Federal body, has an interesting although overburdened corporate structure. The seven Divisions — A.C.T., New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia — are autonomous corporate bodies, each registered in its own State according to the appropriate Company legislation.

Whilst a study has not been made of the Individual Memoranda and Articles of Association of each Division, it is understood that each is modelled on a common structure with only minor variations to suit local State situations.

For the size of the organisation, the total corporate structure would appear to be most unwieldy and probably unnecessary to conduct the affairs of the Institute.

The corporate structure is historical having been conceived, so far as the Divisions are concerned, in the 1920s. In addition to the Divisions, there are sixty-six affiliated radio Clubs, located in the States as follows:—

Victoria	18	New South Wales	18
Western Australia	6	South Australia	4
Queensland	15	A.C.T.	1
Northern Territory	1	P.N.G., etc.	3

These Clubs are affiliated with the Institute and it is probable there are a further number who do not have such affiliation. From information obtained there is little doubt that the majority of Clubs play a more intimate role in the day to day affairs of the radio amateur and potential amateur than do the majority of Divisions.

Clubs are generally based in a geographical region and give service to their Members within that limited range of territory. It is not surprising therefore, that they are, by and large, active and provide on a regular basis a common meeting

ground for those associated with our hobby. An even more complicated structure exists with Divisions and Individual Clubs in each State and there appears to be a lack of identification between these two groups. As in many other areas of activity, lack of identity breeds indifference, and a major solution to the problems of the Institute is seen in a reconciliation between Divisions, Clubs and the National body. In general, the Clubs responding to the question on this topic agree with this view.

There is considerable criticism in some areas of Club liaison with the Divisions, but in general terms the work of the Federal office and its financial requirements is understood and has been accepted.

There is some fairly strong comment on the parochialism of the Divisions and it has even been suggested that for the Federal Executive to avoid such criticism, it should set up its office on "OSCAR 7".

The function of the National body is almost essential in this day and age to provide a co-ordinated service to all Members of the Institute. The production of a magazine is, of necessity, a National obligation and it is probable that much energy, time and interest of Members is dissipated in the production of minor journals sponsored by Clubs or groups of individuals. Over the past few years we have seen a number of such publications rise and wane, each being a product of a group of enthusiasts who eventually become disillusioned with the lack of support for their particular line of interest. If these energies, which are not spontaneous, but appear from time to time in various parts of the country, were to be channelled to the National publication, the Institute and its Members would be better served.

The theme of the major recommendation is therefore, one of co-ordination of a diverse range of WIA activities operating in Australia today. To achieve this goal requires a major re-organisation of the Institute. It would be of a revolutionary nature and on the surface may appear unpalatable to many traditionalists, but in due course it would provide a much stronger and more effective organisation. In particular, its strength would be enhanced to meet the ever-growing threat to the ultimate loss of its valued facilities.

This recommendation is that the National body should set up a study group to investigate the report on the legal, financial and practical ways of creating a single corporate entity which can speak for and co-ordinate the National activities of amateur radio.

In simple terms this would mean —

- Disbandment and liquidation of the corporate bodies known as the Divisions.
- The strengthening of the National body through direct membership of individuals. Individuals who are presently Members of a Divisional body will transfer their membership to a National body. Thus amateurs in Australia would be Members of the Wireless Institute of Australia and not of a State organisation.
- The transfer of affiliations (if existent) of Clubs from the Divisions to the National body to enable Clubs to have direct access to the Federal body.
- The creation of new Clubs to carry out the technical, training and social activities presently undertaken by the Divisional centres in the Capital Cities. These Clubs would then become — Perth Radio Club, Sydney Radio Club, etc.
- Introduce a scheme of regional representation to give individuals and Clubs direct representation at Federal Conferences, etc. The number of regional representatives would be determined —
  - (a) To give regional representation.
  - (b) To be proportionate to the membership.
  - (c) To give each State at least one representative.
- From the regional representatives appoint Directors of the Federal body and at the same time give some discretion to appoint additional Directors where deemed desirable.
- Review the function of the Federal office together with the probable continuance of a Federal executive responsible for the day-to-day administration of the Institute. With the change in function of the Federal office it may be desirable to appoint additional permanent staff rather than part-time employees to give adequate relief to

the Secretary/Manager when he is absent from his office and to assist with the expeditious handling of matters referred to the office.

The presentation of this recommendation has not been made lightly as it is realised that apart from the effect of personal feelings there are probably detailed and complicated legal and financial obstacles to be overcome. Not the least of these would be the disposal of the Divisional assets and the transfer or otherwise of these assets to the Members of the Division to whom they truly belong.

The implementation of such a scheme would bring long-term benefits to the membership. There is little doubt that the intimate style of the Club organisation is more attractive to membership than is the central City-type activity which struggles on in the metropolis of each State. In the two larger States, New South Wales and Victoria, the attendance at General Meetings is a very small fraction of the membership. As has been found in many other organisations, decentralisation within the metropolitan area of the State Capitals is the only really satisfactory way of enticing people to leave their homes to attend meetings and functions. Members are generally sensitive to the traumas of travelling relatively long distances to meetings; the creation of suburban Clubs overcomes this problem to a great extent. It also spreads the load of organisation and administration more widely among the membership and lightens the burden of office.

In this context the National organisation becomes the centroid of administration carrying out the functions of membership control, account presentation and collection, the preparation of publications or material for circulation, the co-ordination of specialist groups which exist at present, and above all, close liaison with those who administer the Wireless Telegraphy Act and therefore control the destiny of amateur radio.

The scheme proposed should also show some significant financial saving. On average, over 25% of the major subscription rate for 1976 is allocated for Divisional funds. This sum would be reduced significantly, a very small proportion of it being added to the National body's expenses to cater for the additional work required. At the same time a much closer relationship would be created between the central body and the Clubs but this could lead to higher costs particularly in the field of stationery, postage, etc. Nevertheless, the picture may be even more reasonable than would first appear. The co-operation and interest which could be developed between the National body and the Clubs would provide a firm basis for an increase in membership which, in turn, would increase the revenues of the organisation without significantly affecting the outgoings. Thus, Members would be better served in two ways —

- (a) by minimising membership dues, and
- (b) by more effective operation of the Institute's activities.

However, harmony is an unnatural state for a Federalist system and great care would have to be taken to ensure that a change such as that envisaged would not lead to even greater problems than exist at present.

## 3 THE FUNCTIONS AND OPERATION OF THE FEDERAL OFFICE

The Memorandum and Articles of Association of the Wireless Institute of Australia indicate that the Company was incorporated on the 17th January, 1972 and that the Members of the Institute are qualified corporations, i.e. Divisions representing radio amateurs in the Commonwealth of Australia. It is not proposed to summarise corporate documents but to mention that the Executive comprises a number of persons who have authority to act for the Institute. The Authorised Officer of the Institute is the Secretary/Manager, whose duties as stated in an advertisement for the post, are — "to act as a Secretary to the Federal Executive and to take responsibility for the administration of the organisation; to act as Manager of the organisation's publications".

The Secretary/Manager is a salaried officer and at this time is assisted by a typist clerk and a part-time assistant. An additional part-time assistant is responsible for obtaining advertising for "Amateur Radio". The total salaries are budgeted at \$23,500 in 1976.

Apart from Members of the Executive it is unlikely that Members of the Institute, including Federal Council Members, appreciate the diverse

operations which are carried out in the Federal office. As with many similar small organisations, it is an "Itsy bitzy" operation covering a wide range of duties, few of which in themselves require special skills but which in aggregate, require considerable devotion to duty. Because of this wide range of tasks the total operation is unquestionably hampered due to interruptions, telephone calls, personal callers and the general switching from task to task which is inevitable in an office of this nature.

It is not possible to conduct a detailed Organisation and Methods study of an operation of this kind. It would appear that the systems provided, particularly for membership records and finance, are of adequate sophistication, and therefore the balance of the work has to be conducted in a manner baffling an office with limited facilities.

Similarly, it is not possible to allocate with meaningful accuracy, the time spent by members of the staff on their various tasks. Suffice to say that the staff appear to have their priorities in the right order and appear to conduct their business in an efficient manner, bearing in mind the nature of the work.

Probably the most important segment of the work, at least so far as the membership is concerned, is the accurate maintenance of Members' records, their subscription accounts and the production of mailing labels for "Amateur Radio". If this procedure fails at any point of time or is not updated expeditiously, the individual Member is contacted immediately. The maintenance of this system which is based on EDP records, is an important facet in Member relations. It is presently conducted efficiently and must not be permitted to fall below the existing standard.

For most of the other operations of the office it is desirable that the staff should be fully familiar with amateur radio, as it is only a close understanding of the hobby that enables enquiries and correspondence to be dealt with sensibly and expeditiously.

It was surprising to find that no retired radio amateurs were employed part-time in the office. Such people could be invaluable if additional staff were required or replaced.

As previously mentioned, it was not considered a part of this investigation to undertake a detailed study of the day-to-day operations of the Federal office, but it would appear desirable to reinforce the staff with at least one permanent officer, preferably having an amateur radio background, who could deal with correspondence and provide a more comprehensive information service to Divisions, Clubs and Members.

Within the membership it is almost unanimously agreed that the location for the Federal office should be Victoria and that no move should be contemplated. This opinion is soundly based on the fact that legislative administrators have their office in Melbourne. It is essential that the National office of our organisation should be in close liaison with those who control our interests, and any move of the legislative office should be followed by a move of the Institute's Federal office.

Opinions on liaison and co-operation between the Divisions and the Federal office are varied. It is clearly recognised that the 1975 Federal Meeting did much to improve relations, but some Divisions are not satisfied with the situation obtaining at the present time. Criticism has been levelled at the lack of information emanating from the Federal office and the delays in receiving replies to correspondence. It has been suggested that the Federal office should adopt a more formal approach to its business, and this opinion is worthy of close investigation.

An improvement in staffing level would enable more rapid communication to take place and give the Federal office an opportunity to prepare material for circulation among the membership by mail, broadcast or through articles in "Amateur Radio".

#### 4 THE ROLE OF THE MEMBER

The majority of Members of the Institute are licensed amateurs. Associates not falling in this category are generally keen on amateur radio as a hobby and are invariably potential members. Unfortunately, only about 50% of licensed amateurs are Members of the Institute, and allowing for inactive licensees and a small number to whom the subscription is a critical factor, this proportion is disappointingly low.

Without question, those contacted during this study endorsed the necessity of a strong Institute which is able to speak for amateurs as a whole and preserve their rights and privileges.

Numerous reasons for amateurs not being affiliated have been put forward, the least common of which is the cost; the fact that the majority of amateurs are able to purchase quite sophisticated and expensive equipment, endorses this statement.

The most common view expressed is the inferred lack of activity by the Institute. However, it is unlikely that the non Member would have a complete working knowledge of the Institute's activities and in particular what it is doing to assist the Member in diverse ways. There will always be a percentage who are prepared to "free-wheel" and enjoy the benefits obtained by others who support the cause, but there still remains a hard core of licensed amateurs who are potential Members, and it is to these that the advantages of membership must be made known.

It is realised that numerous attempts have been made from time to time to attract these people to membership with minimal results, and it is believed that the only way in which these people can be forced to appreciate the work of the Institute is by some compulsorily-applied levy conditional on the issue of a licence. This may seem hard but it is not unreasonable that such activities as national and international representation could not be fully supported by this means. Imposition of levies is not unusual in Government finance, and the recently-announced fee for the Novice Licence has indicated that the legislature has a power to adjust licence fees from the standard prescribed for the full amateur.

All licensed amateurs are free to use the facilities provided by the Institute by ways of repeaters which are becoming numerous throughout the country and are generally fully utilised. No doubt such facilities are used by non Members. Probably it is feasible to place in the repeater system a brief message which could be transmitted from time to time pointing out that the repeater is a facility provided by the Institute which would welcome into membership those using the facility.

Many amateurs give considerable service to the Institute and to its affiliated activities but there is always a call for greater participation by the membership. By reducing the personnel engaged in the administration of the present Divisions, more Members would be available to participate in Club activities and allied spheres of interest. Such activities as WICEN come to mind as particularly worthy of support as this is an organisation devoted to service in times of emergency — a most valuable community service which is not widely publicised outside the amateur ranks.

In this report a number of suggestions have been made to improve the Institute's operations; it is hoped that at least some of these may entice amateurs to become Members and perhaps, more importantly, overcome obvious prejudices which have been built up over the years against the Institute and some individuals who have served it. Such personal antipathies and interstate jealousies have been frequently mentioned as major barriers to the smooth running of the Institute's affairs. These must be overcome in the interests of the amateur fraternity as a whole.

There has been some criticism on the make up of the Amateur Radio Call Book. It is appreciated that the Call Book is published in conjunction with the PMGs Department and has to contain the name of every licensed amateur in the country. Possibly the EDP system could be so programmed to have every licensee on its roll, a system which would readily facilitate a print out which could be readily transferred into a Call Book. At the same time each Member of the Institute could be asterisked, thus highlighting licensees who are not Members.

The retention of the present Member and the recruitment of potential Members is obviously the most important task of the Institute. Without membership the Institute is nothing, and true effectiveness can only be achieved when membership of the Institute comprises virtually 100% of the licensed amateurs in this country. Great emphasis must, therefore, be paid to the requirements of the individual Member either directly or through the affiliated organisations in which he is interested.

#### 5 COMMUNICATIONS

There have been varied criticism of the lack of communication within the Institute during past years. This is quite a remarkable fact bearing in mind that of all recreative organisations, the Institute has at its fingertips the most popular of communication media — the radio and television. It is probably not opportune to discuss television as a communication media at this time but no doubt its use in disseminating institute information will develop in the future. Each Division conducts news broadcasts which vary in content and interest. It is suggested that these broadcasts should be reinforced, particularly from the Federal level.

At the present time a modest amount of Federal information is conveyed through these broadcasts but more effective use of this facility could be made if reports of Federal Proceedings and activities were regularly (say monthly) taped and forwarded to each broadcast organisation, the cassettes being circulated if necessary and eventually returned for re-use. Generally speaking, broadcasts are only made on Sunday mornings and possibly repeated later that same day. Much wider coverage would be obtained if broadcasts were repeated during a week day and possibly at a time which would suit many of the shift workers who are unable to listen at the present prescribed times.

In addition to improving the efficiency of news dissemination through broadcasts, recourse should also be made to the regular circulation of newsletters from Federal source, perhaps initially on a quarterly basis, for dissemination by Divisions and Clubs at their regular meetings. By these two means the Federal office would become better known and its activities fully recognised by the membership and many interested persons who are potential Members.

The proposed scheme of Clubs being in direct contact with the Federal office would probably not affect broadcasts as these would still be undertaken by the Metropolitan Clubs or alternatively, a broader spectrum of operators obtained from sharing the activity with Suburban Clubs.

Many comments have been received on the lack of formal public relations conducted by the Institute. It is questionable whether these critics are fully familiar with the problems which face persons or organisations disseminating public information. By and large, the National media is not at all interested in routine events and will only publish information which is related to spectacular happenings, e.g. the Darwin disaster. It would be almost impossible for the Federal body to obtain mileage from the National press particularly as each State has its own newspapers and media outlets. The only reasonable means of getting some coverage via the press is for Clubs to disseminate information to suburban or regional papers which are generally hungry for news with local and personal content. There are numerous excellent examples of this type of publicity.

Public relations is an expensive and time-consuming exercise and unless professionally conducted, is generally unrewarding.

One of the interesting facets of life which has come out of the investigation is the attitude of the amateur himself to communications. Many comments in correspondence have indicated a lack of understanding of various functions of the Institute and yet these have been published from time to time in AR and in Victoria at least, repeated in WIA broadcasts. So many times one speaks to amateurs and hears the comment, "I do not have time to read AR or to listen to the broadcast", but yet these people will talk in monosyllables for an interminable period, wasting many hours, a few minutes of which could be devoted to an understanding for the Institute. Perhaps this is part of our way of life today and most certainly is a difficult problem to overcome.

Even during the time in which this investigation has been conducted, there has been a significant improvement in communications between the Federal body and the amateur. From time to time information has been submitted to the broadcast, and individual Members of Council have made a contribution. Concurrently, editorials and articles have been published in AR which have given much background information on the work of the Executive and in particular, reviewed in detail the top level activities of the Institute and its financial

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Number of Filter Crystals	5	8	8	8	8	4	8
Bandwidth (6dB down)	2.5 kHz	2.4 kHz	3.75 kHz	5.0 kHz	12.0 kHz	0.5 kHz	0.5 kHz
Passband Ripple	< 1 dB	< 2 dB	< 2 dB	< 2 dB	< 2 dB	< 1 dB	< 0.5 dB
Insertion Loss	< 3 dB	< 3.5 dB	< 3.5 dB	< 3.5 dB	< 3.0 dB	< 5 dB	< 6.5 dB
Input-Output	Z <sub>t</sub>	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination	C <sub>t</sub>	30 pF					
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	> 45 dB	> 100 dB	> 100 dB	> 100 dB	> 90 dB	> 90 dB	> 90 dB
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XD-9-03	12 kHz	-50 mV/kHz		\$24.10

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situation applicable to the year 1975. No doubt arrangements are in hand for a continuance of this informative material; it is essential that this be maintained as it will possibly take several years for it to be fully appreciated by the total membership.

To sum up this section — we have the ideal facilities for communication — use them to the fullest extent.

## 6 FINANCE

Correspondence seeking opinions on the financial position of the Institute has met with a strange response. In some cases it is believed that Members have been adequately informed, but others, even Divisions and Divisional officers complain that requests for financial information have not been met by the Federal office. Perusal of the pages of "Amateur Radio" in the latter part of 1975 indicate a comprehensive review has been given of the Institute's finances. A statement of income and expenditure together with the balance sheet for the 1974 year, has been presented in full and elsewhere readily understandable "pies" have been presented to give a break up of expenditure for both the Institute and "Amateur Radio" magazine.

There is little point in analysing income and expenditure in detail; suffice to say that 60% of income is expended in the production of AR and the Call Book. The cost of administration and special projects accounts for 30%, with meetings and conventions incurring the balance of expenditure.

With ever-increasing costs it is difficult to visualise any reasonable means of reducing expenditure except in relation to the publications, and thoughts on this subject are given under the appropriate heading.

Two areas of expenditure are worthy of closer investigation —

(a) As indicated elsewhere, there is an overwhelming awareness of the need for the Institute to firstly maintain a good relationship with the legislative controllers in Australia, and more particularly, to ensure that adequate representations are made to preserve the existing international facilities enjoyed by radio amateurs. Only 2.8% of expenditure is directed to these two areas and it may well be desirable to increase such representation and expenditure to ensure that the facilities enjoyed by radio amateurs in Australia are not prejudiced.

(b) The second item is the expenditure on "Mag Pubs" which is quoted as 4.1%. Due to the varied nature of administering Mag Pubs it is questionable whether this allocation is accurate and whether the comparable income truly reflects the result of this marketing activity. This subject is commented on elsewhere.

Generally speaking, there would appear to be little opportunity to reduce expenditure at the Federal level except as indicated above and the only reasonable means of reducing Members' contributions is to co-ordinate activities outside the Federal body, i.e. in the Divisions and Clubs. Each Division has its own fee to support its work and the many Members of the Institute who are Members of the affiliated Clubs also pay for the privilege of being in those Clubs, either by direct subscription or by contributions to the many fund-raising efforts conducted by the Clubs. A streamlining of the overall administration by the elimination of one of these cost centres would seem logical and is recommended. Except as indicated, the membership should be satisfied with the way the finances of the Federal body are handled. With AR requiring such a large proportion of the income it is hardly feasible to effect any significant savings; this can only be achieved elsewhere in the organisation.

## 7 TRADING

There have been a number of suggestions that the Institute should enter the field of general trading, both in magazines and similar publications and in materials and equipment for the use of members.

At the present time Mag Pubs is the only venture of this nature and it is probably one of the most difficult ones to handle. Members have been unduly critical of the efficiency of handling Mag Pubs business and it is obviously not realised how much work is necessary to provide this service. In order to obtain appropriate discounts to justify this work, orders for publications have to be collated and then

relayed to the publisher in an overseas country. Not only does the collation take time particularly when waiting for sufficient orders to be received but postal delays between overseas countries are becoming increasingly longer and therefore delivery times become protracted.

Whilst an effort has been made to faithfully record the time and money spent in this operation it is one of many facets and it is difficult to allocate with great accuracy. It is therefore suspected that the cost of operating Mag Pubs is not commensurate with the modest return obtained. It should either be dropped or handed to a voluntary organisation outside Victoria to administer. This, of course, could be done on behalf of the Executive and is at least one small part of the activities which could be decentralised from Melbourne.

Members would not be unduly prejudiced if Mag Pubs disappeared. Lists of overseas publications could be printed in AR from time to time and the Member directed to order straight from the publisher or through a local book seller.

The advocates of trading in equipment and components are probably unaware of the financial implications involved in such operations particularly where paid staff is required to manage an enterprise without the productivity reward normally associated with the one-man business or small partnership.

The last few years has seen an enormous change in the philosophies of the radio amateur towards equipment. A relatively short time ago the amateur owning commercially-manufactured equipment was almost unknown, most amateurs being satisfied to pursue traditional "home brew" activities, getting both satisfaction from manufacturing and understanding the functions of radio as well as the joys of operating. Today, the incidence of "home brew" on any frequencies under 70 cm is a rarity and a large turnover of commercially-manufactured equipment has been experienced by the small number of component distributors active in Australia.

In this study it has not been possible to ascertain this National turnover nor estimate the capital involved in running these businesses. It must, however, run into several hundred thousand dollars. If the Institute is to enter this field it must consider a number of salient points:—

- The total market for amateur equipment.
- The percentage of this market which could be obtained.
- The dealerships available for imported equipment.
- The amount of capital required to conduct a business.
- The source of funds to operate the business.
- The expenses incurred in running a business, including salaries, interest, premises, general overheads and guarantee funds, particularly bearing in mind the trend to consumerism.
- Discounting policies.
- The reaction of present advertisers in "Amateur Radio" and their contribution to the publication of this journal.

Such matters require the formation of a competent committee of persons, conversant with business and commerce who would be capable of making an accurate economic study of such a proposition. If such a business venture is contemplated it is recommended that no action be taken without such a study.

## 8 PUBLICATIONS

The WIA is only concerned with the production of two publications for general circulation. These are the monthly magazine "Amateur Radio" and the Amateur Radio Call Book, published from time to time. From all the discussions and comments directed to the newsworthiness and general format of "Amateur Radio" there has been little criticism, and a number of complimentary remarks have been received on the improvements which have been made during the last 12 months. Members consider that news bulletins from the Federal office and memoranda on the work of the Federal Executive is essential although these requests would appear to have been adequately covered in editions published in the latter part of 1975.

There is a common plea for more regional news and a continuance of Divisional or regional bulletins which serve to keep the membership in touch with colleagues in the same geographic region. It is obvious however, that those seeking more local

content do not realise that this cannot be manufactured by the editorial staff and it must be clearly pointed out to those who desire this material that it must be fed to the Editor from the Club or region concerned.

There is some move to suggest making "Amateur Radio" available to non Members as a means of promoting membership and perhaps improving the magazine's finances. There has been discussion on this matter in the past and it is presumed the current policy has been well thought out and is under continuous review.

The cost of producing "Amateur Radio" with its attendant distribution charges are cause for concern as they will, at least in the foreseeable future, continue to increase at a rapid rate together with other general costs of the Institute. Some of these extra costs can be offset by additional advertising revenue, but it has to be borne in mind that continually increasing advertising charges may inhibit the use of the magazine by trade houses. Three means of overcoming the foreseeable cost problem may be worthy of consideration —

1. Provide more attractive supplements to AR which give local or regional news, and at the same time persuade the publishers of subsidiary magazines such as those published by Clubs to forego their activity and channel their material through AR. This may be a means of improving the circulation of AR and possibly attract additional membership to the Institute. Wider circulation would make the magazine more lucrative to advertisers and thus improve the supporting revenue.
2. A closer association with the radio Clubs may make it feasible to distribute a portion of the circulation of the magazine in bulk, i.e. distribution at Club meetings, provided these were scheduled early in the month to coincide with the magazine publication dates. It would be worthwhile investigating this as a partial method of distribution and the savings which may emanate therefrom.
3. From observations of the technical press it would appear that magazines covering a broad spectrum of radio and electronics have limited viability as they have been obliged to digress into the more popular areas of hi-fi and general electronics. It may be possible to make an arrangement with a magazine publisher whereby AR could be incorporated in a magazine, particularly one which is carrying limited WIA and Club information in its normal content. Certainly the radio amateur would lose a magazine devoted entirely to his interest but on the other hand the costs of production would be lower, circulation would be vastly increased and this would open a new field of potential membership. Expensive distribution costs would also be overcome. A Member of the Institute could possibly receive a concessional rate for his copy of the magazine but this should not be subsidised in any way from the Member's subscription to the Institute. By adopting this suggestion the Member's subscription would be substantially reduced and the Member would feel he was getting more for his money — an often repeated requirement of membership — or at least receive his present services at lower cost.

It is presumably the Institute's objective to publish the Amateur Radio Call Book on an annual basis but in recent years this has not been achieved due to the magnitude of the task. A brief reference to the Call Book has been made in the Membership segment indicating that it may be possible to set up an EDP system which has the name and address of every licence holder available for print out. Members of the Institute would be suitably annotated.

A more detailed investigation into the production of the Call Book would be an interesting venture for a group conversant with EDP, and it is suggested that a Call Book could be formed from reproduced copies of the computer print out issued to the membership in loose-leaf form. By this means, the Call Book could be regularly updated on say, a Call Sign area basis which, allowing for the smaller Call areas, would probably permit a complete revision every 12 or 18 months. The other written material together with advertising contained in the present Call Book, could be produced in similar format but only issued at much longer intervals unless a sponsor required his advertising to be updated.

## 9 NATIONAL AND INTERNATIONAL RELATIONSHIPS

It would appear that the Institute, mainly through the efforts of the Federal body and Divisions, is held in high esteem by those responsible for administering legislation in Australia.

It is unusual to find an amateur organisation controlled by legislation, and even more difficult for the entrepreneur amateur to accept restrictions on his activities. However, this has been achieved over many years and a state of co-operation and mutual trust exists between the parties. It is worthy of consideration to seek closer bonds with legislative offices, not only to present the Institute's viewpoint to the legislature but possibly to assist in increasing the membership of the Institute which is financing liaison activities.

By introducing a novice radio licence at a modest fee it has been demonstrated that licence financing is not necessarily tied to similar licences issued to commercial bodies, and it may be possible to incorporate in the licence fee some small increment of money which could be passed back to the Institute in order to finance national and international representation. In return for this conces-

sion the Institute could offer a number of services to the legislature particularly in the field of policing regulations concerning the issue of licences and the control of unauthorised radio activities. Examples of such co-operation are seen in Japan where the amateur authority acts as a regulatory body in surveying and registering amateur equipment and it is in this similar area that amateurs, authorised through the Institute, could make a contribution towards more rigorous control of radio Communications in the non commercial field. The WIA could also consider acting as a collecting agency for licence fees.

The past few years have seen significant advances in the development of international representation by the creation of a Region 3 Committee on which the Institute is represented. Most amateur bodies recognise the absolute need for this representation because without it the amateur may suffer loss of privileges. In this atmosphere he is entitled to even greater representation to ensure that amateurs' rights are preserved at the next international radio conference, thus strengthening the case for the continuation and perhaps extension of the present amateur facilities.

International representation is expensive and again, it may be possible to obtain via the licence fee, a grant towards expenses so incurred. Alternatively, representations could be made in Government circles for a representative of the WIA to be accredited by the Government and subsidised when attending conferences which are complementary to international meetings which will be attended by an official Australian delegation.

## 10 CONCLUSION

Although a number of practical considerations have been outlined in this report it has been realised that during the period of this study, the Federal Executive has made a competent appraisal of the problems within the Institute and has done much to improve its information service to the membership. If some of the matters mentioned have already been considered it is due to Federal Executive taking appropriate action, and in this regard the Executive should be congratulated and not criticised by the membership. It is hoped that other proposals may be worthy of further consideration. ■

# COMMERCIAL KINKS

Ron Fisher, VK3OM

3 Fairlaw Ave.,  
Glen Waverley, 3150

After a short recess, Commercial Kinks is back in action. I find that summer activities keep me rather busy so amateur radio has had to take second place.

It is quite a while since a popular communications receiver was covered in this column. Our discussion of the Trio 9R59 series continued over several issues and created quite a deal of interest. Over the last year or two, the Realistic DX 150/160 series has undoubtedly become the biggest selling low priced communications receiver on the Australian market.

Firstly we will take a look at the various models and see how they differ. It is also interesting to note that contrary to normal trends the price of these receivers has dropped since they were first introduced. The present retail price is \$179.95. Looking back through the advertisements in this magazine, it appears that the original DX 150 was introduced about October 1969 at a price of \$229.50. The appearance of the original DX 150 and the latest DX 160 is identical and the features of the sets are basically unchanged. However, the circuit and the frequency coverage have changed.

All models have a full transistor circuit with built in AC power supply plus provision to operate from a 12 volt DC source. Single conversion with a 455 kHz IF is employed with two transistors in a cascade RF stage feeding the mixer. A product detector, fast and slow AGC, and a noise limiter are provided along with calibrated band spread for all amateur bands from 80 to 10 metres.

Now for the circuit differences. The original DX 150 used all bipolar transistors in its design. The DX 150a used FETs in the RF, oscillator and mixer stages and also incorporated a ceramic filter in the IF stage to improve skirt selectivity. It also included a built-in speaker. The outcome

of all this was an improvement in strong signal handling and better AGC action.

The DX 150b was essentially the same, but an external speaker, the SP 150, was supplied in place of the previous built-in unit.

The DX 160 differed in two main points. First it included one extra band covering from 150 kHz to 400 kHz. This enables reception of aircraft beacons and airport control towers. The main circuit difference is the inclusion of a single IC in place of the four transistors previously used in the audio driver and output stages. An FET has also been substituted for the bipolar transistor BFO and the buffer stage employed in the earlier models has been eliminated.

Now for a few hints on using these sets and also a few simple modifications.

In general all of these receivers work best on a short antenna. Although the later models with FET front ends had improved strong signal capability they could still produce severe cross modulation if a long antenna was connected. I have found that about 6 metres of wire is quite enough, or if you wish to use a "long" wire then a 3/30 pf trimmer in series with the lead-in right at the antenna terminal should be employed to reduce the effect on the lower frequencies where the cross modulation is more pronounced due to strong broadcast stations.

The second problem common with all models is the extreme sensitivity of the S meter. It will read S9 plus on signals that should only be S1. In fact when tuning across the various bands the meter seldom drops below full scale. The solution. Put in an S meter sensitivity control. A small 10 Kohm pre-set potentiometer of the type used on printed circuit boards is used. Remove one of the wires from the back of the S meter. It does not matter which one. Solder the two fixed contact lugs of the potentiometer, one to each of the meter terminals. Now solder the wire that was previously removed from the meter to the lug of the potentiometer connected to the moving arm. Tune the receiver to a strong broadcast station and set the pot so that the meter reads full scale.

The third problem occurs only with the DX 160.

It appears that the audio IC has too much gain which produces a very high residual noise level. This is most annoying when trying to listen at low audio levels on the speaker or when using headphones. Although there may be other methods, the one I have found effective is to increase the inverse feedback and so reduce the overall gain of the device. This modification incidentally has no adverse effect on the maximum audio output or on the amount of useable gain of the receiver.

Locate resistor R53, a 4.7 Kohm, on the printed circuit board near the left hand rear corner of the set. Now invert the set and solder a 470 ohm 1/4 watt resistor across R53 on the under side of the board. This should reduce the noise to a very low level.

If you are on the look out for more information on these sets, I suggest you refer to QST for March 1968 for a review on the DX 150 and to QST for September 1970 for a review of the DX 150A. ■

## QSP

### THE YAGI BEAM

T.T. by G3VA in Radio Communication for May '76 mentions an important event almost completely ignored by the media — the passing at the age of 89 of Hidetsugu Yagi one of the great pioneers of aerials and microwave communications. G3VA tells us that Yagi's original work was carried out from about 1919 to 1927 but the results of his work did not appear for another 20 years or so.

### 1975 J.O.T.A.

In his report on the 18th J.O.T.A. in October '75 the National Organiser, Noel Lynch VK4ZNI mentions that a group of 16 Queensland Rovers and Scouters touring Europe after the July Jamboree in Norway had called at the World Bureau Station and spent all day Saturday and all day Sunday trying to get a VK contact. A number of VK stations were heard on the Saturday morning at good signal strengths but no contacts could be made because the stations were engaged in long QSOs and no breaks were made for Dx stations. No VKs or ZLs were heard subsequently at all. The comment was made that it was very frustrating to have an opening through to Australia for 30 minutes or more during that period of poor propagation conditions without being able to break in for even a short contact. In his report VK4ZNI showed from statistics that 333 VK amateur stations were involved (slightly fewer probably than in the previous year) but the total contacts were well up. ■

# A LINEAR POWER AMPLIFIER FOR AUSTRALIAN CONDITIONS

## PART ONE

R. A. J. REYNOLDS, VK3AAR

Home brewing is becoming a lost art amongst the majority of Amateurs. This is not at all surprising, as the benefits of mass production have been extended to the area of Amateur Equipment, and the cost benefits of home brewing have been considerably eroded. However, modern commercial considerations have robbed the Amateur of the component supplies that he would like to home brew; recent developments at the Commercial level have yielded particular components that would greatly improve a home brew but are simply not available, and Commercial construction methods produce an article which is compact, attractive, and generally effective in operations.

There is little to encourage the Amateur to construct his own 160 through 10 Transceiver, or 2 metre SSB Kiddie phone. However there are many areas of Amateur endeavour that still inspire home brewing. The novel, the simple, the unavailable, and the financially unattractive items for example have many Amateurs reaching for the screwdriver and soldering iron.

How often do we hear the expression, "Yaassu FT101B through a home brew linear to a TH3 beam at 12 metres?" It would appear that more Amateurs turn their hand to building linears than any other major item.

### THEORETICAL ASPECTS

The linear is a single stage device involving only a couple of dozen components, there are no critical adjustments, and there are considerable financial gains to be obtained, particularly if there is a junk box and a local surplus store that may be referred to for normally pricey items.

Over the years plenty of designs and construction descriptions have appeared for linear amplifiers for SSB service for varying numbers of bands and varying parts of the RF Spectrum. Probably the most popular linear configuration is the 80 through 10 grounded grid amplifier. But that is where the similarity ends. Depending on the design criteria there is a wild assortment of tube types, power supplies, efficiency targets, drive arrangements, to say nothing of size and shape.

It is an Engineering Fact that, given a set of design parameters, a number of designers will come up with the same number of different designs, controlled by their personal likes and dislikes. Hence the variations that we see in the published designs of linears. Thus, one designer's use of sweep tubes may be controlled by the desire to keep voltages low, whilst another's choice of tube may be controlled by a requirement of maximum circuit efficiency. However, the basic design steps are the same, once the overall requirements are stated.

Most linear amplifiers in the 10 to 80 metre configuration that are built in this country are based on the general designs that have been so regularly published in the USA. They fall into categories controlled by the type of tube used, and the power rating. The tube types are the sweep tube, usually 4 tubes in parallel, of the type designed for the horizontal sweep output stage of television sets: the Transmitting tube type where tubes were actually designed for good linearity in SSB ampli-

fier service, and the "available tube" type, where the tubes chosen are available at low cost from surplus sources. Most designs are around the 1 kW or 2 kW PEP input target and attempt to extract the highest efficiency, even at the expense of linearity in some cases.

Under the regulations in force in this country, the design parameters are somewhat different. Our rules say — *A3A or A3J emission, the peak envelope power of the Radio Frequency output, measured at the input to the antenna transmission line, shall not exceed 400 watts* — The rules then go on to define that the measurement method shall be by doubling the power measured when a two tone output is run into a matching resistive load under maximum linear transmitter output conditions. No reference to maximum input power, no reference to tube power capability, no reference to degree of linearity, no reference to average RF power output under speech conditions and no reference to effective radiated power from the Antenna.

A general result of this is that we are permitted to use as much power as we like to produce a clean 400 PEP output. There are two significant design parameters that result from this state of matters.

1. There is no necessity to specify a high efficiency, and hence high cost output tuning unit.
2. The grounded grid amplifier, which transfers some of the input driving power to the output, giving a higher overall output for a given DC input power to the anodes, loses some of its attraction.

With a couple of assumptions, we are now in a position to write down all of the requirements of a linear amplifier for 80 through 10 metres for SSB service under the rules in force in Australia, assuming that we wish to obtain the legal limit. The

biggest assumption that will be made is that most operators wish to use an exciter of the Collins KWM2 type, the unit that has inspired so many manufacturers in the 20 or so years since its first release. A second assumption will be that a nominally 50 to 70 ohm resistive output feed is required. Operators who wish to run open line will more than likely be considering an out-board ATU and may, within the rules, measure their power at the open wire line in any case. So, while we may consider variations to the fine details, the following is the general specification for a linear amplifier as outlined above.

*Frequency coverage:* 3.5 to 29.7 MHz covering at least the Amateur bands within the spectrum.

*Excitation Power:* Up to 100 watts PEP.

*Output Power:* 400 watts PEP in each of the Amateur Bands, as measured by the approved method.

*Input impedance:* 25 to 100 ohms resistive and within 2:1 SWR against 50 ohms if reactive.

*Output impedance:* As for the input.

*Intermodulation products:* As low as possible, say —30 dB.

*Power Supply:* 240 Volts  $\pm$  10% 50 Hz Single phase.

*Complexity:* The design to be kept as simple as possible.

*Service of operation:* Single Side Band, with or without RF speech processing.

*Cost:* To be kept low, but not at the expense of good design, convenience, or safety.

And before we go any further, *safety*. This subject has been mentioned many times in the discussion of linear amplifiers of this kind, but another mention is not out of place. The type of amplifier that we will be discussing will require a power supply at a potential of 1000 to 4000 volts with a steady state output current of amperes for a few seconds. Personal contact with the output of such a supply is almost certain to be lethal. You might be lucky and live through such an experience, but whilst I have heard of deaths from exposure to linear supplies in this voltage area, I have not heard of one survival. Higher voltages have been known to throw victims clear, usually with burns and physical injury, and a good many of us have been unfortunate enough to get across 600 volts or so, yet this class of potential that we will be considering is very final, and we will be considering more than care; we will be considering special precautions to avoid the possibility of contact with the high tension. QSOs might be possible with operators in an after life, but QSLs are impossible.



The tube is useable to 200 MHz, the anode self capacity is low enough not to cause serious problems, it is compact, and under grounded grid, grounded screen, and zero bias, two tubes draw about 10 mA each to operate well in Class B, and deliver the required power over the 80-10 metre bands.

A feature of this tube is that the filament dissipation is a mere 32 watts per tube, and it is not necessary to force cool the filament pin seals as it is in all the larger tubes. However you would not normally go out to buy a pair of these tubes, as a single 4-250A or 4-400A, whilst it needs force cooling, is about the same price as a single QB3/300, or 4-125A for that matter. Both the QB3/300 and the 4-125A have appeared in small quantities from surplus sources in this country. As another hint, considerable quantities of these tubes are used in both broadcasting and television service.

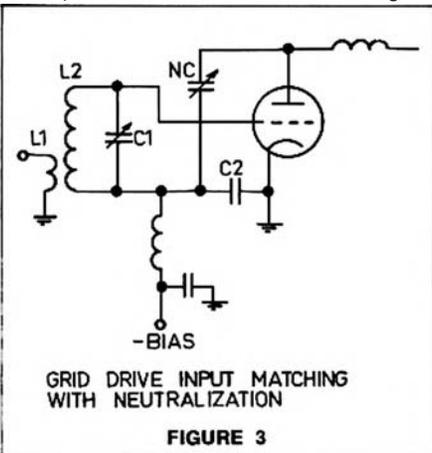
Manufacturers and technical writers often give the intermodulation performance of individual tubes as a measure of their linearity. These figures are of great importance in the design of TV power amplifiers and their use in audio SSB service will indicate the stage linearity at the stated drive and power levels. In general, tubes under hard drive conditions will have poorer linearity than the same tubes treated a little more gently. A 6146 driven hard at a high plate voltage will give an intermod figure of -19 dB whilst at a moderate plate voltage, and of course lower power output, will give a figure of -23 dB or so.

Tubes designed for linear service tend to demonstrate low figures also. Consider the 6146B (YL1370) under the hard driven high output case above: whereas the 'class C' 6146 gave -19 dB, the 'linear' 6146B will give the considerably improved figure of about -26 dB. Tubes primarily developed for linear service, rather than a modification as in the case of the 6146B, may demonstrate intermod figures better than -30 dB. In general, the more negative this number, the better.

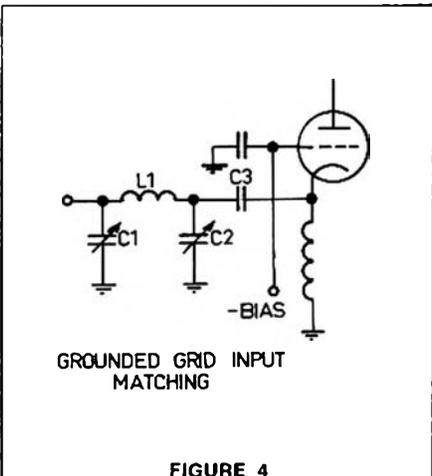
At this stage we are beginning to get an idea of what the linear is going to need in the way of power, roughly what size it is going to be, and approximately, how the unit is going to perform. But as yet, we do not know what the circuit is going to be, although we may well have an accurate guess, what the required drive power will be, or what the component sizes will be. Unfortunately, it will not be possible in these pages to cover every possibility of design. Most designs will be controlled by what components are available from the junk box, or what can be obtained from a friend who knows a friend. So what will follow now will be rather a generalisation quoting particular examples where appropriate.

There are two basic circuits that we might use, the driven grid, Fig. 1, or the more popular driven cathode, or grounded grid Fig. 2. Each of these circuits has its advantages. In the case of Fig. 1 the required drive power is very low, but the

matching circuit must be switched for each band and neutralisation must be provided in the majority of cases. Fig. 2 requires a higher driving power, most of which appears in the output, but does not require neutralisation when well designed, and the matching unit is less critical than the matching unit of Fig. 1. In USA, where the input power to the anode is controlled by regulation, it is an advantage to have the drive power transfer of the circuit of Fig. 2.



First things first, we shall consider the input matching circuit. One of our technical specifications was that the input impedance should be around 2:1 against 50 ohms, that is 25 to 100 ohms if purely resistive. Unfortunately, the tube inputs are rarely within this range and an impedance matching network is required. Fig. 3 shows a typical circuit for a driven grid amplifier with neutralisation. The circuit L2 and C1 are resonant at the operating frequency, the impedance ratio being controlled by the square of the turns ratio L2 to L1. Neutralisation is accomplished in the usual manner by means of the feedback divider NC and C2. The circuit is complicated and from the home brew point of view represents work that we would prefer to do without. On the other hand, if you wish to drive the legal limit from an Argonaut or similar exciter, you will need this configuration to obtain the sensitivity required. Individual networks would be required for each band, but with any luck, it



may not be necessary to retune the drive circuit within a band. A linear built for monoband use would not need switching, and this circuit is not unattractive. The impedance ratio required for this circuit is quite high as most grid circuits operating in class AB or B have impedances in the thousands of ohms area.

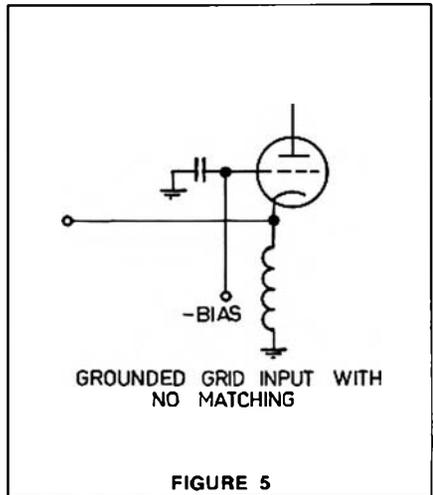
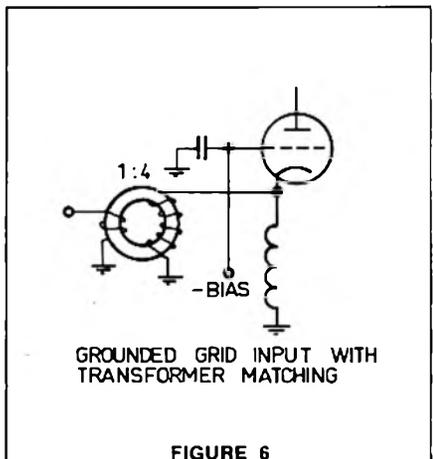


Fig. 2 shows a typical Pi coupler input circuit for a grounded grid amplifier. The impedance looking into the cathode of such a circuit will be up to 500 ohms for some smaller tubes and down to about 100 ohms for the largest tubes that we are likely to use. The general design of Pi couplers will be covered in the section concerned with the output of the amplifier. Again, switching will be required for each band. In this circuit C3 is a DC blocking condenser and as there may be a blocking condenser in the exciter, C3 may in some conditions be omitted. If this is done and directly heated filaments are used, make sure that the input is hard connected to the earthy side of the filament circuit. For centre earthed filament circuits, we have little option but to incorporate C3. The reason for this precaution is to save the filament choke in the event of an accidental short on the input circuit. If we use tubes like the 4-1000A, the input impedance will be about 100 ohms, no additional matching will be required, and the circuit of Fig. 5 may be used with, of course, the



## HF TRANSCEIVERS

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QM70 Linear Amplifier for 2 metres. Approx. 10 watts in gives 50 watts rms output. Voltage requirements 13.8V dc. Price \$105. QM70 70 cm Linear runs a max of 40w RF output using a 2C39A tube. Requires 300V-1000V HT plus 5V ac. Price \$70.

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## COMPONENTS

Our Melbourne store now sells a wide range of components for the keen home brewer. A large stock of bargain resistors, capacitors, ICs, transistors and pcb kits together with plugs and cables especially selected for the amateur are now available.

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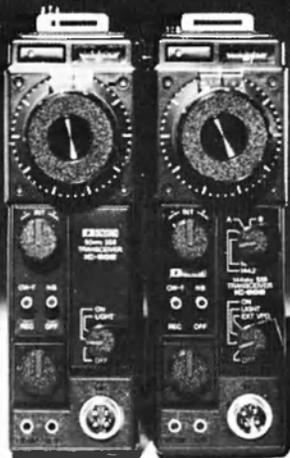
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# ICOM . . . . . where quality counts!



IC502 IC202

OFFER CONTINUES. Each month (until June 1976). VICOM will refund the purchase price of a quality IC202 or IC502 transceiver to one lucky customer who has purchased one of these rigs during the month!

IC202 - 2 metre portable - \$210.

SSB/CW 3 watts with VXO operation. Provision for external antenna and power supply.

Comes complete with mic, carry-strap and dry cells together with -

- \* English manual ✓
- \* 12 month warranty ✓
- \* Factory backed spare parts. ✓



IC502 - 6 metre portable - \$219.

Covers 52-54 MHz this fabulous portable runs both SSB and CW at 3 watts. Includes noise blanker, RIT control, UFO control and provision for external antenna and power. Comes complete with mic, carry-strap dry cells and of course, the VICOM 12 months warranty.

## ACCESSORIES FOR THE PORTABLES

IC20L Linear Amp for 2m - 3 wats in/10 watts out. SSB/CW. Plugs into IC3PS power supply - \$35.

IC50L Linear Amp for 6m - 3 watts in/10 watts out. SSB/CW. Plugs into IC3PS power supply - \$85.

IC3PS The matching power supply for the IC202/502 - \$75.

The superb IC22A is Australia's biggest 2m fm seller. Perhaps it's due to the solid-state T/R relay, P.A. protection, 5 helical resonators and the proven trouble-free performance. Then again, the great intermod attenuation in the receiver front end together with excellent sensitivity (4 microvolts for 20dB quieting) must have won a lot of hearts! Maybe the VICOM pre-delivery checkout, the after sales service and the factory-supplied spare parts has helped. Certainly strict quality control including rigid environmental tests on all rigs has enhanced the IC22A's reliability and its success in the World Amateur Market. Why not take part in this success story? All rigs come complete with mic, brackets, cables, English manual, 6 channels from the Bandplan and the VICOM 12 month warranty. Price \$219 including sales tax.



IC22A



The DV21 PLL Digital VFO is a unique synthesiser to complete your ICOM 2m station (it can be interfaced with other rigs too!). Runs from either 13.8VDC or 240VAC and can scan either empty frequencies or those being used. In addition, two programmable memories for favourite channels can be selected. This sophisticated device incorporates 53 ICs. 34 transistors, 37 diodes and 1 FET and covers the 146-148 MHz in 5 or 10 KHz steps. The DV21 plugs straight into the IC21A or with a simple mod into the accessory socket on the IC22A. The price of \$285 includes 90 day warranty, English manual and spares support.

## IC215 2m fm 3 watt portable

Coming off the ICOM production line towards the end of this month is the brand-new IC215 fm portable. Identical in size and appearance to the popular IC202/502 portables the rig runs 3 watts output and has all the successful features incorporated in the receiver of the IC22A (xtals are interchangeable, too!). The price will be \$160 including 6 channels, mic, carry-strap, dry cells and 12 month warranty.

This just-released device will cause a revolution to traditional cw operation. Simply talk into the mic, set the controls and out comes perfect CW at the speed of your choice! CW in any three languages can be selected at the flick of a switch (the Japanese, English and Spanish) and the IZBOX has been designed to handle the most complex of Australian lingo. This April 1st special sells for a mere \$21,620.



IZBOX



Introducing the new Trio-Kenwood TS700A 2m transceiver. It covers SSB/FM/AM/CW over 144-148 MHz. Introductory offer of \$595 includes mic, English manual, plugs, cables and 90 day warranty.

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### ANTENNA ACCESSORIES

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LA210W

precaution regarding a DC blocking condenser. It may be that we would like to avoid this matching unit altogether. Certainly there are some exciters that will match into more than 100 ohms, and some home brewers will waive the 100 ohm input requirement.

There are two special circuits which are worth a mention. Fig. 6 shows the use of a 1:4 transformer wound on a toroid for use in a grounded grid amplifier. About a 2.5 cm toroid with 8 turns primary and 16 turns secondary 18-20 SWG interwound should be suitable. This would cover 80 through to 10 and would not require switching, and would put the input impedance within the range specified in our general requirements.

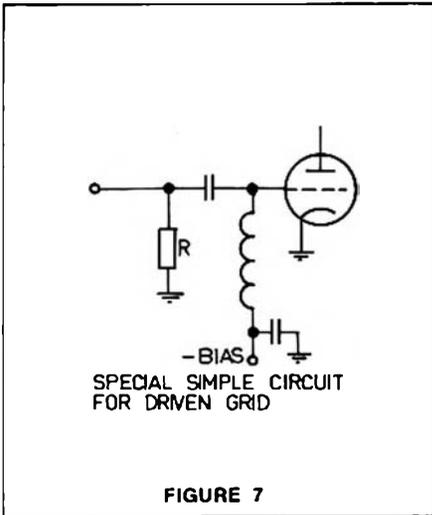


FIGURE 7

The other special circuit is that shown in Fig 7, where a resistor R is placed in the grid circuit. Remembering that the grid impedance is high, R may be made about 70 to 100 ohms. It needs to be a low inductance resistor at the highest frequency used, and large enough to dissipate the power generated in the exciter.

The principle here is that the exciter develops a RF voltage across the resistor sufficient to drive the tube. The power required from the exciter will be similar to that required were the same tube driven in grounded grid, but this circuit has the advantage that the input impedance is well controlled and tuning can be accomplished easily. For instance, the exciter can be tuned into the linear without the power being applied to the linear. The load resistance R will need to be a non-inductive 20 to 50 watt resistor. Such a unit may be the usual combination of a dozen or so 2 watt carbon resistors soldered between two brass discs, the whole lot sitting in a bath of oil.

Reverting for a moment to the circuit of Fig 3, there will be cases where the neutralising capacitor NC may be omitted. This will be the case if a tube designed for VHF or UHF operation is used at lower frequencies. Tubes like the 4CX250 have very good input to output isolation and neutralisation is generally not necessary.

(To be continued)

# THE 11 AND 10 METRE BANDS THROUGH THE BOTTOM OF THE SOLAR CYCLE

Sam Voron VK2BVS  
2 Griffith Ave., East Roseville, 2069

**With the ITU 1979 examination of all amateur bands and their utilization here are details of some efforts being made to more fully utilize our 11 and 10 metre band allocations.**

## THE 28.5 MHz LOCAL 10 METRE NET

Several stations around Australia and New Zealand are now continually monitoring this frequency. The idea being when you are in your shack to keep your receiver on this frequency. The objective is to develop this frequency as a local communications net and (if busy) as a calling frequency. (28.550 and 28.600 MHz being secondary channels). The main reason for not choosing 28.8 MHz as primary is that during International DX openings this channel would be unusable for local workings: however, 28.5 MHz being on the edge of the 10 metre DX tunable range offers a relatively clear frequency while still allowing DX stations to tune into and join the net.

By encouraging the formation of local nets in Australia, New Zealand and New Guinea we can hope to maintain a high level of activity on 10 metres throughout the year.

In previous years the difficulty on 10 metres has been that operators normally tuned across the band, heard nothing and so went back to the lower frequencies. However with the formation of a local net in Sydney on 28.5 MHz, many were alerted to a recent opening into Europe on the 2/11/75 from 7 to 10 p.m. when DK5MY in Munich was worked with only 80 watts and a quarter wave 27 MHz ground plane, on the 24/11/75 from 3.30 a.m. till 5 a.m. into Northern America, and on 28/11/75 a Sporadic E opening permitted contacts with Hawaiian stations using 20 watts output with KH6IJZ being worked for 25 minutes from 5 p.m.

These show that the bottom of the sunspot cycle can be an exciting period on 10m. Openings to the Americas and Europe will occur especially at the commencement and break-up of geomagnetic disturbances (as warned on WIA/IPS broadcasts). Interstate contacts will be regular and strong for nearly 3 months every summer and mid-winter as is the case with 6 metre Sporadic E propagation. Sporadic E, backscatter, and tropospheric modes will also be little affected by the sunspot cycle.

These types of propagation are being observed simply because the existence of local nets serves to foster continuous use of the band. So why not activate a local 10 metre net in your area? By encouraging mobile, portable and base station monitoring of 28.5 MHz, together with a weekly

submission of 10 metre local and DX news to the WIA Divisions for broadcast, you will soon find you have developed an active net in your area. Continuous local activity of our upper HF spectrum seems the first step in increasing our utilisation of our single biggest High Frequency assignment.

This has worked very well on the 160, 11 and 10 metre Sydney nets to such an extent that the two former nets now have a WIA broadcast twice each Sunday and consideration is being given to a 10 metre coverage.

## THE 27.125 MHz ALL MODE LOCAL 11 METRE CALLING CHANNEL

More than 1000 persons applied to sit for the first Amateur Novice exam in early 1976. This means that the high level of local activity on the 11 metre band will require stations to shift to another channel as soon as communications has been established. Also, because the Novice will be crystal locked, amateurs using tunable equipment should be aware of certain procedures which will help him contact our new Novices.

(1) As there are 22 standardised channels in this band, the typical procedure is to establish contact on the calling frequency (channel 14) and then on phone or CW, arrange to QSY to a clear frequency.

(2) Amateurs using tunable equipment and listening for a reply to their CQ call should remember that the Novice is crystal locked. He or she cannot come onto your frequency and so you should tune  $\pm 3$  kHz either side of your frequency if you are calling on a net or alternatively tune the whole band for a reply to your call. Remember also to initiate your call on one of the standardised 22 channels as these are the crystals Novices will find most easy to obtain. The 22 channels are:

- |               |                |
|---------------|----------------|
| 1. 26.965 MHz | 12. 27.105 MHz |
| 2. 26.975     | 13. 27.115     |
| 3. 26.985     | 14. 27.125     |
| 4. 27.005     | 15. 27.135     |
| 5. 27.015     | 16. 27.155     |
| 6. 27.025     | 17. 27.165     |
| 7. 27.035     | 18. 27.175     |
| 8. 27.055     | 19. 27.185     |
| 9. 27.065     | 20. 27.205     |
| 10. 27.075    | 21. 27.215     |
| 11. 27.085    | 22. 27.225     |

In Sydney, Ch. 11 is a secondary channel and Ch. 5 is a tertiary one for persons using 3 channel units. Ch. 2 and 21 are not used in many centres such as Sydney due to interference from hospital paging units.

(3) Many amateurs are using inexpensive 1 watt AM walkie talkie sets, and these are capable of coverage of over 1000 miles given the right conditions and antenna arrangements.

# FURTHER THOUGHTS ON SPEECH PROCESSING

Maurie Evered VK3AVO  
13 Sage St., Oakleigh, 3166

This article is a sequel to "Some Thoughts on Speech Processing" (AR October '74). It presents more facts and figures regarding audio levels and a solid-state version of the speech clipper featured previously.

Most of the information about speech processing found in magazines or text books available in Australia is taken from QST and other foreign sources. Because of this it was decided to measure local signals to ascertain the general audio levels being used by amateur operators, to compare various modulation methods and to assess the relative value of the different types of audio processing. After consideration the 160 metre band was chosen for this study. It was for several reasons —

1. It is thickly populated in the area where the study was performed.
2. It is a band where the same station can be heard often and at various times of the day. This enables many measurements to be taken for accurate averages to be obtained.
3. It is occupied by both SSB and AM stations so enabling comparison of modes; very difficult on any other band these days.
4. At least one station on this band has the capability of varying both the degree and type of processing used (i.e. compression or clipping) and is able to provide a valuable signal source for such a study.

The method of measurement used was simple. RF attenuation was applied to bring all signals to the same level on the receiver S meter and the audio recovered from each signal was taken from the receiver at a point not affected by the setting of the audio gain control. This audio voltage was then measured in a circuit that responds to

average (not peak) levels. The average value is more meaningful in such a study. The peak level should remain unaltered provided that each signal measured was modulated to 100%. For the record an Eddystone 740 receiver was used for this project.

**RESULTS**

The results of these measurements are shown in Table 1. The lowest voltage was designated as "0" dB and all other voltage values converted to dB in terms of this reference level. As can be seen there was quite a variation. Such wide variations of course do not need voltage measurements, the human ear can easily detect such extremes.

This variation of audio levels was also seen when AM stations were received on a selective receiver in the sideband tuning position, in this case an FT101B. A comparison was made of the S meter readings of the carrier and upper and lower sidebands of these same stations. The difference between carrier and sideband readings increases, i.e. the sidebands get weaker, as the average audio level decreases. These results explain why surprisingly a signal may read S9 on the meter but the audio gain has to be raised to copy what is being said.

It is interesting that the operators of several stations producing the higher values of Table 1 were told that they were over-modulating but I detected no evidence of this. Even on the old "barndoor" Eddystone their sidebands did not spread unduly. So fellows, do not be persuaded to reduce your modulation too far, there is no point in having an S9 carrier and an S2 sideband!

The next question to be answered was this: —

What is the value of audio processing, does it work miracles or is it useless? The word miracle is suggested when you hear

one amateur tell another (usually a friend!) that his signal "has gone up by 3-4 S points", i.e. 18-24 dB, when he switched in his compressor. If this is the case who needs a linear amplifier?

Four types of processing were applied to a signal which was adjusted to 100% modulation in each case—

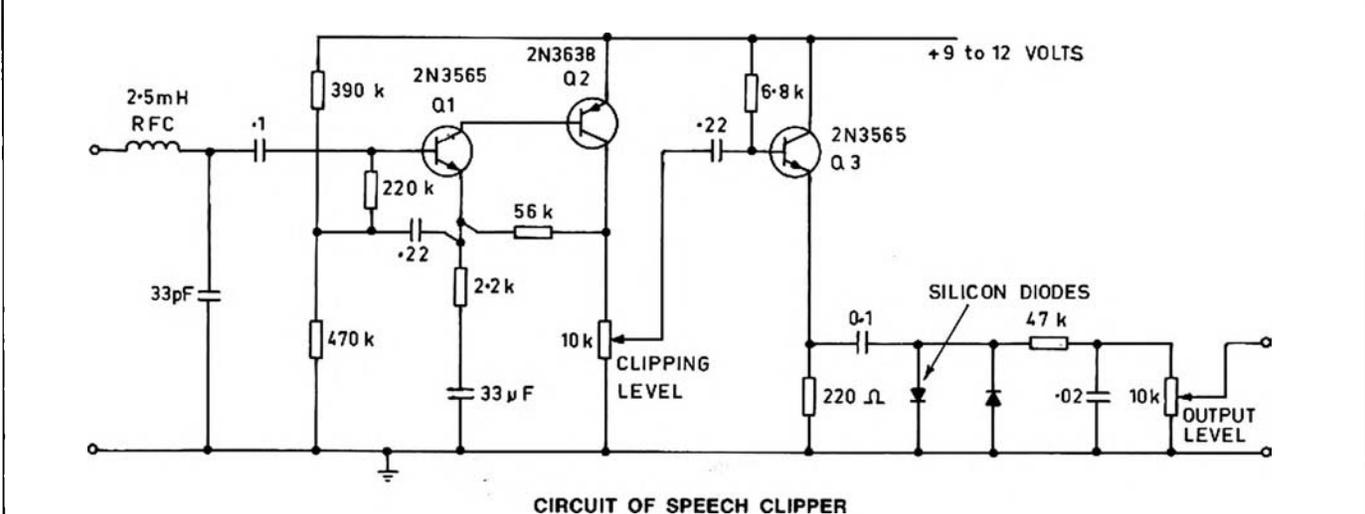
1. Compression with a long decay time.
2. Compression with a short decay time.
3. Light clipping.
4. Heavy clipping.

The recovered audio was measured as in the previous study and compared with the level obtained when no processing was used, this being given a "0" dB reference level. The results are shown in Table 2.

These results largely agree with those reported in QST and elsewhere. Compression, as typically applied, i.e. with a long decay time, is useful for maintaining constant audio level but does little to increase the amount of audio recovered and this is what determines the value of any speech processing that is used. Compression with a short decay time approaches the effect obtained with light clipping and neither of these treatments produces marked distortion. Heavy clipping certainly increases the recovered audio but background noise becomes very noticeable and the distortion level rises markedly, tending to decrease rather than increase the readability. These results indicate that a moderate clipping level is very worthwhile and does help when the going gets tough with signals being received just above the noise level.

**SOLID-STATE CLIPPER**

Now to the second part of this article, that which enables you to achieve this degree of clipping. This solid-state clipper follows the same general circuitry as its valve predecessor, voltage amplification followed by clipping and filtering to remove the unwanted high frequency distortion products.



CIRCUIT OF SPEECH CLIPPER

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The circuit is straightforward but some points to note are:—

- Transistors Q1 and Q2 provide a high gain low distortion directly coupled amplifier pair using one NPN and one PNP. The 220K resistor and the 0.22 uF capacitor between the emitter and base of Q1 provide a high impedance input to suit a crystal or ceramic microphone.
- Transistor Q3 is an emitter follower to provide a high to low impedance match from the voltage amplifier to the clipper.
- Clipping is achieved by the use of two back to back silicon diodes which conduct at approximately 0.7 volt on both positive and negative peaks.

Adjustment follows the methods given in the previous article.

Only one will be repeated here, that requiring no CRO.

- Adjust the transmitter for normal audio gain with the microphone to be used with the clipper.
- Switch the meter to the ALC position and note the reading obtained in 1.
- Switch the clipper into circuit and set both controls just high enough to get a meter reading.
- Advance the clipping control until no

TABLE 1

Recovered Audio in dB above reference level	No. of Stations with a particular level
0-1	7
1-2	3
2-3	3
3-4	6
4-5	2
5	2

TABLE 2

Type of Audio Processing	Amount of Audio Recovered, Above Reference Level (in dB)	Distortion
None	0	None
Compression (Long Decay)	1.5	None
Compression (Short Decay)	4	Slight
Light Clipping	5	Slight
Heavy Clipping	7	Vary Marked

further increase in ALC reading is noted, this indicates that clipping is occurring.

- Advance the output control until the same ALC reading is obtained as in 1 and 2.

A steady "H-E-L-L-O" provides a convenient signal for this adjustment. There is little point in advancing the clipping control beyond this level, it does not increase readability but instead produces excessive distortion and splatter.

This unit was built using a 5 x 3 x 2 inch chassis as a box with a lid made from a scrap of aluminium sheet. Any suitable metal box could of course be used if one is at hand. The components were mounted on Vero board but a printed circuit board could be fashioned.

"On air" tests have proved the worth of this little unit particularly when signals are getting weak.

This article would not be complete without some grateful acknowledgements:—

- To Harold VK3AFQ for suggestions and comments regarding the clipper circuitry.
- To Tony VK3AML whose excellent signal provided the basis for the comparative figures of Table 2.
- To the VK3 160 metre gang who popped up so regularly and provided signals for the figures of Table 1.

## HEAVY DUTY REGULATED PROTECTED POWER SUPPLY FOR THAT 12 VOLT MOBILE

Bruce Mann VK3BM  
Box 724, Swan Hill, Vic., 3585

The matching supply for a 10 watt 2 metre FM transceiver was subject to frequent breakdowns. The Japanese transistors or their equivalents were very expensive or unobtainable, so after doing some "homework" from the extensive literature the following circuit was designed using locally available parts.

Each part is operated well below its rating in the interests of reliability and long life. The bridge rectifier is rated at 8A 400V, the IC is capable of 150 mA, but is merely controlling base current to a pair of 4 A transistors of which the maximum load on short-circuit is 2.75 A.

The requirement was for 2.5 A at 13.5 volts. The voltage on this transceiver must not exceed 14 volts, but if it falls below 13.5 V, there is a marked fall-off in performance. Since the current drain is only a few mA on receive, but over 2 A on transmit, the need for voltage regulation is obvious.

When, after experiment, this circuit was built, it was found that the 5K potentiometer could set the output voltage over a wide range, and that there was no noticeable movement on the voltmeter when the load was varied between 0 and 5 A.

For overload protection, a piece of heavy gauge resistance wire "R" was inserted and

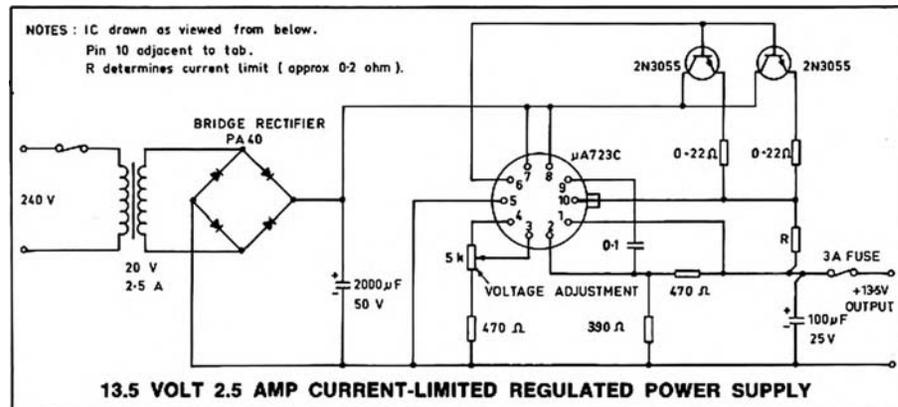
the length adjusted until the voltage began to fall rapidly when the current load increased above 2.75 A. This current would not then be exceeded even into a short-circuit. The resistance of this wire is about 0.2 ohm.

You will notice a 0.22 ohm equalising resistor in the emitter circuit of each 2N3055. One 2N3055 would of course be within its ratings to handle the load — but as mentioned earlier, we are looking for extreme reliability. In this regard, 3 or 4 2N3055s could be paralleled for a greater current capacity with the substitution of a suitable transformer, resistor R and an equalising resistor in each emitter. The 2N3055s are mounted on a 2 inch piece of 4½ inch (35D) heat sink, but insulated from it electrically by mica wafers and bushes for the mounting bolts.

The power supply is mounted in the speaker cabinet with the transceiver above it. The voltage control potentiometer is placed where it can be readily adjusted. Under further consideration for the test bench is a similar power supply with volt and amp meters, front panel control knob, and a much larger range of current and voltage.

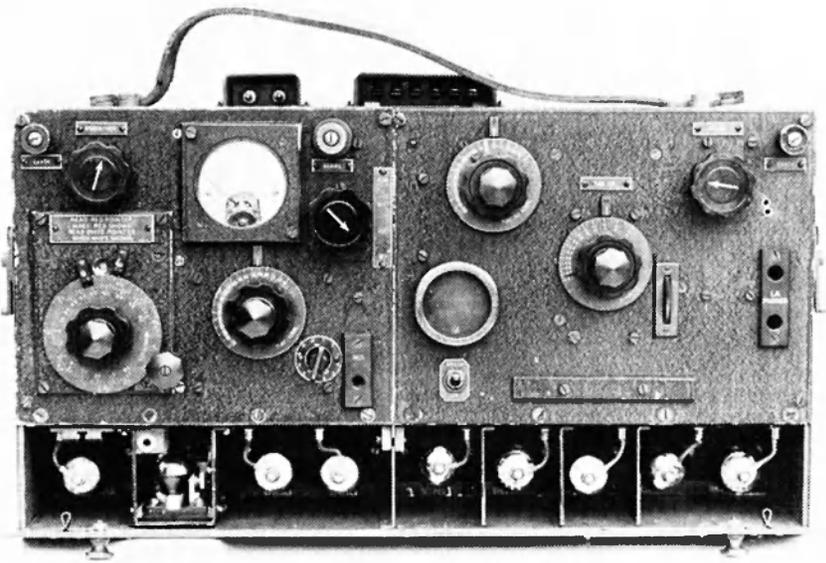
(Anyone planning a larger power supply of this type would be well advised to read the letter from VK3ZCM (now VK3AAB) ("Some Deep Thoughts on a Regulated Power Supply") in AR for October 1974. This contains a wealth of information regarding heat sinks in particular. Also, for more than about 3A output the 2N3055s base current will probably exceed the uA723C rating of 150 mA. The additional current gain necessary could be provided by using a driver transistor e.g. 2N3054 in Darlington configuration to the 2N3055 bases. — Tech. Ed.).

NOTES: IC drawn as viewed from below.  
Pin 10 adjacent to tab.  
R determines current limit (approx 0.2 ohm).



# WORKING WITH THE EARLY 101 TRANSCEIVER

Rodney Champness VK3UG  
44 Rathmullen Rd., Boronia, Vic., 3155



FRONT VIEW OF THE 101 SHOWING THE HORIZONTALLY MOUNTED VALVES

Quite naturally, most people would prefer to have the latest FT101B or FT101E but the early 101, for it's time, was quite a reasonable transceiver and can be upgraded to do a few more things than could originally be done. The 101 and 101A did not have 160 metres, but by fiddling with the VFO and the PA tank circuits, it is possible to put them on this band. The receiver requires alteration to the aerial coil and the oscillator coil.

Chirp on CW seems to be quite a problem on the unmodified 101 and would certainly draw comment from most operators. A few people overcame this problem by crystal locking the transmitter, but this to me does not really solve the problem when VFO operation is the norm. On CW the whole transmitter is keyed using the grid block method and a probable method to

overcome the chirp would be to have various stages come on sequentially. Like the FT101B, the early 101 has three valves, with 2 valves in parallel in the final.

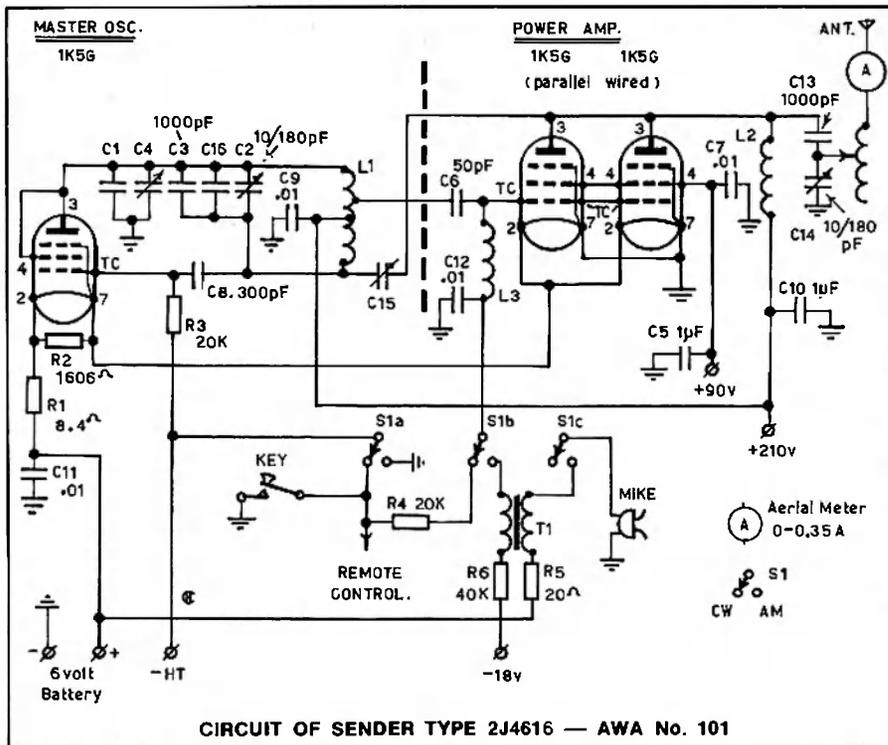
By careful inspection of the 101 circuit, it will be seen that on AM operation both sidebands are transmitted. Most SSB transceivers/transmitters only transmit carrier and one sideband (mode A3H). The parallel connected final valves are grid modulated. I altered my FL200 so that I could use gated screen modulation, as it appears it may be slightly more efficient than the A3H mode originally installed as AM.

The current drains of the set on battery supply are 0.9 amps with just the DC/DC converter going, 1.1 amps Receive only, 1.7 amps Netting, CW Key up 1.1 amps, Key down 1.7 amps, and 1.5 amps on AM. These current drains may appear to be low when compared to the FT101B, but it must be remembered that the 101 is a relatively low powered set putting out 0.4 watts AM and 0.7 watts CW. The 101 is designed only for 6 V DC operation.

The 101 was used at about the beginning of World War II and was manufactured by AWA. In appearance it is very similar to the FS6, a photograph of which was shown in AR for September, 1973, page 18. It covered the same frequency range 4.2-6.8 MHz. The two valves in the final PA were type 1K5-G. On AM the finals were grid modulated directly via a carbon microphone and matching transformer. Note that no valve modulator was used. The receiver section is identical to that used in the FS6 the transmitter and equipment case being different, although identical in size. The 101 power supply is smaller than that used by the FS6, but then it must be remembered that the FS6 put out about 10 times as much RF power.

The 101 in this day and age exhibits most features thought undesirable for portable equipment, in particular. It is big, heavy (nearly 30 kilograms), flea powered, has limited frequency range, has poor frequency stability, chirps on CW and FMs on AM. However, it will load into a variety of aeriels and its circuitry is simple, by today's standards.

Sets of this type in the 1939-1945 era now form part of our history, which is all the more interesting when we compare these old sets with the latest sets. Radio communications has advanced immensely in the 30 to 35 years since sets of this ilk were built, and a look at the 101 transmitter circuit on the accompanying diagram will show you this.



# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

*Newcomers' Notebook* has been going now for nearly 4 years and in that time subjects of interest to newcomers to this electronic hobby of amateur radio have been presented. Most newcomers will not have been members of the WIA for all of this period so do not have all copies featuring *Newcomers' Notebook*. There are many more subjects that are still to be covered in this column so it is not possible even after 4 years to start repeating some of the original articles in an updated form. For this reason an index of the articles presented over this period is now included. Having found what you want, go and pester someone for a copy of the issues applicable. Please remember that *Newcomers' Notebook* is intended to put you on the right track and most certainly is not an end in itself.

## OPERATING:

Two metre FM repeaters — Facts and Fallacies (Part 1) — July '74.

Two metre FM repeaters — Facts and Fallacies — How they work (Part 2) — August '74.

A low power DX station. Hints on how to set it up. — April '75.

Belonging to the WIA. Why you should belong — August '75.

## YRCS AND ZERO-BEAT REPRINTS AND GENERAL HINTS AND KINKS:

June '74, October '74, November '74.

## TEST INSTRUMENTS:

Test Instruments for the Amateur "shack" (Part 1) — June '73.

Part 2 has not been presented as yet.

YRCS Transistorised Signal Injector — September '73.

Modifications to the RF probe in June

issue — September '73.

The Transistorised Signal Injector — How It works, and how to use It — October '73.

## YOUR RADIO LIBRARY AND STUDYING FOR OPERATORS EXAMINATIONS:

Your Radio Reference Library — October '72.

Learning Morse Code — Part 1 — December '72.

Learning Morse Code — Part 2a — March '73.

Learning Morse Code — Part 2b — April '73.

Learning Morse Code — Part 2c — May '73.

A Pet Hate. (People who do not read things properly) — January '74.

Amateur Examinations — January '74.

Recommended Text Books — April '74.

Thoughts for Novices — December '74.

Novice — Introduction to Novice Amateur Radio — June '75.

Morse Code — July '75.

## TVI, BCI, AFI — TECHNICAL AND SOCIAL ASPECTS:

TVI on 6 metres. Why TV sets respond to amateur 6 metre transmissions when tuned to Channel O — January '73.

TVI, BCI and the Irate Neighbour — January '74.

6 Metre Amateurs and Channel O Viewers can co-exist — May '74.

Audio Frequency Interference — How It happens — September '74.

## AERIAL SYSTEMS:

Aerial Matching Unit — August '73.

A Vertical Aerial — August '73.

Medium Wave Loop Aerial — June '75.

Simple Vertical and Horizontal Aerials — July '75.

## RECEIVERS:

Overhauling and Converting Old Domestic Receivers for Amateur Use — September '72.

YRCS 455 kHz BFO — January '73.

Converting BC receivers to 160 metres — August '73.

S-metres for Amateur Receivers — November '73.

Product Detectors for Your Receiver — February '74.

## CONSTRUCTION TECHNIQUES:

Cheap Parts for Construction Projects — August '72.

Making sure what you build is within your capability — July '73.

Where to get Odds and Ends — August '73.

Radio Construction Bits from Hardware Stores — December '73.

Equipment Layout and Design — Part 1 — March '74.

Equipment Layout and Design — Part 2 — April '74.

Some Hints and Comments on Construction — May '74.

## POWER SUPPLIES:

Transistorised 13.8 volts 1.5 amp regulated power supply — July '72.

## TRANSMITTING EQUIPMENT:

Preliminary Information on a 3.5 MHz 10 watt Novice Transmitter — August '75.

A Novice Transmitter — Part 1 — CW section — September '75.

A Novice Transmitter — Part 2 — CW section — October '75.

A Novice Transmitter — Part 3 — Modulator section — November '75.

A Novice Transmitter — Part 4 — Chassis Layout — December '75.

A Novice Transmitter — Part 5 — Transmitter variations — January '76.

A Novice Transmitter — Part 6 — Transmitter variations — February '76.

If there is some particular subject that you would like to be discussed in *Newcomers' Notebook* please contact either David or myself. A few letters have been received and the subjects suggested have been presented where possible. Even with two authors it is far from easy to present all that we would like to present. For example, a cheap, simple, yet effective station monitor, which is easy to use and accurate — is extremely difficult to design. It is easy to build up or buy a complicated, effective monitor at a figure in the region of \$200. What do most amateurs use to monitor their stations emissions — something simple — or complex and expensive — or don't they even bother to monitor, relying on the other chaps' comments? ■

# IARU NEWS

Continuing our examination of the ITU Table of frequency allocations the band 1.215 to 1.300 GHz is allocated to Radiolocation as the primary service and amateur as the secondary service in all Regions. This band is also allocated to the fixed service in the USSR and the other E. European bloc countries whilst in France, Belgium, Netherlands, Portugal, Norway and Sweden this band is also allocated to the radionavigation service. This band is also allocated to the fixed and mobile services in Indonesia, Japan, China, India, Pakistan, Switzerland and (the old) Portuguese overseas Provinces in R1 south of the Equator. In W. Germany the band 1.250 to 1.300 GHz is allocated to the amateur service.

The next higher amateur band is 2.3 to 2.45 GHz which is shown as a secondary service in all Regions. In R2 and R3 Radiolocation is the primary service and the fixed and mobile services are also secondary services along with amateurs. In R1 the

Fixed Service is the primary service with amateur, mobile and radiolocation as secondary services. As with the previous band there are a number of variations affecting European countries. In Japan, India and Pakistan the band is allocated on a primary basis to the fixed, mobile and radiolocation services and on a secondary basis to the amateur service. The frequency 2.45 GHz is designated for ISM purposes world wide except for the E. European bloc countries where 2.375 GHz is used; emissions are confined within + or -50 MHz of the frequencies designated and, as usual, all the other services must accept any harmful interference from ISM. In R2 and R3 the amateur service is the secondary service to Radiolocation in the band 3.3 to 3.4 GHz but in R1 this band is for Radiolocation only with additional allocations by various European countries.

The band 3.4 to 3.5 GHz is allocated to both Fixed-Satellite (space to Earth) and Radiolocation as the primary services with amateur as the secondary service in R2 and R3 but in R1 the band 3.4 to 3.6 GHz is allocated to the Fixed, Fixed-Satellite (space to earth) and mobile as primary services and radiolocation as the secondary service. How-

ever the band 3.4 to 3.475 GHz is also allocated to the amateur service on a secondary basis in the UK, W. Germany, Austria, Netherlands and Israel. The Australian table has a note that in planning the use of the bands 3.4 to 3.5 and certain higher frequency bands (not affecting amateur allocations) account will be taken of the frequency requirements for Commonwealth Government services.

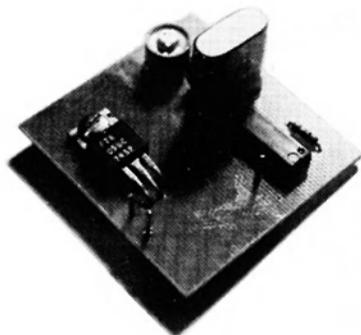
In all 3 Regions the band 5.65 to 5.67 GHz is allocated to Radiolocation as the primary service and amateur as the secondary service. In all 3 Regions the band 5.67 to 5.725 GHz is allocated to Radiolocation as the primary service with the secondary services being amateur and space research (deep space). The band 5.75 to 5.85 GHz in R1 is allocated to Fixed-Satellite (earth to space) and Radiolocation as the primary services and amateur as the secondary service whilst in R2 and R3 the primary service is Radiolocation and amateur as the secondary service. Once again there are various exceptions and variations. In W. Germany the band 5.65 to 5.775 GHz is allocated to the amateur service and 5.775 to 5.85 GHz is allocated to the amateur service and 5.775 to 5.85 GHz is allocated to the fixed service. 5.65 to 5.85

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**MOBILE ANTENNAS**

New Slimline 500W PEP Mobile Antennas complete with Base Section, Coil and Top Section 35-15	.....	
SL/20SL 15 Mx/20 Mx	.....	\$35.00
35-40SL 40 Mx	.....	\$40.00
35-75SL 80 Mx	.....	\$45.00
Extra Coils for Slimline range. Coils only 15/20 Mx	.....	\$10.00
40 Mx	.....	\$14.00
80 Mx	.....	\$18.00
Base	.....	\$10.00
Top Section	.....	\$18.00
Kwikon Base	.....	\$11.00
All Band Switching Mobile Antenna 1 kW PEP	.....	\$125.00
ALSO New Range of HiQ 2000 Watt PEP Mobile Antennas.	.....	

GHz is also allocated to the fixed and mobile service in Indonesia, Japan, China, India and Pakistan. In all countries 5.8 MHz is designated for IMS + or -75 MHz under the usual conditions. There are other variations mainly affecting the E. European bloc countries. In R2 the band 5.85 to 5.925 MHz is allocated to Radiolocation as the primary service and amateur as the secondary service. "Radio astronomy observations are being carried out between 5.75 to 5.77 GHz in a number of countries under national arrangements and administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

In all 3 Regions the band 10 to 10.5 GHz is allocated to Radiolocation as the primary service and

amateur as the secondary service. The band 9.975 to 10.025 GHz may be used by weather radar on meteorological satellites. In W. Germany 10.25 to 10.5 GHz is allocated to amateur and 10 to 10.25 GHz is also allocated to the fixed and mobile services which also enjoy the allocation 10 to 10.5 GHz in Japan and Sweden.

The last of the amateur allocated bands is the band 24 to 24.05 GHz which is shared with Amateur-Satellite. 24.05 to 24.25 GHz is allocated to Radiolocation as the primary service and amateur as the secondary service. 24.125 GHz (+ or -125 MHz) is designed for IMS under the usual conditions. In the E. European bloc countries 24.05 to 24.25 GHz is also allocated to the fixed and mobile services. In the Australian tables 24 25 to

25.25 GHz ground-based radio navigation aids are not permitted except where they operate in co-operation with airborne or shipborne radionavigation devices.

There are no other ITU amateur allocations. Amateur and amateur satellite allocations are to be sought for WARC 1979 for various other frequency bands particularly above the 24 GHz band for discussion at the IARU R2 meeting this month. These are 48 to 50 GHz, 71 to 76 GHz, 165 to 170 GHz, 240 to 250 GHz and 300 GHz up. All these are in unallocated ITU bands.

It is probable that the amateur frequency requirements for all Regions will be firm up at the inter-regional IARU meeting scheduled to follow immediately after the conclusion of the R2 meeting in Miami.

## INTRUDER WATCH

All Chandler, VK3LC

1536 High Street, Glen Irla, 3146

I wish to stress upon Members that since the PMGs department has been separated into two separate departments liaison with the Amateur Service has been upgraded, and we now have full co-operation with the newly designated branch. The name is now: "Licensing, Policy and Operations Branch"; "Radio Frequency Management Division"; "Postal and Telecommunications Department". Thus, the activities of the Branch, insofar as the Intruder Watch is concerned, have been upgraded and full co-operation is now being experienced by your Federal Co-ordinator on intruder problems.

Whereas, before this upgrading, the majority of Amateurs were of the opinion that the Intruder Watch was a waste of their time in reporting because officialdom did nothing to further the cause, now, by the co-operation between the Branch and

the Amateur Service, some measure of success should be manifest in the reporting of intruders in our Amateur bands.

One of the points stressed by their personnel is the fact that we do not have enough Observers to file sufficient reports for the authorities to act upon. They say that when only two or three individuals file reports on a particular intruder it lacks credibility and it is not sufficient evidence for them to do anything about it.

They need lots of reports so that their monitoring stations can be alerted to listen for the intruder. It is the reports that their monitoring stations supply that they act upon, and they have to have positive identification as to the country of origin of the intruder, and the fact that it is an intruder before they can get Governmental sanction to file a complaint to the Administration concerned. The Amateur Service is to be looked upon as the initiating service, the watch-dog to alert the monitoring stations, as the official back-up service, to act.

So, as in any Public petition or official relation, it is the weight of numbers that counts, and the Licensing Branch is no exception to that, but will use the Amateur reports as a starting point if they can get enough Observers to inform them of any particular frequency or station causing intrusions to the Amateur Service.

The words "harmful interference" as used extensively in the past are now discontinued and

"intrusions" substituted and, although most Amateurs change frequency when experiencing interference because of the flexibility of band frequencies, reports are to be designated as "intrusions" but causing interference to their Amateur stations.

In the WIA we need a program of Member public relations to get more observing stations to report infringements of Commercial intrusions into our bands.

Thus, I am asking all Divisions for support in this important aspect of Amateur Radio to obtain Member participation. There are co-ordinators in all States who have the knowledge and the facilities to help individual Members to become acquainted with the types of signals to listen for; and who have report forms and literature appertaining to the Intruder Watch, and I urge every Member to give this matter deep consideration.

We need at this very moment to take steps to preserve our frequency assignments from the intrusions of Commercial interests and the Intruder Watch is one very important method of so doing, by alerting our Administration. They are too busy with this and other things to police our frequencies unless alerted by us as to what is going on.

I stress once again upon Divisions to give this problem deep thought and to come up with ways and means to increase activity in this Intruder Watch.

If you do not know who your co-ordinator is, write to me direct.

## VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP

Foreston, 5233

### AMATEUR BAND BEACONS

VK0	VKOMA, Mawson	53.100
	VKOGF, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbrall	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.850
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
SD	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
VE	VE1ATN, Canada	50.056
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K2IRT/KG6, Guam	50.090
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850

ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
ZL2	ZL2MHF, Upper Mutt	28.170

The 6 metre beacon proposed for VK7 on 52.400 appears not to have made it on the air as yet, so it has been withdrawn from listing pending advice as to when it is in actual operation.

A listing of the known overseas beacons on six metres has been continued this month as the March-April period favours possible trans-equatorial propagation (TEP) and listeners in good locations should keep an ear on the 50 MHz end of six metres, particularly around the period of late morning to early afternoon, and again towards the latter part of the afternoon. In northern latitudes evening contacts are sometimes found possible. Six metres is a band often full of surprises. Even though the DX may have disappeared from the VK scene in general, other areas may be offering at this time of the year.

The VK3 two metre beacon has had an overhaul and now, with the antenna re-located, appears to be putting in a consistent signal to Mt. Gambier most evenings. Perhaps it may now be possible to hear it in Adelaide. The Adelaide area operators are looking forward with anticipation to the completion of the beacon in Mt. Gambier which will provide the only beacon within a consistent operating range of Adelaide, and thus be able to give an indication of possible band conditions. The FM repeater in Mt. Gambier will also be awaited with interest as it also could provide us with indications of distance working. It has now been confirmed that it will operate on Channel 3.

Please note also that the Mt. William repeater in VK3 has changed operation from Channel 1 to Channel 7, and should not suffer the co-channel interference from Melbourne repeater on Ch. 1.

### MOONBOUNCE REPORT

From "The Propogator", newsletter of the Illawarra Amateur Radio Society, N.S.W., comes some in-

formation of their activities on the EME circuit. "The December EME tests provided a first contact with W9GAB whose signals peaked at 6 dB over noise. A further contact was made with K2UYH (to 11 dB over). A few words were copied of his SSB under conditions of deep fading, using 2.1 kHz bandwidth.

"During the subsequent European test period, approx. 8 hours later, contact was made with F9FT (9 to 6 dB over) and PA0SSB was heard calling us but no contact was made. A final check of our echos revealed that the dish was pointing 2½ degrees off the moon. Heavy cloud had prevented visual checks overnight and insufficient correction had been made at the start of the second test period for relative angular velocity between moon and the original sun reference hour angle, hence the lower than normal signal from F9FT.

"A verbal approval was received in December to allow EME transmissions between 432.000 and 432.050 MHz on a strictly non interference basis; the Drake 2B IF channel receiver was modified to allow remote shifting of its calibration oscillator frequency. This provides measured off-set from WWV at 15 MHz as a frequency reference on its 100 kHz crystal harmonic at 432 MHz for adjustment of the transmit frequency.

"The January tests were another all night effort but results more than compensated for lost sleep. First contacts were made with W1SL (on our 10th attempt), KOTLM, WOYZS who called us in our half hour CO period, and finally with JA1VDV (the first VK — JA UHF contact) on our first attempt! This contact was on 432.045 MHz and illustrates the need for transmit frequency change capability as 432.000 is usually not available in Japan, being a national FM calling frequency.

"The European test period some 5 hours later produced contacts with F9FT and 15MSH. ZE5JJ was heard again, but he had a receiver pre-amp

problem and could only give us a 'T' report. Heavy rain at both ends did not help in setting up for this one".

On 144 MHz EME Chris VK5MC reports working two new stations in the period 7-8/2 and 11/2, being WA7BJU and W4WNNH/8. No other details are available at the moment. We have not heard from Ron VK3AKC for a long time of his exploits on 1296 MHz EME, and what have you been doing, Ray VK3ATN? Some reports on activities would be appreciated.

#### 70 cm BAND PLAN

Under the heading "The proposed 70 cm bandplan as related to EME activity" comes a further interesting short discussion from "The Propogator", reading as follows for your information.

"Simultaneous activity on several frequency channels is now becoming not unusual during EME test periods. Doppler shift of +/- 1 1/2 kHz maximum plus SSB bandwidth requirements are now clearly demonstrating the inadequacy of the proposed 10 kHz segment for exclusive EME operation.

"The day is rapidly approaching when ham stations operating here in VK with 150 watts input and beams with 15 to 18 dB gain on 70 cm will be capable of causing QRM to stations in Europe and America working over the EME path on the same frequency. This is because the moon has to be near the horizon for long (earth) distance EME contacts and the sensitivity of EME receivers is such that very low level signals can be a problem as QRM. (The current receiving system at VK2AMW has a threshold sensitivity of -154 dBm or 0.004 microvolts). Antenna gain has, of course, nothing to do with the achievement of this sensitivity. The VK station causing the interference may not be able to hear any trace of the EME station being QRMd.

"It is of interest to note that the only other mode of 70 cm operation which covers international contacts (satellite mode) has been provided with a 3 MHz wide segment in the 30 MHz wide (in VK) band. Hence 50 kHz from 432.000 to 432.050 MHz is suggested for exclusive EME work.

"There are a number of other very good reasons now becoming apparent as to the need for a much wider segment of the 70 cm band being allocated for exclusive EME operation, but the above may be of some interest to those hams who have not had UHF operating experience".

#### CAIRNS AWARD 1976

This award may well be of interest to VHF operators as well as those on the HF bands. Requirements are during 1976 to work three Cairns stations (i.e. within a 100 mile radius of Cairns) for which a very attractive award is being offered. As the next summer DX season will be in full swing before the end of 1976, VHF operators on 6 metres might well try for the award. A copy of the log entries is needed, and should be sent to the Cairns Amateur Radio Club, via Station VK4HM, P.O. Box 1426, Cairns, Qld., 4870.

It is also hoped that VHF operators shared in the award for contacting five stations in Mt. Gambier during the celebrations there in February and March. VK5BMG was a required contact. Entries to the South East Radio Group, Box 1103, Mt. Gambier, S.A. 5290.

#### JOTTINGS FROM AROUND THE BANDS

Good conditions prevailed at the end of January on 144 MHz which allowed VK3YJP/5 using an IC202 to go up on top of Mt. Lofly and work Fred VK3AZG in Melbourne. Not bad for the 202 and a whip antenna. . . . Kerry VK5SU at Ceduna worked into Adelaide on 1/2, 2/2 and 4/2 via Ch. 1 repeater, and also reported contacts on 2 metres on 28/1 between Albany, W.A. and Gippsland, Vic. . . . 6 metres opened up well on 15/1 and 16/2 to VK5, Lindsay VK4AAL very strong for hours, Claud VK4UX also, and down south VK7ZWW was S9. Mike gave brief details of the proposed 6 metre beacon down there, call sign VK7RNT, 25 watts, FSK to half wave dipole, and operating on 52.400 MHz. It awaits PMG approval before commencing operation. . . . Mike VK7ZWW operating portable from Mt. Barrow worked VK4ZZB/4 on 144 MHz at 5 x 4 on 15/2 in the evening. Good work Mike! . . . Steve VK5ZIM reports there are now at least 25 stations in the Adelaide area using the IC202 144 MHz SSB transceiver, plus those with other equipment. This situation is probably similar in other capitals, so if their owners do the right thing and erect a good antenna, and possibly an additional 30W amplifier, good things could come of 144 MHz SSB before long. . . . Clem VK5GL took his IC202 with him to Stansbury on Yorke Peninsula, and was able to work back to Adelaide quite well with his 3 W PEP and a 3 el. beam inside the holiday house, distance probably about 70 miles. To prove that it could be done, I swung my antenna to the west, fired up straight through my 30 dB mountain, and worked Clem, 5 x 3/4 from me, and 5 x 6 from him to me, a much more thrilling contact than one of those S9 contacts!

#### 144 MHz BAND PLAN

In a letter from Geoff VK3AMK he mentions the explosion of activity on the low end of 2 metres since the introduction of the IC202. I agree when he says this additional activity is extremely welcome, and regardless of what some people think and say about commercial gear there is no doubt the availability of a good rig at a reasonable price has restored activity to the low end of the band. However, this sudden increase has brought with it some difficulties, sometimes due to thoughtlessness and to a form of selfishness mainly brought about by lack of experience.

Geoff mentions that as a result of some of this activity Daryl VK3AQR has drawn up a band plan to try and get activity on the low end of 2 metres sorted out into some order to benefit everybody. I understand Daryl proposes submitting the plan to AR for general consideration but so far has not done so. In the meantime Geoff submits an outline of his plan and comments are called for from interested operators.

(a) 144.000 to 144.200 for DX working only (i.e. no local chat over the back fence, tests etc.) 144.000 to 144.010 for EME only. (I would like to see this extended to 144.020 as world operating indications are tending to show that 10 kHz is too narrow a segment — refer to EME report this column this month. . . . 5LP) 144.010 to 144.050 for DX CW only. 144.050 to 144.200 for DX phone working only, primary calling frequency to be 144.100, secondary calling frequency 144.150. These

frequencies should be respected for what they are, calling frequencies. Once contact is made QSY off the frequency please. Stations using 144.000 to 144.200 to be narrow mode only with VFO control.

(b) 144.200 to 144.500 to be used for all local working, skeds, overflow from segment below if that section is very busy, 144.300 primary calling frequency, 144.350 secondary calling frequency. Again narrow mode and VFO control.

(c) 144.500 to 144.700 exclusively for beacons. The present situation is crazy, thirteen 2 metre beacons in VK and ZL spread from 144.010 to 145.400. How many people ever listen for most or any of them? Particularly when high up in the band.

The beacon plan is as follows:

(1) provision for a minimum of three exclusive beacon frequencies per VK call area.

(2) each beacon to be identified by frequency as well as call sign, i.e. each beacon to have a frequency allocated relative to the call area number.

(3) the primary beacon for each call area to be allocated on a 10 kHz channel system in the 144.500 to 144.600 segment. Secondary beacons in each call area to be allocated on a 10 kHz channel system in the 144.600 to 144.700 segment. Tertiary beacons (and subsequent if ever required) in each call area to be allocated 5 kHz above the secondary beacons in that area — e.g. VK6 primary beacon Perth 144.560 (the 60 kHz means VK6). Secondary beacon Albany 144.660, tertiary beacon Carnarvon 144.665.

Thanks Geoff for going to the trouble of letting me know, and to Daryl for starting the ball rolling. It seems a fair plan at this stage. I would like to think about it further, and I hope others also will give it some thought. I am pleased to see that it embraces the thoughts I had several years ago when I advocated beacons in the region 144.500 to 144.700, this being the same end of the dial scale on the average transceiver but one 500 kHz segment higher. Mostly it simply means turning the band change switch one position and you can then tune in the beacons — simple?

The other important point about the proposed beacon segment is that the average 2 metre yagi antenna is still likely to give some reasonable performance up to 144.700 and a bit higher, and plenty of converters will give reasonable performance over a 1 MHz bandwidth, so it all fits in quite well.

If anyone is writing to me, and I hope you will, with news for this column, your comments on the proposed band plan would be welcome. Constructive comments please, it is no use condemning some aspect of the plan if you are unable to offer an acceptable or reasonable alternative. When Daryl publishes the whole plan in greater detail you may be able to better understand the full implications; in the meantime this summary is published to start you thinking, perhaps in the right direction.

There does not seem to be a lot of other news at the moment, so we will close with the thought for the month: "Manners are like the zero in arithmetic; they may not be much in themselves, but they are capable of adding a great deal to the value of everything else".

The Voice in the Hills. ■

## MAGAZINE INDEX

Syd Clark, VK3ASC

#### BREAK-IN November 1975

Solid State Circuits for SSB; A Linear for the ZL2BDB Transceiver; Jason and the Argonauts. December 1975

The History of the Wellington VHF Group; Wellington VHF Group Hut, Mt. Kakanui; Frequency Deviation Measurement; Wot — No Dips???; Getting on to Micro-waves; Mounting of Yagi Aerials.

#### QJ MAGAZINE October 1975

A Programmable Keyer for the Contest Operator; Antennas: New VHF Antenna; Regulated 200 Watt 12 Volt DC Power Supply; Alice in Basic-Land; Don't Build a Repeater; Using Epoxy Cement In

Electronic Projects; Peak Envelope Power — What Is It?; The Sasa Story; The Optacon; Math's Notes — Simple mast construction.

#### HAM RADIO October 1975

Receiver Noise Figure, Sensitivity and Dynamic Range; High Dynamic Range Receiver Input Stages; Solid State Communications Receiver; Low Cost 1296 MHz Pre-amplifier; Low Noise 28-30 MHz Pre-amplifier; BFO Multiplexer; High Performance Balanced Mixer for 2304 MHz; Satellite Receivers for Repeaters; Crystal Discriminator for VHF FM. November 1975

High Performance VHF FM Receiver; SSB with ITC LIs; RTTY Line End Indicator; Tuneable Audio Filter for CW Communications; SSTV Pre-amplifier; Crystal Mixer; Binaural CW Reception; Varactor Controlled VFO; Soldering Iron Holder; Dipole Antennas; Collins R390A Modifications. December 1975

Collins S-Line Frequency Synthesizer; High Frequency Linear Amplifier; Introduction to Micro-processors; Squelch Circuits for Transistor Radios;

2304 MHz Power Doubler; 1296 MHz Bandpass Filters; UHF Frequency Scaler; 1968-1975 Cumulative Index.

#### QST November 1975

Ideas on 2 Metre FM Mobile and Portable Antennas; A Morse Code to Alphanumeric Converter and Display; A Resistive Antenna Bridge — Simplified; Pattern Factors for Elevated Horizontal Antennas Over Real Earth; A 5c Transistor Tester; Linear Tuning — What Price?; A General Technique for Satellite Tracking; Modifying the Heath HW16 from 15 to 20 Metres; Improved Frequency Stability for the Heath SB-300.

#### December 1975

A Calorimeter for VHF and UHF Power Measurements; A Morse Code to Alphanumeric Converter Part 2; A Transmission Line Low Profile Antenna; A Universal Transistor Tester; A Modular Transceiver for 1296 MHz; Read Capacitance with your VOM; A Tuning Aid for SSTV; Slippers for the HW-7 Transceiver.

**RADIO COMMUNICATION** November 1975  
 A 70 to 432 MHz Transmitter Converter; Yaesu Receiver FR101; Annual Report of RSGB.  
**December 1975**  
 A Hybrid Ring Converter for 70 cm; Ham-M Operation for the Blind; Technical Topics.  
**RADIO 25** October 1975  
 Solid State 10/2M SSB Transverter; Operation of Miniature Lamps at other than rated volts.

November 1975  
 The Grahamstown Repeater Governor's Kop; Those were the Days; Hams go to War; A Computer Controlled VFO; Robin Hood; The Best of QSX; Mosquito Repeller; The Ground Plane Antenna; Long Distance Communication on VHF.  
**December 1975**  
 IARU Region 1 News; Tygerberg Branch; The VHF-UHF Watchdog Calling System; Small Loops for the

Lower Frequencies; A Review of 2 Metre Band-planning in S.A.  
**SHORTWAVE MAGAZINE** October 1975  
 Line Termination in Aerial Design; Compact Modulator PSU.  
**November 1975**  
 Modifications for the KW-2000 Transceiver Series; Active Aerial Unit; PSU Remote Sensing.

## IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

**A SUMMARY OF PREDICTIONS FOR THE DATE OF CYCLE 20 SUNSPOT MINIMA**  
 Average Cycle Characteristic — Mid 1975 — Smoothed No. 5.  
 Waldmeier — Early 1975 — No numbers predicted.  
 Jacobs (CQ Magazine) — Late 1976 — Smoothed No. 5 — No numbers predicted.  
 Lincoln — McNish NOAA — Early 1977 — No numbers predicted.  
 Boykin — Richards NASA — Late 1976 — Smoothed No. 12.  
 en and Lintz (CQ Magazine) — Mid 1977 — Smoothed No. 3.  
 Others — During 1977 — No numbers predicted.

From these predictions, it would appear that the minima is as hard to foresee as is the daily sunspot count. However, they are talking about the smoothed running 12 month number, derived from the formula

$$R_s = \frac{1}{2} RM_1 + RM_2 + RM_3 \dots RM_{12} + \frac{1}{2} RM_{13}$$

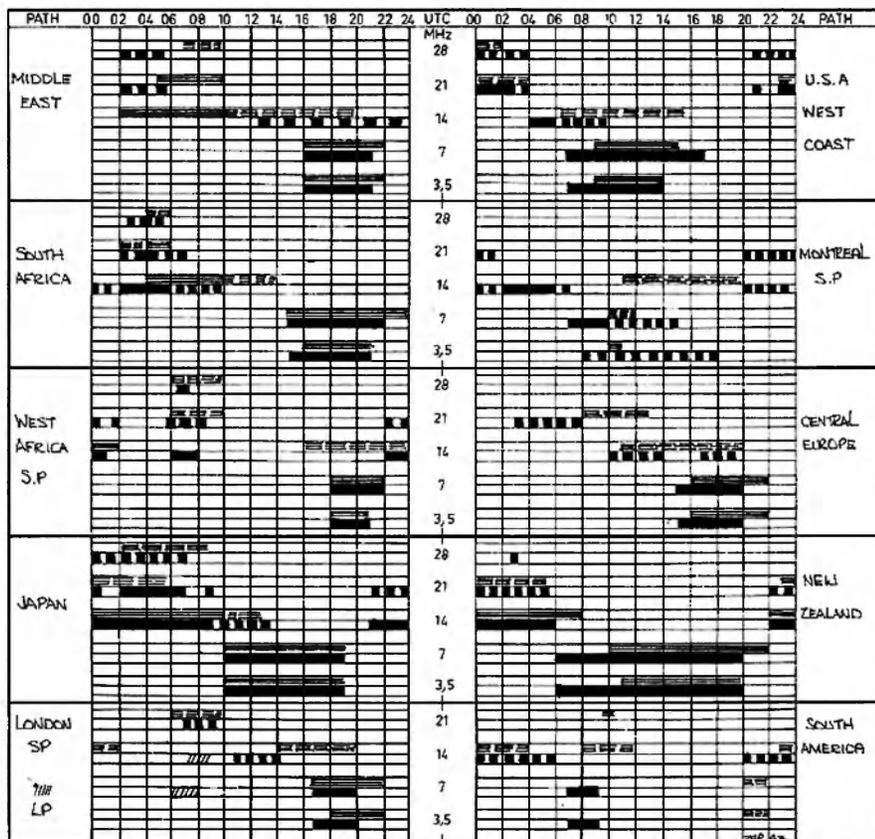
Where  $R_s = 12$  month smoothed number centred on  $R_m7$   
 $R_m =$  monthly mean unsmoothed.

Whilst the last 12 months have shown some signs of cycle 21 sunspots appearing, their appearance is counted along with cycle 20 spots. Some bursts of new activity have been noted in July and August 1975 but have quietened down again since early 1976.

The latest projections at the end of January from Zurich were April 6, May 5, June 5, July 4.

If the monthly count drops to the low of Jan. 76 at 8.6 it is within the realms of possibility that Boykin-Richards of NASA is fairly close to the mark. Guess we will just have to wait and see.

The whole scene looks like very mediocre conditions for some time yet. Of course the seasonal changes along with the sudden bursts of activity will produce some good periods. Generally the next 12 months will see an overall decrease in band openings, particularly the higher bands. 40, 80 and 160 M should produce increased activity during the darkness period over the all darkness paths. Many are hunting 5 Band DXCC, and they mostly QSL direct. Be aware when and where to



### LEGEND:

- Lines — From Western Australia.
- Bars — From Eastern Australia.
- Full lines or black bars — more than 50% of the month but not all days.
- Broken Lines or Black Bars — better than 20% of the month.
- At least 2 Geomagnetic disturbances expected. One early and another late in the month.

listen. The prediction charts I find are a fair guide to times. Daily variation in conditions will play an important part.

As the solar activity decreases, the geomagnetic disturbances have an increased effect. Perseverance does pay off in the long run.

## REPEATERS

Ken Jewell, VK3ZNJ  
 Peter Mill, VK3ZPP

As most readers will be aware there has been a dramatic increase in the number of Repeaters throughout Australia in recent years and it was felt that the time had come for a separate column in Amateur Radio to fulfill the needs of this fastest growing aspect of the Amateur scene. It will be up to you the FM users to ensure that this column is a success, as we must have information from all Repeater Groups and Committees to make it worthwhile each month.

Criticism has been levelled at the accuracy of repeater information published in AR in the past, but those who have tried to get this data have not had an easy task. Now is your chance to have accurate information about your Repeater put into print and we seek your co-operation. Please send

all copy to PETER MILL, VK3ZPP, 2 IVY ST., PARKDALE, VIC., 3194, and he will see that it will be printed. It is hoped that each month there will be a table of repeater details progressively for each State and advice of changes as they occur.

### FEDERAL NEWS

On 1st March, 1976, the Federal Repeater Secretariat, formerly based in South Australia, commenced operation from Victoria. The Secretariat consists of Chairman Ken Seddon VK3ACS, Committee members John Martin VK3ZJC, Peter Mill VK3ZPP, corresponding consultant Ken Jewell VK3ZNJ. The first meeting of the FRs was held on the 26th February 1976, and a great deal of business was concluded, including preliminary work on the 70 cm band Repeater Plan with the meeting finishing well after midnight. Being close to the Headquarters of the PMG Department, and the Federal Executive, it is hoped that problems with repeater licensing in some States will soon be resolved.

### VICTORIAN NEWS

On Saturday, 28th February 1976, the annual State

Repeater Meeting and election of office-bearers for the State Repeater Committee was held in Melbourne. Representatives of all known VHF and UHF Groups attended this meeting which formulates the State policy on repeaters and processes applications and assists with problems in relation to repeaters.

At the meeting Surgeon-Captain Jim Lloyd VK3CDR, representing Federal Executive, spoke on recent discussions with the PMG Department regarding the development of new repeater licensing conditions and the standardisation of requirements throughout Australia.

The business of the meeting commenced with the election of office-bearers for the next 12 months and the results were:

**Old Committee** — Chairman: Peter Linden VK3BX; Vice-Chairman: Peter Mill VK3ZPP; Secretary: Ken Jewell VK3ZNJ; Publicity: Geo. Francis VK3HV.

**New Committee:** Peter Linden VK3BX; Peter Mill VK3ZPP; John Bills-Thompson VK3AAA; Daryl St. John VK3AQR.

The committee and all representatives wish to

Thank the two retiring members VK3HV and VK32NJ for their excellent work in setting up operations from the beginning last year.

During the meeting several proposals were submitted to the vote and subsequently adopted and where applicable will be forwarded to the FRF for necessary action.

The first of these was the creation of an 8th repeater channel using 146.05 MHz input (channel 41) and 146.65 MHz output (channel 53). If approved by the necessary controlling bodies, this channel will be used in Victoria as a low power (to 2.5 W) local community fill-in repeater channel. It is expected that repeaters on this channel would not be sited on a high spot and could be situated as close as 80 km apart.

Re-numbering of repeaters was also adopted, numbering from channel 1 to 8 in ascending order of frequency and input channel. This was done to easily identify the frequency of the repeater and to remove the stigma of "second class" channels for the existing 5, 6 and 7 repeaters. It was agreed by all Groups that they would, where possible,

standardise on identification, time out length, silent tail period, and other technical requirements in order to give repeater users standard facilities throughout the State. Approval was also given by the meeting to the Geelong Group to proceed with a feasibility study on channel 3 for a repeater in the Otway Ranges in the south west of Victoria.

#### NEW SOUTH WALES NEWS

It is hoped that there will be a State Repeater meeting in Sydney in the near future and, resulting from this, a State Repeater Committee. Comments from NSW indicate that perhaps they also have grown out of the present 7 channel system. Should we therefore keep increasing the number of VHF channels for repeaters thus reducing the spectrum for simplex operation and rendering obsolete present equipment if we expand into the next MHz. If support for the 8th channel, as proposed in Victoria, is forthcoming from NSW then this could give some breathing space. There are two repeater channel changes due for change over on 2nd May, 1976; they are Gosford to channel

5, and Newcastle to channel 3. Unfortunately there are no other details available.

#### WEST AUSTRALIAN NEWS

There is very little available at the present time except that Channel 1, which is situated at Rollystone at a height of 1200 ft. ASL, is now working well with no other details to hand. Just commissioned is Channel 2 at Wireless Hill which is designed to cover the dead spots in Perth and to the north. It is located on the coastal plain north of Perth at an elevation of 200 ft.; as yet no details about call sign, power, range, etc.

#### AFTERTHOUGHT

We as Amateurs have, in the past, been in the forefront of radio experiments. Should we now continue to stack repeaters into the two metre band when we will have available, in the very near future, at least 30 repeater channels in the 70 cm band? Perhaps some specialist groups such as RTTY operators or even Radio Clubs could think about this as a combined voice on the air in the state of the art. ■

## CONTESTS

Ken Phillips, VK3AUQ  
Box 87, East Melbourne, 3002

#### CONTEST CALENDAR

##### April

24/25 PACC Dx Contest (Veron)  
24/25 Bermuda Phone

##### May

1/2 Helvella 22 Contest  
8/9 Bermuda CW  
22/23 USSR Dx Contest

#### PACC Dx CONTEST

Starts: 1200 GMT April 24.  
Ends: 1800 GMT April 25.

Frequencies 1.8 thru 28 MHz CW and phone one contact per band per station either CW or phone (but no cross mode) for QSO and multiplier credit (CW only on 160). Send RS(T) and serial number, PA/PI/PE will send RS(T) plus number plus 2 letters, indicating the province. There are 12 provinces — GR, FR, DR, OV, GD, UT, NH, ZH, ZL, NB, LB, YP. Each contact worth 3 points.

Final score is total contact points multiplied by the number of provinces worked on each band (maximum of 72).

Logs should have date and time GMT, stations worked, transmitted and received numbers and letters, multiplier column for each band, and points.

Logs must be sent to Veron Contest Manager PA0DIN P.O.B. 1166 Arnhem, The Netherlands, post marked before 30th June.

#### BERMUDA CONTEST

Phone April 24-25, CW May 8-9.  
Starts 0000 GMT Saturday.  
Ends 0200 GMT Sunday.

Single operator home stations only. Exchange RS(T) report and QTH, VP9 will give RS(T) report and Parish.

Each completed QSO worth 3 points, multiply by number of different VP9 stations worked on each band 3.5 to 2.8 MHz.

Logs go to: The Radio Society of Bermuda, P.O. Box 275, Hamilton 5, Bermuda, before 30th June.

#### HELVETIA 22 CONTEST

Starts 1500 GMT May 1st.  
Ends 1700 GMT May 2nd.

All bands 1.8 to 28 MHz Phone or CW. The same station may be worked on each band for QSO and multiplier credit, but only on one mode.

Exchange RS(T) plus 3 figure contact number starting at 001. Swiss stations will also send 2 letters indicating their Canton. There are 22 Cantons: AG, AR, BE, BS, FR, GE, GL, GR, LU, NE, NW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH.

Scoring: Each QSO counts 3 points. The multiplier is the sum of Cantons worked on each band. Final score, total QSO points times sum of Cantons on each band.

Mail log within 30 days to USKA Traffic Manager Rene Oehninger, HB9AMA, Im Moos, 5707 Seengen, Switzerland.

## ROSS HULL VHF-UHF MEMORIAL CONTEST 1975/76 RESULTS

Trophy winner VK5SU J. W. K. Adams (5th time in a row); 48-hour certificate VK2AMW — Illawarra Amateur Radio Society — operated by VK2ALU, L. E. Patison.

Detailed scores — 1st column 7 day, 2nd column 48-hour.

#### Section (A) Transmitting Open

VK5SU	6941	3505
VK2BHO	2227	686
VK3VF	662	271
VK4DT	465	405
VK2HZ	—	191

#### Section (B) Transmitting Phone

VK7ZAH	5066	2881
VK4DO	2697	884
VK8ZGF	2335	820
VK6ZED	1978	1406
VK5LP	1865	745

VK6ZDY	1695	705
VK7ZGJ	1621	631
VK1ZRK	1550	515
VK6ZKO	1467	749
VK4ZRQ	1348	514
VK4ZRF	1241	535
VK22HT	1072	369
VK5ZTT	871	250
VK3AVJ	828	—
VK2BJF	732	324
VK5ZMM	415	—
P29GA	370	335
VK2BMX	301	125

#### Section (C) Transmitting CW

VK2AMW	2950	2850
VK4XA	421	185

No Receiving Logs were received for this contest. ■

#### USSR Dx CONTEST

Starts 2100 GMT 22 May.  
Ends 2100 GMT 23 May.

Bands 3.5-28 MHz CW and SSB, but no cross mode.

Contest Call — "CQ-M". Exchange RS(T) and serial number starting at 001.

Scoring: Contacts between stations on different continents equals 5 points, contacts between stations in the same country count only for multiplier. One country or territory gives 1 point for multiplier per band. Total multiplier is total number of countries or territories from all bands. Add total QSO points and multiply by total multiplier, for final score.

Logs should be sent to: CQ-M Contest Committee, P.O. Box 88, Moscow, USSR no later than 1st July, 1976.

#### COMMENTS ON THE ROSS HULL CONTEST

Activity this year appears to have increased, judging by the scores of VK5SU and VK7ZAH, in spite of the 'a'e announcement of contest dates. The number of logs received is up on last year also, many with worthwhile comments attached.

One very interesting log is from VK2AMW, the station of the Illawarra Amateur Radio Society, operated by one operator, Lyle Patison VK2ALU. Lyle is the Co-ordinator of the Dapto Moonbounce Group. All his contacts were by EME on 70 cm, and the log reads like HF, with calls like W, K, JA, F9, 15 etc. He was operating the group Moonbounce station which has authorisation to run 1 Kw DC input to the final.

Kerry VK5SU sends statistics of stations worked in each State. His overall number of contacts is up 14% on last year, number of different stations up 6%. More stations worked in VK1, VK4, VK5, VK6, ZL, and fewer in VK2, VK3, VK7.

CW contacts appear to be on the increase also, which is an interesting trend for a VHF contest. I have found occasion to use it on the UHF bands myself when conditions were not favourable. Russ VK4XA more than doubled his score from last year.

AM activity seems to have almost disappeared apart from 6 metre nets, as everyone seems to be turning to SSB transceive — even on 432!

Several commented on the difficulty of working out contest times in GMT hours but EAST days. It is being considered with the new rules which should be ready for the next contest. I hope to work you all in next year's contest, and please send in a log — you may not win, but it does show that you care. ■

## LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,  
Dear Sir,

In February '76 issue of AR, F. K. McTaggart VK3NW/2BNW, accuses me of woolly thinking in relation to some of the facts in my article "The Golden Years . . ."

After re-reading the article, my researched information, and his critique, it appears that the only error of any great substance, was that I inadvertently gave the prize of first VK/W QSO to MacLurcan instead of Howden. I'm sure Max VK3BQ will accept my apology. Both the aforesaid OOTs made it to the States (A2CM wkg 6EKY) in the same month and year viz Nov. 1924 so it was a very close thing. I did not credit the first VK/G QSO to MacLurcan; I said he was the first to do this on 20 metres and as far as I am aware, no one disputes it.

My short quote of Shakespeare's line "All the world's, etc.", was not another woolly fumble as VK3NW/2BNW also assumed. It was deliberate and needs no apology. A minor bastardisation it

might be but it's one that's often used.

If Mr. McTaggart writes for his "bread", or pleasure, he will know that the constant plea from Editors, the world over, is "make it short and simple". In these interests, some small licence must be permitted.

VK3NW/2BNW admits his criticism of this is pedantic. True, and how pedantic can one get! My many thanks to those who responded to "The Golden Years . . ." by saying it revived memories. Alan Shewsmith VK4SS.

The Editor,  
Dear Sir,

Those posting QSL cards direct to overseas countries should ensure that the full address is included. Some months ago I forwarded a large packet of QSL cards addressed "Amateur Radio QSL Bureau Box 88 Moscow" — I failed to include "U.S.S.R." Three months later the package was returned to me bearing a written endorsement "TRY U.S.A.", plus a rubber stamp impression reading "ADDRESSEE UNKNOWN IN MOSCOW IDAHOE U.S.A. — return to Sender".

It is hard to understand why the Postal Sorter would think of Moscow Idaho before Moscow Russia, unless some satisfaction was obtained in sending the package "for a ride" because of my omission.

Bill Bullivant VK2BC.

The Editor,  
Dear Sir,

I am slowly and surely becoming disenchanted with our magazine, Amateur Radio. I feel that I am in a position to make the remarks I intend to make having been in the 1930-40s, Technical Editor of our worthy publication, and years prior to that, when I first came into the WIA in 1928, I was Victorian branch correspondent to the official organ of the WIA in the days of CQ being published by the Queensland division.

The magazine, to me, has become impersonal and I think is missing its primary role. When I was associated with the magazine, on the editorial staff, it was agreed that Amateur Radio was the

Official House Magazine of the WIA for dissemination of news and activities of members to the members. It would seem to me that this has now disappeared and we are out of contact with our fellow Hams throughout the Commonwealth. More importantly, we are not being informed of the activities of each of the Divisions. I remember the first thing we used to read, upon receiving the magazine, were the notes supplied by the Zone and branches of the WIA. The magazine was never intended as a technical journal.

I would invite your attention to other magazines such as QST which features, to a very large extent, activities within districts, provinces and zones in the U.S.A. and Canada. I also used to enjoy station descriptions, one a month, which we published for many years.

In these days of computerisation and other automatic means of communications, including push button Repeater communications, we are heading for more impersonalisation.

I offer the above comments purely as constructive criticism.

R. H. Cunningham VK3ML.

## 20 YEARS AGO

Ron Fisher, VK3OM

APRIL 1956

In 1956 the amateur was troubled with commercial intruders in the HF bands just as he is today. The Editorial page of the April 1956 issue of Amateur Radio took a long look at the problem. They concluded "It's up to each and every Amateur to do some real logging, screening out image reception, and reports of stations operating legally under the treaty. Go to it!". Perhaps we did not try hard enough!

With the commencement of television transmissions getting closer most amateurs were rather concerned about the possibility of TVI. For some months the Publications Committee had been on the look out for an article describing an easily built TVI proofed transmitter. The 2Y transmitter

was the answer. Described by N. S. Beard VK2ALJ, it featured a Geloso VFO driving a single 6146 in the final, and of course was a "table top" design as distinct from the more usual rack and panel construction of the time. This was to set the pattern for transmitter design in Australia for the next decade.

Also featured in April 1956 Amateur Radio was Hans Ruckert's "Home-Built DX Receiver". Hans always did things on a grand scale and his receiver was no exception.

Volts, Amps and Man. Robert H. Black, M.D. showed the various ways in which man may come into contact with electricity in his environment.

To round out a very interesting issue, data and operating conditions of the QCE03/20 and OOE06/40 were published as well as a few hints and kinks.

## QSP

NEAR MISSES

From Jan. '76 QST is a note that if a test for a General Class Licence is taken at a FCC examination point, but you miss the code test by only a small amount, you will be given credit for the Technician code element and can go on and take the written part of the exam. But you have to ask.

USA LICENCE RENEWALS

World Radio News of Jan. '76 advised that the FCC in the USA had eliminated the requirement that an applicant for renewal of an Amateur Radio Service licence state that he was able to send and receive International Morse Code at a speed not less than that at which he qualified for the licence being renewed and that he had lawfully accumulated either 2 hours operating time in the last 3 months or 5 hours operating time during the last 12 months. The FCC said the rule was unduly restrictive. A proposed revision of the FCC requirements was that the original of licences must be sent in for renewals. In the past photocopies had been accepted but some applicants had fraudulently altered the originals and submitted the photocopies on which the alterations could not be detected.

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2.08	5/8	8	3	No. 3006	\$1.16
2.16	5/8	16	3	No. 3007	\$1.16
3.08	3/4	8	3	No. 3010	\$1.40
3.16	3/4	16	3	No. 3011	\$1.40
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# AWARDS COLUMN

Brian Austin, VK5CA

To mark the year in which Cairns celebrates its centenary, the Cairns Amateur Radio Club is offering a certificate to those who qualify. Rules:

1. All stations outside the Cairns area are eligible. The Cairns area, for Award purposes, is a radius of 100 miles of Cairns.
2. VK and ZL stations must QSO with three Cairns area stations. Overseas stations must QSO with two Cairns area stations.
3. Send a copy of log details of QSOs to CARC VK4HM, P.O. Box 1426 Cairns, Qld., 4870. Awards will be forwarded in bulk via Bureaux unless the cost of post and packing (quarto size) is remitted.
4. The award will be available for the whole of 1976, Cairns' Centenary Year.

Cairns Callsigns: Cairns area stations are the following VK4s: TL YG AE RY HM KV DJ MH AMO NU HK VI VT DB SU NF ZY YT CI OX ZCS ZBU ZN<sub>2</sub> ZIP ZIB NI.

## WAZL AWARD

1. The award is available to all licensed amateurs and shortwave listeners (on a heard basis).
2. Contacts after November 1945 are valid.
3. Do not send QSL cards. A list showing callsigns, branches and other details should be certified by the Awards Manager of a National Society.
4. Endorsements may be claimed for bands and modes. In addition a special endorsement is available if all the contacts were made within a period of 12 months.
5. There is no fee for the award. It is suggested that 2 or 3 IRCs be sent to help defray expenses.
6. The address for applications is:  
NZART,  
Box 489,  
Wellington, N.Z.

Requirements: N.Z. amateurs require confirmed contacts with 45 different branches of NZART. Other amateurs require confirmed contacts with 35 different branches of NZART.

## NZART Branches:

1 Ashburton	36 South Westland
2 Auckland	37 Southland
3 Western Suburbs	38 Taumarunui
4 Cambridge	39 Tauranga
5 Christchurch	40 Te Awamatu
6 Dannevirke	41 Thames Valley
7	42 Titahi Bay
8 East Southland	43 Waihi
9 Egmont	44 Matamata Radio Club
10 Franklin	45 Waimarino
11 Gisborne	46 Wairarapa
12 Hamilton	47 Waitara
13 Hastings	48 Wanganui
14 Hawera	49 Westland
15 Hawke's Bay Central	50 Wellington
16 Horowhenua	51 Eastern Bay of Plenty
17 Huntly	52 Wairoa
18 Hutt Valley	53 Te Puke
19 Inglewood	54 Patea
20 Manawatu	55 Waitomo
21 Manukau	56 Hornby
22 Marlborough	57 Tokoroa
23 Marton	58 Helensville
24 Motueka	59 Mangakino
25 Napier	60 Taupo
26 Nelson	61 Central Otago
27 New Plymouth	62 Reefton Buller
28 Northland	63 Upper Hutt
29 North Shore	64 North Otago
30 Otago	65 Papakura
31 Pahiatua	66 Auckland VHF
32 Rāhōtu Coastal	67 Kawerau
33 Rotorua	68 North Canterbury
34 South Canterbury	
35 South Otago	

# HAMADS

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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

Frequency Meter BC221T, complete with charts and built-in stabilised power supply, hardly used, \$35. Richard Barnes, 1/21 Baden St., Coogee, 2034 NSW or Ph. (02) 59 0471, 10-5 p.m.

Vinten MTR13, ch. 1, 4, 40 (1 Rx only), 6 ch. capacity, Rx and Tx's well, MPF121 pre-amp in front-end, mute mod., with circuit, \$80; FM low band, TCA 1649A, suit 6m or parts, \$10. VK3ZMP, 2 Baranya Ct., Kaw, 3101. Ph. (03) 80 3704.

Drake R4B Rx in excellent condition, one owner, very late serial number, fitted with a number of extra xtals. Complete with handbook, \$400. Ph. (087) 25 2228.

FTV650 6m Transverter, new and unused, in carton and 6m antenna, new, \$170 ONO; Hygalin 650 AM novice transceiver, 23 channels, all working, service manual, never used, \$120 ONO. VK3AZM, QTHR. Ph. (03) 391 3055 bus.; (03) 749 1446 AH.

Yagi 2m, 10 elements, commercial make, ex VK2JH, \$10. Mrs. G. Hutchinson, 3 Cammeray Road, Castle Cove. Ph. (02) 406 5065.

Swan 240 Transceiver, 20-40-80, with AC supply, good condition, just been overhauled, \$225 ONO; also Eddystone 770U VHF-UHF Rx, 140 MHz to 500 MHz, good condition, \$185 ONO. Peter Milne, VK3BEJ, QTHR or Ph. (050) 24 5814.

FT200 Transceiver and power supply (71) with H/B, DC supply and handbook, \$320. VK4XV, QTHR. Ph. (07) 59 8570 AH.

Collins Rx Type 51J-4, Serial No. 6935, unmodified and complete with handbooks, but less speaker, \$500. Also, new antenna 18AVT/WB-A, \$50. VK3XY, items COD at QTHR. Ph. (03) 97 1265.

Drake R4B Receiver, T4XB Transmitter, MS4 speaker, complete station, all as new \$695. VK3OM, QTHR. Phone (03) 560 9215.

Realistic DX180 Solid State Receiver with matching speaker, all as new \$140 o.n.o. VK3OM, QTHR. Ph. (03) 560 9215.

Clegg FM27B Transceiver 146-148 MHz, with additional xtals for 145-146 MHz, supplied separately. Handbook and mobile mount, \$240. Heath SB610 scope, needs new CRO tube, OK otherwise, \$45. VK2WD, QTHR. Ph. (02) 42 6080.

## WANTED

Copy or loan of circuit diagram of Patec Signal Generator, type SG 150 kHz to 30 MHz, urgent. T. R. Powney, P.O. Box 32, Ocean Grove, Vic. 3226.

Tiltover and/or Crankup Mast and 20 metre beam or Tribander. Mal Sinclair, VK2BMS, QTHR. Ph. (02) 407 0261 bus.; (02) 95 2362 AH.

Theosophists, or similarly-inclined: Tom House, BA — VK2BTH — would welcome hearing from you. Skeds, preferably CW, eyeball QSOs or correspondence. 34 Wolseley Rd., Lindfield, 2070. Ph. (02) 467 2773.

Good Set (or part set) of TRAPS for Hy-Gain old model TH3 tribander Yagi; also for Hy-Gain TH4. Wanted circuit diagram for Star SR-550 Receiver. Price and details to A. M. McGregor, VK4KX, QTHR. Ph. (07) 36 5385.

Power Transformer for R5223 Communications Rx. Your price paid for reasonable unit. VK2BXF, QTHR (PC 2113). Ph. (02) 888 2981 AH or (02) 451 5555, ext. 26, bus.

Handbooks and/or Circuits to copy or buy for Hamcrafters Rx — SX111 and Tx HT-32. Peter Milne, VK3BEJ, QTHR or Ph. (050) 24 5814.

Transverters — 6m, 2m, 70cm, to suit FT101, also helical or trap verticals, anywhere in between 160m to 6m. Bob Yorston, VK2CAN. Ph. (02) 646 0317 (9 to 5).

# SILENT KEYS

It is with deep regret that we record the passing of —

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P. EVANS  
DR. J. D. ASHTON  
MR. R. H. GREENWOOD  
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VK3OG  
VK3OZ  
L30608  
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VK4JW

# PROJECT AUSTRALIS

David Hull, VK3ZDH

## MAY 1976

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time Z	Long °W	Date	Orbit No.	Time	Long °W
1	16196	01.21	75.30	1	6669	00.28	56.89
2	16208	00.20	60.30	2	6682	01.22	70.51
3	16221	01.15	74.05	3	6694	00.21	5
4	16233	00.15	59.05	4	6707	01.16	6.
5	16246	01.10	72.80	5	6719	00.15	53.89
6	16258	00.10	57.80	6	6732	01.09	67.51
7	16271	01.05	71.55	7	6744	00.08	52.38
8	16283	00.50	56.55	8	6757	01.03	66.01
9	16296	01.00	70.30	9	6769	00.02	50.89
10	16308	00.00	55.30	10	6782	00.56	64.51
11	16321	00.55	69.05	11	6795	01.51	78.13
12	16334	01.50	82.80	12	6807	00.50	63.01
13	16346	00.50	67.80	13	6820	01.44	76.63
14	16359	01.45	81.55	14	6832	00.44	61.51
15	16371	00.45	66.55	15	6845	01.38	75.13
16	16384	01.39	80.30	16	6857	00.37	60.01
17	16396	00.39	65.30	17	6870	01.31	73.63
18	16409	01.34	79.05	18	6882	00.31	58.51
19	16421	00.34	64.05	19	6895	01.25	72.13
20	16434	01.29	77.80	20	6907	00.24	57.01
21	16446	00.29	62.80	21	6920	01.19	70.63
22	16459	01.24	76.55	22	6932	00.18	55.51
23	16471	00.24	61.55	23	6945	01.12	69.13
24	16484	01.19	75.30	24	6957	00.12	54.01
25	16496	00.19	60.30	25	6970	01.06	67.63
26	16509	01.14	74.05	26	6982	00.05	52.51
27	16521	00.14	59.05	27	6995	00.59	68.13
28	16534	01.09	72.80	28	7008	01.54	78.75
29	16546	00.08	57.80	29	7020	00.53	64.63
30	16559	01.03	71.55	30	7033	01.47	78.25
31	16571	00.03	56.55	31	7045	00.47	63.13

# WANTED

ARTICLES AND  
PHOTOGRAPHS FOR AR  
EDITOR QTHR

## BETTER THAN FT101E?

FT101 Mark 2, B, or EE plus G3LLL's RF Clipper wins on price and performance — more Rx gain — better selectivity, also variable output control (run any power with full clipping, could solve your RFI or TVI problems, but at least ensures optimum results on all bands, fixed or mobile, and not only on 20 metres! See FT101E Processor instructions) AR test report on G3LLL's clipper — "average two S points gain on transmit", "no loss quality", standard clipper suits FT101 Mark 2, B, E and EE SPECIAL™ version for FT101 Mark 1. If in doubt send for details. England's only a post box away.

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YAESU MUSEN FT-101-E AC-DC transceivers 10 to 160 M.	<b>\$650</b>	LAC-2 lightning arrestors	<b>\$6</b>
TRIO-KENWOOD model QR-666 170 KHz to 30 MHz AC-DC receivers	<b>\$300</b>	Model AR-2 RINGO 3/4 waves verticals	<b>\$20</b>
BARLOW-WADLEY model XCR-30 MK-II receivers	<b>\$225</b>	AR-2X RINGO RANGER double 3/4 waves verticals	<b>\$35</b>
HY-GAIN ANTENNAS		ARX-2 extension for AR-2	<b>\$15</b>
14AVQ 10-40 M. verticals, 19' tall, no guys	<b>\$65</b>	A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each	<b>\$60</b>
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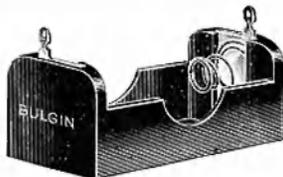
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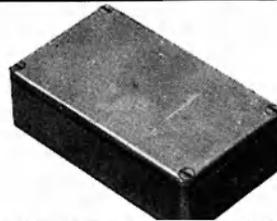
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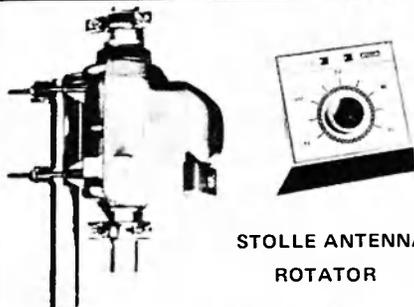
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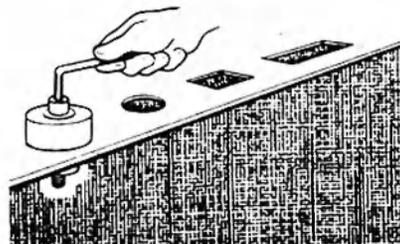
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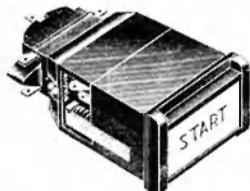
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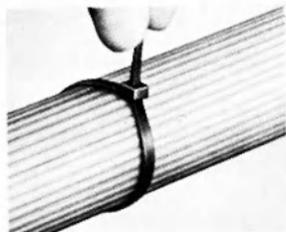
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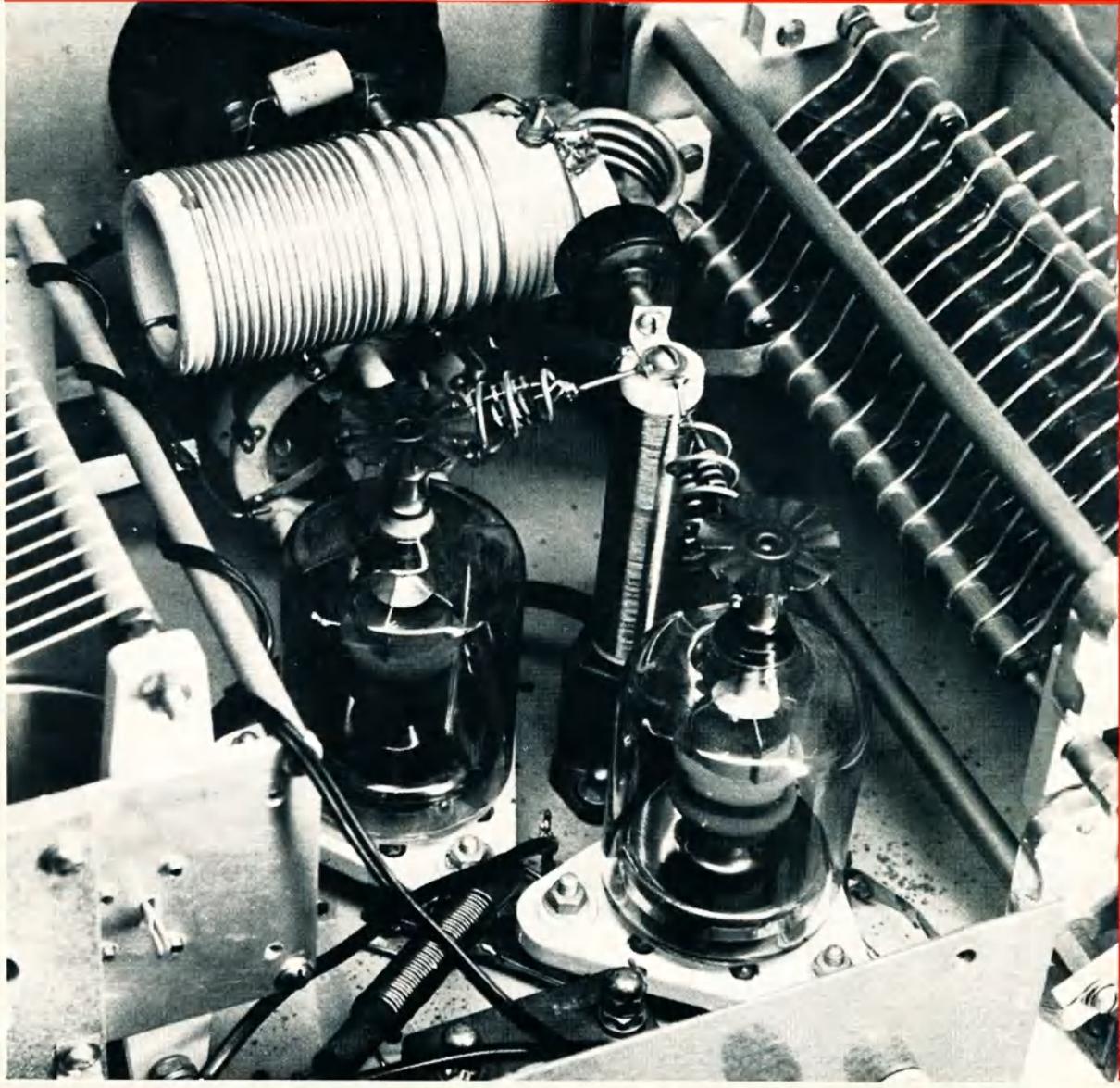
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VOL. 44, No. 5

MAY, 1976

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### COVER PHOTO

A close-up of the "works" of the VK3AAR 400 W PEP linear covering 80 to 10 metres.

Photo: VK3YCY



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2 METRE FM TRANSCEIVER  
22 Channels, fitted with Ch. 1 and 4 repeaters.  
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**\$235 — Extra Channel Crystals \$10 Set**

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**SPECIFICATIONS — FM Section:** Tuning range 88-108 MHz; Sensitivity, 5uV for 30 dB S/N; Signal to noise ratio, 55 dB; Intermediate frequency, 10.7 MHz; Distortion 1%; MPX separation, 25 dB; Antenna. Built-in line cord antenna, plus 300 ohm balanced input for external antenna; Output level, 200 mV.  
**AM Section:** Tuning range, 525-1650 kHz; Intermediate frequency, 455 kHz; Sensitivity, 300 uV/M; Signal to noise ratio, 40 dB; Antenna, Built-in Ferrite Bar Antenna, plus input for external system; Output level, 200 mV; Dimensions, 290 W x 100 H x 180 D (mm).  
**\$69.00 — Pack and Post \$3**

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#### 1 WATT 3 CHANNEL TRANSCEIVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION

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Transistors: 13  
Channel Numbers: 3, 27.24 OMHz  
Transmitter Frequency Tolerance:  $\pm 0.005\%$   
RF Input Power: 1 watt  
Tone Call Frequency: 2000 Hz  
Receiver type: Superheterodyne  
Receiver Sensitivity: 0.7 uV at 10 dB S/N  
Selectivity: 45 dB at  $\pm 10$  kHz  
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Audio Output: 500 mW to External Speaker Jack  
Power Supply: 8 UM-3 (penlite battery)  
Current Drain: Transmitter: 120-122 mA  
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We have Walkie-Talkie Crystals for the following frequencies

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**\$8 A PAIR (Transmit and Receive)**

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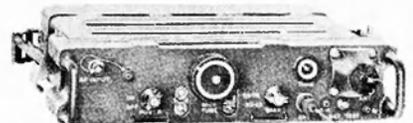


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# amateur radio

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Copy is required by the third of each month. Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.

The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

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# QSP FEDERAL CONVENTION

The 40th Federal Convention will be held this month from 7th to 9th at Diplomat Motor Inn, Acland Street, St. Kilda, in Melbourne.

There is every reason to believe that the volume of business will be so great that the time allowed may barely suffice.

In fact, your Executive is involved with so much of major importance to amateur radio throughout Australia that time is at a premium.

Preparations for WARC 1979 will occupy many hours of work each week inside and outside the working groups.

Consideration of the Arnold Report and any resultant action will occupy much time and thought.

Liaison with IARU is essential if the amateur service is to put up a united front.

There are many items of detail for consideration at the Convention. Detail which will affect us all in one way or another. Some degree of priorities will become essential.

Quite apart from this enormous work load there exists some need to re-examine the outcome of previous Conventions in specific areas.

If you cannot come along to the Convention, even for a short period, wish us well. If you can come along you will be very welcome.

Amateur radio is in need of your support and assistance. Help us to plan for the continuation of a bright future — better, if possible, than the past.

D. A. WARDLAW, VK3ADW  
Federal President

## EDITOR'S DESK

Bill Roper, VK3ARZ

Naturally enough in these days of inflation, economics dictates the size and presentation of AR.

It is interesting to note that the major overseas amateur radio magazines have now changed size to approximately that of this magazine, which confirms what we have known for a long time. This three column format is the most economical and practical size for us to use.

In August 1974 I was forced to place the "Contents" index on the front cover to solve a space problem. This move was favoured by many members and has now become a feature of AR.

If you looked closely at last month's issue you will have noticed some minor changes in layout. These have improved the appearance of your magazine, particularly the regular columns.

Although there are many problems associated with producing AR each month, two problems that have been with us for a long time are still causing concern. They are suitable photographs for the front cover, and drafting assistance for preparation of circuit diagrams and drawings.

Photographs of equipment are interesting, but AR is not just a technical magazine. We need photographs of people and their involvement with our wonderful hobby. Field day, contests, JOTA, Oscar, WICEN, QSL bureaux, ATV, RTTY, FM repeaters, are just a few that spring to mind.

Many amateurs are keen photographers. How about combining your interests. Like everybody else contributing to your magazine, we cannot pay you, but if your photograph is published complete acknowledgement will be given. Perhaps we could have an annual award of books from Magguba for the best photograph published.

Photographs should preferably be of high contrast, glossy finish, and about eight to ten inches square. However, other types can sometimes be used.

Difficulty in having circuit diagrams and drawings prepared for publication is the main reason why some articles are delayed for many months before appearing in AR. We need at least three new draftsmen. Previous experience would be preferred; we will supply the drafting materials. If you are looking for some way to put something back into your hobby, to become involved in your magazine, perhaps you can help us in this area. If so I would like to hear from you.

Cyril VK3AUM has brought to my attention the problems facing blind amateurs in trying to keep abreast of what is happening in amateur radio and in the WIA. Particularly when it is not possible to have someone read AR to them.

Unfortunately the WIA is not in a position to produce a "talking book" version of AR, but what a worthwhile venture for some amateur(s) to undertake for our several blind members.

If you would like to assist by reading AR on to tape, please let me know.

In addition to the comment in the Letters to the Editor column this month, Geoff VK3AMK has also commented on why so few VK amateurs appear in the ARRL DXCC lists. There is no doubt about it that the Australian DXCC is a keenly sought award and is deservedly preferred by Australian amateurs.

The small QSP paragraphs that appear throughout the magazine each month are an attempt to bring to you a synopsis of international news and views in the world of amateur radio. Reference to the ARRL DXCC listings comes under the heading of news, and in no way was intended as a reflection on the VK DXCC.

Only three articles were received for publication during March. We need a lot more!

## QSP

### NEW ZEALAND GOLDEN JUBILEE

Did you read "IARU News" on p.21 of AR for Nov. '75 about the NZART Golden Jubilee Conference in Auckland 4th to 7th June 1976? New Zealand is the currently popular holiday area because of their dollar devaluation. Add a bonus like their Conference arrangements and it becomes difficult to discover anything more attractive. Look for ZL1AA on about 3566 kHz each evening around 08.00 to 0.830Hz if you want more information or write to the Conference Secretary, PO Box 23-680, Papatoetoe East, Auckland, NZ. The registration fee is \$18.50 (NZ) and the keynote address will be given by Dr. W. H. Pickering of the Jet Propulsion Laboratory in the USA. Dr. Pickering is in fact a Kiwi and was a foundation member of the Wellington Branch of NZART.

### NATIONAL LIBRARY OF AUSTRALIA

Did you know that if any publication is printed in Australia for sale to the public a good copy of it must be lodged immediately with the National Library in Canberra? Copies of AR are supplied to the National Library in addition to the State Library in Melbourne so as to comply with legal requirements. The same applies to the Call Book. Copies of inserts into AR are not sent to the National Library since it is understood these do not go on sale to the public. However the National Library official has pointed out that if any document contributes to current information or future research on the subject area with which it is involved, the submission of a copy for the national collection helps the Library's responsibility to develop and maintain a comprehensive collection of Library material relating to Australia and the Australian people.

# WIANEWS

As might have been expected a number of additional Agenda Items came in from Divisions for discussion at the 1976 Federal Convention being held from 7th to 9th of this month at the Diplomat Motor Inn in Ackland St., St. Kilda.

The VK5 Division have put forward 14 Agenda Items plus a possible General Business Item suggesting that Ionospheric Prediction Charts should re-appear in AR showing the MUF/ALF curves. Charts of this kind were dropped from AR from March 1972. The last ones were on p. 8 of AR for Feb. 1972. The problems here will be one of drafting and one of the space required and the Publications Committee are very well aware of the situation. The unknown factor would be the percentage of amateurs interested in these charts which are likely to reflect much inaccuracy at this point in the sun spot cycle apart from the other factors now deemed desirable in preparing predictions. Please see the series of Ionospheric Predictions articles by Len Poynter VK3ZGP in recent ARs.

The South Australian Agenda Items cover theory examination exemptions for equivalent or better qualifications obtained from tertiary and other organisations to ease pressures on the present system and to make a study of what other theory examinations would be acceptable. Another seeks representations to be made for uninterrupted examinations.

A fourth wants standardisation on associated membership for Novice Licencees and a fifth seeks representations to have a longer duration morse test so that the candidate's best 5 minute receiving segment be marked. A sixth is introduced to clarify Divisional membership upon transfer of a member interstate.

The Division would like to see a policy adopted towards a standardisation of FM channel bandwidth/deviation for all WIA Band plans and in detailed submissions puts forward a proposal that the Institute should negotiate for ATV repeaters to be authorised with inputs in the 420-450 MHz band and outputs in the 576-583 MHz band since the latter band is covered by many domestic TV receivers manufactured overseas. The VK2 Division has also put forward an Agenda Item for the allocation of UHF TV channels 34 and 35 for Institute broadcasts and the like on similar grounds and stating that amateur color TV transmissions are already being made in this band.

The VK5 Division wants negotiations to be begun for the authorisation of official WIA broadcasts at any time.

The remainder of their Agenda Items deal with Contests and Awards. One interesting item suggests that the RD trophy should become the property of the VK5 Division when the Division wins it 6 times in a row. Another suggests that more points should be scored in field days by stations using non-fossil fuels. Yet another suggests that P2 stations should be eligible for Australian Awards if the operator is a WIA member. These notes are necessarily over-abbreviated to save space as the items in question will probably be debated around about the time you receive May AR.

From VK2 comes news of 70 cm repeater and simplex channels, spacings and a numbering system for consideration by the Convention in addition to their proposals relating to an exclusive EME segment from 432.000 to 432.050 MHz.

The Report from AARTG relating to RTTY idents and use of special codes such as ASCII has come forward and an Agenda Item will allow debate on this before official representations begin.

Yet other Agenda Items by the Executive will permit debate about the work and composition of Amateur Advisory Committees, work carried out by the IARU and preparations for WARC 1979.

## EXECUTIVE

Two meetings of the Executive were held during March. The first was a special meeting to discuss the Arnold Report. A small matter which came up indicated problems about contacting any amateur in Papua New Guinea interested in the IARU. Since PNG is a member of the ITU and will therefore have a vote in WARC 1979 perhaps an amateur society there could be formed to aid in the work of the IARU but as previously emphasised the WIA itself cannot be seen to take any initiative in this matter.

The Federal SWL Awards Manager will be going overseas in May and the Federal Awards Manager has kindly agreed to take over these duties.

## 11 METRE BAND

The ACT Division have produced guide lines for operators on the 11m band as promised at the 1975 Convention. This will come up for discussion as the matter is still "on the table". It is interesting to observe that by a footnote the amateur service "may operate" between 26.96 and 27.23 kHz in Region 2, VK and ZL. No restrictions apply. As a result the amateur service in this band has equality of right to operate with stations of the fixed and mobile services in the band and all must accept IMS interference.

## PIRATES

A letter received from the Minister for Post and Telecommunications during March assures the WIA that the Government "does not contemplate changing the long-standing policy adopted in relation to the operation of a Citizens Band Radio Service in Australia as was enunciated by the PMG" in the letter published on page 8 of AR Oct. 1974. He goes on to say that the Government is most concerned about illegal radio operators and advises that a number of ways of more effectively dealing with the problem have recently been examined.

## AX CALL SIGN

An approach has been made to "Central office" for VK stations to be granted the optional use of the AX prefix for the period 1st July 1976 to 31st July 1977 to mark the 75th year of Australian Federation. This idea derived from the VK4 Division.

As you will have seen from the "Editor's Desk" column in April AR VK3TX will shortly relinquish his post as Manager of the Key Section. At the time of writing efforts are being made to find a suitable replacement for him.

## FIRST NOVICE EXAM

Some criticisms have been levelled at the 5 wpm morse exam for Novices as well as about some of the 50 "multi-choice answer" type of questions in the one hour Novice theory exam. It should be noted that the length of the "dit" determines the morse code speed but many amateurs not particularly proficient in the art often prefer the actual letters to be sent at a greater speed than the spaces in between since this facilitates rhythm recognition as opposed to translating from one language to another. Get an expert to send correctly at 5 wpm (this could be difficult) speed and you will observe the long-drawn-out effect of very slow CW. These were some comments on the morse paper; others seemed to favour high speed characters with long spaces in between. Unfortunately there can be only one standard. Yet others complained about a tone change during the receiving test.

Comments on the theory paper varied from "a reasonable standard" to "some very difficult questions unanswerable by an AOCIP holder". Perhaps the lack of some syllabus to follow coupled with inadequate home-work by the candidate seem to be comments on the problem areas as the great majority of the questions were definitely elementary although some required more thought than others. Copies of the Novice exam paper were difficult to obtain and this is likely to be the future pattern because of the alleged difficulty in finding enough elementary questions from so simple a subject.

The 30 minute "Regulations" paper appeared quite straightforward to anyone who had studied "the Handbook" and bearing in mind that this paper is the same for everyone. Incidentally the revision of the Handbook is under way — as it has been for some time. The Institute is doing work on this through the good offices of VK5TY but delays occurred awaiting the Novice licensing legislation followed by other revisionary legislation to the act. The outcome of the latter is still unknown although it has now been assumed to have lapsed. Whether or not WARC 1979 and its preparatory work will affect the revision of the Handbook is another question mark.

Since the Novice exam paper was the first in the series and the number of candidates was unusually great there is every reason to believe that future exams (morse in May, all sections in November) should begin to run much more smoothly. A suggestion came up that the Novice Investigation Committee of the

early 1970s should be revived but this could be overtaken by events — refer to April WIANEWS in the paragraph beginning "Two other complex matters also received attention".

### BROADCAST MATERIAL

At the end of March arrangements were made to produce "Federal" broadcast tapes for Divisional broadcasts. Thanks to the work of Bill Roper VK3ARZ, and Ron Fisher VK3OM, this additional news service should assist in the dissemination of amateur radio news to reinforce the written word in AR and to reach the non-WIA listener.

A news release from the ABCB indicated as a by-line that Mr. Jim Wilkinson will be taking up an appointment with the Post

and Telecommunications Department. It is understood he will head the Radio Frequency Management Division of the Department — a return to his former stamping ground. An extract was received from a publication entitled "Telecom 2000" put out by the ATC and sent in by a keen member. This leaves little to the imagination in relation to VHF/UHF frequencies for the mobile services and seems likely to govern thinking for WARC 1979. Unfortunately it is too lengthy for reprint in AR but Divisional Federal Councillors possess a photocopy of section 4.

### WARC 1979

In relation to WARC 1979 please see IARU News in this issue. ■

## QSP

### CRO PHOSPHORS

The Feb 1976 issue of CQ-TV (available on subscription of \$4.50 per annum from "Magpubs") contains details of 35 American JEDEC "P" series of phosphors and would be of interest to many.

### INSURANCE

Latest information from the USA (e.g. Ham Radio CQ QST Feb '76) indicates that thefts of rigs from motor vehicles has assumed such proportions that in one State (Texas) auto insurance policies are clause with an exclusion for loss or damage to CB, 2-way mobile radio or telephone, including accessories.

### IARU

The Dec '75 issue of the official IARU "Calendar" contains advice that the REP (the IARU member society for Portugal) has notified the establishment of a competing society ARP in Portugal and hence under IARU Rules requests societies not to maintain any relationships (including QSL bureau services) with ARP. The same issue includes a note that the Guyana AR Assoc. newly joined IARU as a member in 1975 and an application is pending from the R. Soc. of Swaziland. Of the 740,000 worldwide amateur radio stations some 737,000 are in countries represented by the 89 IARU member societies. The first 5-band WAC award was issued to JA7AO in Oct. '75 — not an easy award to get.

### MOBILE EXPLOSION HAZARDS

This is the heading for a section in TT by G3VA in Radio Communication Feb. '76. He writes "for many years it has been recognised that the operation of a radio transmitter in areas where blasting operations are being carried out represents some degree of hazard owing to the possibility of small electrical sparks". Similarly this can cause explosions due to the ignition of flammable gas mixtures. Some work, he writes, has been done on site lately which shows that ignition of explosive mixtures can be due to any sparks which may be produced by natural wires or metallic structures forming resonant aerials, that this is most likely to occur at frequencies from 3 MHz upwards and that as frequencies increases there will be a tendency for any sparks to be maintained over a longer period thus reducing the power needed for ignition to occur. All the more reason not to operate anywhere near re-fuelling stations and particularly not when your car or boat is being filled up with petrol.

### SPECIAL OE PREFIX

To celebrate 50 years of amateur radio, special prefixes may be used by Austrian stations from 1st April to 30th June 1976 using OE50 in place of the OE prefix. Thus OE1XA becomes OE50/1XA, OE3CL becomes OE50/3CL and so on. Jan. '76 RI News.

### NEW ITU MEMBERS

According to IARU Region 1 News, Jan. '76 Korea (Democratic People's Republic) and Mozambique (People's Republic) have acceded to the ITU Convention thus bringing the total membership up to 146.

### NEW CALL SIGNS

Contrary to QSP items previously published, the IARU Region 1 News for Jan. '76 shows the call sign series D2A-D3Z as being allocated provisionally by the ITU to the Republic of Mozambique. D4A-D4Z and D5A-D5Z are shown as provisionally allocated to the Republics of Cape Verde and Liberia respectively.

### CONGRATULATIONS

A snippet from a professional journal, sent in by an anonymous reader, tells us that Surg. Capt. Jim Lloyd, the Executive Vice-Chairman has been appointed Director General, Naval Health Services with effect 18th May. Sincere congratulations Surgeon Rear Admiral S. J. Lloyd.

### OLD TIMERS CLUB

The advertisement on p.25 of AR March '76 may have alerted many old timers (holding an amateur licence 25 or more years ago, qualifies) that a local group now functions. About 60 sat down to dinner on 10th March, including some from interstate and from country areas, and a most enjoyable evening ensued. The gathering included a spry 85-year-old amateur therefore many items of historical interest were discussed and no doubt were noted by the Chairman VK3ML, assisted by VK3DH and Federal Historian VK3ZS. A club was formed so if you require further details, please write to VK3ARV QTHR, who hopes to compile (with photographs) thumb-nail sketches of 'old timers' for the record. ■

## TRY THIS

Ron Cook, VK3AFW

Bill Rice, VK3ABP

### SIMPLE 10.7 MHz SWEEP GENERATOR

John Day VK3ZJF and  
George N. Long VK3ZDB

We occasionally need to look at the response of an IF amp or a filter. This circuit was developed for just that requirement and can quite easily be used for any other frequency. Normally we use a spectrum analyzer as a fixed tuned receiver for

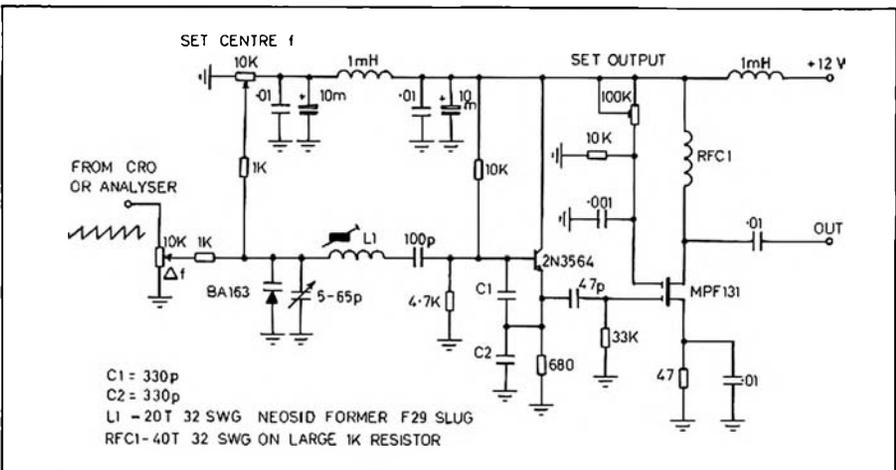
### FURTHER TO THE IC202 REVIEW

Since the review of the IC 202 was published in March Amateur Radio, the English instruction manual has come to hand. This appears to have similar content to the Japanese version, but has one notable addition. There is now a full printed circuit board layout plus a voltage chart for each transistor and IC in the unit. Details are also included on the fitting of extra crystals for additional band coverage. Circuit adjustment points are also clearly shown on several internal photos. These manuals are available to those who may have received only Japanese manuals with their IC 202's purchased from Vicom International. ■

its wide dynamic range of about 70 dB. However, a CRO is quite satisfactory if you are prepared to accept the limited dynamic range.

The VARICAP diode used was an ITT BA163 but could be just about any form of VARICAP you have with sufficient capacitance range. All other details should be self-explanatory; however the three capacitors in the oscillator frequency determining network should be STYROSEAL types.

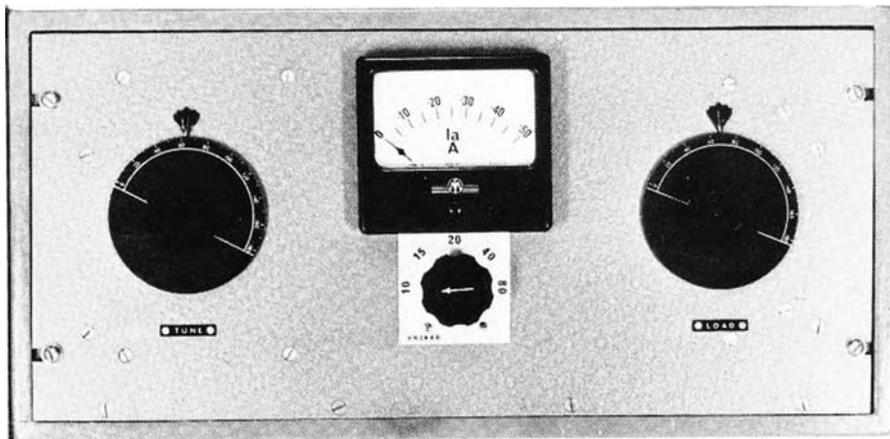
The 2N3564 can be replaced by any NPN Silicon device such as the 2N3693, 2N3643, BF115, provided it will oscillate. The MPF131 is the latest version of the old MPF121 which could be used or you could use any of the following: FT0601, MPF122, 3N210, 40672. ■



Circuit of a simple 10.7 MHz sweep generator

# A LINEAR POWER AMPLIFIER FOR AUSTRALIAN CONDITIONS PART TWO

R. A. J. Reynolds, VK3AAR



Front view of the VK3AAR 400W PEP linear

The subject of screen and bias voltages will be controlled very closely by the tubes chosen, and the manufacturers recommendations should be followed for the plate voltage chosen. There are a few observations which should be made. It is important that the bias and screen voltages are well controlled. Preferably they should be regulated and well bled. There are some tubes, particularly in the 4CX250 class, which can draw negative screen current, and if the supply is inadequately bled, the voltage will rise dramatically and the tube, to say nothing of the filter components in the supply, will fail prematurely.

The rest of the design is basically the same for all amplifiers of this class. The output stage will consist of a Pi coupler whose purpose is to match the impedance of the plate circuit to that of the antenna feedline. The plate circuit impedance will be as low as 500 ohms in the case of a handful of sweep tubes, and as high as 8000 ohms in the case of a couple of 4-125As under grounded screen zero bias with 4 k V on the anode. The required output impedance from the coupler will depend on the antenna to be used, and we have stated that it must be at least a 2:1 SWR against 50 ohms. Flexibility to match loads outside this range is, of course, to be encouraged. At the same time as providing an impedance match, the coupler will provide the output filtering necessary to remove or at least attenuate the harmonics present in all amplifiers other than purely Class A.

The Pi coupler consists of three components which, in Fig 1 are C3 L and C4. The rest of the components around this circuit will be discussed later.

An excellent treatment of the general design of Pi couplers suitable for linear amplifiers is given in the 'Radio Data Reference Book' by G. R. Jessop, which is a RSGB publication. The treatment in this book covers the design for use in various classes and services of amplifier. Both the input and the output Pi couplers are considered by means of one or two basic equations and a series of ABACs and graphs. About 20 pages of this book are dedicated to this subject, and even if

a home brewer does not build his own coupler, a read over these pages will give an insight into just what happens in that rather magical unit.

Very briefly, the design involves calculating the RF waveform impedance at the anode, stating the output impedance at the transmission line, and then for each band, applying the ABACs and graphs to determine the values of C3 L and C4 required for Fig 1. The ABACs and graphs are for a loaded Q of 12 which is satisfactory. Greater or lesser Q's are used but a Q of 12 is stated to be a good compromise for filtering and component size.

Since we have opted for a power output of about 400 Watts PEP and the general trend seems to be towards a power supply of about 2500 to 3000 volts for the anode, our input impedances will all be about 4000 to 5000 ohms and we have already stated that our output impedance will have to cover the range 25 to 100 ohms. This virtually fixes the design of the output coupler. The only situations where major design variations will occur will be the case where a handful of sweep tubes is used, and the case where tubes are run at very high voltages. Both of these cases will require individual treatment. Several designs have appeared for the sweep tubes, and only the more adventuresome of us will try the 4000 Volt class. Fortunately, a single design of Pi coupler will therefore suit nearly all linears built for Australian conditions.

Considering that such a unit, or at least the coil and switch assembly, is available commercially at a very moderate cost, there does not seem to be much point in home brewing this assembly. The cost is less than a single output tube, and if one tube is saved from destruction in the 'turn on' testing by having the right inductance in circuit, then the investment will be worthwhile. A suitable unit, which covers the 80 to 10 Metre Bands, is available from William Willis & Co. Pty. Ltd., 77 Canterbury Road, Canterbury. One word of comment. The switch unit on this assembly will handle 400 Watts without distress, but operation at 600 Watts CW with an HT of 3700 Volts did cause switch failure, as did

trying to use the second bank of contacts to switch a little more primary capacity for the lower bands. These failures occurred during limit testing of a prototype. (No. into a dummy load!)

However, in normal service, no problems should be experienced. The efficiency of the Willis coupler was such that no fall off of performance was observed at 10 Metres when used with high frequency tubes. A capacitance range of 30 pF to about 200 pF was required for the input capacity and up to 1000 pF is required at the output. Remembering that there will be about 10 pF anode capacity in the output tubes, this means that C3 will need to cover from 20 to 190 pF or so. There may be some difficulty in achieving this from available variable capacitors, and special precautions may need to be taken. This will be discussed in the construction section of this article. Since there may be a desire to feed a low impedance aerial directly on 80 metres, a 1000 pF variable in the output may need to be augmented with another 750 pF fixed capacitor. A switch contact on the Willis coupler is provided for this purpose.

As far as the design of a typical linear is concerned, all that remains to be considered is a few minor components. With reference to Fig 1, consider each in turn.

## RFC1

This is the HT choke. No matter what the rest of the design is, this choke will be almost invariant. It needs the following properties. It must have a reactive impedance which is high compared with the plate impedance on all bands, it must be able to carry the DC plate current without resistive loss, and it must be able to withstand several thousand volts of RF longitudinally.

Many designs have appeared for this choke in varying complexities, since there is one problem. That is that the self resonance of a coil wound for a high impedance at 3.5 MHz is likely to lie in the area 10 to 30 MHz. Now it is important that the self resonance frequency is not near any of the Amateur Bands, and systems of staggered winding pitches, varying diameters, and combinations have all been

tried with success. However, even the simplest design does work. A piece of 3/4 inch diameter Teflon close wound with 24 SWG high quality enamel wire for a length of 3 1/4 inches, self resonates at 17 MHz as determined with a GDO. There is nothing magic about those dimensions, they were just a guess. At all events, this choke has been satisfactory on all bands without heating. (Turn power off and make sure that the HT is discharged before feeling how hot the choke is!)

**C1**  
This is the very important DC blocking capacitor. To provide maximum coupling it must have a low series impedance at all operating frequencies. The performance at 3.5 MHz requires that the capacity must be greater than about 1000 pF and the heating performance at 30 MHz requires that the capacitor type must be a low loss coaxial ceramic type. The fact that the HT is about 3000 Volts or so demands that the voltage rating should be well in excess of this figure. Since the matter of safety also comes into this, it is suggested that a working voltage rating of 7.5 kV DC or better be chosen. Capacitors similar to those manufactured by Centralab (Series 850S) are suitable.

**C2**  
A 1000 pF 5 kV mica will serve as an adequate bypass capacitor.

**RFC2**  
This RFC serves two purposes. Firstly it provides a DC path to ground should the DC blocking capacitor fail, and secondly it provides a static drain to clear static build-up from the antenna which can fail the blocking capacitor.

A third use for this component was discovered at VK3AAR. The linear was being used into a dipole without a DC return path, with a Bird thru-line wattmeter in circuit, and the application of the HT to the linear induced a sufficiently large pulse through the blocking capacitor (1800 pF) to destroy the diode in the wattmeter element. Fitting the choke removed the

problem. The size of this choke is not important and about 1 mH is adequate. However, the wire size should be large enough to blow the main power fuse should the blocking capacitor fail. For example a 2 cm ferrite ring wound with a single layer of 24 SWG enamel wire works adequately.

**APC**  
The Anti Parasitic Choke will be a composition type carbon resistor about 50 to 100 ohms, "Shorted" by about 2 or 3 turns of 16 SWG tinned copper wire. One will be required in each anode lead. This choke suppresses VHF spurious emissions.

Grid and screen bypass capacitors will be 1000 pF disc ceramics or similar.

The only other component to be found in the linear where design is required is the heater choke required for the grounded grid amplifier. The size of this choke will be controlled by the filament current. An air choke to carry the 14 or so amps required by most tubes, having at the same time a high RF reactance compared with 300 ohms, would be quite a monster. Fortunately, we can resort to the use of ferrite once again. There seems little point in doing an absolute design, and the experience of others yields a unit that is easy and cheap to construct. An ordinary broadcast band ferrite rod about 1/2 inch diameter, bifilar wound with 20 turns of 16 SWG enamel wire, gets a little warm at 14 amps, but operates quite well.

Apart from a few practical aspects that become evident when the linear is being built, and which vary from unit to unit, the above covers the general design of the amplifier part of the linear. Jumping the gun a little, and considering the final construction, it is possible to build a satisfactory linear with no input matching circuit, no screen supply, and no bias supply. The final circuit will be as shown in Fig 8. This would appear to be the simplest circuit that I could build within the components that I had available. There is nothing unusual or novel about this circuit, but under test it does deliver 400

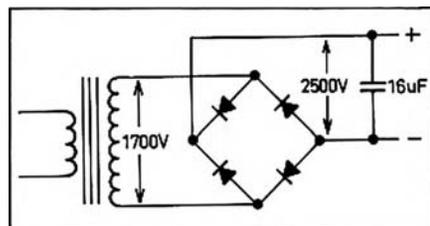


FIGURE 9

watts PEP on all bands using a 2-tone test into a 50 ohm dummy load, with a minimum of fuss.

Whilst not part of the linear amplifier itself, the design of a power supply is worth more than a passing mention. We have already established that we need between 1000 and 4000 Volts, at currents that we can deduce to be between 1 Amp peak at 1000 Volts and 250 mA peak at 4000 Volts. Under misalignment the peak currents may be twice these figures. The average currents will be about half the above currents.

However, over a period of several hours, the mean energy required from the power supply will be quite low. This raises several problems with regard to just how large the power supply components need to be. Again there is no single solution to the problem. The simple alternative of RF speech processing or not changes the power supply size by some 20 to 30% when processing is used.

For the home brewer the power supply is likely to be the most expensive item, particularly if he does not already have a power transformer and filter components. So it is well worthwhile examining the design of the power supply in some detail, if only to avoid expensive mistakes. As in the case of the linear amplifier itself, let us establish the requirements of the supply.

**Input power:** 240 V AC single phase.

**Output Voltage:** Let us consider an average of 2500 Volts.

**Output Current:** Syllabic maximum: 500 mA.

Average (5 minutes): 350 mA (speech Processed), 250 mA (unprocessed).

Average (1 hour): 150 mA (speech processed), 110 mA (unprocessed).

**Ripple at 500 mA:** Better than 3%.

**Regulation:** From zero current to syllabic maximum: 10%.

**Subsidiary supplies:** Filaments: 5 Volts at 15 Amps; Relay supply: 24 Volts DC at 500 mA.

**Metering:** Plate current, 0 to 500 mA. Plate voltage, 0 to 3000 Volts.

The justification for setting the above targets rests with experience and the accepted practices. Certainly the average current ranges will vary somewhat from operator to operator, so it will not be unreasonable if we consider the worst conditions in the following treatment. The individual may choose for himself if he wishes to cut down on the design.

Both at the commercial and home brew levels, the design of power supplies varies

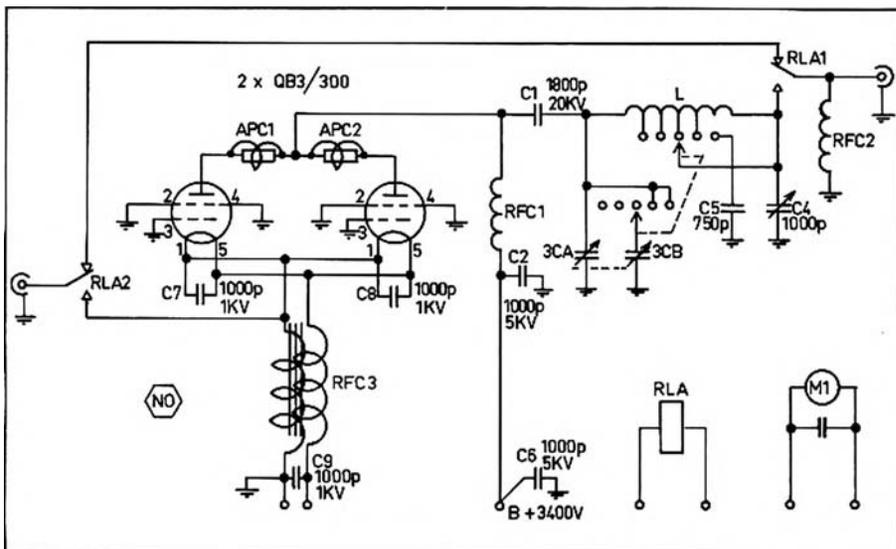


FIGURE 8

# MULTI-7 23 CHANNEL TRANSCEIVER



**VHF ONLY \$189.00**

**MULTI-7 VHF 2 METRE 23 CHANNEL TRANSCEIVER**

Compare this unit - no others have all the features.

- Exclusive receiver fine tuning for "off frequency" stations.
- Inbuilt centre zero discriminator meter for frequency adjustment
- Exclusive "AFB" (audio feed back) squelch circuit opens on the weakest of signals.
- Helical resonator and crystal filter
- Speaker can be changed to top or bottom of cabinet
- Special "instantaneous" channel button allows instant QSY to nominated channel.

Frequency Range: 146.0 to 148.0 MHz. 23 Channel FM Transceiver All solid state construction. RF power output 10W or 1W with switch. Receiver Sensitivity: 1.0uV @ 30 dB S/N Power Requirements: 13.5V DC @ 2.3A max. Size: 134Wx58Hx216D mm Weight: 1.8 kg. Comes with microphone, mobile mount, manual and DC leads. Supplied complete with one set of crystals on channel 40 (146.00 MHz)

Cat. D-3007 ..... \$189.00

**SPECIAL**

Additional crystals available at \$6.00 per channel if purchased with the multi 7 (Yes - this will give you 6 channels for only \$219.00 - a bargain)

Crystals normally available for the Multi 7 include repeater and anti repeater 1, 2, 3, 4, 5, 6 and simplex channels 40, 50 and 52.

## KENWOOD COMMUNICATIONS EQUIPMENT

**TS-700A \$645**

**TRANSCEIVER**



**TS-520 TRANSCEIVER**

**KENWOOD TS-520 TRANSCEIVER**

TS-520 Transceiver is designed and engineered for the enthusiast who wants the most professional equipment made. Features outstanding receiver sensitivity. All solid state engineering. Driver and final stages valves. Long-lasting performance. Amplified-type two position ALC circuitry gives vastly improved rise characteristics and excellent compression. Dial coverage is 100 kHz per turn in 1 kHz graduations. 8 pole crystal filter, and exclusive high stability FET VFO. (Mic. not included).

**Specifications:**  
 Frequency Range: 3.50, 7.00, 14.00, 21.00, 28.00 MHz, WWV - 10.00 MHz (Receiver only)  
 Mode: USB, LSB, CW  
 Carrier Suppression: 40dB  
 Unwanted Sideband Suppression: 40dB  
 Sensitivity: High impedance (50k $\Omega$ ) 0.5uV for 10dB (S+N)/N on 80 to 15 meter band, 1.0uV for 10dB (S+N)/N on 10 meter band.  
 Selectivity: SSB: 2.4 kHz (1-6dB), 4.4 kHz (60dB), CW: 0.5 kHz (1-6dB), 1.5 kHz (60dB) (with optional CW filter)  
 Frequency Stability: 100 Hz per 30 minutes after warm-up  
 Power Requirements: 120/220 VAC, 50/60 Hz 12VDC  
 Dimensions: 333Wx150Hx335D mm  
 Weight: 16 kg.  
 Cat. D-2520 ..... \$570



**KENWOOD TS-700A ALL MODE TRANSCEIVER**

TS-700 All Mode Transceiver is for 2 M operation and is equipped for SSB, FM, CW and AM. Features sending and receiving capability on 22 channels with 11 crystals from 144 MHz to 148 MHz. Rugged final stages are fully capable of sustained operation. This results from maximum performance transistorization throughout. Has Noise reflector type squelch circuitry, AC/DC capability, and dual tuning mechanism with bandspread for maximum convenience. Performance is further highlighted by noise blanker, amplified type AGC circuitry, dependable S meter, and built-in marker oscillator.

**Specifications:**  
 Frequency range: 144 MHz - 148 MHz. Mode SSB, FM, CW, AM. RF power output: SSB, CW & FM - 10 watts. AM - 3 watts. IF frequencies: 1st IF - 10.7 MHz; 2nd IF - 455 KHz Receiver sensitivity: SSB & CW - 0.5uV input for 10 dB S/N, FM - 1uV input for 26dB S/N, AM - 2uV input for 10dB S/N Selectivity SSB, CW & AM - 4.8 kHz (at -60 dB), FM - 40 kHz (at -50dB)  
 Frequency stability: 34 kHz from 1 minute to 60 minutes after switching on; thereafter, 200 Hz per 30 minutes of operation.  
 Dimensions: 278Wx124Hx320D mm. Weight: 11 kg. Equipment provided: 500 ohm dynamic microphone (1), 2 ampere and 5 ampere fuses (one each); extension speaker plug (1); auxiliary feet (2); pin-type plugs (2); AC cord (1); DC cable (1); decals sheet (1).  
 Cat. D-3100 ..... \$645.00

# MULTI-2000 SSB/FM/CW TRANSCEIVER



**\$585.**

**MULTI 2000 TRANSCEIVER**

The ultimate in 2M equipment, operates on FM, SSB, CW. Transceives between 144.0 and 148.0 MHz in 10KHz steps. Fully synthesised repeater offset. 4 fixed channels (crystals not included) high and low power, noise blanker, wide and narrow band switch etc. Sensitivity FM : 1.0uV, SSB/CW : 0.3uV. RF output : 1W and 10W (PEP). Built in power supply for 240 volt AC or ext. 12 volt DC. Cat. D-3010 ..... \$585.00

# KENWOOD 2 METRE. TRANSVERTOR \$240

**TV-502 Specifications:**  
 Frequency Range: 144.0 - 148 MHz. Mode: SSB, CW, Antenna Impedance: 50 ohms. Sensitivity: 1uV for 10dB (S/N) Image Ratio: 60dB. RF Rejection: 60dB. Dimensions: 168Wx153Hx336D mm. Power Output: 10 watts. Matching Unit for TS 520 transceiver.  
 Cat. D-3502 ..... \$240.00



# 15-6 METRE MOBILE LINEAR AMP. \$159

**100 watts input on AM with 2.5 watts drive. Front panel selection of 15 M band, 10/11 M, or 6 M bands. Automatic keying delay for SSB. No internal wiring of transceiver required. No internal tuning controls. Stand by position on selector switch. Transceiver sized automatic RF Keyer built in. Compact heavy gauge steel cabinet. Operates from 12V Draws 15 Amp max on SSB peaks. Weight: 8 lbs.  
 Cat. D-2540 ..... \$159.00**



# NOVICE TRANSVERTER KIT \$99.50

**DICK SMITH "NOVICE TRANSVERTER" SEE E.A. April '76**

10 metres to 80 metres at up to 30W p.e.p.

Designed by Australia's top RF Engineer, exclusively for us.

The cheapest and best way for a novice to get going on 80 metres.

Put in any signal (AM/FM/SSB) on the 27 MHz novice band and it is instantly "Transformed" (down to 80 metres).

Inbuilt receiver converts "Transvert" 80 meter signals up to 10 meter novice band.

Max power 10 watts and 30 watts p.e.p. SSB from as little as 100mV input (and suitable 100W-3 Warts)

Easy to build (takes about 3 hours) fit prototyping boards, fully reverse voltage protection

Input and output 50ohm

13.8 volt DC (max) operation - ideal for Mobile rigs

Supplied with special 27 MHz Xtal which allows follow frequency to 81 transverters to 80 metre section of novice band.

Cat. K3134 ..... Very Special Offer \$99.50



# SCOOP PURCHASE HY-GAIN AERIALS

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greatly, and particularly if you have certain major components, you are quite justified in copying an established circuit. Let us consider the pros and cons of some of the more usual power supply configurations.

### FULL WAVE WITH A PAIR OF 866a AND CHOKE INPUT

This circuit is the traditional one. Its advantages are that the regulation is very good, the current in the rectifier tubes is kept as low as possible and high value capacitors are not required. Against it are the higher transformer voltage, the high bleed current and the large swinging choke that are required. The use of 866s would seem to be dubious in these days of semi-conductors.

### VOLTAGE DOUBLER

This class of circuit is quite popular in the 1000 Volt output class. The power transformer is quite easy to make, high current rectifiers are cheap and available, and high value 600 Volt electrolytic capacitors are not over expensive. However, at higher voltages, electrolytic capacitors have to be cascaded to obtain the high working voltages needed. A general problem with doubler circuits is that the ripple and regulation is poorer with the same total capacity compared with a full wave circuit.

### HALF WAVE RECTIFIER

This circuit has many of the problems of the voltage doubler circuit, and in these days of inexpensive solid state rectifiers, there is much to be gained by using a full wave bridge, using the same power transformer.

### FULL WAVE BRIDGE

At voltages near the 2.5 kV that we are considering the full wave bridge has many advantages. It provides the best ripple performance obtainable with a single phase circuit and consequently minimizes the size of the filter components. In fact, for a linear amplifier, adequate filtering may be obtained with a single storage condenser. The disadvantage of this circuit is that a power transformer of high voltage output is required, and the output winding must be floating; that is no part of the winding may be connected to earth. This latter fact does present problems to the transformer designer.

With all this in mind, the logical choice for our linear power supply would be the full wave bridge, or if a suitable transformer is available, a conventional full wave two diode circuit. The best generally available method for power supply design is that detailed in the Radiotron Designers Handbook edited by Langford-Smith. For each circuit type that we have mentioned, plus a few others, curves are published from which the regulation, ripple and component ratings can be obtained for a given circuit. Conversely, given some of the parameters, the remainder can be deduced.

Using this design method for our general example we discover that the ripple requirement predominates and that a 16 uF single storage capacitor will suffice. Of course, it would be possible to use a

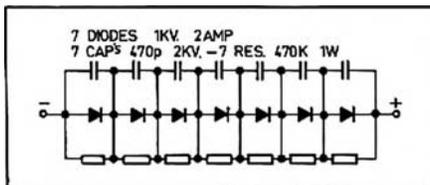


FIGURE 10

smaller Input capacitor of 6.5 uF followed by a 10 henry filter choke followed by another filter condenser of 1 uF. My opinion is that these extra components are not necessary, and since the single condenser circuit improves the regulation from 10 to 7%, the larger value is to be preferred. So the rectifier circuit becomes that shown in Fig 9.

Since we are using a condenser input filter, the required transformer secondary voltage is the output required DC divided by the square root of 2, which works out to be 1770 Volts. The storage condenser will need to be rated for a working voltage of something greater than 2500 V DC. The fortunate amongst us will reach into the junk box and find a 16 uF 8500 V DC paper capacitor weighing about 10 kilos, as I did, the rest might find kind friends or be forced to "manufacture" such a unit from several electrolytics fitted with balancing resistors.

Continuing with the design method we discover several more important design parameters. Each of the four diode legs will have an average current of about 250 mA, a repetitive peak of about 5.5 Amps and probably a turn on surge current of about 30 Amps. It is quite easy to see why simple circuits like this were not used in the days of valve rectifiers. Even now, some care will have to be taken in the choice of diodes. Using a factor of safety of 2.6 for PIV, a figure which is satisfactory for unprotected circuits, each leg will have to be rated at more than 6500 peak inverse volts. Following the usual practice, each leg could consist of 7 diodes

each rated at 1 or preferably 2 Amps average forward current and 1000 volts reverse, connected in series, each diode having a 470 pF 2 kV disc ceramic condenser and a 470 K 1 W resistor in parallel across it. So each leg will look like Fig 10. There is little point in saving pennies in the diode department, and the above calculations are based on the syllabic current.

The power transformer does not have to work this hard. Diodes heat up quickly, but transformers take some time due to their mass. Hence, the transformer need only be rated at something like the 1 hour average.

Considering the speech processed case, the average DC output is 150 mA, which means that the transformer will have to be rated at something like 230 mA RMS, or 400 VA continuous. For this sort of service the expression IVS or intermittent voice service is used. The IVS rating for the transformer we have just described is about 1350 VA IVS. It sounds better anyway. All the same it is a fairly lusty transformer, and one which you would prefer to buy at disposal prices.

Two other supplies are required, the filament and relay voltages. The filament supply may be obtained from a separate filament transformer, or if there is room on the main transformer, sufficient turns of a suitable gauge wire may be added to obtain the correct filament voltage. Much the same can be said of the relay supply. In the case of my own unit the main transformer provides the HT and filament windings, whilst a small 18 Volts aside transformer raises 24 volts DC by means of a couple of diodes and a 1000 uF 30 V electrolytic. These fine details will depend very much on the size of the junk box.

A suitable power supply circuit for the linear amplifier of Fig 8 is shown in Fig 11. A conventional voltage divider and shunt is used to adjust a meter to read supply voltage mounted on the supply chassis, while a 1 ohm shunt and adjust-

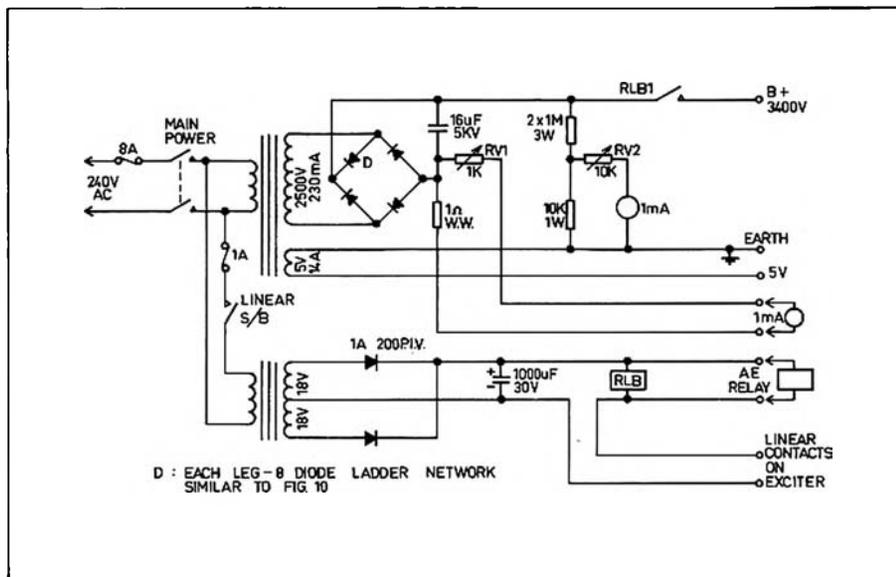


FIGURE 11

able multiplier operates a remote meter mounted on the linear chassis indicating anode current. Note that this arrangement does not permit the high voltage to be applied directly to the meter movements. During receive the HT must be removed from the anodes to avoid noise and possible receiver destruction should the final take off. A long throw circuit breaker RLB connected in parallel with the aerial changeover relay RLA removes all but the filament power from the linear chassis.

There are alternative methods for removing the HT from the tubes. Opening the cathodes with a smaller circuit breaker will bias the tubes hard off, but will leave the anodes high with respect to ground. Removing the 240 Volt power from the transformer, or opening the high voltage secondary will all kill the HT, but will introduce the problem of high surge currents each time the press to talk or vox operates.

This concludes the electrical design of the linear and power supply. A design has been deduced that is as simple as possible, using a minimum of components at what should be a low total cost, certainly less than a completed commercial amplifier. The only design parameter that we have relaxed is the input impedance, which we could modify should we wish to do so. Probably the only facet of the overall design that we have not covered is the mechanical layout. A few general comments can be made, but the choice of tubes possible and the range of parts that may be available to the constructor, makes

a general mechanical layout impossible. My feelings on general details are as follows:

I consider that the power supply should be enclosed in such a way that the high voltage components may only be touched with difficulty, and this must include abuse by any person. Ventilation holes should be small and even covered with a fine mesh. The use of a suitably large transformer and solid state rectifiers may permit a completely closed box. An adequate power earth should be provided through the input power cable. This prompts an interesting detail. A problem that is observed by many linear operators is the syllabic modulation of the power mains. It is not unusual for an exciter and linear combination to pull current from the mains varying from half an Amp to about 8 Amps. This causes lights to flicker, VFOs to drift and all sorts of associated problems at a syllabic rate. So it might be necessary to power the linear from a different power circuit. Operators with shacks remote from the domestic power board, may have to run a second power feed to the shack. Even with normal supply regulation, a variation of about 5 to 10 volts is quite possible on the 240 volt mains.

The linear amplifier itself should be well screened, and at the same time well ventilated. The use of perforated or expanded metal achieves both these aims. As well as a coaxial earth to the exciter, a separate earth to the exciter using a length of recovered coax outer will help to reduce RF feedback. In operation, the increased

quantity of RF around the shack due to high transmitter output may increase the possibility of RF feedback in general. The usual treatment of improved earthing, removal of RF current on coax outers, and general shielding will correct the problem. So, a little elementary design, a little construction, and you too can say . . . "An FT101E into a homebrew linear running the legal limit". (Next month the author describes his success in building a 400 W PEP linear covering 80 through 10). ■

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## AN AR SPECIAL

## A REVIEW

## OF THE

## UNIDEN

## 2020 HF

## TRANSCEIVER

To those of us who started out in amateur radio in the immediate post war days and were brought up on such names as Hallcrafters, National, Johnson and Collins, the new crop of Japanese amateur equipment manufacturers seem strange indeed. However, as time passes, no doubt many of these new names will be just as famous and synonymous with our hobby.

Uniden is perhaps the most recent addition to the amateur vocabulary.

In actual fact, Uniden have been producing high grade commercial communications gear for some years now and whilst the 2020 represents their first attempt at the amateur market, it is backed by this experience and obviously a keen know-how of amateur requirements.

### TECHNICAL FEATURES

The 2020 is a five band transceiver that covers the 80, 40, 20 and 15 metre bands with 500 kHz coverage on each band.

The ten metre band is covered in four steps of 500 kHz each to give a total coverage of 28.0 to 30 MHz. The eleven metre band is also included with 27.0 to 27.5 MHz coverage. While the Japanese models provide receive only facilities on this band, all 2020's sold in Australia have transmit function on this band. A receive only band from 15.0 to 15.5 MHz is included for reception on WWV and also a few short wave broadcast stations.

Operation is provided for USB, LSB, CW and AM. Separate filters are included for upper and lower sideband which allows for change of sideband without frequency shift. These filters have a nominal band-pass of 2.4 kHz at -6 dB. Also included as standard is a 600 Hz CW filter.

Perhaps the most unusual feature of the Uniden is the tuning system. Instead of covering the full 500 kHz in one sweep as is usual these days, there are five, push-button selected, 100 kHz segments. This enables the operator to shift from one end of the band to the other by simply pressing the appropriate button. The frequency generation system associated with this



The Uniden 2020 with matching speaker and external VFO.

tuning method employs the advanced phase locked loop technique.

Rather than take up space here, I would refer readers to page 16 of November 1975 Amateur Radio for a full description of the operation of this system. The PLL circuit is claimed to improve frequency stability over that obtained with a more normal set up. Just how this works out will be discussed later.

Another unusual feature of the Uniden is the dial readout, which is a combination of digital by LEDs for the Megahertz and one hundred kilohertz segments, while the hertz and tens of hertz are displayed on a rotating drum dial with calibrations drawn to imitate the LED readout of the first portion of the dial. Even the red colour of the LEDs has been perfectly matched.

The Uniden 2020 has all the normally expected features of a modern transceiver. It will operate from AC mains from 110 to 240 volts as well as from 12 volts DC. It has receiver offset tuning but once again the Uniden does it with a slight twist. Two tuning ranges are provided, one with  $\pm 5$  kHz and the second with  $\pm 1$  kHz. The bandspread RIT is selected with a pull-on switch on the offset control.

A cooling fan for the final stages is another part of the standard equipment, as is a three position AGC selector for fast, slow or off. A noise blanker and a built-in monitor loudspeaker are included. Needless to say, the Uniden is all solid state except for the transmitter driver and final stages which use a 12BY7 and two 6146B tubes respectively. 52 transistors, 16 FETs, 18 ICs and 154 diodes are employed in the solid state sections.

All this adds up to a very complex piece of gear and there are surely more components per dollar paid out than any other piece of gear available on the market today. It will of course be interesting to see how reliable the Uniden proves to be after a few years of operation.

Obviously, with such a complex circuit, a good deal of space could be taken up with descriptions of each and every part of the transceiver, but I think most readers will be more interested in how the transceiver handles, how it sounds, and what happens when the knobs are turned.

### THE UNIDEN 2020 ON THE AIR

In appearance the 2020 is quite different to any of its competitors. It is also rather large by current standards. It measures 350 mm wide by 165 mm high by 333 mm deep and weighs in at 39.6 pounds or

18 kg. It might therefore be hard to fit into the average family car if mobile operation is required, and would represent quite an effort to lift off the operating table into the car and return. However, most amateurs will probably be using the Uniden as a fixed station only. Incidentally, when running from 12 volts DC, the standby current drain is 7 amps with 22 amps peak at full SSB output.

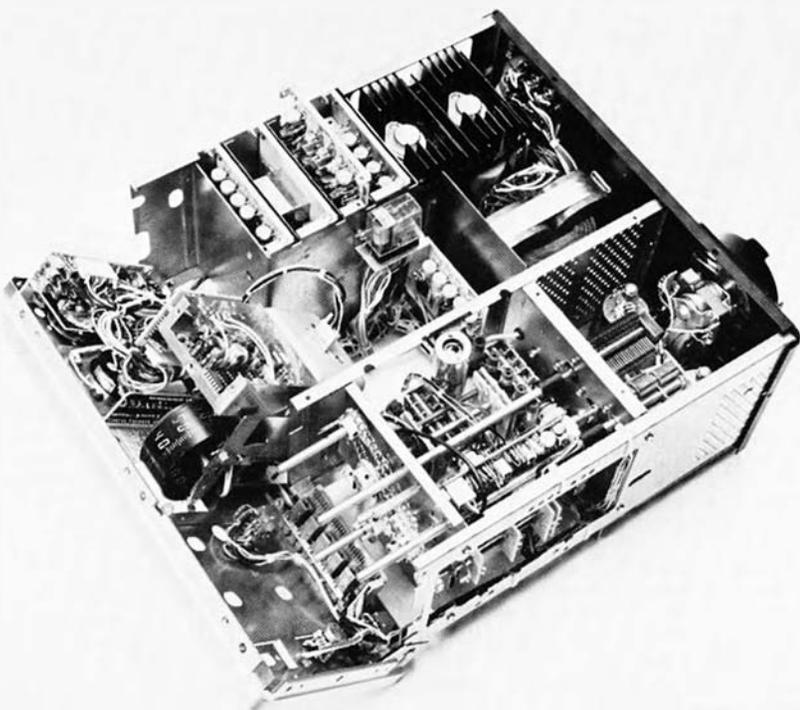
The 'S' meter, which also reads ALC voltage, cathode current, and relative RF output when in the transmit mode, must be the clearest meter on any piece of amateur gear on the market today. It has a predominantly bright green scale with a red needle that stands out with remarkable clarity. The meter movement is well damped and average readings can be taken without any eye strain at all.

The tuning system of the 2020 proved a little disappointing. Firstly, the tuning knob is much too big. One about fifteen millimetres smaller in diameter would be much easier to turn. It also seems an odd omission that a spinner handle has not been provided. The 100 kHz tuning range could also come in for some criticism. It seems that the designers of the 2020 set out to prove Murphy's Law. That is, that the station you want to listen to is just outside the range of that particular segment.

If you like to tune up and down the band it is amazing how often this happens. But, speaking to many owners of the Uniden, the majority put the tuning system on the top of their best-liked features list.

Calibration points on the kilohertz dial are spaced about 1.5 mm apart and the pointer, which can be adjusted vertically to achieve zero set, is illuminated to give excellent contrast against the moving scale. Linearity of the kHz scale is quite good. It checked out to within 500 Hz over the full range.

The crystal calibrator works with rather an unusual system. Instead of using a 100 kHz crystal as is normal these days, a 6.4 MHz crystal, with a multi-vibrator to divide down to 25 kHz is employed. Though unusual, it appeared to work somewhat better than the older 100 kHz system with regard to stability. However, the strength of the 25 kHz points on the various tuning ranges was rather low and in fact often hard to find at all amongst the QRM on 80 and 40 metres. An average of 'S' 8 was obtained with the lowest reading on 80, and the highest of just over S9 on 10 metres.



This exploded view of the 2020 shows many of the components and the facility of swinging out the front panel for easy access.

Switching from band to band produced no more than a 500 Hz change in the dial calibration point.

Another feature of the tuning system is a tightness control for the knob. This enables the tension to be controlled up to the point of actually locking the knob; quite a handy feature for mobile operation.

One last comment on the tuning dial is that if the transceiver is used in a position with direct sunlight falling on the front panel, the readout becomes very hard to see. Unfortunately this is one of the problems that has to be accepted with LED readouts and there does not seem to be any easy solution.

The dual speed offset tuning proved to be a delight to use. The  $\pm$  one kHz range was ideal for setting an SSB signal spot on. A separate switch is provided for the RIT and a small and rather dull LED above the control indicates operation of this.

Frequency stability was next checked out. The published specification is rather vague, stating 'Less than 300 Hz drift in starting. Less than 100 Hz drift or less after 30 minutes of warm up'. This would seem to indicate that no more than 400 Hz drift could occur over all. In fact, over an eight hour period, the 2020 drifted 1400 Hz. If the specification is interpreted as meaning 100 Hz drift per hour after warm up, then this would be just met.

The above is not implying that this amount of drift is in any way unsatisfactory. For the average amateur using the 2020 for two or three hours, the total drift would be very small and go unnoticed.

However considering the complex system of frequency generation, the Uniden does little better in regard to stability than any other modern transceiver.

The action of the noise blanker was disappointing. It did reduce the level of car ignition noise to some extent and proved useful in weak signal copy through this type of interference. On all other types of noise such as electrical appliances and power line noise, no noticeable improvement could be detected. As far as could be seen there is no adjustment to increase the blanking action.

One of the small but nice features on the 2020 is the inclusion of a tip-ring and sleeve headphone socket. This enables the use of the common and cheap stereo type headphones available from supermarkets and discount shops. An attenuator is also included to bring the audio level to the right point.

On receive the Uniden proved a most pleasant set to listen to. Audio quality from the built-in speaker, which is set into the bottom cover of the cabinet, was very well balanced. It produced a full, round tone that is often lacking with these small speaker units. The overall good quality was assisted by a first rate AGC system. Several owners suggested that the slow AGC position could have been a bit slower, but after listening for several lengthy periods no strain or fatigue was encountered. Whilst no actual measurements were taken it was obvious that both the product detector and audio output section were working with very low distortion.

A point of criticism is the cooling fan. Reading the advertising on the 2020 the impression is gained that the fan switches off when the transmitter heaters are off. This does not occur. It is possible to switch the fan off in the receive mode but to do this it is necessary to reach behind the set and push the 'RF power AMP' switch to the off position. This is normally actuated when a transverter is connected. To make matters worse, the fan is by no means silent. It produces a good deal of low frequency rumble. The actual fan mounting seems to be the culprit as the motor noise is transmitted through the cabinet which sets up a resonant effect.

On transmit, the Uniden proved to be a very smooth performer. Power output was checked at 110 watts on 80, 40 and 20 metres with 100 and 95 watts on 15 and 10 metres. This was in the CW position with PEP output on SSB essentially the same. The transmitted wave form as viewed on a Heath SB610 monitor scope was extremely clean. No doubt this can be attributed to the regulated screen voltage on the 6146B finals. The AM output is double sideband and the transmitted signal was of good quality. Power output on AM averaged about 35 watts. Double sideband AM reception is not possible with the 2020.

VOX operation on SSB was very smooth. There is no audible clicking or plopping through the speaker and only a very subdued sound from the relay. Those who are consistent VOX operators may find the delay a little long even when set to the shortest position. It would seem that this could be modified with little trouble.

## ACCESSORIES

The Uniden is supplied with a very complete set of accessory plugs and connectors. These include a good quality PTT dynamic microphone with curly-cord and four pin screw-on connector. A spare microphone connector is also included for use with your favourite mike. In addition to this you receive a PL259 antenna plug, several RCA plugs, headphone and key plugs, 3.5 mm plug for an external speaker, plus spare fuses, and extra cabinet feet to raise the front of the transceiver.

The instruction book is very well produced. Actual operating data is complete and well illustrated. As is usual these days, no alignment data is included and trouble shooting is assumed to be the dealers problem rather than the individual amateur. However, if you are game, there is an excellent illustration of each circuit board showing every part clearly.

There is a full range of external accessories available for the Uniden 2020. These include an external VFO and matching external loud speaker. The unit used in our test report was supplied by Vicom International of 139 Auburn Road, Auburn, Victoria, and information regarding price and delivery of the Uniden 2020 and its external accessory units should be addressed to them, or to their Sydney branch at 23 Whiting Street, Artarmon. ■

# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

## AN 80 METRE NOVICE RECEIVER — PART 1

The receiver has proved to be a lengthy project trying to obtain the two conflicting requirements of good performance with simplicity of design. The receiver is sensitive — any signal worth listening to on a Yaesu Musen FR-100B receiver is quite readable on the Novice receiver.

The selectivity is not as good as the FR-100B but is quite reasonable when it is considered that the parts for this receiver cost about the same as a good crystal or mechanical filter. It is quite stable as regards tuning stability and is a very effective monitor receiver for the companion transmitter. This means that it can handle a very strong signal without overloading, and is capable of receiving AM/CW/SSB/FM transmission modes over the frequency range 3.5 to 3.85 MHz.

It is the intention of this series of articles to form both an instructional and constructional series for those who want a simple but effective receiver and those who want some tuition towards an Amateur Exam. This month the circuit diagram of the receiver will be presented along with a detailed parts list. A detailed description of the receiver operation will commence next month.

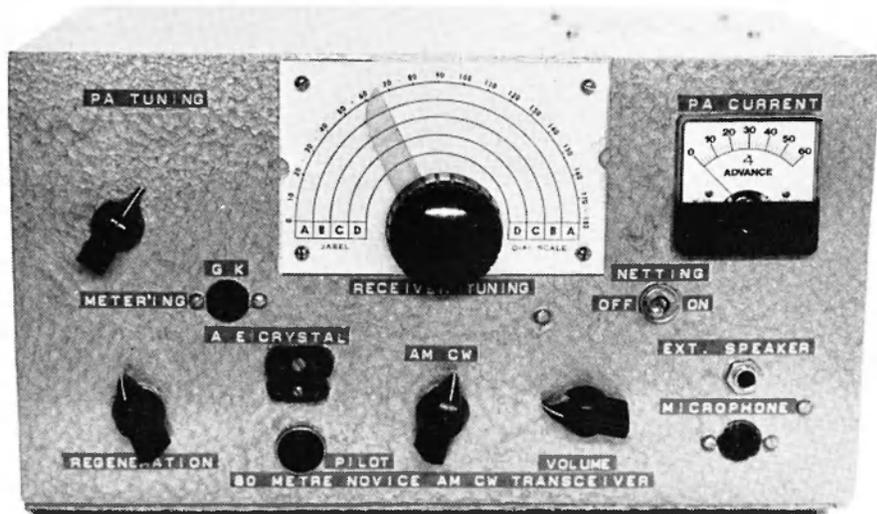
The receiver is mounted on the same chassis as the previously described transmitter (although it can be mounted on a separate chassis if desired). The above chassis layout is shown in Fig 1 of December 75 AR. However, since that diagram was drawn, a 455 kHz IF transformer has been mounted between V4 and V5. V7, a voltage regulator, is mounted in any convenient spot on the chassis. R72 the monitor level control is mounted just above the metering socket shown on Fig 2 of December 75 AR. Please note that STR2 is the same terminal strip shown in the circuit diagram of the transmitter in September 75 AR.

### COMPONENT LIST FOR THE 80 METRE NOVICE RECEIVER

R50 — 16 K ohm 2 watt, or 2 X 33 K ohm 1 watt resistors in parallel. The value of this resistor depends on the supply voltage which in this particular case is about 360 V DC. The resistor is intended to drop the HT voltage to the heptode section of the frequency converter V4.

R51 — 47 ohm 1 watt, valve heater balancing resistor, equalises voltage drop across the series-parallel heater network. Can be deleted if the heaters are wired for parallel operation from 6 volts.

R52 — 5 to 22 ohms ½ watt, determines the amount of RF signal attenuation achieved when the moving arm of R53 is at the R52 end of its travel. It can be omitted which will mean that R53 can short circuit the aerial input coil.



A front panel view of the novice transceiver described in this series of articles.

R53 — 3 K ohm wire wound or carbon potentiometer. 3 K ohm is optimum but values between 2 K and 5 K ohm will be useable. It is used as an RF gain control by increasing the negative bias on pin 2 of V4 relative to the cathode pin 3.

R54 — 15 K ohm 1 watt, portion of a voltage divider supplying nominally 100 volts to pin 1 of V4 despite variations in current drain of the screen with variations in bias applied to the grid pin 2.

R55 — 18 K ohm 1 watt, portion of the voltage divider mentioned above. The current through this voltage divider also causes a voltage to be dropped across R53 which improves the RF gain control operation. R53 also forms portion of this voltage divider network across the HT supply.

R56 — 390 ohms ½ watt, cathode bias resistor for the heptode section of V4. This sets the minimum operating bias for the heptode, but not the triode, and allied with the screen voltage controls the maximum current drain of the heptode section.

R57 — 47 K ohm ½ watt, grid leak for oscillator section of V4.

R58 — 10 K ohm 1 watt, HT dropping resistor for the oscillator section of V4.

R59 — 10 K ohm wire wound potentiometer, used as the regeneration control of the regenerative detector stage. Varies the voltage on the screen of V5 which controls its gain and the point at which oscillation occurs.

R60 — 18 K ohm 1 watt, drops the voltage from the regulated 150 volt line to about 60 volts at the top end of the regeneration potentiometer.

R61 — 1 M ohm ½ watt, grid leak for the regenerative detector. Grid DC return to cathode.

R62 — 3.3 K ohm ½ watt, used purely as an RF attenuator so that RF would not be radiated about the chassis by the line to the regeneration control. The value is not critical and may be left out in some cases.

R63 — 100 K ohm ½ watt, plate load resistor for V5, audio voltages are developed across this resistor.

R64 — 0.47 M ohm ½ watt, grid return for V6a, audio voltages are developed across this resistor by the action of C68, R63 and the operation of V5.

R65 — 100 K ohm ½ watt, used as a grid stopper but in conjunction with C69 forms part of the audio top cut filter.

R66 — 2.8 K ohm 2 watt (2 x 5.6 K ohm 1 watt in parallel), HT voltage dropping and decoupling resistor.

R67 — 2.2 K ohm ½ watt, cathode bias resistor for V6a.

R68 — 47 K ohm ½ watt, plate load resistor for V6a, same function as R63.

R69 — 0.47 M ohm ½ watt, grid return for V6b, audio voltages are developed across this resistor by the action of C72, R68 and the operation of V6b.

R70 — 100 K ohm ½ watt, used as a grid stopper, but in conjunction with C73 forms part of an audio low pass filter. Operation the same as R65.

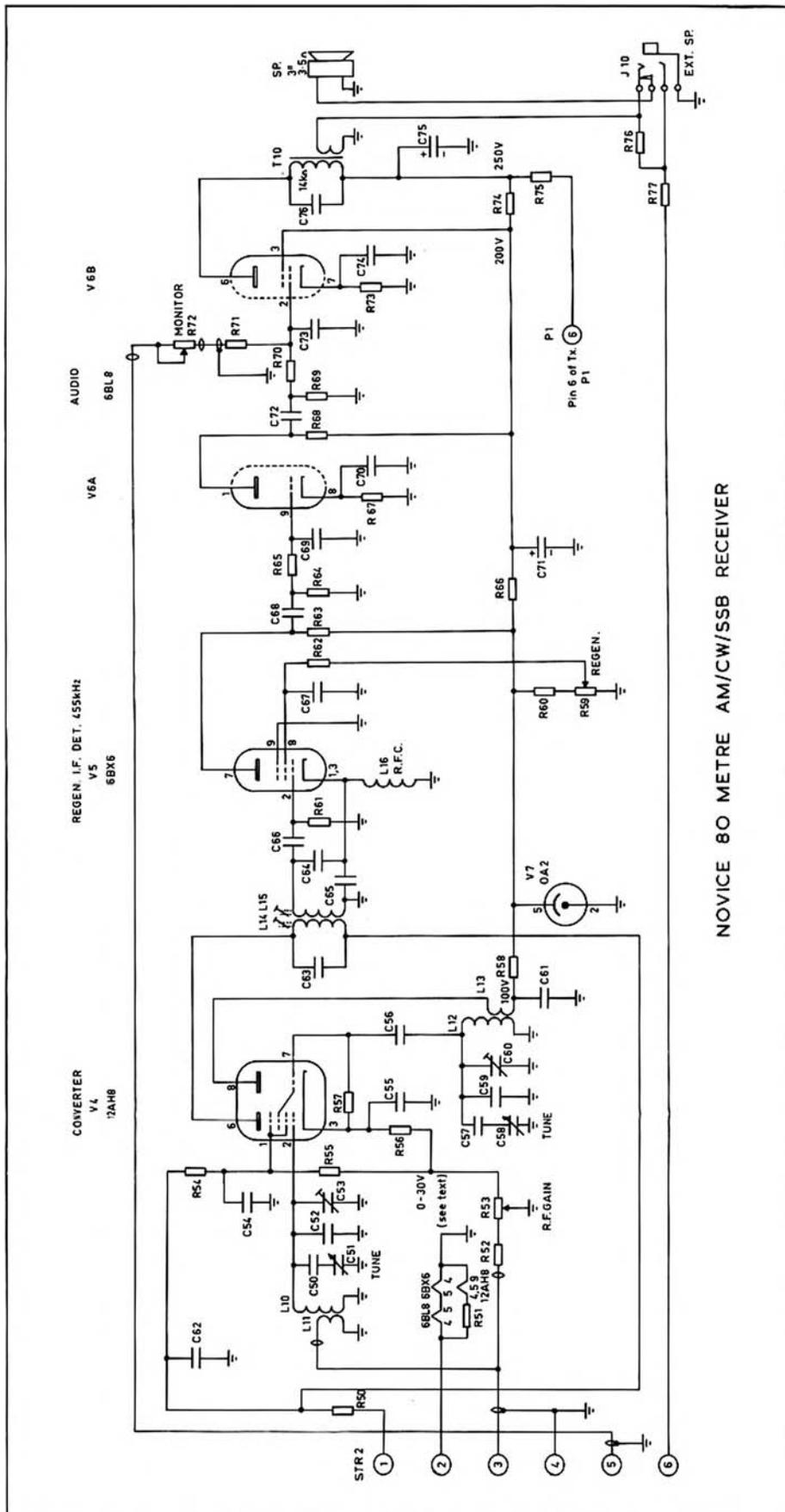
R71 — 2.7 K ohm ½ watt, used in monitor circuit to set minimum monitor level. Can be omitted if the monitor facility is not required.

R72 — 100 K ohm carbon linear or log type potentiometer, used to control the receiver audio output level when the receiver is used for monitoring purposes.

R73 — 330 ohms ½ watt, cathode bias resistor for V6b, in conjunction with the screen voltage sets the DC current drain of the valve.

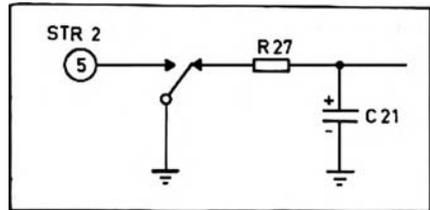
R74 — 2.2 K ohm 2 watt (1K and 1.2 K ohm in series), HT voltage dropping and decoupling resistor.

R75 — 3.5 K to 4 K ohm 5 watt wire wound resistor, used to drop the available power supply voltage down to 250 volts from 360 volts in this case. The value of this resistor will vary with different supply voltages, being higher if your supply is above 360 V and zero if supply is 250 volts.



NOVICE 80 METRE AM/CW/SSB RECEIVER

- R76 — 50 to 150 ohms ½ watt, drops level of output to a level acceptable for headphones, determined by experiment.
- R77 — 150 ohm, originally used for monitoring purposes coming from the modulation choke in the transmitter. Redundant now as receiver monitors the transmitter RF signal direct, but useful if receiver is not being built and the transmitter audio is being monitored direct.
- C50 — 92 pF mica or styroseal, used in series with C51 to get Aerial and Oscillator circuits to track 455 kHz apart. Controls the maximum effective capacity of C51.
- C51 — 10-415 pF tuning gang, one gang of a twin gang capacitor. The aerial coil tuning capacitor.
- C52 — 250 pF mica or styroseal, acts as a band set capacitor, selects approximately the portion of the radio spectrum tuned by the receiver.
- C53 — 3 to 30 pF trimmer capacitor, used to peak the tuning of the aerial tuned circuit.
- C54 — 0.01 uF 400 volt polyester, RF screen bypass capacitor for V4.
- C55 — 0.0047 uF 100 volt green cap or polyester, RF cathode bypass for the heptode section of V4.
- C56 — 47 pF mica or styroseal, local oscillator section of V4 coupling capacitor from the tuned circuit to the oscillator grid.
- C57 — 68 pF mica or styroseal, used in series with C58 to set the maximum frequency range of oscillation of the receiver local oscillator, in this case from about 3.955 MHz to 4.305 MHz.
- C58 — 10-415 pF tuning gang mechanically coupled with C51, tunes the oscillator from 3.955 MHz to 4.305 MHz.
- C59 — 180 pF mica or styroseal, acts as a bandset capacitor.
- C60 — 7 to 70 pF Philips or similar trimmer, used to fine adjust exact segment of the band tuned.
- C61 — 0.022 uF 200 volt polyester, oscillator feedback coil RF bypass, placed bottom end of L13 at RF earth.
- C62 — 0.022 uF 400 volt polyester, RF bypass to earth for V4 plate circuit.
- C63 — 100 pF mica, tuning capacitor for L14 and is already built into the 455 kHz IF transformer.
- C64 — 100 pF mica, tuning capacitor for L15 and is already built into the 455 kHz IF transformer.
- C65 — 0.047 uF 200 volt polyester, used in conjunction with C64 to form an RF voltage divider at the junction of these two capacitors so that the regenerative detector can get RF feedback in the correct phase to produce oscillation when the valve gain is high enough.



Modified in modulator

Head Office & mail orders . . .  
 139 Auburn Rd, Auburn, Vic. 3123 Ph: (03) 82-5398  
 Sydney Branch . . . (Manager — Jack Gilham)  
 23 Whiting St, Artarmon, NSW 2064 Ph: (02) 439-1271

Prices and specifications subject to change without notice. Prices include Sales Tax but exclude freight and Insurance. Allow 50c per \$100, minimum \$1.

## HF TRANSCEIVERS

Uniden 2020 80-11M transceiver, complete	\$570
Atlas 210/215 X solid-state transceiver including noise blanker	\$695
Atlas AR-230 AC power supply Atlas Deluxe mobile mount (DMK) \$ 55	\$165
Kenwood TS520 80-10M transceiver, complete	\$598
Yaesu FT101E 160-10M transceiver, complete	\$670
Yaesu FT75B mobile transceiver	\$280
— FP75AC power supply — DC75DC power supply \$ 70 \$ 75	
Weston 27MHz transceiver, 5 watts AM	\$135

## LINEARS

Yaesu EL2100B hf linear	\$430
QM-70 2M 50W rms	\$105
OM-70 79cm 40W	\$ 70

## TEST GEAR

Yaesu YO-100 monitor scope	\$205
Yaesu YC-355D frequency counter	\$250

## SPEECH COMPRESSORS

MC33A AC/DC includes two tone generator and in-built compression level meter	\$62
MC22 AC/DC as above less meter	\$ 49

## VICOM FOR PERSONALISED SERVICE

Meet our Melbourne Branch crew . . .



Peter, VK31Z

Russell, VK3NT

MAL, VK3MW

## NEW COUPLERS

CL666 Antenna Coupler 2.5kW, 1.8-28MHz, 0.3dB loss, heavy duty, superb quality	\$235
CL66 Antenna Coupler 500W, 3.5-29MHz, 0.3dB loss, includes 4 pos coax switch	\$ 98
CL199 Antenna Coupler 200W, 3.5-29MHz	\$ 47

## 2m Fm

IC22A incl 6 chs, 12 month warranty	\$219
IC215 portable, 6 chs, 12 month warranty	\$160
DV-21 PLL VFO for IC22A	\$285

## ANTENNA ACCESSORIES

Vicom hydraulic 40' tower, fob Auburn	\$570
HAM II heavy duty with control unit	\$168
CD 44 medium duty with control unit	\$135
8 core cable for rotators — 75c/metre	
Vicom VC-2 SWR/power meter, 3-150 MHz, up to 1000W pep, twin meters	\$ 25
SWR200 swr/pwr meter to 2kW at 200 MHz	\$ 49
Leader LPM885 swr/pwr meter	\$ 78
ME-UA UHF pwr/swr meter to 15 watts	\$ 69
AS-BL Balun	\$ 18
AS-GM gutter clamp with cable and connector	\$ 10
RG 58AU coax cable 45c per metre	

## FOR THE NOVICE

Simple conversion instructions available for Uniden, TS-520, FT75B, FT101E to reduce power etc for novice licence requirements.

## 2M ANTENNAS

LA 210N 10el stacked beam	\$125
AS 210BN twin boom 18dB	\$ 99
AS 210AN single boom 14.5dB	\$ 38
ARX-2 6dB (Ringo Ranger)	\$ 35
Lindenow 5/8 fibreglass for mobile	\$ 26
M25 Scalar 5/8 fibreglass for mobile	\$ 17

## HF ANTENNAS

Midy HIN 40-10m	\$ 38
Midy VN 80-10m	\$ 44
AL 48DXN 40-80m	\$ 38
AL 24DXN 20-40m	\$ 28
14AVQ trap vertical 40-10m	\$ 69



## 2m SSB

Introducing the new Trio-Kenwood TS700A 2m transceiver. It covers SSB/FM/AM/CW over 144-148 MHz. Introductory offer of \$595 includes mic, English manual, plugs, cables and 90 day warranty.

## DISTRIBUTORS:

Canberra:	Dalcom 32 Kalgoorlie Crescent, Fisher. Phone: (062) 88-4899.
Adelaide:	Graham Stallard, 27 White Avenue, Lockleys. Phone: (08) 43-7981.
Newcastle:	Digitronics, 188 Parry Street, Newcastle. Phone: (049) 69-2040.
Perth:	Netronics, 388 Huntriss Avenue, Woodlands. Phone: (092) 46-3232.

## A FREE RIG EACH MONTH!

OFFER CONTINUES. Each month (until June 1976). VICOM will refund the purchase price of a quality IC202 or IC502 transceiver to one lucky customer who has purchased one of these rigs during the month!

IC202 — 2 metre portable — \$210.

SSB/CW 3 watts with VXO operation. Provision for external antenna and power supply.

Comes complete with mic, carry-strap and dry cells together with —

- \* English manual ✓
- \* 12 month warranty ✓
- \* Factory backed spare parts. ✓

IC502 — 6 metre portable — \$219.

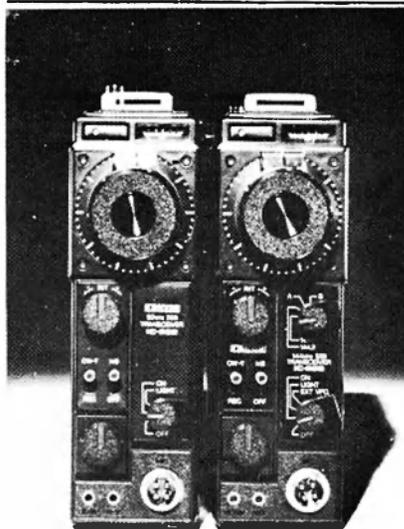
Covers 52-54 MHz this fabulous portable runs both SSB and CW at 3 watts. Includes noise blanker, RIT control, UFO control and provision for external antenna and power. Comes complete with mic, carry-strap dry cells and of course, the VICOM 12 months warranty.

Winner of free rig — March: Mr J. Zmood, VK3ZAU, 1 Wrixen Ave, East Brighton

## ACCESSORIES FOR THE PORTABLES

IC20L linear amp for 2M (10 watts)	\$85
IC50L linear amp for 6m (10 watts)	\$85
IC3PS matching power supply	\$75
Telescopic Antennas for IC202	\$1.95
Slow motion drive for IC202	\$6.50
Desk Mic ICSM2	\$34

Note: Serial number required when ordering spares.



IC502 IC202



# the little surprise

The IC-22A has caused some pretty big surprises since it first started making waves in VHF-FM. Veteran operators have been delightfully surprised by its sophisticated styling and ease of operation; FM beginners, by its versatility, large number of possible channels, and its great value as a starter unit for FM transceiving; and all owners, by its unexcelled high quality construction and low maintenance problem record, ICOM traditions. The competition was in for a big surprise as it raced past everything in its field to become the most popular two meter crystal controlled radio on the market. Surprise Surprise.

But the IC-22A's best surprise is the little surprise, its price. surprise. The little radio with all the big surprises is also the best FM transceiver value available. Engineered for versatility and sophistication: priced within the reach of the most modest beginner. Whether the IC-22A is your first FM or your last, you're in for a little surprise.

## 12 MONTH WARRANTY, TOO!

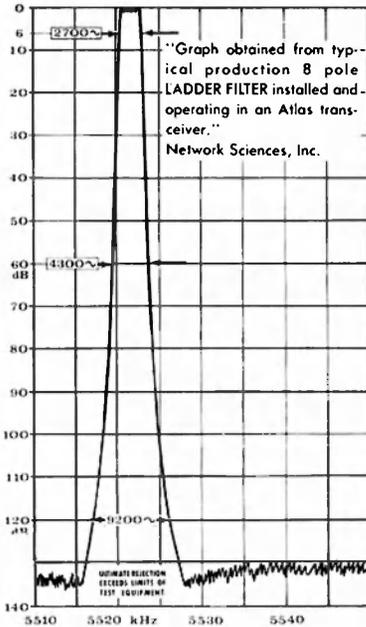


SEMICONDUCTORS	22
TRANSISTORS	4
FET	3
IC	16
DIODES	16
FREQUENCY RANGE	146-148MHz
CHANNELS	22
MODULATION	Phase, F3
VOLTAGE	13.8 (15%)
SIZE	58x156x2305 (dim in MM)
WEIGHT	1.7 kilos

POWER OUTPUT	HI 10 Watts, LO 1 Watt
BANDWIDTH (TRANSMITTED)	15KHz with 5KHz deviation
MICROPHONE	DYNAMIC 500 Ohms
SENSITIVITY	.4 microvolts for 20DB quieting .3 microvolts for 12DB SINAD
INTERMEDIATE FREQUENCIES	10 7MHz First IF 455KHz Second IF
MODULATION ACCEPTANCE	7KHz peak dev. freq. less than 3KHz
RECEIVER BANDWIDTH	-13KHz more than -6DB -23KHz more than -60DB
AUDIO POWER	1 Watt into 8 Ohms



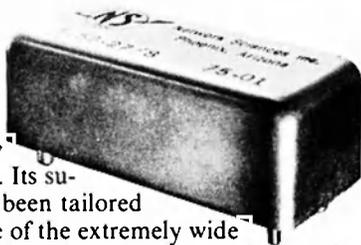
Comes complete with cables, mobile bracket, mic, English manual and 6 channels from the WIA Bandplan (extra xtals \$9 pair).  
 Price: \$219 including 12 month warranty.  
 All sets given pre-sales check out and as VICOM are the sole authorised Australasian Distributor a factory backed supply of spare parts and accessories is available.



**Superior selectivity...  
maximum operating pleasure...  
You get both  
with the Atlas transceiver!**

The selectivity curve above looks phenomenal, especially when compared with ordinary filters. What makes it even more phenomenal is that it is a *true* graph of the *overall* selectivity of the Atlas transceiver, not just a graph of a filter operating in a special test fixture under laboratory conditions.

**THE SUPER SELECTIVITY** of the Atlas transceivers is provided by an *8 pole crystal ladder filter* designed especially for Atlas by Bob Crawford of Network Sciences, Phoenix, Arizona. This filter represents a *major breakthrough in filter design with unprecedented skirt selectivity and ultimate rejection*. Its superior selectivity has been tailored to take full advantage of the extremely wide range of signal levels that the Atlas front end is capable of handling.



**THE 6 db BANDWIDTH** of 2700 cycles was purposely selected to provide audio response from 300 to 3000 cycles in both *transmit* and *receive* modes (it has been proven that transmission and reception of voice frequencies between 300 and 3000 cycles provides a substantial improvement in readability under noisy or weak signal conditions, as compared to narrower bandwidths). At the same time, the improvement in fidelity of voice communication is readily noticeable, and accounts for the constant reports of "broadcast quality" from Atlas transceivers. Unfortunately, many receivers with narrower bandwidths cannot fully appreciate the audio quality of the Atlas transmitter. It takes *2700 cycles of bandwidth* to get all of the quality, and the Atlas transceivers are among the few that have this ideal bandwidth.

**SKIRT SELECTIVITY.** The 8 pole ladder filter provides a bandwidth at 60 db down of only 4300 cycles (shape factor of 1.6) and a bandwidth of only 9200 cycles at 120 db down! No other filter that we know can even list their 120 db Bandwidth. Note that the Atlas filter is narrower at these levels than other filters, even though the others provide less bandwidth at 6 db.

**ULTIMATE REJECTION** is in excess of 130 db, greater than the measuring limits of most test equipment.

**IT IS THIS EXTREMELY STEEP SKIRT SELECTIVITY**, illustrated in the above graph, which rejects strong adjacent channel signals better than any other known receiver.

Combine this amazing selectivity with all the other features of the Atlas, such as: • Strong immunity to overload and cross modulation • All solid state design • 200 watts P.E.P. input • Total broadbanding with **NO TRANSMITTER TUNING** • Modular construction • Compact plug-in design (7 lbs, 3½" x 9½" x 9½"), and you quickly see why you get so much more operating pleasure with the Atlas 210x/215x.

210x or 215x .....	\$635
With noise blanker installed .....	\$695
AC Console 110/220V .....	\$165
Model DD6 Digital Dial .....	\$146
Plug-in Mobile kit .....	\$55
10x Osc. less crystals .....	\$65
Noise Blanker, for plug-in installation .....	\$60

All rigs given thorough pre-sales checkout and are covered by VICOM 90-day warranty.

For complete details please drop us a line and we'll mail you a brochure.

**PLUG-IN-AND-GO-POWER**

# UNIDEN

# ..... the best value

## CHECK THESE FEATURES:



WHY 11 GOOD FEATURES BECOME 11 GOOD REASONS WHY YOUR NEXT (OR FIRST) HF RIG SHOULD BE A "2020"

	UNIDEN 2020	BRAND A	BRAND B
1. Air cooled final	Yes	Yes	Yes
2. Transmitting tubes in final (6146B)	Yes	No	Yes
3. CW filter as standard	Yes	No	No
4. Regulated screen voltages for stable operation of final	Yes	No	No
5. Independent rf circuits for Tx and Rx	Yes	No	No
6. Dual RIT control 5kHz or 1kHz	Yes	No	No
7. Slow/fast AGC switch	Yes	No	Yes
8. PLL VFO for excellent stability and tracking linearity	Yes	No	No
9. Noise Blanker for pulse type noise	Yes	Yes	Yes
10. Hybrid dial with digital analog read-out	Yes	No	No
11. RF amp and fan switchable when receiving only — as desired	Yes	No	No

PRICE \$570

The 2020 does not have 160 metre coverage but there is some scope to bring a little "do-it-yourself" back into the shack — why not make a transverter — connections for transverter operation are on the rear panel.

bands (meters)	Frequency (MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
wwv	15.0

Tubes.....6146B.....	2
12BY7A.....	1
Transistors.....	52
FETs.....	16
ICs.....	18
Diodes.....	154

### SO WHAT'S WITH THE PLL BIT?

We have taken an output frequency of 7MHz as an example and the relevant frequencies to eventually generate 7MHz are shown on the diagram.

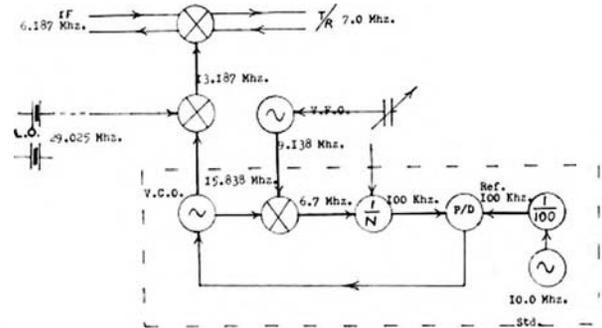
1. The 9.138 MHz signal from the VFO is fed into the mixer in the PLL system. Here it is mixed with the 5.838 MHz signal from the VCO (voltage controlled oscillator) to produce an output frequency of 6.7MHz.
2. The 6.7MHz signal is passed to the programmable divider where it is divided by 67 to produce a 100 KHz signal which is passed to a phase detector (P/D).
3. In the phase detector the 100 KHz signal is compared with another 100 KHz signal derived from a highly stable 10MHz crystal oscillator.
4. The output from the P/D (an error voltage if one exists) is then fed back to the VCO to lock it precisely to 15.838 MHz.
5. This output of 15.838 MHz is fed to the local oscillator mixer where it is mixed with 29.025 MHz from the band oscillator circuit.
6. This produces a 13.187 MHz signal which is then fed to the transmitter or receiver mixer where it is mixed with the ssb signal generated at 6.187 MHz to produce the final output of 7MHz.
7. For other bands, a different band oscillator crystal is used, and to generate the 100 KHz segments within a band, the program on the divider is altered so that the divider's output is still 100 KHz.

Thus the 2020 has the stability of the 10MHz reference oscillator. So much for the example given: of somewhat more practical interest is the sequence of events if the tuning knob (VFO) is turned — a reasonable state of affairs if we are going to tune the band! The following explanation also applies if the VFO or VCO tends to drift.

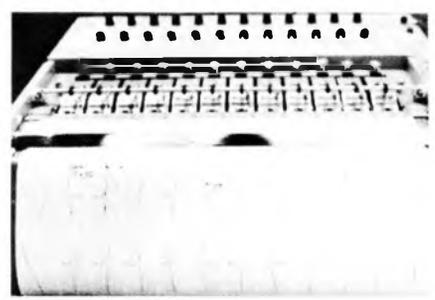
When the VFO frequency is varied, the programmable divider is presented with a frequency other than 6.7 MHz. Hence its output will not be exactly 100 KHz.

This produces an error voltage from the P/D which shifts the VCO such that a difference in frequency between the VCO and the VFO is exactly 6.7MHz. Naturally all this takes place with the speed and agility of a startled gazelle! i.e. instantaneously. For other bands, different local oscillator frequencies are employed, and a different frequency is presented to the divider. However the principle is exactly the same as described above.

..... Peter Williams, VK3IZ



Peter Williams checking out the Uniden Production Line. 45,000 quality transceivers are produced here every month of the year.



Every rig is environmentally checked and VFO stability recorded on this graph recorder which handles 12 sets at a time.



This is what we're raving about. The superb "2020" ac/dc transceiver utilising the latest in electronic sophistication.

## BUT DON'T GET CAUGHT! THOSE WHO BUY FROM VICOM ENJOY



- \* 90-day warranty
- \* Spare parts, change-over boards, engineering back-up — supported directly from the factory.
- \* Thorough pre-sales checkout. No "take it or leave it" attitude.
- \* English Manual includes mic, plugs, cables.

C66 — 100 pF mica or styrofoam, grid coupling capacitor for regenerative detector. Exact function of this capacitor will be explained in a later article.

C67 — 0.27 uF 200 volt polyester, intended to earth the screen for both audio and RF signals.

C68 — 0.001 uF 200 volt polyester, audio coupling capacitor, small value used to attenuate the lower audio frequencies.

C69 — 390 pF mica or ceramic, used to attenuate the higher audio frequencies above about 3 kHz.

C70 — 0.22 uF 25 to 100 volt greencap or similar, cathode bypass for V6a, small size means that it is not effective below about 300 Hz so that low frequencies are attenuated.

C71 — 4 to 24 uF 300 volts working electrolytic, HT smoothing and decoupling capacitor.

C72 — 0.001 uF 400 volt polyester, audio coupling capacitor, small value used to attenuate frequencies below about 300 Hz.

C73 — 390 pF mica or ceramic, used to attenuate the higher audio frequencies above about 3 kHz, works in conjunction with R70 to form an elementary low pass filter.

C74 — 2.2 uF 10 volt working electrolytic, cathode bypass for frequencies above 300 Hz, has little effect below that frequency.

C75 — 4 to 24 uF 300 volt working electrolytic, HT smoothing and interstage decoupling capacitor.

C76 — 0.0068 uF 630 volt polyester, attenuates the higher audio frequencies above about 3 kHz. 300 Hz to 3 kHz is an adequate bandpass for communications quality audio.

V4 — 12AH8, frequency converter. Other valves that can be used with some modification are 6AN7, 6AE8, 6BL8, 6BE6.

V5 — 6BX6, 455 kHz regenerative detector. Other suitable valves are 6CB6, 6AU6, 6AM6 with suitable modification of circuitry.

V6 — 6BL8, audio amplifier. Other valves designed specifically for audio may be preferable, such as 6GW8, 6BM8, 6AB8, etc.

V7 — OA2, 150 volt voltage regulator. Another suitable regulator is a VR150.

L10 — 20 turns 22 B&S enamelled copper wire wound on a 3/4" diameter former, close wound.

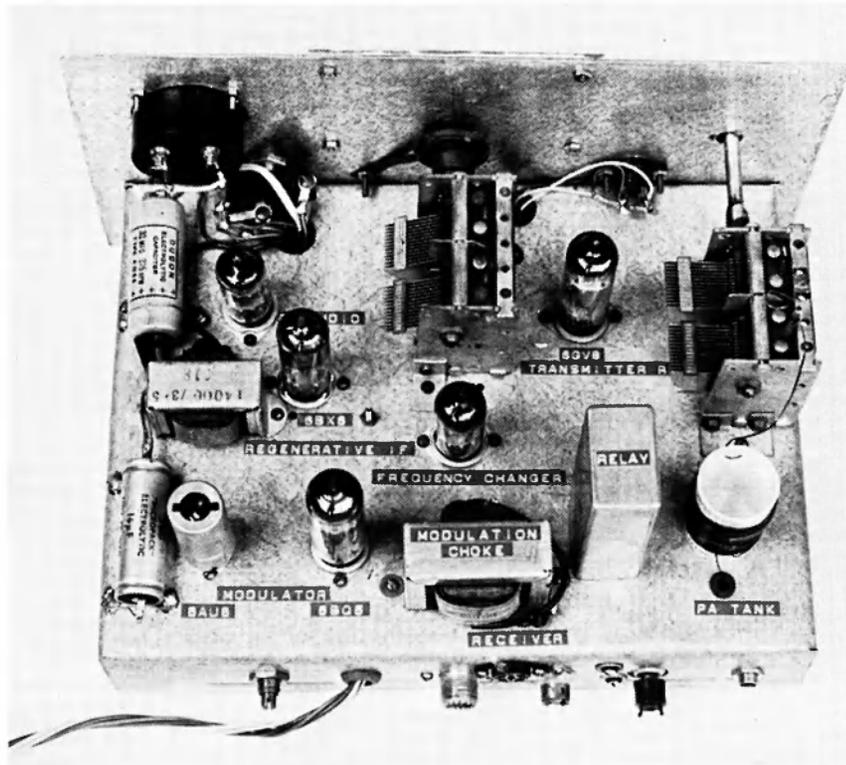
L11 — 5 turns 28 B&S enamelled copper wire wound on same former as L10. Wound over the earthy end of L10 and wound in the same sense.

L12 — 19 turns 22 B&S enamelled copper wire wound on a 3/4" diameter former, close wound.

L13 — 8 turns 28 B&S enamelled copper wire wound on same former as L12 and wound at the earthy end of the tuned winding, but the winding spaced to start 1/8" away, wound in the same sense as L12, close wound.

L14 — Primary winding of the 455 kHz IF transformer.

L15 — Secondary winding of the 455 kHz IF transformer.



The novice transceiver with the case removed, clearly showing component placement on the chassis.

Note — L14, L15, C63 and C64 are all mounted in the same IF transformer can, as obtained from an old battery valve portable radio. The IF transformer is modified as will be explained in a later article.

L16 — 1 mH to 2.5 mH radio frequency choke, used as a DC return for the cathode of V5, placing the cathode effectively at the capacitive tap on L15, C64/65.

T10 — 14 K ohm to 3.5 ohm speaker transformer, used to convert the high impedance signal in the plate circuit of V6b to an impedance to suit the loudspeaker. The impedance ratio of the speaker transformer will depend on the type of output valve used and the speaker in use, e.g. 3.5 or 15 ohms.

J10 — Stereo jack with one set of change-over contacts, used to switch out the internal speaker, when an external speaker is plugged in, also used to feed a lower audio level to a suitably wired set of headphones via the second set of contacts.

#### GENERAL COMPONENTS

1-36:1 reduction slow motion drive with scale, such as Jabel.

3-9 pin miniature valve sockets.

1-7 pin miniature valve socket.

Control knobs to suit, terminal strips, wire, solder, nuts and bolts, small loudspeaker approximately 3" diameter, shielded cable, small mounting brackets. ■

#### 45W TWO METRE BOOSTER AMPLIFIER

As featured in April Electronics Today, p. 86 35-45 W output from 10 W drive, 12.5 V supply. Just the thing to boost 10 W mobile FM rigs! Features rugged 2N6084 transistor, diode switching and simple construction.

ET1710 kit	\$26.50
Heatsink to suit	\$2.50
or p.c. board alone	\$2.50
*Add P & P: Kit, 60c; Heatsink, 60c; p.c.b., 30c	

#### RF POWER TRANSISTORS

High quality, fully VSWR protected CTC transistors for class A B or C use to 175 MHz. Bargain prices!

	1 to 9	10 up
83-12 5 W out	\$5.70	\$4.80
B12-12 15 W out	\$7.70	\$7.10
B40-12 40 W out	\$17.50	\$17.20

or \$30 the set of three

\*Add P & P: 1-3 items, 30c; 3-9, 40c; 10 up, 60c

#### VHF CONVERTER KITS etc.

Modern solid state converters featuring FET front ends, bandpass design, simple construction, choice of IF frequencies. Crystals not included. Features in February ELECTRONICS TODAY, p. 63.

28 MHz (ET1707B)	\$11.00
52 MHz (ET1707B)	\$11.00
144 MHz (ET1707A)	\$14.00

Also:

432 MHz FET Conv.	\$14.00
Marker Generator	\$10.00

\*Add P & P: 60c per kit.

Send S.A.E. for details on other devices.

Neosid coil and ferrite components, Eimenco trimmers etc.

#### AMATEUR COMMUNICATIONS ADVANCEMENTS

P.O. BOX 57, ROZELLE, 2039.

# COMMERCIAL KINKS

Ron Fisher. VK3OM  
3 Fairview Ave.,  
Glan Waverley, 3150

This month we have a few new modifications to the Yaesu FT101 transceiver, but firstly a few thoughts on the design of the modern HF SSB transceiver. Perhaps readers might like to add to the list month by month.

## WHY DON'T THEY?

Why is it that manufacturers of transceivers do not incorporate a couple (at least) of AC power outlets on the back panel. Every Hi-Fi amplifier worth its salt has this facility. If your shack is anything like mine you are probably using half a dozen power points plus a few double adaptors to get power to everything.

## NEXT THOUGHT

It is about time that HF transceivers incorporated an SWR meter. After all they are mostly designed for portable as well as home operation, but every time you pop

it in the car, it is usually necessary to connect up an external SWR meter which will never sit in place.

## FINALLY, FOR THIS MONTH

Why not incorporate separate bias controls for AC and DC operation. It is an unusual transceiver that does not require adjustment in this respect.

What opinions do you have on these and other points.

## THE FT101

One of the advantages in buying a G3LL RF speech clipper is that every so often the distributors of these excellent little units send out modification sheets for the 101 to people on their mailing list.

The latest one received contains the zener diode AGC modification published in this column some months ago and two other interesting hints that I will now pass on.

## IMPROVED AM RECEPTION

This simple modification will be found to give greater clarity and increased sound output in the AM mode.

1. Locate the 10K resistor going from one end of the AM detector diode to chassis and remove same.
2. Replace 10K resistor with any small

signal germanium diode.

3. There is a 50/50 chance as to whether or not you have wired the diode in the correct polarity, so now try the set out. AM should be louder and clearer. If it is very weak and distorted reverse the diode.

## FT101 MARK I IMPROVED RECEIVE AUDIO

Some early Mark 1's, especially those fitted with output transistors instead of an audio IC, have a tendency to excessive low frequency content in the receive audio giving muddled sound with a marked tendency to speaker rattle. The following modification rolls off the low audio frequencies and gives clearer sound.

1. Locate the RF choke going to the 'hot' end of the AF gain control and disconnect from same.
2. Re-make the connection from the choke to the AF gain control via a series capacitor of about .05 uF.
3. Instal 10 K ohm resistor, one side being connected to the junction of the capacitor and the RF choke, the other side going to the chassis.

Next month, amongst other things, some simple and effective modifications for the Kenwood TS 520. ■

# IARU NEWS

Last month we concluded our examination of ITU Table of Frequency Allocations and as promised in February 1976 AR we will now return to the "escape clauses"

If a service may operate in a specific frequency band subject to not causing harmful interference, this means also that this service cannot claim protection from harmful interference caused by other services to which the band is allocated (No. 148). A somewhat complex example of this would be the use of amateur satellites in the band 435-438 MHz.

Clause 413 recognises that the frequency bands from 5 to 30 MHz are particularly useful for long-distance communications and the member countries agree to make every possible effort to reserve these bands for such communications. The minimum power necessary shall be employed. Clause 423 (2) states that in principle broadcasting stations using frequencies below 5060 kHz (except the band 3.9 to 4.0 MHz) or above 41 MHz shall not employ power exceeding that necessary to maintain economically an effective national service of good quality within the frontiers of the country concerned.

Article 4 of the Regulations caters for special agreements between countries.

Clause 115 says that administrations of member or associate member countries of the ITU shall not assign to a station any frequency in derogation of the Table or other Regulations except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the Convention and Regulations. Incidentally countries ratifying the Radio Regulations can, and do, make reservations of many kinds. Certain countries (not many) appear not to be members of the ITU.

Clause 704 says that member countries should exercise the utmost goodwill and mutual assistance to the settlement of problems of harmful interference. Clause 705 goes into the considerations which must be given. Subsequent clauses set out procedures for mutual co-operation and recourse to the International Frequency Registration Board (IFRB) set up under the Regulations.

Article 9 of the Radio Regulations (Clauses 486 to 639) requires that frequency assignments to fixed, land, broadcasting, radionavigation land, radio-location land, standard frequency stations and

ground-based stations in the meteorological aids service shall be notified by administrations in the prescribed detail to the IFRB. The IFRB maintains a Master International Frequency Register. Similar provisions apply to administrations intending to establish a satellite system (art. 9A).

Article 13 deals with monitoring and Appendix 8 sets out the form of report of harmful interference. Various CCIR Recommendations refer to international monitoring.

Clause 693 says that all stations are forbidden to carry out unnecessary transmissions, the transmission of superfluous signals and correspondence, the transmission of signals without identification. In the last case there are special exceptions for distress and other special radio systems. 694 says that all stations shall radiate only as much power as is necessary to ensure a satisfactory service.

Clause 698 states that Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, incl. power networks, does not cause harmful interference to a radio service operating in accordance with the Regulations. 701 states that emissions made by a station for tests, adjustments or experiments shall transmit frequent idents at slow speed.

Clause 722 states that administrations bind themselves to take the necessary measures to prohibit and prevent 723 (a) the unauthorised interception of radiocommunications not intended for the general use of the public 724 (b) the existence or divulgence of anything intercepted under 723. Clause 719 states that infringements of the Radio Regulations shall be reported to their respective administrations by the stations detecting them on an Appendix 7 form.

Clause 725 states that no transmitting station may be established or operated by a private person or by any enterprise without a licence issued by the government of the country and Clause 728 says that the holder of a licence is required to preserve the secrecy of telecommunication as provided for in the Convention.

Article 41 (1560 to 1567A) deals specifically with amateur stations. 1560 forbids communications if one country has notified objection to amateur radio. 1561 says that transmissions between amateur stations shall be made in plain language and shall be limited to messages of a technical nature to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. Third party traffic is absolutely forbidden

unless (1562) modified by special arrangements between the administrations of the countries concerned.

Clause 1563 (3) says that an amateur station operator shall have proved he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals but administrations can waive this for stations making use exclusively of frequencies above 144 MHz. And 1564 states that administrations shall take measures to verify the technical qualifications of amateur station operators. 1565 says that the maximum power of amateur stations shall be fixed by administrations having regard to the technical qualifications of the operators and to the conditions under which these stations are to work.

1566 says the Convention and Regulations apply to amateur stations and that the emitted frequency shall be as stable and as free from spurious emissions as the state of technical development for such stations permits. 1567 says that during the course of their transmissions amateur stations shall transmit their call sign at short intervals and 1567A deals with the amateur satellite service in snared bands.

Article 42 deals with experimental stations.

The Radio Regulations of the ITU were of course ratified for Australia by the Government subject to specified variations, etc. Since the volume of the Regulations is nearly 2 inches thick and the whole thing so complex and so full of detail the excerpts given here are brief, condensed and not suitable for quotation in any matter of importance.

## WARC 1979

As foreshadowed last month the importance of the IARU meeting in Miami, immediately after the conclusion of the Region 2 Conference, has assumed such importance that the Federal President has sought and obtained Federal Council approval to attend in person. Your Federal President is also Chairman of Committee No. 2 to formulate the proposals of the amateur and amateur satellite services for the Government's Preparatory Group for the Australian brief for WARC 1979. The first meeting of the Committee is to be held on the 5th of April prior to his trip to Miami. A lot of work is going on to prepare the WIA case.

## INTRUDER WATCH

Alf Chandler VK3LC, in addition to being the WIA Federal Intruder Watch Co-ordinator has kindly consented to and has been accepted as the IARU Region 3 Association Intruder Watch Co-ordinator. ■

# CONTESTS

Ken Phillips, VK3AUQ  
Box 67, East Melbourne, 3002

## CONTEST CALENDAR

### May

8-9 Bermuda CW  
9.5-29.11 Yugoslavia YZ-30 Contest  
14-18 YL ISSBers QSO Party  
22-23 USSR CQ-M Contest

### June

5-13 Townsville Pacific Festival Contest  
12-13 RSGB National Field Day  
12-14 Midwinter Field Day (VHF)  
26-27 ARRL Field Day

### July

24-25 ARRL Bicentennial

## YUGOSLAVIA YZ-30 CONTEST

From 9/5/76 to 29/11/76

In celebration of the 30th Anniversary of Liberty, the SRJ has organised the YZ-30 Contest. All Yugoslavian stations will use the special YZ prefix.

All bands and modes will be used but no cross band or cross mode. The exchange will be a signal report only.

Only requirements for the colourful YZ-30 certificate is contacting 30 or more YZ stations.

Your log should contain time and date, YZ station worked, signal report and frequency. It is requested that you also include the usual signed declaration and 3 IRCs to cover mailing.

Send to SRJ YZ-30 Contest, PO Box 48, 11001 Belgrad, Yugoslavia.

## YL ISSBers QSO PARTY

1901 GMT 14/5/76 to 1900 GMT 16/5/76 with two rest periods.

Rules are lengthy and are available from W7EOI.

Frequencies: CW 3565 7085 14070 21070. Phone 3873 7273 14333 21373 28673 DX on 3775 7090.

Logs to L. W. Colaman, W7EOI, 412-19th Street SW, Great Falls, Montana 59404.

## TOWNSVILLE PACIFIC FESTIVAL CONTEST

The aim of the contest is to promote an interest in the Townsville Pacific Festival, and to increase activity on all Amateur Bands by stations in Australia, New Zealand, Pacific Islands and all countries bounding the Pacific Ocean.

I trust that all will participate and enjoy the contest and make it as interesting as past contests.

1. Time of contest: The contest to be run for 8 days 0001 GMT Saturday 5th June 1976 — 2359 GMT Sunday 13th June 1976.

### 2 Sections:

- (a) Transmitting all bands phone only
- (b) Transmitting all bands CW only
- (c) Transmitting all bands Open
- (d) Transmitting VHF and UHF VK only
- (e) Receiving all bands Open

3. Logs: These are to show the section entered and points claimed for each contact. This is most important, as if points claimed is not completed only 1 point per contact will be allowed. VHF logs must show distance in kilometres between stations.

### 4 Contacts:

- (a) CW to CW contacts count as double score
- (b) One (1) contact per band per mode a day only
- (c) No cross band contacts
- (d) Repeater contacts do not score

## SCORING TABLE — VK, ZL, P29 STATIONS

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9/P29	ZL	VK0
VK0	7	7	7	7	7	7	7	7	7	7	—
VK1	—	1	1	2	3	4	2	4	5	3	7
VK2	1	—	2	1	2	4	3	4	5	3	7
VK3	1	2	—	3	2	4	1	6	4	3	7
VK4	2	1	3	—	4	6	5	2	1	4	7
VK5	3	2	2	4	—	1	3	4	5	4	7
VK6	4	4	4	6	1	—	4	1	5	6	7
VK7	2	3	1	5	3	4	—	6	5	3	7
VK8	4	4	6	2	4	1	6	—	2	4	7
VK9/P29	5	5	4	1	5	5	5	2	—	6	7
ZL	3	3	3	4	4	6	3	5	6	—	7

VK, ZL, P29 to other Pacific seaboard countries and islands 1 point

# 1976 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY CONTEST RESULTS

## 24 HOUR DIVISION

### Section (a) Tx Phone

VK 4XZ 1601 7TT 467  
3ALZ 578 7AX 429

### Section (b) Tx CW

VK 7HE 1414 3TX 874  
5DL 1262

### Section (c) Tx Open

VK 2CAX 2243 1DA 1170  
3JI 1484

### Section (d) Tx Phone Multi Op

VK 3ATL 5230 4WIT 2360  
1WI 3016 3ANR 2265  
3BCG 2610 3BGJ 1474

### Section (e) Tx Open Multi Op

VK 3ATM 5487 2WG 3189  
1ACA 4575 5LW 2345  
3AUQ 4131 3XK 1613  
8DA 3715

### Section (f) VHF Portable/Mobile

VK 2AHE 1470 4ZGB 160  
2ZCT 853 1ZVT 149  
4ZIG 578 4ZGR/7 102  
3AYF 396 3AFI 10C  
4PV 308 3YFC 4C  
3YIA 190

### Section (g) Home Tx Stations

VK 3CM 870 5NJ 310  
1LF 455

Section (h) Receiving  
E W Trebilcock 460 (CW)  
C. H. Thorpe 445

## 6 HOUR DIVISION

### Section (a) Tx Phone

VK ANM 449 3YC 214  
3ADW 400

### Section (b) Tx CW

VK 2YB 386 3XU 220  
2JM 226

### Section (c) Tx Open

VK 7AL 635 4AAP 388

### Section (d) Tx Phone Multi Op

VK 4WIM 1548 3RV 936  
5KR 1044 4AYM 501

### Section (e) Tx Open Multi Op

VK 3BDO 803

### Section (f) VHF Portable/Mobile

VK 3ZJS 725 3ZBY 336  
2ZHT 640 2BSU 249  
2AHE 542 1LF 160  
3BCH 466 3YAY check log  
5ZCF 449

### Section (g) Home Tx Stations — Nil

### Section (h) Receiving — Nil

NOTE—Checking of logs not complete, so scores and placings are subject to confirmation

5. Awards: Perpetual Trophy is held by TARC and it will be inscribed with the name of the winner, who will receive a smaller trophy.

Overseas Stations (excluding VK, P29, ZL) with the highest score will receive a "Pacific Festival" medalion. Section winners will be awarded a certificate.

### 6. Scoring: HF stations.

## BONUS POINTS — EXCEPT VK4 STATIONS

15 points for contacts with VK4WIT

9 points for contacts with other Townsville stations.

## VK4 STATIONS

1 point per contact for working VKWIT or other Townsville stations. (Intrastate contacts not otherwise permitted for scoring.)

## OVERSEAS STATIONS — EXCLUDING ZL, P29

3 points for contact with any VK station  
5 points for contact with any VK Club station  
8 points for contact with any Townsville station  
15 points for contact with VK4WIT

## ALL STATIONS

160 metres — 5 bonus points per contact  
RTTY and TV — 10 bonus points per contact  
CW/CW — double points

## SCORING TABLE VHF/UHF STATIONS

0-50 km — 1 point  
50-100 km — 2 points

100-200 km — 3 points  
200-400 km — 4 points  
400 and over — 5 points

Bonus points — VHF/UHF stations only other than Townsville stations — Contacts with your local club station add 15 points only if your club station has contacted VK4WIT in preceding 24 hours (contact number must be recorded). Townsville stations receive one point per contact only.

### 7. Identification.

All station identify for the ease of scoring for example:

(Phone) VK4WIT Townsville  
(CW) VK4WIT/TVL

### Send logs to:

Townsville Pacific Festival Contest  
VK4WIT — CHC No. 6568  
PO Box 964,  
TOWNSVILLE 4810,  
Australia

Entries close 30 September 1976

## MID-WINTER FIELD DAY CONTEST (VHF)

Starts at 1200 EAST, Saturday 12th June, finishes 1400 EAST, Sunday 14th June

## RULES

- 1. All bands 52 MHz and above may be used
- 2. One contact per station per band per clock hour. You may work a station one minute before and after the hour.

3. Serial numbers shall be exchanged in the form of a signal report followed by consecutively increasing numbers.

4. Minimum contact distance is 1 km.

5. Crossband, HF and repeaters may be used for contact set up but not for scoring

6. All FM frequencies classed as nets: Oscar 6 and 7 are not classed as repeaters

## SECTIONS

1. Field stations; 2. Mobile stations; 3. Home stations. Best 6 consecutive clock hours and best overall score in each section

## ENTRIES

Logs can be handed to a VHF committee member or posted to the VHF and TV Group, 14 Atchison Street, Crows Nest, 2065. Entries close 13/8/76. Logs must have date, time, call signs, locations of both stations, serial numbers, points claimed, band and modes used

**SCORING TABLE**

km	6m		2m		70 cm	ATV	576 up
	FM	Tune	FM	Tune			
1-50	1	2	1	3	4	20	10
51-100	2	4	2	6	10	50	50
101-150	5	10	5	15	30	150	100
151-300	10	20	10	30	50	250	200
301-500	25	50	15	45	100	500	500
501-800	20	40	25	75	200	1000	600
801-1200	15	30	35	105	400	2000	700
1201-2000	10	20	75	225	500	2500	800
2001-up	25	50	125	375	600	3000	1000

Oscar 2-10 Translator 20 VK/ZL 50 other countries  
 70-2 Translator 50 VK/ZL 100 other countries  
 ATV Serial numbers must be exchanged on vision and sound.

**LETTERS TO THE EDITOR**

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

21 Bovelles St., Camp Hill, Qld., 4152

The Editor,  
 Amateur Radio,  
 Dear Sir,

I read with interest VK2SK's article on the G4ZU "X" Beam, and hereby offer some suggestions, and information, from my own extensive experiments with this array dating back to approximately 1969 when VK3PP, VK3CR and others were also using it with much success. Like Charlie 3PP, I have lost count of the number of data sheets posted to VK, ZL and DX countries giving the necessary constructional details.

It took me two years to get Jim ZL2NH to build one! After correspondence with "Dicky" Bird G4ZU, I proceeded to try and improve the performance of this compact beam, and found a slight improvement resulted when the Radials were increased from 12 ft., the original length, to 13 feet. This has the effect of wide-spacing the two elements, and tuning was not so critical.

In my case I used "ex-army" copper-plated "whips" for the radials, and very light wire. Although it drooped, it was self-supporting. With 13 foot radials, the wire "tails" were 6½ ft. and 7½ ft. respectively, and a permanent one-turn loop of 16 g wire was placed in the centre of the director for grid-dipping purposes.

This is the most important part of the tuning operation and should be done with the beam as high as possible. Increasing the height from 6 ft. to 35 ft altered the resonant frequency by approx. 50 kHz! Do NOT rely on the GDO dial, but have a second-operator listen to the GDO on a calibrated receiver to ascertain the "dip" frequency. If the Director is not tuned the beam will be next to useless.

Tuning the antenna is simply a matter of altering the length of the wire "tails" (both ends) by one inch at a time. Performance was much improved, both receiving and transmitting, by using a balun.

As the G4ZU "X" beam is basically a compromise of a normal 2-el. Yagi, naturally performance cannot be as good as a straight 2-element beam. This is mainly due to the shortened elements (radials); the wire tails contribute almost nothing to performance, and are only for resonating purposes. However, its main advantages are: compactness, and ease and cheapness of construction.

In conclusion, I worked approximately 250 countries on this antenna, in two years, but conditions were good in those days!

FRED LUBACH VK4RF

(Copies of Fred's data sheet may be obtained from him at the above address — please forward s.a.s.e. — Ed.).

The Editor,  
 Dear Sir,

Novice and would-be Novice Amateurs are facing two immediate problems, namely a source of relatively cheap crystals for 80 and 15 metres, and a directory of slow morse stations that they may obtain practice from prior to the examinations.

I am of the understanding that the Ladies' Amateur Radio Association is establishing a bank of crystals which will be available for use by Novice Amateur Radio Operators. I am not sure whether they intend to hire the crystals or sell them at an attractive price to Novices. Perhaps LARA can let AR know of the methods to obtain suitable crystals from them, or advise me so that I can inform Novices via AR. Crystals are rather expensive in Australia. The minimum price that I have heard of for an 80 metre crystal is \$5, and the more common price is \$7 plus tax. Overseas crystals for 80 metres sell for \$3 American plus airmail post. Perhaps one or more of the local crystal manufacturers would care to produce crystals in bulk for the Novice operators. Anyone with ideas?

I have received a number of requests for lists of stations sending slow morse for prospective amateurs. Can the operators of these services please let me know when and on what frequencies these sessions take place and the speeds used. I received no replies to a similar request a couple of years back. For the sake of the prospective new licensees I hope that the people concerned will advise me of the facts so that they may be published in AR.

Rodney Champness VK3UG

The Editor,  
 Dear Sir,

March issue of AR (p25) carries a small item regarding ARRL DXCC listings, and gives the false impression that only two Australian Amateurs have more than 300 countries confirmed. (AR for January lists at least 17 VKs with over 300!)

As we all know Australia has its own DXCC Awards system, using the ARRL official list of countries, ably managed by Brian VK5CA, and it is therefore unnecessary to mail cards to USA, which is an expensive exercise these days.

I am surprised that this type of article has appeared twice in recent months without anyone bothering to explain the reason for the lack of VKs on the ARRL list!

Fred Lubach VK4RF.

(See the Awards Column in this issue for the latest VK DXCC top listings—Ed.)

The Editor,  
 Dear Sir,

**18th JAMBOREE OF THE AIR — PAPUA NEW GUINEA**

1. Papua New Guinea became a sovereign state on the 16th September 1975. Previous to this, the country was self governing but legally tied to Australia as the Territory of Papua and the Trust Territory of New Guinea. On October 18th and 19th, Papua New Guinea voiced its independence for the world to hear. For on those two days, the PNG Scouting Association and the Fraternity of Amateur Radio Operators throughout the country united to produce the first PNG Jamboree of the Air (JOTA). This article describes the event. Its organisation and, I believe, success.

2. For some time amateur radio operators have assisted the Australian Scouting Association (PNG Division) each year to produce the Jamboree of the Air. Credit here goes to stalwart pillars of amateur radio in PNG such as P29VF, P29BS and many others. 1975 showed the voice of PNG as a new nation and the 1975 JOTA proved a great success.

3. The 1975 PNG JOTA was organised by Mr. Joe Kivori, Field Commissioner of the PNG Scouting Association National Headquarters. The event was advertised in the national newspaper — Post Courier — and also over the national radio station, NBC. Mr. John Baker, a member of the Royal Australian Air Force on loan to the Papua New Guinea Defence Force and holder of call P29WB rallied the PNG amateurs throughout the country. Mr. Kivori organised the Scouts, Guides, Clubs and Brownies into four major groups, to cover the four operating periods throughout the weekend. P29WB co-ordinated the amateurs and the equipment to provide the service.



From left to right front row: P29AX Harry Sims, Police Commissioner Mr. Plous Kerepia, OBE (with microphone), P29WB John Baker. Supporting Cast: Leaders and Scouts from PNG.

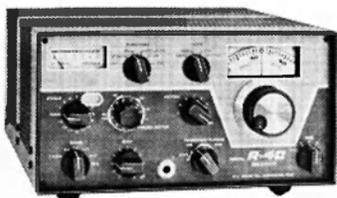
4. The major centre of activity was Port Moresby, the National Capital. Activities commenced early on the morning of Saturday 18 Oct. 75, with the erection of portable aerials and equipment at Tuaguba Hill, in Port Moresby. Permission was granted to use the residence reserved for visiting dignitaries to PNG, and all fraternities associated with scouting, and their leaders gathered at 10 am for the opening. The opening address was given by Mr. Plous Kerepia, OBE, Police Commissioner and acting Chief Scouting Commissioner for PNG. At the conclusion of his address, the Commissioner led his scouts and guides in singing the PNG national independence anthem. Contacts were made with Queensland, New South Wales, Victoria and South Australia, and messages between scouts and guides were exchanged with VK5 Baden Powell, the official South Australian Scouting Association station transmitting from the Scout Camp at Woodside in the Adelaide Hills and Mrs. Williams the Queensland State Commissioner for Guides, to name a couple.

5. PNG Scouts and Guides told their counterparts in the Pacific and Asia of their country, their way of life, Independence celebrations and their scouting activities. Kovi Saum of the 1st Morosi Troop spoke Pidgin English to David Black of Charters Towers. Elizabeth Wallis of the 1st Elevale Rangers exchanged greetings and ideas with Mrs. Williams in Queensland. Many others participated.

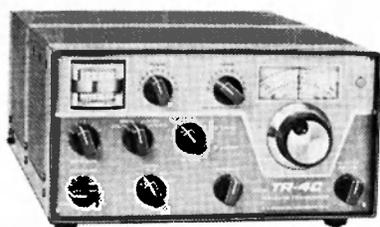
6. The opening session closed at 1 pm local time to relocate at the Boroko Scout Hall. More antenna erecting and equipment placement had the PNG JOTA active by 2 pm. Amateur operators in the Port Moresby area who participated were: P25 Harry Sims, a new arrival from New Zealand; P25 Phil Nandies, a respected PNG businessman and keen amateur radio enthusiast; P29GR Garry Ryan who was disappointed that 6 metres was not open to Australia for the weekend; P29WG Bill Giellis who was residing in the area for a short while and who offered his equipment and assistance; P29JS Jim Smith a professional communications engineer, recently arrived from England and P29JM Jack McDonald another arrival who ably assisted in aerial direction and the ensuing clean up. P29WB John Baker, acted as the co-ordinator. The equipment used ranged from Yaesu Musen FT-101B to Galaxy transceivers and the antennas were a G5RV and a hy-gain 14AVO.

7. The other major centre of activity was at Vanimo. Vanimo is a small township nestled in a coastal bay in the north west corner of the PNG mainland only 10 miles from the PNG/Irian Jaya border. P29CD Barry Dundas provided the equipment; a FT-101B and a TH3MK3 tri-bander yagi. Forty scouts crammed into Barry's small shack to speak to scouts in New Zealand, the Cook Islands, Australia, Italy, the Marshall Islands (Pacific Ocean), Israel and Greece. One contact was made with an 80-year-old gentleman in England who chatted merrily to all of the scouts for quite a while.

8. The weekend activities closed at 5 pm local time on Sunday 19th October 1975. Some 100 scouts were able to converse with their counterparts all over the world. The activity was thoroughly enjoyed by all who attended.  
 J. Baker P29WB.

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Accuracy ...  
Dependability ..****R-4C  
RECEIVER****\$695**

• Linear permeability tuned VFO with 1 kHz dial divisions. VFO and crystal frequencies pre-mixed for all-band stability • Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 MHz of 10 meters with crystals furnished • Any fifteen 500 kHz ranges between 1.5 and 30 MHz can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 MHz not recommended) • Electronic Passband tuning gives sideband selection, without retuning • Accessory Noise blanker operates on CW, SSB, and AM • Notch filter and 25 kHz crystal calibrator are built-in • Product detector for SSB/CW, diode detector for AM • Crystal Lattice Filter gives superior shape factor and ultimate selectivity for better adjacent channel rejection • Solid State Permeability Tuned VFO • Three AGC Release Times, two for SSB and AM plus fast release for break-in CW. Also AGC off. • Excellent Overload and Cross Modulation characteristics • Dimensions: 5½"H, 10¾"W, 12¼"D (14.0 x 27.3 x 31.1 cm). Wt.: 16 lbs. (7.3 kg).

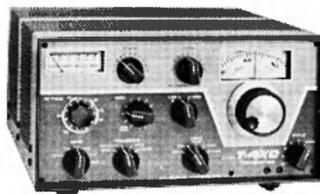
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**TRANSMIT:** • VOX or PTT on SSB or AM • Input Power: SSB, 300 watts P.E.P.; AM, 260 watts P.E.P. controlled carrier compatible with SSB linears; CW, 260 watts • Adjustable pi-network.

**RECEIVE:** • Sensitivity better than ½ µV for 10 dB S/N • I.F. Selectivity 2.1 kHz @ 6 dB, 3.6 kHz @ 60 dB. • AGC lull on receive modes, variable with RF gain control, fast attack and slow release with noise pulse suppression • Diode Detector for AM reception.

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RECEIVER**

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**PRELIMINARY SPECIFICATIONS:** • Coverage: 500 kHz to 30 MHz • Frequency can be read accurately to better than 5 kHz • Sensitivity typically 0.5 microvolts for 10 dB S+N/N SSB and better than 2 microvolts for 10 dB S+N/N AM • Selectable sidebands • Built-in power supply: 117/234 VAC ± 20% • If the AC power source fails the unit switches automatically to an internal battery pack which uses eight D-cells (not supplied) • For reduced current drain on DC operation the dials do not light up unless a red pushbutton on the front panel is depressed.

The performance, versatility, size and low cost of the SSR-1 make it ideal for use as a stand-by amateur or novice-amateur receiver, short wave receiver, CB monitor receiver, or general purpose laboratory receiver.

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# VHF-UHF AN EXPANDING WORLD

Eric Jamieson VK5LP  
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	VKOGR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbray	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
KG6	KG6JDX, Guam	50.105
	KG6APP, Guam	50.150
	K2IRT/KG8, Guam	50.098
VE	VE1ATN, Canada	50.056
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hull	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

Some people in the southern States in particular might wonder why so many overseas beacons are listed. There might not be much chance for us to hear the Pacific and northern beacons, but I would think quite a few operators in northern VK2 and in VK4 would be looking around when conditions are suitable. Similarly with the 144 MHz beacons in New Zealand. Perhaps little chance for most of the year in VK5, but I guess there are possibilities existing for those in VK2 and VK7 from time to time. It's like I always say, if you are in the shack doing something other than operating on the air, why not monitor some frequency according to weather conditions and time of year. You might be surprised what you hear. Have those in VK5 noted how much of Channel 0 TV from Brisbane and Wagga is to be heard at ANY time of the year. Monitor them and see.

Pleased to note that the South East Radio Group in Mount Gambier are going to stage another convention this year over the weekend of 12th and 13th June. Unfortunately the VK5 holiday weekend once again does not correspond with the Victorian holiday, so arrangements are being tailored to allow as much mixing of the various populations as the shorter weekend will allow. My spies have already informed me of something very different for the Saturday night, and there looks like being a jumble sale on the Sunday which should be good news for many — perhaps if those who attend do not bring too much trash the standard of sales could be kept up and some worthwhile exchanges made. Entries are invited again for the home construction section, which has proved very popular for some time now.

While on the subject of Mt. Gambier I would like to say thankyou on behalf of the amateur population for the efforts of the amateurs in that town in manning VK5BMG during the "Back to Mt. Gambier" Centenary Celebrations. I had very little trouble in making the required five contacts, and those of you who did, do not forget to send in your application for the award; this will make the SE boys feel the work was worth the time and effort expended.

A note from John VK4UI attached to the Gold Coast Radio Club Newsletter mentions nothing was

heard up there of the elusive summertime 144 MHz DX. A1 VK4FE was desperately trying for a VK6 to complete WAS on 2 metres but to no avail. There is plenty of 144 MHz activity in VK4 it appears, especially around Brisbane on 144.1, and many of the boys are continuing to keep a look out for signals from the southern States, so keep the beams north more often. John also mentions hearing that the Brisbane VHF Group have a 432 MHz beacon going (nobody "ain't" told me yet . . . 5LP). With the general increase in distances being worked on the 432 MHz band, especially across the southern part of Australia, perhaps some 432 MHz beacons might help, though for that matter 2 metres will still be the main indicator of what happens on 432. Thanks, John.

At the March meeting of the Gold Coast Radio Club Pat VK4FI produced a letter from a friend in America from the State of Virginia, who said that some CBers were driving their power amplifiers to 500W and 1 kW output, some even as high as 2 kW output! They think they are smart, but the powerful rigs were causing TVI and were even interfering with the naval base at Bremerton, Washington. The authorities got tough and confiscated the gear, including 129 rigs and cars, and could have fined them up to \$5000 a day while using the gear! Those whose gear was confiscated are now on the blacklist and can no longer take examinations for communications or elector associated with the work the FCC regulates. Might be a moral in this story for some in VK land!

Just to show how news gets to me at times, I recently received a note from Ron VK5SD who cased on a message from Claud VK4UX in Rockhampton via 20 metres! Thanks, chaps

The report mentions that Claud VK4UX had a breakthrough to Japan on 52.050 SSB on 20/3/76 at 0420Z, to JA7NAM and JG1TRW. That's the first report for this year . . . Rockhampton now have their repeater licence again, call sign VK4RAR, frequencies 146.1 up 146.7 down . . . VK4MM has been working consistently through the satellite . . . Oscar 6 and Oscar 7 have caught up with each other and are now only 5 to 6 minutes apart, giving a longer period of use.

## ANTENNA PARTS. KITS



QUAD HUB \$35.00 plus Postage  
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QUAD KIT \$135.00. Freight forward.

Consisting of: Hub 12 ft solid F/G  
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**S. T. CLARK**

P.O. BOX 45, ROSANNA

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The Model YC-601 displays actual transmit and receive frequencies on six bright, green coloured digital display tubes.

All amateur bands are switch selected for complete frequency readout with 100Hz accuracy. The power supply is built-in. Connection cable is supplied with the unit.

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Power Consumption: Approx. 10VA  
Size: 220(W) x 80(H) x 235(D) mm  
Weight: Approx. 2.5kg.



Digital Display Unit only  
**Price \$189**

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**ELECTRONIC SERVICES** 60 SHANNON STREET, BOX HILL NORTH, 3129  
Phone: 89 2213

FRED BAIL  
VK3YS

JIM BAIL  
VK3ABA

JAS 7576-19

## MOONBOUNCE REPORT

Sorry to hear Lyle VK2ALU has been afflicted with spinal injuries and hospitalisation, but now convalescing at home. This has restricted to some extent the activities of the VK2AMW EME schedules. We hope you will soon be better, Lyle.

The February tests were carried out, however with some difficulty due to lack of experienced personnel, but Charlie VK2ZEN and a group did a good job in manning the station for the first WVE test period. Only VE4JX was heard, but a contact could not be completed.

144 MHz seems to be the main band of interest here in VK5 at the moment. I notice from my own log book that 80 per cent of VHF contacts have been on that band, most of them over the 250 mile path to Mt. Gambier. Signals generally have been very consistent, plenty of 5x6 and 5x7 type contacts, but rising to well over S9 towards the end of March. There is now some very good equipment in VK5 for 2 metre operation, and some very fine antenna systems are either on the way or in use. The Barossa Valley group of 2 metre stations, Keith VK5SV, David VK5KK, Clarrie VK5NA, Peter VK5ZPW and myself VK5LP on the fringe of the valley are all pretty active, and not much gets past the ears in the group. We are all looking for long distance contacts with special thoughts towards south-western VK2. Canberra, together with any part of VK3 or VK7. VK5SV and VK5KK have a tremendous take-off to the east and south east. So what about a few others in the areas mentioned really giving it a try, particularly when the weather map tells you conditions should be right. I would very much like to work a 2 metre station in Canberra, or Broken Hill for that matter, and I would reckon the rest of the gang would be there too!

With the coming of the winter months there will surely be 2 metre DX to be found around 144.1 on SSB or CW. Why not a resolve by all those with suitable equipment to see what can be worked this year? There must be scores of stations with small 2 metre SSB rigs. Why not build a linear to add to it, they will drive a QEQ06/40 easily. If you do not have the time or skill to make your own, commercial linears for 2 metres are advertised as being available at a fairly reasonable price, so you can up your power that way. All this, coupled to a good ten element yagi, will put most of you in the ball park. Do not expect to find stations like you do on 20 metres, but what you do find several hundreds of miles away will surely give you a thrill to work. I still get quite excited when I work some new stations over the 300 mile mark, after all these years.

## FIELD DAY CONTEST

The VK2 VHF and TV Group are holding their mid-winter Field Day on the 12th to 14th June, 1976. See "Contests" column for the rules.

## LATE NEWS

The following has arrived from David VK4DT. and will be of interest to many.

"The Brisbane VHF Group is now operating a 70 cm beacon in Brisbane with details as follows: Call sign VK4RBB, 432.000 MHz, but shortly to be changed to 432.400 MHz, 10 watts out from solid state transmitter, nbfm, 1000 Hz tone with  $\pm 4$  kHz deviation, key speed 10 wpm. Antenna 3 half wave dipoles in phase, horizontal polarisation.

Location: Wilson Heights on north side of Brisbane approx. 250 feet a.s.l. The unit is operating on a temporary permit to be confirmed on publication of the new agreed band plan. We think this may be one of the first 70 cm beacons in Australia." (VK6 had a 70 cm beacon for some time several years ago, and VK5 had a temporary beacon back in the sixties . . . 5LP). David continues:

"The Brisbane repeater channel 4, VK4RBN is currently operating from West Chermide using two phased dipoles and a duplexer. Final location will be Mt. Glorious, for which a licence is to hand. Good coverage is being experienced over all Brisbane."

## TELEPHONE NUMBER

Some of those interstate people desiring to contact me have been running into some difficulty with telephone contact. My number is (08) 389 1204, which is different from that shown in the directory. For business purposes this is a silent number, and will not appear in the next edition of the telephone directory. It is published here because those who have been worrying me with work problems are unlikely to read these notes, and I have no objection to my amateur friends being

able to phone in special information from time to time. It is suggested all those who are ever likely to telephone me should make a note of this number now as it will not be repeated. You are most likely to find me able to answer the telephone personally between 0800 and 0830 EST except Wednesday. Night calls can be difficult as I periodically have meetings and other activities to attend. So now you are all in the picture. Repeat: write down the above number now, where it can be found because you cannot obtain it from telephone information channels.

Let's close with the thought for the month: "Ask any man, 'Where did you buy those pork chops?' and he will reply, 'At the butcher's'. Ask any woman the same question, and she will reply, 'Why? What's the matter with them?'"

The Voice in the Hills

# AWARDS COLUMN

Brian Austin, VK5CA

## ADDITIONS TO COUNTRIES LIST

Announcement is hereby made of two additions to the Countries List:

Sable Island, VX9, and  
St. Paul Island, VY0

The addition of Sable Island is based on Point 1 of the criteria used for Countries List additions ("a distinctively separate administration") and St. Paul Island by reason of Point 3 ("separation by foreign land"). Contacts made after 15.11.1945 with either Sable Island or St. Paul Island may be submitted for DXCC credits starting 1.2.1976.

No DXCC credits will be given for any operations from Sable Island or St. Paul Island until it has been established that landing and operation from those islands was done under specific permission from the proper authority. (QST, Jan. 76)

## GOLDEN JUBILEE CONFERENCE AWARD FOR 80 Mx

The following letter has been received from Doug Whillans ZL1AFW, the Conference Secretary:

"A number of us are working Australian stations who are interested in the Golden Jubilee Conference Award for 80 Mx.

A total of 50 points scored as under —

(a) Branch stations (5 points each) Branch Number given after call. There are seven such stations. ZL1AA (02), ZL1RK (03), ZL1SA (10), ZL1OB (21), ZL1WO (29), ZL1VK (65), ZL1BQ (66). These are all Auckland Branches. A minimum of three Branch stations to be worked

(b) One member from each of the above branches, 2 points each. Further contacts with members of the above branches, 1 point each.

A total of 50 points is to be scored, only one contact with any one station to count. Contacts to be made between 1st March and 1st June 1976. Usual certified list to be forwarded to

The Award Custodian,  
P.O. Box 23-680,

Papatoetoe East, Auckland

The award is FREE

We hope your members will join us. The Club stations are rostered and most are on every evening"

## NORTHERN CALIFORNIA DX CLUB — SPECIAL 1976 BICENTENNIAL CALIFORNIA AWARD

Eligibility — Any station outside the Continental limits of the United States. However, KL7 and KH6 are also eligible.

### Requirements:

76 is for the year 1776, when the USA became independent from Great Britain.

13 is for the original 13 Colonies that formed the USA.

1. Work 76 stations in the US Sixth call area which are not members of the Northern California DX Club

2. In addition, work 13 stations in the US Sixth call area which are members of the Northern California DX Club.

Time limits — All stations must be worked during the calendar year of 1976, e.g. Jan. 1, 1976 through Dec. 31, 1976

### Verification — Required Information:

1. List 76 stations which are not members of NCDXC

## A few words from "IZNIBS"

The next 12 months will see an increasing use of digital and solid state in all areas of Amateur activity! This is stating the obvious in some respects, but it is also a somewhat sobering thought that the complexity of the modern "black boxes" is a challenge to distributor and customer alike when it comes to the inevitable question of service — let's face it, they don't all last forever and sometimes even, have problems during warranty periods! What to do about it and how much it costs you is, in fact, governed by how you went about the original purchase. If purchased from an authorised distributor, such as ourselves, you have no worries — service, spares, technical advice and a warranty are all there. On the other hand, the bargain price elsewhere, possibly purchased from dubious sources, may offer no guarantees — of any kind.

We often wonder why there is not more responsibility with the sales and service of amateur equipment. Of course the purists who deplore the increasing number of amateurs buying "off the shelf" are perfectly entitled to their view, but there is no reason why the technical inquisitiveness (if that's a word) of amateurs buying such equipment should not be employed to the full in knowing how their equipment works even though they may not have built the equivalent of a Uniden 2020 or an ICOM DV21 digital VFO. If you want to know more about the technicalities of your equipment which cannot be explained from the manual, drop us a line and we would be happy to help.

Uniden Corporation are making great inroads into the HF transceiver market both here and overseas. A recent costing by an executive of a large Australian electronics company (also in amateur) indicated that they could not even produce it in quantity for less than \$1000. We have been very happy with the performance of this unit and whilst any piece of electronic equipment can develop teething troubles, these have been minimal with this set. At \$570 there is no better value for money available especially when you consider that upper and lower sideband crystal filters are used and a CW filter is included in the price. With any other set this is an extra \$40 odd and must be taken into consideration when making a decision. The most immediate and obvious impression from those who have bought the rig (not my impression as I don't get that much time to operate these days!) is the sharpness and sensitivity of the receiver together with its extremely good cross modulation performance — almost as good as the Atlas and that's saying something! Whilst talking of Atlas it is worth noting that at last, these are being provided with a noise blander — although an option, we believe they should be an integral part of the set. The noise blander is designed specifically to blank out the pulse type noise, the same as any other blander, and will effectively deal with ignition noise. Other more continuous noise signals will not be silenced or reduced, a point often forgotten when assessing the effectiveness of a noise blander.

Last but not least TRIO-KENWOOD have released to the export market the TS700A — not 144-146 as advertised elsewhere, but the full 4 MHz. If you contemplate going to the silk department this multi-mode VHF transceiver has been extensively used in its 2 MHz version for some time in Europe. The traditional Kenwood quality with the extended coverage now available 144-148 MHz promises to make a big impact with those wanting multimode operation. Drop us a line for further details.

**73 PETER 31Z**  
General Manager  
VICOM International Pty Limited

2 List 13 stations which are members of NCDXC  
3 Give date, time, frequency and mode of each OSO

**Band/Modes:**

There is one basic award certificate for mixed band/modes. Stickers will be issued for each additional band/mode applied for. Example: Application may be made for the basic certificate by working 76 California stations and 13 NCDXC stations using mixed bands/modes. Special stickers will be issued for individual single bands and all different individual modes of operation: CW, SSB, OSCAR, RTTY, ATV etc on each band. The same station may be counted for different bands/modes. Example: A station worked on 20 metres CW may be counted for the basic mixed modes award, and also for the single band 20 metre CW award.

Note — All stations worked may be used also for the regular NCDXC California award.

**Charge (Cost):**

Send 5 IRCs with the application for the basic award. Send 2 IRCs for each additional individual band/mode sticker.

**Award Custodian:**

Send list and IRCs to:  
Jim M. Ruys W6UZX,  
3860 Pestana Way,  
Livermore, CA 94550 USA

**AUSTRALIAN DXCC TOP LISTINGS AS AT 14.3.1976**

**PHONE**

VK6RU	319/351	VK2APK	300/313
VK4KS	318/337	VK4PX	297/304
VK5MS	313/343	VK5AB	291/314
VK6MK	306/333	VK3JW	291/296
VK3AHO	304/326	VK4FJ	287/314
VK4UC	301/306	VK7DK	286/292

**CW**

VK2EO	317/346*	VK3XB	280/300
VK3AHO	308/31	VK3NC	268/297
VK2OL	303/332	VK6RU	266/295
VK3YL	294/317	VK3YD	258/281
VK2APK	291/304	VK4TY	253/272
VK4FJ	290/322	VK3TL	248/260

**OPEN**

VK6RU	319/351	VK4UC	304/316
VK4KS	319/343	VK2SG	301/311
VK4SD	315/336	VK4FJ	300/332
VK2APK	311/329	VK4TY	300/321
VK6MK	306/333	VK3XB	286/306
VK4PX	304/315	VK3TL	280/283

\*Transferred from Open.  
DXCC New member VK9AP — tally 102

**YRCS**

Bob Guthberlet  
31 Bandon Terrace,  
Marino, 5049

**NAME OF THE SCHEME**

In the December 1975 issue of Zero Beat, Mr. R. C. Black, State NSW Supervisor, has given reasons why "The Scheme" in New South Wales has changed the name from "Youth Radio Clubs Scheme" to "Youth Radio Scheme". This has been done in rejection of the 1972 Constitution which specifically states, I quote: "The name of the organisation shall be "The Wireless Institute of Australia, Youth Radio Clubs Scheme" abbreviated "YRCS".

This was unanimously agreed upon by all supervisors, including the NSW representative. Section (9) of the Constitution gives the correct procedure to be adopted for any alteration. "This Constitution may be added to, altered or amended by the YRCS Council subject to obtaining the consent of a majority of all Supervisors, notice of any such proposed alterations having been circulated in writing by the Federal YRCS Secretary to all members of the YRCS Council at least twenty (20) days in advance".

In support of reverting to the original title, M. Black has stated that the newly approved Syllabuses and Vacation Courses made the "Clubs" too restrictive. There may be some reasons for a change in the name, but no valid reason can be given for blatantly flouting the existing constitution under which all States have agreed upon and are required to accept. Further, the 1972 Constitution, however inadequate, was accepted and endorsed by the

Federal Executive of the Wireless Institute of Australia.

As a matter of any alteration to the name of the Scheme is one for Federal YRCS jurisdiction, I would point out that the Free 2N3055 reward offered by the NSW Committee for the best title submitted is made without my approval and will have no bearing on a name-change unless Section (9) of the Federal YRCS Constitution is invoked.

The action of the NSW Committee has opened the way for any club in that State to disregard any constitution, including that of NSW and could well introduce a movement of disintegration of the Scheme in Australia.

**FEDERATION**

Australia today is in a state of flux, with groups and individuals protesting, resisting, and generally disregarding the elements which make up a free democratic society. In this arena of so-called radicalism YRCS is striving to maintain its program of assisting youth, and it behoves each of us to remember the words of an old negro: "Your forebears came to this country in the 'Mayfair', and mine in slave ships, but remember, we are all in the same boat now".

In other words, no man, no State, is an island, and whilst we must change our ideas from time to time, let same be done in a democratic and constitutional manner.

**NEW CONSTITUTION**

Following my appeal to State Supervisors to convene this subject to Executive Committees, I have received very limited answers. Will Supervisors please regard this matter as urgent and send me a copy of a complete draft.

**MAGAZINE INDEX**

Syd Clark, VK3ASC

**BREAK-IN Jan/Feb 1976**

The Origin of the NZART; Radio Telatype in New Zealand; Our Constitution — May 1928; Auckland VHF Group (Inc); NZART Current Policy 1976; A Path Through the Semi-Conductor Jungle; Improving the Argonaut; A 2 Metre Transverter for the FT200.

**HAM RADIO January 1976**

Synthesized Two-Metre FM Transceiver; 50 MHz Frequency Counter; Antenna and Tower Restrictions; Diode Detectors; Microprocessors; Wideband Linear Amplifier; High Gain Yagi for 432 MHz; Remote Repeater Control; Basic Troubleshooting; RAM Keyer Update; Audio-power Integrated Circuits.

**CO-TV February 1976**

Indication; Circuit Notebook No 24 — Oscilloscope Calibrator; Scanning; A Repeater ATV Style; Slow Scan News; SSTV Control Circuitry; SSTV Analog-Digital Conversion.

**MOBILE NEWS Jan/Feb 1976**

Re-Charging Dry Cells; Antenna Filter & Splitter; Unit for Two Metres.

**QST January 1976**

A Transmitter for 432 MHz; A 15 Metre Goober Whistle; Simple Broadband Matching Network; An Accu-Keyer for QRP Operation; An AC Line Monitor; Learning to Work with Integrated Circuits, Pt. 1; Impedance of Short Vertical Antenna; A Scanning Touch-Tone Digit and Word Decoder; Some Capacitor Basics.

**February 1976**

Operation Vietnamese Refugee; Danger Lurks; To the Moon and Back; Learning to Work with Integrated Circuits — 2; UHF Antenna Radiometry; Build a Baby Ultimate; A Multiband Phased Vertical Array; The Cheapie GP; A 2 Metre Frequency and Sensitivity Calibrator; A Digital Morse Code Synthesizer; Reviews:— Heath SB-230 kW Amplifier; CES 200 & 210 Touchtone Pads; Curtis EK-430 Keyer and 8044-2 Kit; Telecom 75; Changing and Chasing; Overnight Sensation — Eloise; The First Steps in Ham PR; Be Your Own DXpedition.

**RADIO COMMUNICATION January 1976**

1.3 GHz Band SSB; Some Reflections on the Four Way Phasing Method; ICOM IC-201 Transceiver-Review; An Alignment Aid for VHF Receivers; An SSTV Sync Pulse Generator for 50 Hz Mains

March 1976

A Digital Frequency Counter and Timer: WARC 1979; A 1.8 MHz Direction Finding Receiver; A Dustbinlid Aerial for 10 GHz; The KW108 Monitorscope-Review; Improving the Keying Characteristics of the AT5 Transmitter; A 10 GHz Varactor Multiplier. ■

**REPEATERS**

Ken Jewell, VK3ZNJ  
Peter Mill, VK3ZPP

By now you will have read our opening column in April AR and it is hoped that we will be able to keep bringing you the latest news on the repeater scene. Any person who contributes copy for the column should be aware of the likely delay in appearance. As I write this it is the 25th of March, and I guess you will be reading this early in May. While on the subject of contributions, any photographs relating to repeaters such as sites, antennas, and equipment are welcome. If possible photographs should be high contrast, glossy, 8" x 10" prints. If anyone wishes to phone in any news they could ring Ken Jewell on Melbourne (03) 604 8219 and pass it along to him. You will notice this month that there is a list of Victorian Repeater details. Month by month we hope to give the details of the repeaters in the other states.

**FEDERAL NEWS**

The matters under consideration by the Federal Repeater Secretariat which have been referred to the States for their comment are:— 1. Draft Repeater licensing conditions. 2. The VK3 proposal mentioned last month regarding channel numbering and an additional channel. 3. The FM channel frequencies for the 70 cm band. In order for the FRS to carry out its work efficiently it must be aware of all operational repeaters and applications being processed to assist in negotiations with the Posts and Telecommunications Department and to prepare an FM Directory which will ultimately be published in the callbook. We require the following information:— (a) location, (b) ERP, (c) channel, (d) call sign, (e) type of identification and (f) legal nominee. This data should be sent to:— Federal Repeater Secretariat, WIA, PO BOX 150, TOORAK, VIC., 3142.

**VICTORIAN NEWS**

Until there has been an agreement on the 430 MHz band FM channels Australia wide, the Victorian 70 cm Group proposes to establish an experimental manned repeater using an input frequency of 438.45 MHz and an output on 435.00 MHz to determine the possible characteristics of this band. The equipment is believed to be of commercial origin and no other details are available as yet. The proposed repeater at Mt Big Ben in the northeast of the state has moved a step closer with the official approval for the use of the site. This will be followed closely by the construction of a brick hut and an 80 ft tower. The equipment will be a PLESSEY 25 Watt unit, all solid state. At present it is being tested in Wangaratta.

**TASMANIAN NEWS**

A second repeater is in the advanced construction stage in Tasmania and will be located at Loona, which is 1 mile west of Ulverstone, on the northern coast, and at an elevation of 400 ft. It will probably be on channel 5, as this is the only one which is realistic to use due to the co-channel problems with Victorian repeaters. The site is ready with power and application has been made for the call sign VK7RNW. The equipment is solid state using an STC 131 receiver, a PYE 734 exciter, and an AWA 25 Watt final board. The repeater will have an audible ident possibly similar to that used on VK3RML.

**SOUTH AUSTRALIAN NEWS**

From Mt Gambier there is advice that their repeater, which will probably be on channel 3, is to be located at the site of the SESB TV studios on the side of the Blue Lake crater. It is hoped to have the call sign VK5RMG for the repeater which will have an operational range of 75 km. The equipment is in the advanced construction stage and should be operational by the time of the annual Convention in June. The gear will be all solid state PHILIPS 1680 for both the receiver and the transmitter, with an output power of 15 Watts and all the usual features such as an audible ident.

## VICTORIAN REPEATERS

Operational Callsign	Ch.	Location or Service Area	Type of Ident	Range	Project Officer
VK3RML	1	Mt. Dandenong/Melbourne	Audible	100 km	VK3BX
VK3RGL	4	Mt. Anakie/Geelong	Verbal	100 km	VK3AQR
VK3RLV	2	Mt. Tassie/Latrobe Valley	Audible	80 km	VK3HV
VK3RWZ	7	Mt. William/Western Vic.	Verbal	120 km	VK3ZYG
VK3RSH	3	Swan Hill	Audible	40 km	VK3BM
VK3RAM	2	Mt. Alexander/Bendigo	FSK	100 km	VK3AAA
VK3RMA	4	Mildura	Audible	40 km	VK3BRB
<b>Testing Stage</b>					
VK3RBA	5	Ballarat	Verbal	40 km	VK3AMH
VK3REG	3	East Gippsland	Audible	60 km	VK3ZCG
<b>Construction Stage</b>					
VK3RNE	4	Mt. Big Ben Albury/Wodonga	Audible	?	VK2YGN
VK3RMM	6	Mt. Macedon/Central Victoria	Audible	?	VK3BX
<b>Proposal Stage</b>					
VK3RSW ?	3	Otway Ranges/SW Coast	Audible	?	VK3AQR

## 20 YEARS AGO

Ron Fisher, VK3OM

MAY 1956

New portable-mobile regulations were announced in Amateur Radio for May 1956. It was now possible to operate portable or mobile on all HF bands without the need for a special permit for periods of up to 24 hours. Prior to this it was necessary to apply in writing for a special portable permit for each and every excursion into the field. It was suggested that this might bring about an increase in mobile operation.

Part two of the '2Y' transmitter covered testing and adjustment plus a few hints on additional TVI suppression. The basic ideas incorporated in this transmitter must have been duplicated a thousand times over as almost every Australian amateur was to build up a Geloso VFO driving one or two 6146's or 607's.

Relays, their history, use, and problems was discussed in an article which was summarised from a lecture presented to the South Australian Division by Mr. Keith Main.

New 'S' meter circuits were always of interest. Most of the receivers obtained from disposals sources did not include meters and of course to be 'with it', an S meter was essential. J. G. Oliver VK7JO showed how he did it.

Volts Amps and Man. Robert H. Black MD continued with part two of his series and discussed amongst other things the use of low voltage portable electrical equipment.

Amateur Radio magazine in those days was printed on just about the lowest grade of paper possible to get. The committee publishing 'AR' had been keen to improve this matter for some time but the budget was just as tight in those days as it is now. To whet the appetites of readers, four pages of the May issue was published on a better grade of paper. However it took quite a few years before we were able to make the change.

The Urunga Easter Convention of 1956 took one whole page to describe. It must have been quite an affair.

## PROJECT AUSTRALIS

David Hull, VK3ZDH

### NOTES FOR NEWCOMERS

As many mail and telephone calls clearly indicate, newcomers are trying the Oscar satellites all the time. Lately the influx of 'black box' sideband rigs 'or 2m has increased the number of people interested. How to work out when to listen still causes the most problems and it may be beneficial to review the procedures.

The figures printed in AR each month are for the reference orbit for each day. This orbit is the first one to cross the equator going south to North (Ascending node) after 0000Z (UCT). Each successive orbit will cross the equator 115 mins. later. The position on the equator that the satellite crosses is given in terms of longitude degrees west. This figure is used as a pointer to indicate whether any particular orbit will be visible from any QTH.

# H I . M O U N D

## HAND KEYS

from BAIL ELECTRONIC SERVICES

**Model HK-808.** Heavy duty commercial hand key with full ball race pivots, heavy marble base and dust cover. The ultimate hand key. Price \$45.00

**Model HK-701.** Heavy Duty De Luxe Hand Key, fully adjustable, ball bearing shaft, plastic protective cover. Mounted on heavy non-skid poly marble base. Base dimensions 168mm x 103mm. Price \$26.00

**Model HK-707.** Economy hand key in all black ABS resin, metal parts protected by moulded ABS resin cover. \$15.00

**Model HK-708.** Similar to HK-707 but without cover and with smart chromium plated keying mechanism and flat American style knob. Price \$9.95

Above prices include S.T., allow \$2.00 P.P. and Ins. Prices and specifications subject to change.

**Model TC-701.** Morse practice oscillator with built in key and speaker. Including battery and earphone. Copy of morse code on case. Two can be wired together to form a practice communication set. Price \$16.50

**Model MK-701.** Manipulator (side swiper) for an electronic keyer. Accurate and restful keying operation are assured owing to a heavy metal plate and a frictional rubber belt beneath the periphery of the main base. \$27.00

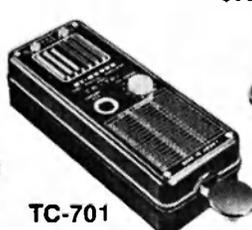
**Model BK-100.** Semi-automatic (bug) key, with standard adjustments, wide speed range, protective plastic cover, on heavy non-skid base, beautifully finished. Base dimensions 175mm x 75 mm. Price \$38.50



HK-707



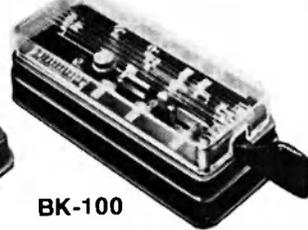
HK-708



TC-701



MK-701



BK-100

**bail**

**ELECTRONIC SERVICES** 60 Shannon St., Box Hill North, Vic., 3129 Phone 89 2213  
Distributors in Qld., NSW, S.A., W.A.

FRED BAIL VK3YS  
JIM BAIL VK3ABA

JAS7576-1R

A. Identification  
Callsign  
B. Frequency  
kHz (E)/(M)

Please use ball point pen and bear down.

B. Frequency:— (E) = Estimated; (M) = Measured



**APPENDIX 8**  
**Report of Intrusions into Amateur Bands**  
Station Causing Interference (A-F)

C. Emission ..... D. Bandwidth .....

F. Nature of Interference-Traffic-Remarks.

O. Dates and Times (UT) ..... E. Strength (RST) .....

Station experiencing Interference (M-O)

M. Name and Callsign ..... Co-ord. ....

N. Address .....

Signature ..... Date .....

Counter Signature ..... Co-ord. ....

**INTRUDER**  
**WATCH**

All Chandler, VK3LC

1538 High Street, Glen Iris, 3146

aining to the Intruder Watch I am always delighted to supply on demand.

You can write to me QTHR, or break in on my skeds if you wish. Skeds are— 21260 kHz 2300 Z Wednesday mornings (EAST 9 am) — 14160 kHz 2300 Z Thursday mornings — occasionally (about one per week) on the VK3UE net. 14150 kHz 2300 Z daily except Sundays I also often operate on the YL ISSB System on 14333 kHz at 0300 Z Saturdays. Break any of these and I can come off frequency. My phone number is 509 2556 but do not ring after 9 pm please

Divisional Co-ordinators are — VK1AOP, Ted Pearce 45 Carnegie Cres., Narrabundah. 2604; VK2AFG, Les Weldon, 11 Raymond Ave., Northmead. 2152; VK3XB, Ivor Stafford, 16 Byron St., Box Hill South, 3128; VK4KX, Murray McGregor, 6 Murray St., Red Hill, 4059; VK5LG, Leith Cotton, 64 Weeroona Ave., Parkholme, 5043; VK6, Albert Cash, 54 Frederick St., Shoalwater Bay, 6169; VK7MX, Max Ives, PO Box 12, Devonport East, 7310

Station XSGU calling SUDV has been giving much trouble on 14155 kHz lately. My information is that

it is a Red Chinese military station. More complete information would be appreciated. Another broadcast intruder into the 7 MHz band is Radio Republic Indonesia on 7070 kHz. On 7 MHz we have Pakistan, Tirana, Cairo, Moscow, Peking (with Majak jammer) and now Indonesia. What next?

**LARA**

Ladies Amateur Radio Association

Early this year a LARA newsletter was prepared and circulated to all members on the mailing list. For those who did not receive the letter or who are not yet lucky enough to be on the list, we present a summary of doings in the various LARA groups.

Each state group has a few YLs who sat for the February exams and who are now anxiously awaiting

The satellite crosses the equator a further 28 deg approx. west on each successive orbit as the earth turns underneath the polar orbiting satellite. Thus by adding 115 mins. and 28 deg. successively to the reference figure in AR all orbits for any day can be calculated. Note: Do not exceed 24 hours as the figures are not exact and errors will accumulate fast. Use the next day's reference figures

Now with a list of orbits worked out consult the standard orbit table printed in Oct. 72 and Nov. 74 AR [a SAE to the call book QTH of VK2ZDH will get you a copy if you are a new member] and take the nearest 5 deg. increment table for the long deg. W figure you have calculated. For each capital city the tables will show mins. to be added to the equator crossing and azimuth and elevation figures for antenna pointing if you have steerable arrays. Oscar 6 (145.95 +/- 50 kHz in, 29.5 +/- 50 kHz out) is 'on' Monday nights, Thursday nights, Saturday nights, and Sunday mornings. Oscar 7 is 'on' all the time. Mode A (145.9 +/- 50 kHz in, 29.45 MHz +/- 50 kHz out) on odd days of the year. Mode B (432.15 +/- 25 kHz in, 149.95 +/- 25 Hz out) on even days of the year. Note Jan. 1 is an odd day, Feb. 1 being the 32nd day of the year is an even day.

Do not exceed 100W EIRP and keep away from the passband edges for best results, also don't clobber the DUs, KH6s, KR6s, P29s, etc. The weak signal next to them is me trying to work them!

**JUNE PREDICTIONS**

OSCAR 6				OSCAR 7			
Date	No.	Z	W	Date	No.	Time	Long
1	16584	00.58	70.22	1	7058	01.41	75.29
2	16597	01.53	83.97	2	7070	00.41	60.17
3	16609	00.53	68.97	3	7083	01.35	73.79
4	16622	01.48	82.72	4	7095	00.34	58.67
5	16634	00.48	67.72	5	7108	01.28	72.29
6	16647	01.42	81.47	6	7120	00.28	57.17
7	16659	00.42	66.47	7	7133	01.22	70.79
8	16672	01.37	80.22	8	7145	00.21	55.67
9	16684	00.37	65.22	9	7158	01.16	69.29
10	16697	01.32	78.97	10	7170	00.15	54.17
11	16709	00.32	63.97	11	7183	01.09	67.79
12	16722	01.27	77.72	12	7195	00.09	52.67
13	16734	00.27	62.72	13	7208	01.03	66.29
14	16747	01.22	76.47	14	7220	00.02	51.17
15	16759	00.22	61.47	15	7233	00.56	64.79
16	16772	01.17	75.22	16	7246	01.51	78.41
17	16784	00.17	60.22	17	7258	00.50	63.29
18	16797	01.12	73.97	18	7271	01.44	76.91
19	16809	00.12	58.97	19	7283	00.44	61.79
20	16822	01.06	72.72	20	7296	01.38	75.41
21	16834	00.06	57.72	21	7308	00.37	60.29
22	16847	01.01	71.47	22	7321	01.31	73.91
23	16859	00.01	56.47	23	7333	00.31	58.79
24	16872	00.56	70.22	24	7346	01.25	72.41
25	16885	01.51	83.97	25	7358	00.24	57.29
26	16897	00.51	68.97	26	7371	01.19	70.91
27	16910	01.46	82.72	27	7383	00.18	55.79
28	16922	00.46	67.72	28	7396	01.12	69.41
29	16935	01.41	81.47	29	7408	00.12	54.29
30	16947	00.41	66.47	30	7421	01.06	67.91

By now I presume that all readers will have read and assimilated my message of last month. The transcript was also forwarded to all Divisions separately. The matter is so important that I wished the impact to be felt by all members, and acted upon by many.

As I write this report it is early days, but I have received an acknowledgement from VK5, and am patiently awaiting such from the other Divisions. Our Administration insisted that our old report forms were not acceptable to them, so the form reproduced here has been developed. It is quite simple and supplies can be obtained from Divisional Co-ordinators whom, in any case you are not aware of your Co-ordinator, I have listed below. Any help in identifications or for that matter, anything apper-

results. Some members sat the novice exam in March so we should soon have some new YL calls around.

LARA in VK5 is growing rapidly. Myrna VK5YW, who is net controller on the 80 m skeds, is one of the more active YLs in VK5 but other YLs are joining in classes and meetings.

LARA in VK3 is trying a new idea this year. Meetings are being held at members' homes instead of at the institute rooms. So far, meetings have been held at Inverloch, Mt. Dandenong, and Geelong, with the April meeting being held in Frankston at the home of Clarice VK3VB.

YLs from VK4, VK2, VK7 and VK6 are all heard on the Monday night skeds which are held at 1000 GMT. These skeds are held on 3650 KHz each week.

At this point LARA would like to remind non-licensed YLs that broadcasting on an amateur station by unlicensed operators is permitted when the station licensee supervises according to the regulations, so come up and join in. It's good practice for when you get your own call! Just to show what is going on in the rest of the world we include some overseas YL notes.

For those YLs interested in joining LARA please apply to LARA, c/o WIA, Vic. Division, 412 Brunswick St., Fitzroy, Vic.

In Germany there are about 500 YL operators, most of whom work only on 2 metres. They have their



CHRISTA, DJ1TE

own YL club and certificate. To obtain their certificate one must work 10 German YL stations.

This information came from Christa DJ1TE — who is both an active DXer and mother of two harmonics (children).

Christa was licensed in 1953 at the age of 18, and at that time was editor of their 'YL Column' in the local German radio magazine. She was then a technical assistant at a Television Station. In 1960 Christa married and went QRT for 10 years.

In 1970 she was surprised with a 5 element beam and transceiver for a Christmas present from her husband, and so DX was her aim again.

Christa is very active, especially in contests and looks forward to talking to Australian girls. One of her main ambitions is to obtain her DXCC with only YL stations — a great feat in any language.

**NEW ZEALAND**

In New Zealand, WARC, the Women's Amateur Radio Operators' Club now has 59 transmitting members which only includes 9 ZL calls. Australian members include Joan VK3BJB, Heather VK3HD and Norma VK3AYL.

WARC runs a certificate which requires VK stations to work 12 different WARC members. For any information about WARC write to the secretary, Celia ZL1ALK at 4 Great South Rd., Papakura Stn., New Zealand or call in on the WARC nets. These are on Monday evenings at 0800 GMT on 3 680 MHz.

# IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

February was indeed a low in sunspot activity, producing only a provisional monthly mean of 4.6, the previous low of 6.2 being in Mar. 75. During February, the Solar Flux fell to 69 for some 12 days in succession.

The pattern of geomagnetic activity has become quite erratic over the past few months, with the number of disturbed days increasing. During the past 12 months, there was an average of two periods per solar rotation period. This has now increased to three, which makes it more difficult to predict even one period (27 days) ahead. From past experience during the sunspot minima, they will not persist, tending to produce a minima in geomagnetic and ionospheric disturbances prior to the new cycle establishing itself. In the present e. during the coming 12 months.

Statements that prior to, and immediately following magnetic storms, are periods of better than average activity, were well to the fore during March.

Following the period of low activity in February, towards March 20th, a rise in solar flux to 96 and a drop in the A index to 5 produced some good openings on 15m and 10m on March 21, 22.

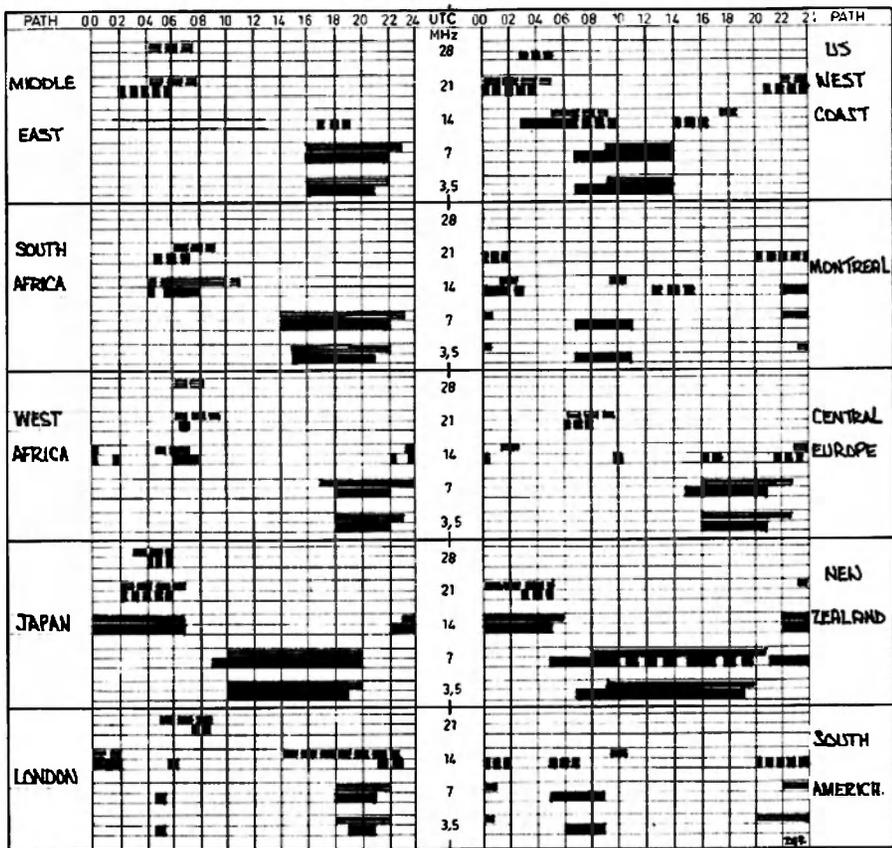
More spectacular were the events on March 25-27. On 25th at 0814 WWV on 5 MHz had a strong auroral buzz and was almost unreadable, but extracted the report fair to good — geomagnetic field quiet — coded forecast N6 K index — 0. Solar flux (24th) was 83.

On 26th at 0814 WWV on 5 MHz still had the strong buzz, however the forecast was — poor to fair — field active — coded forecast W4 K Index — 6. Solar flux (25th), 27 March was — at 0814 — poor — active — W3 K was 5. Solar flux 87 (26th).

Looking at the indices in perspective we have:—  
 25 Mar Flux — 86 A — 4  
 26 Mar Flux — 87 A — 86  
 27 Mar Flux — 86 A — 30

The results? At 1100 15m and 10 were open from JA across to Europe. On the 26th between 0000 and 2356, or same day GMT, one DXer worked all USSR areas 0 through 9 on 10m then 15m. OSYd and, working through to two hours after sunrise, completed the same on 80m. Almost had to use a cricket bat during that period.

This co-incided with the CQ WPX contest. Judging by the activity over the 48 hours, some FB DX was worked all round. It does pay to keep



**CHART LEGEND**

LINES FROM WESTERN AUSTRALIA.

BARs FROM EASTERN AUSTRALIA.

ALL TIMES: UNIVERSAL (GMT).

SOLID LINES/BARS: BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.

BROKEN LINES/BARS: LESS THAN 50% OF THE MONTH. (Useful at period of increased solar activity.)

PREDICTIONS: COURTESY I.P.S. SYDNEY.

SUNSPOT DATA: DR. WALDEMEIR, SWISS FEDERAL OBSERVATORY, ZURICH.

OTHER DATA: WWV/H DAILY AT HOUR PLUS 14, 18, 45 MINUTES.

an ear on the WWV/H forecasts and figures as I have mentioned earlier. You can often pick the optimum time to work DX when it normally isn't

there. I feel sure we should see some more interesting events during the coming months, particularly around Oct./Nov. 1976.

# HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

**Power Transformers** 240V Pri. 12V Sec. 120A. \$20  
Another 10 220, 240, 260 Pri. 1700V Sec. 350 mA.  
\$22 Yaesu FL1000 Linear E.C., \$220. Johnson  
Viking "Courier" Linear GC 500W, pair 811A 117V  
AC. \$120 Offers considered. VK35X, QTHR. Ph (03)  
82 2152

**FV-50B VFO**, 5 band, solid state, GC \$30. Plessey  
ICs: SL610, SL612 3 off, SL621, SL622, SL640 2 off,  
Anzac MD108 Mixer, 6V IC reg. some comps and  
PCB suit. G3ZVC exciter, used but OK. \$40 lot.  
Valve YL1060 new \$20, used few hours. \$15  
TRM435 — 0 — 435 for 400 mA 6.3V @ 5.5A.  
5V @ 6A. \$5 Ckoche 5H for 400 mA \$3. VK3AOZ  
Lou Ph. (03) 751 1281 A.H. or PO Box 46, Olinda

**Television Camera** Phillips EL8000/01/12, one  
spare Vidicon and complete Handbook, \$95.00.  
MTR151-25B STC Carphone complete with xtls for  
Ch. 40. \$90.00 ONO. MR 20A Low Band, not com-  
pleted, priced to sell. VK22FX, QTHR

**Yaesu FR100B, Rx** 80-10m plus WWV. AM. SSB  
and CW filters. FL200B matching Tx. 240W PEP.  
80-10m. Good original condx. with books, matching  
speaker and FC6 50 MHz converter, all for \$425.  
Will also sell above with FL1000 matching Linear  
if desired. \$625. VK300 QTHR Ph (03) 45 4828

**Complete Service Manual for Rx/R5223**, showing  
all details for alignment, repair, construction,  
voltage and sensitivity of each unit, plus 2 large  
circuits, one for wiring diagram, one as circuit  
diagram, all for \$15 J. C. Van Ooijen, P.O. Box  
141, West St. Kilda, Vic. 3182 Ph (03) 699 2400

**Halicrafters HT37** 240V AC operation AM CW  
SSB Drake 2B with Q multiplier, AM CW SSB  
MR10 and MR20 146 Unit FM, Galaxy III, complete  
with PSU 27 MHz equip TR 2 off. No reasonable  
offer refused. All complete with manuals etc. All  
in 1st class order and guaranteed to work 100 per  
cent Ph (043) 96 4553

**HT32 Halicrafters Tx** 230V AC PS complete with  
aerial change over relay and instruction book  
good order \$150 ONO 1676 Low Band car phone  
and instruction book part mod., \$50 ONO VK3AQQ.  
QTHR Ph (03) 459 6445

**FT75B, FV50C, DC75B PS**, bought new Nov. '75.  
Do deal to fit FT101 or similar Tx. VK4PM, QTHR  
Ph. (074) 62 1021

**FTDX400 Transceiver**, 80-10m including 11m, noise  
blanker CW filter, silent tan good condition. Mal  
Sinclair VK2BMS, QTHR. Ph (02) 407 0261 Bus.  
(02) 95 2362 A.H.

**Sony 2100-CVE Video Tape Recorder**, \$400. Sony  
CVM-100VZ Monitor, \$300. Sanyo Video Camera  
\$140. VK3 Division SSVT Kit, nearly completed.  
\$175. Hammalund HQ 129-K Rx, offers VK4NY  
Travaglia Base Hospital, Rockhampton. 4700 Ph  
(079) 27 6879

**FT-75 Transceiver**, complete with FV-50C VFO and  
DC-75 mobile power supply and mounting bracket,  
plus homebrew AC power supply with speaker.  
Equipment little used and mint condition with  
English manual and original cartons. New price  
about \$400. Will take \$280. Dave Jeanes VK2BSJ.  
QTHR. Ph. (02) 651 1316

**Antenna TH3 JR**, \$80 Thick 72 ohm 100 ft coax  
\$40. HT power supply \$40. VK3TL Ph. (03) 846 1516

**Free to Radio Club:** A fair quantity of radio parts to  
be collected from Templestowe. VK3TL Ph. (03)  
846 1516

**Vinten Car Phone**, L/Band, half converted to 2m,  
have circuit \$25 Vinten car phone L/Band, \$25  
IGL 2m 1W FM Exciter, \$19 IGL 430 MC Converter  
Rx EA not completed \$25 VTVM EA not com-  
pleted. \$15 VK3YBR, QTHR. Ph. (03) 795 2792

**Pye Base Station**, 25W AM 70-85 MHz, good cond.,  
no xtls, mike and stand. Pye 3A Mobile on 6Mx  
53-032 Pye Leader (2) ex Taxi, 84 MHz multi Ch.  
Pye Reporter, 84 MHz 2 Mx AM HB Transceiver  
and power supply 3-6 MHz Command Rx, 3/12 Tx,  
needs mod. Iranny Edystone all band Rx, needs  
attention. Ex Disposals Monitor Scope and spare  
tubes, needs attention. 5V DC 240V filtered PSU.  
Any offers all or any? VK3UB, QTHR Ph (03)  
49 2973

**Communications Rx**, gen. cov. R5223 1.5 MHz-  
30.5 MHz in 29 switched bands, BFO noise limiter,  
inbuilt PS 230/110V AC or 24V DC, all leads and  
inbuilt speaker, head phones and complete service  
manual, tested on all ranges 2 uV for 10 dB SN,  
spare module for modification of detector/BFO  
unit also, \$200. C. Cook VK3ZBD, QTHR. Ph (03)  
89 2117 A.H.

**Hansen SWR3**, SWR — FS meter, \$10 Zephyr  
Dynamic Car diode mike, 50K imp with desk  
stand, \$15. VK3PR, 6 View Ct., Leongatha Ph  
(056) 62 2711

**QRT Edystone 888A Rx**, \$150. Canonball 10W  
180 Mx Tx. AM SSB. \$50 Regulated power supply.  
\$40 122 Set, \$10 FL100B Tx. out of order, what  
offers? VK3AWF, QTHR. Ph. (03) 82 7926

**Gonsel GSB100 Tx**, mint cond., all modes, VOX  
manual, ideal for Novice or drive any linear, \$180  
or offer. HB Linear with two 811s, B&W 1 kW  
turret 10-80m, AC filament meter, two MA meters,  
\$100 or offer. Pair of Selsen motors, \$10. Tranpro  
VCT, \$40 Auto-Mate electronic keyer, \$35. AR7  
Rx, \$25 Dozens of spare valves, 813s 814, 811As,  
866s etc. plus Rx valves of all types. Send SASE  
for list. Uniquely collectors items. Send SASE.  
VK2DA, QTHR. Ph (02) 94 1039

**4BTV Hustler Trap Dipole**, complete with 80m re-  
sonator, \$50 VK2SM, QTHR

**FT-200** with power supply, hardly used, \$250 Pilot-  
phone 11/MR3B, \$20 MTR13 \$15 Base Station  
BTR-10R, \$20. Creed teleprinter model 7B, \$25  
Creed reperfl type 85B, \$15 Creed tape printer  
type 47R, \$10. AC bridge BR-8, \$5 VHF absorption  
wavemeter, \$5 Multimeter H-70 \$10 Marconi  
TF643B wavemeter, \$5 BC221, \$5 Mrs. Jeffries  
Ph. (03) 550 1066

**Collins KWM2A Transceiver** W/AC matching supply  
Drake R4C Receiver. Both absolutely as new.  
VK3ADR Ph (03) 24 1231 Bus., (03) 20 6135 A.H.  
**Swan 500C** with 240V power supply, speaker, VOX  
mic., manual and spare PA valves. Ph (02) 759 3354

**INOUE IC700 Solid State** (except for Tx mixer,  
driver and — 2 x 6146 — output) Tx Rx and  
power supply, very good condition, \$250 ONO.  
Enormous junk box to be cleared out. New and  
used components and assemblies, from transistors  
to transceivers. J. Lilley, 39 Middlesex Rd., Surrey  
Hills Ph (03) 83 3230

**12AVO Trap Vertical**, 20, 15, 10m, 4 months old,  
excellent performer, \$36. Would consider exchange  
for RF signal generator (old type) VK3LJ, QTHR.  
**101B**, mint condition, little use, \$500 R. A. Watson,  
69 Edmund St., Caloundra, Old 4551

**Signal Generator HP608D** (military version) 10-420  
MHz (has accurate attenuator) \$725. Ham-M Rotator  
without control box \$18 Mark Webster, 1 Fisher  
Ave., Waroonga Ph (02) 48 6241

**Television Camera**, Vidicon Type (Studio), \$80.  
Teleprinter Mod 15, \$80 STC MTR121, modifed  
2m, \$20 AWA Type 25M 2m solid state \$110.  
Pye 14" Studio Monitor, \$35 AWA off air TV Rx,  
\$35. RCA TV wave form monitor, \$25. VK2ZPM  
QTHR. Ph. (02) 476 2304

**10-15-20m Cubical Quad**, 8' boom (2" dia) spreaders  
aluminium/solid F/G, complete with 3 band tri-  
gamma match. Also 27' Oregon Lattice Tilt-Over  
Tower with top support and bottom side thrust  
bearings \$150 the lot — buyer arrange collection.  
VK3AZN, QTHR Ph (03) 791 7147 AH.

**FT75 SSB Transceiver**, FP75 AC PSU FV50 VFO  
nome brew digital dial, also usable as OFM to 20  
MHz, \$280 all in good condition, hardly used.  
Neil Osborne VK3YEI, QTHR. Phone (03) 763 0256

## WANTED

**FL2000 Yaesu Linear Amplifier**, VK3BAX, QTHR.  
Ph (052) 9 5949 Bus., (052) 9 7401 A.H.

**RCP10 Controller for AD704 VHF Receiver**, L.  
Hughes, 32 Howie St., Glen Iris, 3146, Vic. Ph.  
(03) 29 3706.

# SILENT KEYS

It is with deep regret that we record the  
passing of —

K. A. BRADY VK2AFF  
K. A. FOALE VK5ZFK  
P. C. HUTCHINS VK5PH  
BRIG. G. P. HUNT (R'd) VK6QJ

**PERCY EVANS** VK30Z  
Amateurs in Australia, and the world be-  
yond, will be saddened by the death of  
Percy Evans, VK30Z.

Born in Manchester, England, in 1883,  
Percy migrated to Australia in 1912. His  
interest in radio communication commenced  
in New Zealand in 1923 with the con-  
struction of simple broadcast receivers,  
the components of which were largely  
home made. He could recall with nostalgia  
how a few years later he sat through  
several nights receiving the transmission  
of Kingford Smith on the first trans-  
Pacific flight and how, the next day he  
read the newspapers to check the ac-  
curacy of the reports.

In 1928, living in Sydney, he received  
his first amateur licence with the call sign  
VK2OW. Four years later in Victoria he  
was allocated the call that was to be his  
for the next 44 years, VK30Z.

Ever an experimenter, one of his chief  
delights was in antenna design, and at  
the time of his death he was vigorously  
engaged in the erection of a 70 ft. high,  
204BA antenna with a CDE rotator.

He made his last contact on February  
1st to G4GI. Eight days later he entered  
hospital in Talara where he passed away  
on the morning of February 27th 1976.

VK3AGG

**Channel 7 Crystals** for loan or hire for second  
week of May school vacation (15-22 May), for  
holiday in Grampians MR6A crystals (4065 27 kHz  
10353.57 kHz — same as required for MR3A,  
MR10A, MR20A Vinten MTR13, BTR8/10 IGL)  
VK3ZLN, QTHR. Ph. (03) 328 4148.

**Receiver 0.5-30 MHz** AM CW SSB, in going order,  
for prospective amateur. Price to \$200. Contact  
VK3ZR, QTHR. Ph. (03) 89 4645 A.H.

**Table for Teletype Model 15 Teleprinter**. Type XRT  
or similar, VK3ARY, QTHR. Ph. (03) 277 4798.

**Transverters** — 6m, 2m, 70 cm, to suit FT101, also  
helical or trap verticals, anywhere in between  
160m to 6m. Bob Yorston VK2CAN. Ph (02) 646 0317  
(9 am - 5 pm)

**Swan 350 Transceiver** with matching AC power  
supply, around \$250; also Ken KP202. Prefer with  
Jap channels fitted. VK30M Ph. (03) 560 9215

**iTT GH2005 Series Modem**, multi level AM and  
vestigial sideband modulation, 2.4, 4.8, 7.2 or  
9.6 K/Baud rate. With handbooks. Will exchange  
for an ASR33TTY. P. Christie VK5EM. Ph (082)  
223 2296

## STOLEN

**ICOM 22**, fitted repeaters and channels A & B  
50 and 51. Ser. No. 1310858, stolen from my car  
in Little Lonsdale Street. Any information to C.I.B.  
Russell Street, please, or VK3ARP.

# QSP

## QSL BUREAU

The VK2 Divisional President advises that with  
effect from March 1976 the WIA Hunter Branch  
will provide both the Inwards and Outwards QSL  
Bureau for VK2. The address is c/o Post Office,  
Teralba, NSW 2284. All previous VK2 QSL Bureau  
addresses are cancelled. Outwards QSL cards from  
VK2 members may be either posted to Teralba or  
left in the Alchison Street office. Further details  
should be obtained from the Admin. Secretary,  
VK2 Division.

## MOBILEERING

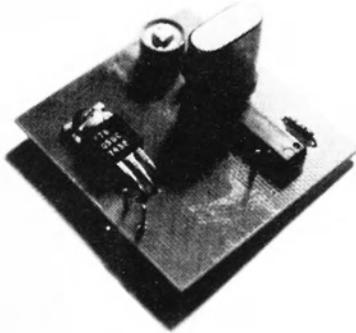
According to QTC, the journal of the Radio Society  
of Kenya, Jan '76 issue, Mobile amateur stations  
are not permitted in East Africa. ■

TO COMPLEMENT OUR USUAL RANGE OF CRYSTALS

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In addition, the student is taught to "sing" the symbols with the correct rhythm in becoming his own transmitter during the final critical phase of his system.

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Proof of the efficiency of the system is the large increase in letters by those who have used it.

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● 24 Channel FM Transceiver

## FT-224

The FT-224 is an advanced, solid state transceiver, that features 10 watts and 23 channel flexibility plus one priority channel, all in one compact package. Dial is marked in channel frequencies for direct read-out, and three popular channels are installed. Additional plus features include automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. A monitor switch is provided which enables checking of your own transmitter/receiver frequencies. Panel meter functions as "S" meter, transmitter RF output, and centre reading discriminator meter which enables received frequency to be checked. FET RF with five section helical resonator. Three IF filters. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.



**GENERAL**  
**Frequency Range:** 146 to 148 MHz  
**Number of Channels:** 23 plus 1 priority channel.  
**Mode:** FM  
**Frequency Stability:** ± 0.001%.  
**Circuitry:** 30 Transistors, 23 Diodes, 4 IC, 5 FET  
**Power Source:** 13.5V DC

**Antenna Impedance:** 52 ohm unbalanced  
**Power requirement:** 0.4A receive, 2.2A transmit (DC).  
**Size:** 180(w) x 70(h) x 220(d) mm.  
**Weight:** 2.5 kg  
**RECEIVER**  
**Sensitivity:** 0.3 uV for 20 dB quieting.  
**Selectivity:** 15 kHz at 6 dB, 25 kHz at 60 dB

**Audio Output:** 2.5 Watts at 4 ohm  
**TRANSMITTER**  
**RF Output Power:** 1 & 10 watts  
**Spurious Radiation:** —60 dB or better  
**Deviation:** ± 5 kHz nominal.

**FT-224 (inc. 3 chns.)** \$199.00  
**Extra standard channels** \$8.00  
**FP-2 Matching AC PS** \$69.00

Prices include Sales Tax. Freight and insurance extra. Prices and specifications are subject to change. All sets are pre-checked before despatch and are covered by our 90 Day Warranty.



**ELECTRONIC SERVICES** 60 Shannon St., Box Hill North, Vic., 3129. Phone 89 2213  
 Distributors in Qld., NSW, S.A., W.A.

**FRED BAIL VK3YS**  
**JIM BAIL VK3ABA**

JAS7576-20

# SIDEBAND ELECTRONICS SALES

**UNIDEN** model 2020 AC-DC transceivers 10 to 80 M with 3 crystal filters \$550

**TRIO-KENWOOD** model TS-520 AC-DC transceivers 10 to 80 M. Still only \$530

**YAESU-MUSEN** model FT 101-E AC-DC transceivers 10 to 160 M w. speech processor \$650

**TRIO-KENWOOD** model QR-666 receiver 170 KHz to 30 MHz AC-DC \$300

**BARLOW-WADLEY** model XCR-30 MK II portable DC communications receiver \$225

## HY-GAIN ANTENNAS

14AVQ 10-40 M. verticals, 19' tall, no guys \$65

18AVT-WB 10-80 M. verticals, 23' tall, no guys \$90

TH3JR 10-15-20 junior 3 el. Yagi 12' boom \$135

TH3MK3 10-15-20 senior 3 el. Yagi 14' boom \$180

TH6DX 10-15-20 senior 6 el. Yagi 24' boom \$225

HY-QUAD 10-15-20 cubical quad Yagi 8' boom \$200

TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom \$190

BN-86 balun for beam purchasers only \$18

## ANTENNA ROTATORS

Model CDR AR-22 junior rotator for small and light beams \$55

Model CDR Ham-II for all hf beams except 40 M ones! \$165

KEN model KR-400 for all medium size hf beams with internal disc brake \$100

KEN model KR-500 for vertical elevation control of satellite tracking \$100

All models rotators come complete with 230V AC indicator-control units.

4-conductor light cable for AR-22 20 cents per yard

12-conductor light cable for Ham-II 30 cents per yard

8-conductor heavy cable for Ham-II 70 cents per yard

6-conductor heavy cable for KR-400-500 60 cents per yard

**DRAKE W-4 SWR—WATT METER** 0-200 and 0-2000 Watt scales \$60

**DRAKE TV-1000 TVI Low pass Filter** \$25

**SINGLE METER SWR METER** \$15

**TWIN METER SWR METER** \$22

## MARK MOBILE ANTENNAS

Helical 6' long HW-40 for 40 M. \$18

High power KW-40 for 40 M. \$25

HW-20 for 20 M. \$16

Swivel mobile mount and chrome plated spring for all \$12

## ASAHI MOBILE ANTENNAS

AS-2-DW-E 1/4 wave 2 M. mobile whip \$8

AS-WW 5/8 wave 2 M. mobile whip \$18

AS-GM gutter clip mount with canle and connectors \$10

M-Ring body mount and cap for 1/4 M. whips \$5

## CUSH CRAFT ANTENNAS

Model DGPA 52-27 MHz adjustable ground plane \$25

LAC-2 lightning arrestors \$6

Model AR-2 RINGO 5/8 waves verticals \$20

AR-2X RINGO RANGER double 5/8 waves verticals \$35

ARX-2 extension for AR-2 \$15

A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each \$60

A147-11 11 elements 2 M. Yagi \$30

**CRYSTAL FILTERS** 9 MHz, similar to FT-200 ones, with carrier crystals \$35

**KYOKUTO** 2 Meter FM 15 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144 to 148 MHz, receive to 149 MHz, no more crystals to buy, includes simplex, repeater and anti-repeater operation. Still only \$300

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**AUTOMATIC MORSE KEYERS** EK-150 with built-in squeeze key paddle AC operated with monitor \$75

**FERRITE CORE BALUNS** cheaper Japanese product for up to 500 W RF \$12

**COAX CABLE CONNECTORS-SWITCHES** Amphenol type male for RG8U and RG58U cable, two types, female chassis mount, double male, double female, all types 100 cents each

Amphenol angle and T-connectors 150 cents each

3 Position coax switches \$8

RG-8U coax cable 3/8" diam. 80 cents per yard

RG-58U coax cable 3-16" diam. 30 cents per yard

Add \$1 cutting and handling cost for coax and rotator cable orders

**P.T.T. DYNAMIC MICROPHONES** 50K or 600 ohms with 4-pin Jap. plugs \$10

**DUMMY LOADS**, 50 ohms with Watt meters built-in 0-200 MHz, two types 0-15 Watt and 0-6—0-30—0-150 Watt \$45 and \$80 resp.

**TRIO-KENWOOD DIP METERS** Model DM-800 0.7 to 250 MHz few only \$60

**27 MHz TRANSCEIVERS** 5 Watt AM 6 channels with 27.880 MHz crystals \$75

1 Watt hand-held 3 channels 27.240 crystals \$50

15 Watt PEP 23-channels AM-SSB model SE-501 \$175

**CUSH CRAFT** model CR-1 27-29 MHz Ringo 5/8 wave antennas \$35

All prices quoted are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over \$100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded.

## IMPORTANT CHANGE, PLEASE NOTE!

Effective immediately all retail sales are handled by Peter Schulz, VK 2 ZXL, business address 24 Kurri Street, LOFTUS. Postcode 2232. Postal address, Postbox 184 SUTHERLAND. Postcode 2232, telephone 02-521-7573. Peter Schulz will attend to all orders, service and repairs, not \$12 per hour, that is a bit stiff, \$6 per hour suffices for expert attention with the aid of all sorts of modern instruments. I shall continue to back Peter, Schulz, with my business experience and finances for quality imports at the lowest available prices, a 12 year record that will not and has not yet been broken. Arie Bles.



VOL. 44, No. 6

JUNE, 1976

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### COVER PHOTO

*Bill Roper, VK3ARZ, the editor of AR, occasionally finds time free from producing the magazine to have a contact on the HF bands. Antennae in use include a trapped dipole for 80 and 40 metres and a 3 element monoband beam for 20 metres.*

# HAM

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The Micro Size Powerhouse!  
1 15/16 H x 5 3/16 W x 6 13/16" D

P.M.G. Type Approved (Licence Required)

- Slider Type Volume and Squelch Controls.
- "Range Boost" Modulation Circuitry for Greater Effective Range.
- Built-in Speaker plus Push-Button Selected External Speaker-Microphone (supplied).
- Operates on 12 V DC Negative or Positive Ground.
- 6 Channels, Crystal Controlled, Push-Button Selected.
- 5 Watts Maximum Legal Input Power.
- Extra Sensitive Receiver, Better than 1 uV for 10 dB Signal-to-Noise Ratio.
- 455 kHz Mechanical Filter for Superior Selectivity and Adjacent Channel Rejection.

**\$139.00**  
WITH SET OF CRYSTALS



### OPTIONAL ACCESSORIES

- PS-54 AC POWER SUPPLY. Permits 240 volts AC Base Station Operation of Micro 66. \$57.50.
- PS-57 BATTERY/ANTENNA PACK with shoulder type carrying strap. Permits portable operation of Micro 66. \$57.50.

- LAFAYETTE HA310 WALKIE TALKIES, 27 MHz, 1 watt, 3 channel. Fitted with 27.240 MHz crystals. PMG approved type. **\$69.90 each**
- 1 WATT 2 CHANNEL TRANSCEIVER with call system. 27.240 MHz. 12 transistor. PMG approved type. **\$45 each or \$89 a pair**
- LAFAYETTE 27 MHz FIBREGLASS COWL MOUNT MOBILE LOADED ANTENNA, 36" ling. **\$23.95**
- LAFAYETTE 27 MHz GUTTER MOUNT MOBILE ANTENNAS, fitted with 52 ohm coax and PL259 VHF plug. **\$22.50**
- LAFAYETTE 27 MHz COMBINATION AM RADIO AND 27 MHz LOADED ANTENNA with RF splitter harness. **\$28.95**

- 27 MHz MARINE ANTENNA. Designed for installation on fibreglass boats. Does not require any metallic earthing. **\$59**
- 1/4 WAVE STAINLESS STEEL 27 MHz ANTENNA with heavy duty spring steel base and insulator. **\$35**

- PONY CB74A 6 CHANNEL 27 MHz 5W AM TRANSCEIVER. PMG approved for 27.880 MHz operation and fitted with 27.880 MHz crystals. **\$121**
- NEW PORCELAIN EGG INSULATORS **35c each of 10 for \$3**

- HANSEN FS5 COMBINATION SWR BRIDGE AND POWER METER. 2 power ranges 10 and 100 watt, 52 and 75 impedance switching. **\$29.50**

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We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.165	27.255
27.085	27.225	27.265
27.125	27.235	27.880
27.155	27.240	27.910

**\$8 A PAIR (Transmit and Receive)**

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a truly portable communications receiver, based on the WADLEY LOOP principle, the same principle as applied in the DELTA-HET and RACAL receivers. A truly crystal-controlled highly sensitive multiple heterodyne portable receiver of exceptional stability with continuous, uninterrupted coverage from 500 kHz to 31 MHz.

All for **\$239** F.O.R.

### WANTED TO BUY

Communication Receivers, Transceivers, Walkie Talkies, Amplifiers and Stereo Equipment. Top prices for good clean units. We also accept trade-ins.

### THIS MONTH'S SPECIAL SOLID STATE 19 TRANSISTOR MULTI-BAND RADIO — 9 RANGES



AM, SW, FM, VHF, AIR, PB BATTERY/OPERATED COLOUR CODED 9 BAND DIAL

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Slider controls, Dial light, Fine tuning control, Flip-up Time Zone map, Telescope antennas complete with batteries.

~~\$59~~ **Reduced to \$49.90**  
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**SPECIFICATIONS — FM Section:** Tuning range, 88-108 MHz; Sensitivity, 5uV for 30 dB S/N; Signal to noise ratio, 55 dB; Intermediate frequency, 10.7 MHz; Distortion 1%; MPX separation, 25 dB; Antenna, Built-in line cord antenna, plus 300 ohm balanced input for external antenna; Output level, 200 mV.

**AM Section:** Tuning range, 525-1650 kHz; Intermediate frequency, 455 kHz; Sensitivity, 300 uV/M; Signal to noise ratio, 40 dB; Antenna, Built-in Ferrite Bar Antenna, plus input for external system; Output level, 200 mV; Dimensions, 290 W x 100 H x 180 D (mm).

**\$69.00 — Pack and Post \$3**

LOOKING FOR BARGAINS?



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PANEL METERS 5 7/8" x 4 1/4" with 0-1 MA movement. Various scales on meters. (Gas Analyser etc.). **\$5 each**

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BATTERY ELIMINATORS to suit transistor radios and cassette recorders, AC-DC 6 volt, 300 MA P.S.6300. **\$7.50**

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# amateur radio

Published monthly as its official journal by the Wireless Institute of Australia, founded 1910.

JUNE, 1976

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Copy is required by the third of each month. Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.

The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:

Advertising material should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 25th of the second month preceding publication. Phone: (03) 24 8852.

Hamads should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 3rd of the month preceding publication.

Trade Practices Act:

It is impossible for us to ensure that advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly.

Printers: EQUITY PRESS PTY. LTD.

50-52 Islington Street, Collingwood, 3066  
Tel.: 41-5054, 41-5055

## QSP MORE MEMBERS NEEDED

During April, while attending the Inter-Regional meeting of the IARU, it was my privilege to confer with the major leaders of amateur radio affairs from throughout the world. The subjects discussed were many and varied, but were all of vital importance.

As Noel Eaton VE3QJ, President of IARU said, during the next few vital years leading up to WARC 1979 it is of utmost importance for every amateur in the world to support his local Society, thus giving backing to the team working on his behalf to preserve amateur radio frequencies and privileges.

The WIA is committed to represent the amateurs of Australia in the preparation of the Australian brief for WARC '79.

We are also committed to assist, through the medium of the IARU, other countries. Countries not as well situated, insofar as resources are concerned, as ourselves.

It is important that the membership of the WIA is as great a percentage of licensed amateurs as possible. The more members the more encouraging it is for those who give their time to look after the interests of all amateurs in this country.

More members also means that the financial burden is spread a little less heavily on each.

Will you do your bit to encourage more amateurs to join the WIA.

Remember WARC '79.

DAVID WARDLAW, VK3ADW,  
Federal President, WIA

## EDITOR'S DESK

Bill Roper, VK3ARZ

As I write this comment, it is the eve of the 1976 Federal Convention to be held in Melbourne.

Representatives from all States, as well as members of Executive, are taking leave from their families, and jobs (without pay or with a corresponding loss of holiday time), to meet for three days. They will argue, plead, hassle; some will be triumphant, some disappointed. But they will all be doing their utmost to further and improve our hobby of amateur radio.

These people are giving up their time to be INVOLVED in the administration and furtherance of our wonderful leisure time activity.

Are you an INVOLVED amateur? Or are you a spectator amateur?

Each committee, sub-committee and co-opted office holder of the federal body of the WIA submits a report to the Federal Convention. Many of these reports are lengthy.

As editor I also have to submit a report relating to the activities of the Publications Committee. Many thousands of words could have been written about the many happenings during 1975, the tremendous amount of work performed in their spare time by a handful of volunteers to produce your magazine.

Here is the Publications Committee report for 1975:—

### AMATEUR RADIO

Despite the disastrous fire at the commencement of the year, AR has continued to improve.

A change of printer resulted in a more professional operation at a saving of thousands of dollars.

Most members of the committee contributed well to publication of AR, but with an average delay of nine months in publication of submitted articles, it is obvious we are in urgent need of assistance, particularly drafting and technical editing.

We also need more quality articles and photographs.

Tom Cook, the advertising representative, continues to justify his appointment; Peter Dodd is a vital and indispensable part of AR.

The lack of assistance from most areas of Australia is still a regrettable but expected disappointment. AR is not a commercial magazine published for the enjoyment of dispassionate subscribers/purchasers. It is *our* magazine — a house magazine of the WIA — a magazine of involvement — a forum for ideas — a vehicle for education and for dissemination of news to and from members.

AR is now of world standard. But an enormous work load falls on too few — a few who cannot continue indefinitely without aid and replacement.

AR is oftentimes the only tangible benefit of membership of the oldest radio society in the world; it is essential that it not be allowed to lose its individuality.

### CALL BOOK

The committee is willing to edit and publish a call book, PROVIDED the call sign/address listings are made available to us in EDP format. We cannot assume responsibility for preparing this information.

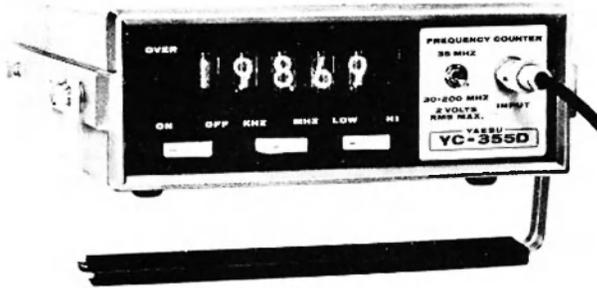
### MAGPUBS

Magpubs continues to be a relatively successful venture.

# YAESU MEASURING EQUIPMENT



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## YC-355D 200 MHz FREQUENCY COUNTER

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### TECHNICAL DATA

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Stability:  $\pm 0.0005\%$  at 25°C,  $\pm 0.0025\%$  at  $\pm 40^\circ\text{C}$ .

Aux. 1 MHz Output: 5V p-p.  
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## YO-100

\$195



### TECHNICAL DATA

#### VERTICAL

Sensitivity: 200m V P-P/cm.  
Frequency Response: 10 Hz to 40 KHz +3dB 3180 kHz (455 kHz or 9 MHz inputs optional). Direct 10 Hz to 60 MHz.  
Input Impedance: 500 K ohm.

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The Model YP-150 can be used as dummy load and power meter within the frequency range of 1.8 MHz to 200 MHz. Three switch selected scales assure accurate power measurement in high and low power range. Built-in fan cools unit for stable measurement.

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### TECHNICAL DATA

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FRED BAIL VK3YS  
JIM BAIL VK3ABA

JAS7576-18

# WIANEWS

The Secretary of the Darwin Club wrote to the VK5 Divisional Council, which in turn passed it on to the Executive, that it had been unanimously agreed that the monies collected in the Darwin Appeal Fund should go to the Club and not to individual members.

Accordingly Executive resolved to send a cheque for the full amount collected — \$1084.38 — to the President of the Darwin Club with the request that the money should be used to acquire tangible assets for that Club. Future visitors would therefore be able to see how the donations were put to good use.

The possibility of publishing a call book during 1976 was further investigated during April. Unfortunately there are a whole host of problems connected with such a venture but nevertheless most had been brought into the daylight for examination and the Executive felt it was possible to put the facts before the Federal Convention for a decision one way or the other.

It was agreed that if a call sign book is produced this year there would be no alternative to its preparation from the membership EDP records as the starting point. The Publications Committee said they were prepared to undertake the task again so long as the call sign data derived from the computer records.

The Central Queensland Branch of the WIA in Rockhampton wrote requesting a representative from Executive to attend a convention to coincide with the City's Capricana Festival at the end of August or early in September. The Executive decided that every effort would be made to send a representative as requested and also thought it might be acceptable if the person concerned carried on to various North Queensland centres on the same trip if this might achieve any useful object.

Also on the Agenda was an invitation to the WIA to send a representative to NZART's Golden Jubilee Conference in Auckland early in June. The Federal Honorary Treasurer, Keith Roget, VK3YQ thought he could arrange something on his own account and if this materialises he would certainly be very pleased to attend on behalf of the Institute.

At the 1975 Federal Convention the Federal Council felt it was desirable to prepare guidelines for amateurs using the 11 m band. This has now been prepared ready for discussion at the 1976 Federal Convention and proved in fact to be somewhat more complicated than appeared at first sight because of all the other services in the band. Such a document should be of considerable assistance to Novice operators who may choose to use this band in preference to the segments licensed for their use in the 15 m and 80 m bands.

The Federal President visited the ARRL Headquarters in Newington Connecticut after his attendance at the IARU meeting and investigated the details of Novice licensing in the USA, amongst other subjects. The material he came away with will be very useful to the Institute in negotiations with Central Office.

He also learnt about the big educational programme under preparation by the ARRL which indicates that the WIA are not alone in tackling this particularly important aspect of amateur radio.

Almost as soon as he returned from the USA and Canada the Federal President attended the second meeting of the Australian Preparatory Group engaged with the preparation of the Australian brief for WARC 1979. This was very largely a meeting devoted to administrative matters as might be expected this early in the proceedings. A second meeting of Committee 2 — the committee dealing with amateur matters — will be required before the next APG meeting towards the end of June.

As soon as the Federal Convention is over work will have to begin on preparing the WIA's submissions to Committee 2. A considerable volume of documents from overseas have already been accumulated to assist in the work. In addition there is a vast store of reports and papers from the past as reference material including such items as the 110 page Stanford Research Institute's searching enquiry into Amateur Radio — an International Resource for Technological, Economic and Sociological Development. The WIA are also most fortunate in having available the enormous experience and knowledge of international amateur radio affairs accumulated over many years by Michael Owen VK3KI.

Nobody has come forward to manage the Key Section whilst Deane Blackman VK3TX is overseas. A reply from "Central Office" advised they were prepared to authorise the use of AX calls during the period of H.M. the Queen's proposed visit to Australia next year to mark the 25th anniversary of her accession to the throne. A compromise attempt to have the AX call authorised for the first half of 1977 was also turned down.

A member very kindly sent in a copy of Section 4 — "RF Spectrum and Mobile Services" — of a publication by the ATC (NTP Branch — planning) entitled "Telecom 2000". Members who may be interested in the ideas circulating around the Telecoms Authority would be well advised to obtain a copy of this publication for themselves. A number of quotes from this were used in the Federal broadcast tapes during April in the hope that this one particular area of danger to amateurs on the VHF/UHF bands will be noted.

WIANEWS of April reported on a reply from the Minister about pirate activities. The Executive followed this up by asking the Minister if there is any intention to restrict or prohibit the importation and/or sale or disposal of transmitting equipment of a kind suitable for use or commonly in use by pirate operators without affecting supplies to legitimate users. Reports coming through from the USA indicate that CB radio over there appears to have become a gigantic headache in more ways than one.

Finally a quote from a Summerland Radio Club Committee report: "The success of a club or organisation would seem to be directly proportional to the amount of unstinted effort on the part of its leaders and inversely proportional to the apathy of its members". ■

## TRY THIS

Ron Cook, VK3AFN

Bill Rice, VK3ABP

### RE-USING AN ENVELOPES

By carefully slitting open the bottom of the envelope to remove Amateur Radio, it may be re-used for filing odd notes and circuits.

An envelope may hold the FT101 manual PLUS photostat copies of the various hints and kinks which have appeared in AR over the years. Thus all is together and no hunting required for information when required.

Suitable designation is made on the

back top of the envelopes i.e. "FT101", "ANTENNAE", etc. — VK3ZIK. ■

The wire and plastic tie strips that secure the top of bread bags and other plastic packed food items should be saved, straightened out and re-used to cable up all of those straggling connections behind the operating desk. A dozen or so of these ties will convert a "rats nest" into a neat and tidy set up. — VK3OM. ■

## QSP

### CB

Reports from the USA press and other sources indicate that USA CB operations really have exploded lately with applications running around the half million mark each month and CB equipment now accounting for about 10% of the air freight carried from Japan to the USA. Truck drivers in the USA

appear to be major users of CB equipment to warn one another about speed traps, and local police carry CB gear to aid them in their work. Other comments heard are unprintable.

### INWARDS QSL ADDRESSES

VK1 QSL Officer, G.P.O. Box 1173, Canberra, A.C.T., 2601.  
VK2 QSL Bureau, C/o Hunter Branch, P.O. Teralba, N.S.W., 2284.  
VK3 QSL Bureau, Mr. E. Trebilcock, 340 Gillies St., Thornbury, Vic., 3071.  
(Outwards — Mr. W. L. Jackson VK3XM, 23 Maine St., Carnegie, Vic., 3163)  
VK4 QSL Officer, G.P.O. Box 636, Brisbane, Qld., 4001.  
VK5 QSL Bureau, Mr. Geo. Luxon VK5RX, 27 Belair Rd., Torrens Park, S.A., 5062.  
VK6 QSL Bureau, Mr. J. Rumble, VK6RU, G.P.O. Box F319, Perth, W.A., 6001.  
VK7 QSL Bureau, G.P.O. Box 371D, Hobart, Tas., 7001.  
VK8 QSL Bureau, C/o VK8HA, P.O. Box 1418, Darwin, N.T., 5794.  
VK9, 0, Federal QSL Bureau, 23 Landale St., Box Hill, Vic., 3128.

# IARU REGION 2 CONFERENCE AND INTER-REGIONAL MEETING

Michael Owen VK3KI

Regions 1 and 3 of the IARU have already held conferences to determine their policy for WARC 1979. At its conference of national societies in Region 2 held in Miami, Florida, between the 11th-15th April, Region 2 has adopted a position consistent with the position already taken by the meetings of the other regions. There is, therefore, for the first time, co-ordinated world amateur service approach towards the most important ITU conference of the decade.

After an opening plenary session, the Conference split into three committees to consider the papers presented for discussion and decision. On the fourth day a final plenary session was held to ratify the decisions of the committees and to deal with other business including the election of a new executive committee to serve until after WARC 1979. The executive committee of Region 2 is —

President — V. C. Clark W4KFC.

Vice-President — P. Selderman YV5BPG.

Secretary — G. Reusens OA4AV.

Treasurer — P. L. Parker VP9GO.

Members — L. P. Caamano HI8LC, A. Chanes CE3ABZ, F. Zarrabe YN1IFI.

The national societies represented at this Conference were —

Argentina, Bermuda, Bolivia, Canada, Chile, Columbia, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Netherlands/Antilles, Nicaragua, Paraguay, Peru, Trinidad, United States, Venezuela.

At the same time representatives of all three Regions, who were present in Miami for the Inter-Region Conference to be held at the conclusion of the Region 2 Conference, took advantage of the opportunity to meet informally. A formal meeting was held the day after the Region 2 Conference was closed. Taking part in these meetings were Region 1 — Louis v.d. Nadort, PA0LOU (Chairman) and Roy Stevens, G2BVN (Secretary), Region 2 — Michael J. Owen, VK3KI (Director), IARU Headquarters — Noel B. Eaton, VE3CJ, Richard L. Baldwin, W1RU and David Sumner, K1ZND.

In addition, also participating were from RSGB — John Allaway, G3FKM and Tim Hughes, G3GVV, The Japan Amateur Radio League — S. Hara, JA1AN (President), The Wireless Institute of Australia — David Wardlaw, VK3ADW (President), The Luxembourg Society — Jean Wolff, LX1JW, USKA, Switzerland — Harry Laett, HB9GA.

At the conclusion of the Inter-Regional Conference the following statement was issued.

## IARU MEETING, MIAMI, FLORIDA — APRIL, 1976

Meeting in Miami, Florida, over a period of six days during April, 1976, officers and

directors of the International Amateur Radio Union and its three regional organisations discussed in depth the problems facing radio amateurs in preparation for WARC-79, and solutions to those problems. Deliberations at those meetings resulted in the following actions:

(1) The need for close liaison amongst the regions was recognised, as was the desirability of conformity between the regions where possible. The avoidance of duplication of effort by the separate regions was also acknowledged. In lengthy informal meetings the representatives of the regional societies represented were able to prepare a basis for a position paper that could be used as a model by IARU member societies or others as appropriate.

(2) Detailed consideration was given to the frequency needs of the amateur service, as indicated by the position papers already submitted by several societies.

(3) Changes in various definitions and radio regulations were discussed at length.

(4) Consideration was given to the dates and importance of several regional and international meetings that are scheduled, and attendance of suitable amateur representatives was discussed.

(5) There was detailed comment on and analysis of the preparation in each region and by the several major societies represented.

(6) The president of IARU asked that there be a meeting of Roy Stevens, Michael Owen, Victor Clark, David Sumner, and himself in Geneva during September, 1976 (at the time of the IFRB Frequency Management Seminar) to finalise the document described in paragraph (1) above.

(7) It was agreed that there should be a guide available for those who might be travelling abroad and who might be willing and capable of assisting in WARC preparatory work. IARU Headquarters staff agreed to work on this.

(8) There was an analysis of the WARC newsletter and the functions it is supposed to be serving.

(9) There was extensive discussion of the problems which arise when there are competing societies in a country, and it was agreed to continue with the existing policy, which discourages official IARU contact with such societies.

(10) It was agreed that the contests and awards committee of ARRL would study the feasibility of establishing an IARU award, whose purpose is to encourage amateur knowledge of and interest in IARU.

(11) Finally, there was extensive discussion of the need for adequate amateur representation on each administration's delegation to WARC-79.

The group closed its final meeting on Friday, April 16, by emphasising the value of such face-to-face meeting and discussions, and with a pledge to maintain close communications by every means possible during these critical months of preparation for WARC-79.

## PUTTING THE ALL-REGION CONFERENCE IN PERSPECTIVE

The International Amateur Radio Union is a fragile thing on paper. Its work is carried out by one of the National Societies that constitutes its membership and is nominated the Headquarters Society. The officers of the Headquarter Society ordinarily take corresponding positions in the IARU. No member society pays any dues, nor do the member societies elect the IARU officers. The whole burden is thrown on one Society which must determine the priority it gives that responsibility amongst all its other obligations to its members generally.

Facing the challenge of the 1979 World Administrative Radio Conference of the International Telecommunications Union, the American Radio Relay League as the Headquarter Society of the IARU has given a high priority to this responsibility. So that he can devote his full attention to the IARU, an ARRL Vice-President, Noel Eaton, VE3CJ, is President of the IARU, ARRL President, Harry Dannals, W2TUK, having declined the position in view of his other commitments.

The three Regions have developed their own regional organisation. Whilst each has a common aim, each Regional Organisation is structured a little differently or works a little differently. The newest and smallest (in terms of numbers of members), is the Region 3 Association. The oldest and largest is the Region 1 organisation.

Why then was the first meeting of the representatives of the Regions and major amateur Societies so important? To meet the challenge of the 1979 WARC, the amateur service cannot waste resource. Duplication of effort is a waste of resource. Not to take advantage of the knowledge and experience of those who have it is a waste of resource. Not to take the last step and to formulate our position without recognising the differing needs and aspirations of different countries in different regions is a waste of resource. A simple failure to communicate on matters of common interest is a waste of resource.

That is why the All Region Conference was important. Perhaps Region 3 got more than it gave, but that is in the nature of things. It is as important to amateurs in those countries where the administration has in the past been the stout defenders

of the amateur service that these administrations remain our defenders as it is that other countries support the legitimate aspirations of the amateur service. The ITU has no proportional representation. The United States of America has one vote, so does Nauru.

I believe that the All Region Conference achieved what it set out to achieve; the Regions are not parts larger than the whole. Each region is interlocking with the other regions and IARU Headquarters. The positive policy, set out in the formal statement, is the tangible evidence of this. It is true that no earth-shattering decisions were made. That was not the function of the Conference. A positive program, based on mutual understanding and with the

benefit of the advice of those experienced in the different aspects relevant to that program, is the real achievement of Noel Eaton's vision of an Inter-Regional conference.

Whilst the Region 3 Association was represented by one of its four Directors, it was significant that the largest and the next largest Society in the Region were also represented by the respective Presidents, Shozo Hara, JA1AN (JARL) and David Wardlaw, VK3ADW (WIA). The IARU cannot exist independently of its member Societies. The member societies are together the IARU. The representation of these two Region 3 Societies, as well as RSGB and the presence of the Region 2 Societies, was a large factor in reaching

the mutual understanding to which reference has already been made.

In evaluating the worth of the Inter-Region Conference I suggest we can be reassured that the IARU recognises the differing needs and pressures in different countries in different Regions, confident in the co-ordination and co-operation between the Regions and the Headquarters in preparation for the 1979 WARC, grateful for the breadth of experience and insight of those contributing to the amateur case and thankful that ARRL as IARU Headquarter Society is "making it all happen".

There is, however, one thing that we cannot be. We cannot be complacent about the future. ■

# "COSMO FRIENDS OF KAWATANA" RADIO CLUB

Des Greenham, VK3CO  
23 Stewart St., Seymour, Vic. 3660

Many VK stations may have spoken to Chitary, a very active Japanese operator who spends a great deal of time on 15 metres. Chitary, more recently JA6THP, was originally JH6ZCY, a Club station.

It may not be generally known that Chitary is a patient of a large national hospital in Kawatana near Nagasaki in the Southern part of Japan. Chitary, unfortunately, contracted progressive muscular dystrophy (PMD) when very young and is confined to this hospital. His movements are limited and he is under constant medical care.

He is only one of many such patients in this large hospital and, in an effort to communicate with other people, Chitary taught himself English, qualified as an Amateur operator, and formed the "Cosmo Friends of Kawatana Radio Club" in the hospital. There are now 13 licensed operators of JH6ZCY, the station call. Chitary recently established his own station with call JA6THP, in his hospital room. His equipment is set up on a bed trolley and his antenna, a 4 element Yagi, is mounted on the hospital roof with a remote rotator control. From here he can talk to the world through amateur radio.

Recently, when visiting Japan, it was decided to make a special effort and visit a friend in Nagasaki. "All Nippon Airways", a large Japanese domestic airline, operate regular and frequent flights from Osaka to Nagasaki. So, one morning, bright and early, the Boeing 737 was boarded for a quick flight to Nagasaki. A pleasant and scenic taxi trip to Kawatana followed, and a special "eyeball" QSO



VK3CO with some members of the club at Kawatana. Chitary, JA6THP is on extreme right.

took place with these very unique hand-capped operators. Everyone, including the hospital staff, were most hospitable and friendly. Despite a language barrier, communication was achieved using drawings, diagrams, and even hand gesticulations amid roars of laughter from everyone . . .

Whilst there, it was learnt that another VK operator had visited there only weeks before — this was VK2XT Bill, who also has regular contacts with the stations at Kawatana. It was good to see an Australian boomerang QSL on the wall of Chitary's shack midst many other DX souvenirs. A special QSL from VK3CO in the form of a polished wooden map of Australia was presented with due ceremony and added to Chitary's collection.

Lunch was provided by the generous hospital staff and, naturally rice formed the major part. This, however, presented no difficulty but the chop sticks certainly did . . . The clumsy efforts of this visitor from "Down Under" with the chop sticks, created a comedy interlude for these wonderful people of Kawatana.

Finally, it came time to leave . . . It was

with mixed feelings that the "International" Eyeball QSO with such a remarkable group came to a close.

A car trip to Nagasaki airport through the courtesy of one of the medical staff and jet plane to Osaka completed the day's adventure.

Since returning to Australia, regular skeds are kept with Chitary and his Club. His situation is more clearly understood and his courage and determination admired and appreciated.

The "Cosmo Friends of Kawatana" radio club is now two years old. On February 22nd last, special celebrations were held to mark this occasion. Skeds were arranged with stations in many countries for this day and fortunately conditions on 15 metres were very good. Contacts were made and friendships reaffirmed in many parts of the world. The club operators are very active on 15 metres, and should you hear a call from any of the operators in the hospital, JH6ZCY or JA6THP, just call in and say "hello" — your contact will really be appreciated by these courageous people who are physically handicapped and confined within four walls. ■



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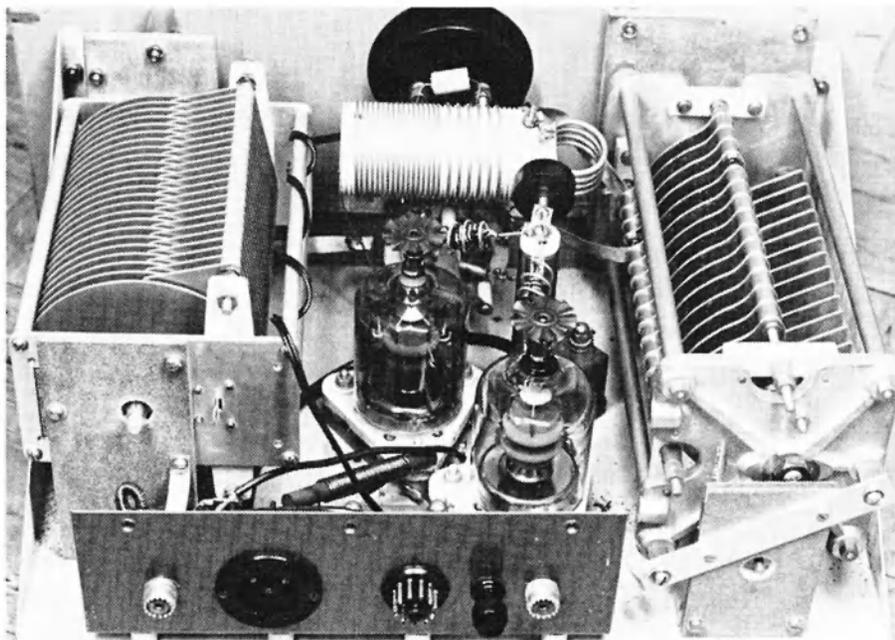
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WE503

# A LINEAR POWER AMPLIFIER FOR AUSTRALIAN CONDITIONS

## PART THREE

R. A. J. Reynolds, VK3AAR



### CONSTRUCTION DETAILS

As in most home brew projects, the final design of the 80 through 10 linear at VK3AAR was somewhat governed by the major items that were in the junk box, at the local disposals sources, and available from friends. The prospect of reproducing the amplifier about to be described in exact detail would be formidable. Many of the components are very much 'one off' in the writers experience, even though they must have been made in considerable numbers some years ago.

The VK3AAR junk box is quite extensive, but even so, did not extend to adequate tuning and loading capacitors, a Pi-coupler, a chassis and cabinet, or a convenient power transformer. There were of course a handful of minor components that had to be found. On reflection, these items represent the bulk of the amplifier, so it cannot be assumed that the VK3AAR amplifier will be all that different from any other attempt. One feature is worthy of note. The overall cost of such a unit is considerably less than that of a commercially available item. In my case, the total cost over and above the bits from the junk box was a little over \$50. There is little doubt that I could have built an amplifier for even less cost by less suitable items from the junk box, such as TV power transformers strung up in series, an old chassis, chopped up broadcast condensers, and bits of copper wire wound into a Pi-coupler, but I considered that in order to present a prettier unit, a little money had to be spent.

The circuit diagrams are those shown in Figs 8 and 11. These circuits are of course flavoured by the components available. For example C3A and C3B could be replaced by a single variable capacitor 10 to 200 pF at about 5 kV spacing. In my case the

available unit was 30 to 200 pF, and the stator had to be sectioned and switched to achieve a low capacity for the 10 to 20 m bands.

The theoretical derivation of the circuit was covered earlier in this series, and the prospective constructor would be well advised to become familiar with the reasons for the choice of each component. For example, whilst the range of value for C3 needs to be fairly close to the circuit value, that for C1 could be anywhere between 1000 and 3000 pF. Hence, the circuit value for C1 which is shown as 1800 pF, could be relaxed to 1000 pF in order to use a junk box component, whereas a 20 to 180 pF variable could hardly be used for C3 without additional padding for 80 metres and may be sectioning for 10 metres.

The following description is peculiar to the VK3AAR linear and the components that were available for its construction. Some concluding notes on tuning, testing and operating will be common to all amplifiers, although here again there is more than one way of doing a job, and the availability of support equipment will dictate the methods used by individuals.

The chassis, front panel, cabinet, complete with the two variable capacitors were purchased from surplus sources. This unit was originally an aerial tuning unit for an unknown service. It was apparently equipped with plug-in coil units designed to cover a range of frequencies. Evidently 50 or more of these ATUs have appeared in Melbourne in recent times, and possession of such a unit would make the construction of a linear somewhat easier.

The two variable capacitors in the ATU are a Jennings 1000 pF air variable rated at 3500 Volt spacing and a 30 to 200 pF air variable of unknown manufacturer, which would appear to be about 6000 to 8000 Volt rating. These capacitors serve

as the loading and tuning capacitors. The identification on the front panel is even correct.

Because of the design of the plate tuning capacitor, the minimum capacity was too large for operation on 10 and 15 metres, and the setting somewhat too close to the minimum capacity for convenient use on 20 metres. This situation was remedied by sectioning 4 of the stator plates so that only these four were in circuit for the higher frequency bands. This involved dismantling the unit, cutting the stator support rods at the appropriate point, threading each of the cut ends and fitting these ends with a fairly thin nut, so as not to cause arcing between the stator sections on the higher bands. Care must be taken not to strain the ceramic insulators that support the stator assembly, or an annoying fracture may occur. No additional support was required for this unit as there are three support rods for each section.

Provision was made to switch the extra section into circuit for operation on 40 and 80. It would of course be most convenient if this could be ganged with the band change switch, but this does create some problems. There is a spare set of contacts on the Willis Pi-coupler that I used, however the switch failed almost instantly when used for this purpose. The RF voltage present on the switch that couples this extra C is in the order of kV's and somewhat special precautions must be taken. If there is plenty of room a large ceramic switch or a mechanical coupling to a special second switch could be used. Alternatively a separate control on the front panel might be used for 10-15-20 in one position and 40-80 in the other.

Several attempts were made to repair, modify and eventually replace the switch supplied with the Willis Coupler. The final result was a somewhat elaborate ceramic





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Overload: On phono 120mV.  
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on 2-tone test being achieved on all bands into a 50 ohm load. With comments as required, the performance of the Amplifier was as follows, tested against the original specification.

#### FREQUENCY COVERAGE

The tuning did cover the Amateur Bands. Although I did not check it on 11 metres, I have no reason to suspect that it will not work there.

#### EXCITATION POWER

I did not test this fully, however on 10 metres 40 Watts single tone was required to raise 400 Watts at the output.

#### OUTPUT POWER

Using the approved 2-tone method of determining output power, at least 400 W PEP was achieved on all bands into 50 ohms, however it was noted that considerably higher cyllabic peaks were achieved, as follows: 80 m - 490 W, 40 m - 530 W, 20 m - 640 W, 15 m - 530 W and 10 m - 500 W. I commented earlier that this is due to the power supply regulation.

#### INPUT IMPEDANCE

This was not tested fully, but from the optimum position of the loading control on the exciter, it was obvious that the input impedance was higher than 50 ohms. On the other hand, I was surprised to observe that the VSWR at the input on 10 metres was better than 1.5:1 against 50 ohms.

#### OUTPUT IMPEDANCE

On 20-15-10 metres, the amplifier seems to be quite tolerant of poor VSWRs. I have not had the opportunity to test the unit extensively on 40 and 80, but on my observations to date, high impedances should be catered for, but impedances lower than 50 ohms may require more loading capacity than exists at present.

#### INTERMODULATION PRODUCTS

I have concluded that the measurement of IM within the ham shack with equipment normally available is difficult if not impossible.

However I am indebted to Bob VK3SK for drawing to my attention a method of establishing the "cleanness" of a SSB signal. Many SSB Transceivers and Receivers switch from upper to lower sideband by changing carrier crystals and at the same time shifting the VFO so as to leave the receiver calibration in the same place on the dial. Hence, a receiver set to resolve a SSB signal transmitting USB on 20 metres say, when switched to the LSB position, will be looking at a slot outside the pass band of the originating transmitter. Any signal in the LSB position is unwanted in general, and its magnitude is a measure of the nonlinearity of the system. But remember that this also includes the inspecting receiver and the method breaks down when very strong signals are involved as receiver cross modulation starts to predominate. As an example, a signal indicating S9 + 15 dB on a resolved USB might show S3 in the LSB position. If the output in the LSB position is intelligible then the problem is one of unsurpressed sideband and the test changes its mean-

ing, but if it sounds like broken up duck-talk, then assuming 4 dB per S-point there is 6 times 4 plus 15 equals 39 dB of something. Pretty meaningless by itself, but that figure is certainly related to the intermodulation of the system. And if someone reports your LSB as being only 10 dB down on your USB then something is wrong. Figures of about 30 dB have been considered "clean". The amplifier in question? Reports have been received in the 30 to 40 dB area and appear to be about the same as the "barefoot" condition.

This method of establishing just how clean a signal is, was the subject of some investigation on 20 metres recently when it was verified that whilst power levels from linear amplifiers and exciters involving tuning and matching adjustments do not vary very much with small changes in control settings, the LSB/USB figures as detailed above do change dramatically. For example, a very clean signal from Bob VK3SK gave a figure of about 60 dB, but when he changed the setting of the pre-selector on his Collins S-line transmitter, although he noticed only a little power change, the LSB/USB figure degraded by some 20 to 30 dB! The only indication of change in performance at Bob's end was a distortion of the waveform on the monitorscope. This only emphasises how useful a monitorscope can be. Observation of the output waveform very quickly establishes the state of tune of the whole system. Meter readings become only a check.

#### POWER SUPPLY

Condition met.

#### COMPLEXITY

The circuit is simple and straight forward, using no screen or bias supplies, no blower, only one tuned circuit.

#### SERVICE OF OPERATION

The condition is met, but it has already been observed that higher peak powers are available during low duty cycle voice waveforms without speech processing. So for this amplifier and power supply, there is some advantage in not using speech processing. A change to a regulated power supply would give a higher relative power during speech processing, but would limit the peak available power to 400 Watts by law.

#### COST

The total cost was of the order of \$50 which must be considered low. The other part of cost, time, was fairly high. Several weeks of part-time fiddling and investigation were involved, the greater part being the work on the power transformer, and the various efforts on the band change switch.

On the other hand, there is a great deal to be learned from a project such as this. Not so much the process of the construction, but the exercise of solving problems for one's self from a combined theoretical/practical point of view. At the end of it all there is the satisfaction of saying over the air . . . "An FT101E into a HOMEBREW linear running the legal limit". ■

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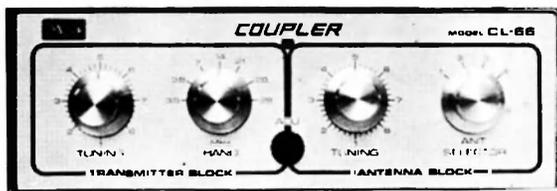
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## THE YAESU FT-221



It is interesting how fashions change in amateur gear. A year or two ago, FM on the 144 MHz band was all the rage. However, while FM is still well up the list on the popularity poll, it seems that it will soon be overtaken by the new FM-SSB-CW-AM transceivers that are appearing on the market. The first of these combination rigs to arrive on the Australian market is the Yaesu FT-221.

Actually the FT-221 is the first of these transceivers to have full coverage of the two metre band from 144 to 148 MHz. Yaesu previously produced the FT-220 which had similar functions but tuned only to 146 MHz and with a few slight modifications was usable in our FM portion of the band.

The FT-221 covers the two metre band in eight segments of 500 kHz. Insofar as facilities are concerned, the FT-221 has everything that the modern HF SSB transceiver incorporates. Such things as VOX, receive and transmit off set tuning, 100 kHz calibrator, noise blanker, 1 kHz main tuning dial read out, 'S' meter with switchable functions of relative RF output and discriminator (zero centre) indicator.

Naturally the set is fully solid state and uses a total of 60 transistors, 18 FET's, 13 integrated circuits, 1 programmable unijunction transistor, 115 diodes plus one thyristor and one varistor. Quite a line up. All of this is fitted into a very compact cabinet measuring only 200 mm wide by 125 mm high by 295 mm deep. In terms of comparison this is quite a bit smaller than say an FT-101. However, for its size, it is quite a solid package, weighing 8.5 kg.

Much use is made of plug-in computer type circuit boards in the construction of the FT-221 and this makes it possible for the large number of components to be fitted in in an orderly fashion. The self contained power supply allows for operation from both 240 volts AC and from 12 volts DC. The FT-221 is therefore highly suitable for both base station and mobile operation. Selection of either mode is automatic with the connection of the appropriate power cord.

In addition to the accurate dial, it is possible to crystal lock the transceiver and operate it in a similar way to the switched channel select FM sets. There is, however, one interesting difference and that is that each crystal provides eight operating frequencies, each in the same relative place on each of the eight band segments. In addition to this only one crystal is required to produce both the transmit and receive function.

Apart from the main tuning dial, no other tuning or peaking control is provided or needed to operate the FT-221. Extensive

use of varicap diodes to tune the receiver front end and the transmitter exciter stages keeps the critical circuits on the nose. All of these varicaps are adjusted by a bank of present potentiometers and in effect they act as the trimming controls for the transceiver.

A small downward facing loud speaker is included, as is a 3.5 mm jack for the connection of an external speaker.

A good quality push-to-talk dynamic microphone, fitted with the now standard screw on four pin type connector is supplied as a standard feature. However it seems odd that the headphone jack on the front panel is a 3.5 mm type which does not match up with normal Japanese headphones which are all fitted with either two or three connection ¼ inch plugs. Adaptors can be purchased to mate the ¼ inch plugs with the 3.5 mm socket but one is not supplied with the transceiver.

The transmitter power output is rated at 12 watts PEP on SSB, 14 watts on FM and CW and 2.5 watts on AM. The reason for the seemingly low output on AM is that 2.5 watts of 100% modulated AM is of course 10 watts PEP.

Two band widths are available on receive. For SSB, CW and AM a 2.4 kHz filter with a two to one shape factor is provided. This of course makes the AM receive mode of only limited use and in general better copy of AM can be achieved in the SSB position. However this assumes that the AM in question is free of any FM or other frequency shift.

For FM a band pass of 17 kHz with a shape factor of just over two to one at the 60 dB points gives an excellent compromise for this mode.

### THE FT221 ON THE AIR

Getting the FT-221 on the air is a very simple operation. As mentioned earlier no actual tuning up is needed. It is only necessary to select the desired mode, the 500 kHz segment in which to transmit, and then the frequency within that segment on the main tuning dial. Push the button on the microphone, and you are on the air.

It is necessary to recalibrate the main dial for each mode of operation due to the different bandpass filters used. With SSB, there is a 2.5 kHz shift between upper and lower sidebands although it would appear that for the present at least only upper sideband is used on two metres. Pressing the "Calibrate" button locks the dial scale but not the actual dial movement.

So the dial is set to the correct point, the button pressed in and the tuning knob rotated until zero beat is reached in the case of SSB or the discriminator meter reads zero or centre scale on FM. It is of course more important to be spot on fre-

quency on FM due to the channel system used than it is on the so called tunable end of the band. After the appropriate calibration at any one hundred kHz point, the overall calibration remained within  $\pm .5$  kHz throughout the range.

To operate through an FM repeater, the FT-221 provides a 600 kHz shift in either the transmit or receive frequency. Repeater operation is only available on the 146.5 MHz range which of course covers all the local repeater frequencies, however it is a trap to try to work into repeater channel four by selecting the 147.0 MHz range. Reverse repeater operation is also possible, that is to listen on the input frequency and transmit on the output frequency by pushing the repeater switch up to "REV".

Repeater operation is indicated by a front panel warning light.

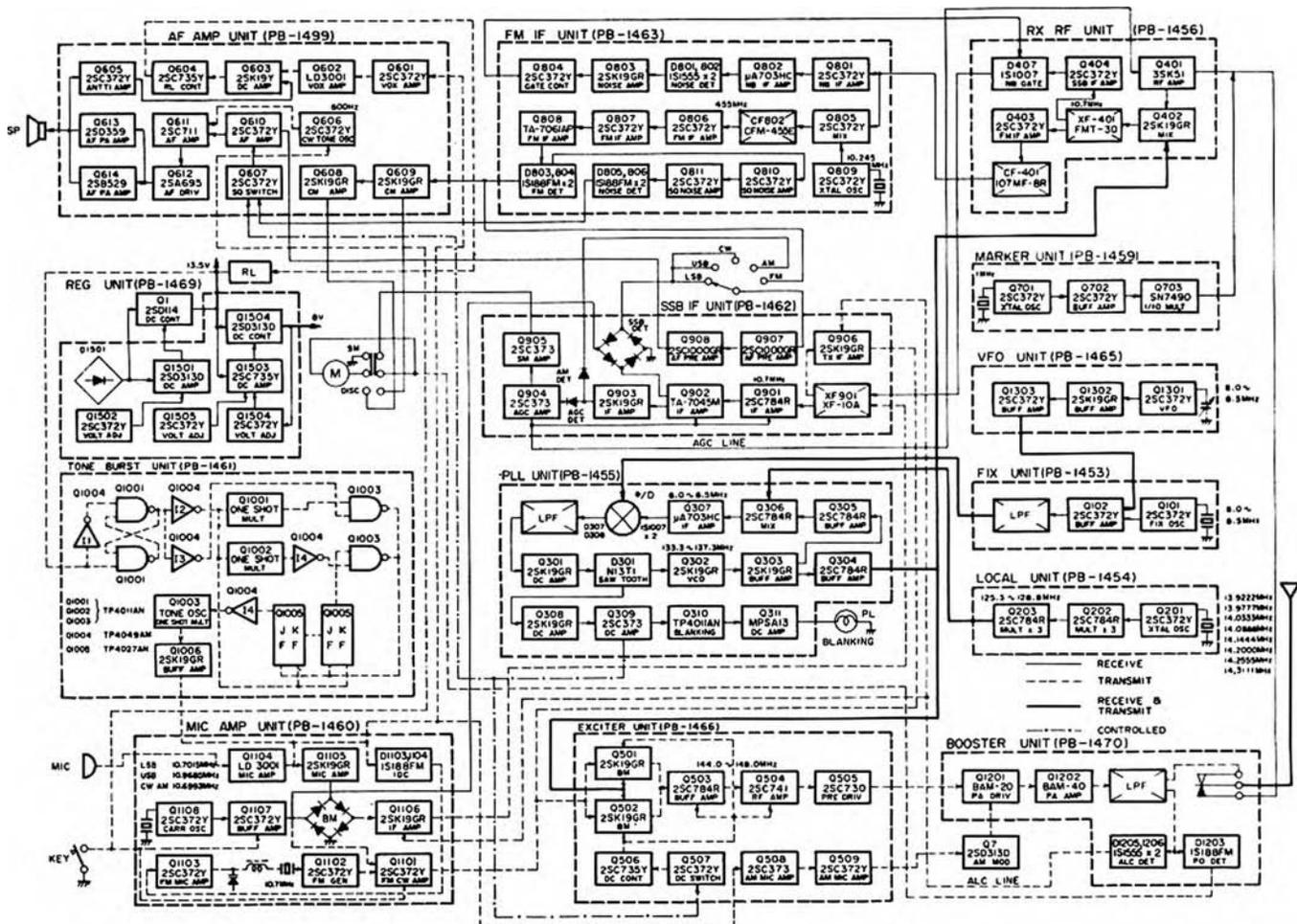
The "S" tuning meter proved to be rather disappointing. Yaesu seem to have over done their all black styling on the FT-221 and carried it to the face of the meter. To make matters worse, the illumination is provided by a single miniature globe set on the left hand side. If the set is used under conditions of poor external light then the meter is just not readable. It is hard to understand why Yaesu did not retain the meter used in the FT-220 or the currently available FT620B, both of which have clear rear illuminated meters.

While on the subject of illumination, the tuning dial must also come in for some criticism. The main kHz dial is reasonably good but the 100 kHz segment indicators set above this are again unreadable under conditions of poor external light.

The two speed tuning control was very smooth to operate with only a very minimal amount of back lash. Immediately behind the central pointer of the main tuning scale is a red LED which shines through the translucent kiloHertz scale. There does not appear to be any useful purpose served by this but it does add a touch of colour to an otherwise sombre appearance.

VOX operation proved to be rather tricky. As received from the agents the VOX delay was far too short although the delay control was set for the longest possible delay. After some playing with the relay control a suitable delay time was produced but the adjustment appeared critical. The action of the VOX appeared to be similar to that of the FT-101 and certainly does not encourage use of this feature.

Frequency stability of the transceiver was impressive. Tests were made over lengthy periods of time and during extremes



FT-21 BLOCK DIAGRAM

of temperature but the total drift recorded was less than 1 kHz. Also the linearity of the calibration was, as mentioned earlier, first rate.

Transmitted audio quality while clean and free of any distortion was generally reported as lacking highs. This applied to both the FM and SSB modes. It is understood that the local agents are aware of this problem and that modifications have been made to many units. However it seems that more improvement is needed in this area.

Received audio quality was decidedly thin both on FM and SSB. At first the small internal speaker was blamed but the sound did not change to any extent with a large external speaker plugged in. Tests were made on the frequency response of the receiver audio system but it proved to be wide enough to give good audio.

Apart from those tests already mentioned, several other points were checked out. Firstly the receiver sensitivity was checked on FM.

- Quieting; .5 uv 25 dB
- 1 uv 38 dB
- Signal to noise ratio.
- .5 uv 32 dB
- 1 uv 38 dB
- Mute opens at .2 uv

These tests were carried out with the set tuned to 146.5 MHz. Next the SSB sensitivity was checked at 144.5 MHz.

- Signal to noise ratio
- .5 uv 28 dB
- 1 uv 36 dB

These are excellent figures on all counts.

The 'S' meter calibration was checked and found to indicate 'S' 9 with a receiver input of 35 uv. Its action however appeared to be "scotch" due no doubt to the relatively high signal to noise ratio at low signal levels. Also no doubt due to the absence of atmospheric noise on the two metre band.

Transmitter power output was next checked.

On FM output at 146.5 MHz was 15 watts. The same figure was obtained on CW.

This was just above the specified figure of 14 watts.

On SSB output was checked at 144.5 MHz.

PEP output was 16 watts, again a little above the specified output of 12 watts.

#### INSTRUCTION BOOK

The book supplied with the FT-21 is well written and illustrated insofar as it

goes. As is usual these days no data is included on servicing procedure and no printed circuit layouts are supplied. However the section on operating the transceiver is very complete and covers some eighteen pages. This is followed by a full description of the circuit with photographs of each board. A large scale block diagram and a very clearly drawn circuit diagram is included.

The FT-21 used for testing in our review was supplied by Bail Electronic Services of 60 Shannon Street, Box Hill North, Victoria, 3129. Bails have a very complete service workshop and of course carry a full range of spares for the FT-21 as well as being up-to-date with all the latest factory supplied data.

#### CONCLUSIONS

For the amateur who wants all mode full coverage of the two metre band, the FT-21 represents an excellent investment. Although the price might at first seem high, when the price of individual units that incorporate all the facilities of the FT-21 are added, the total would be well in excess of the price of this transceiver.

Information on price and delivery of the FT-21 should be directed to Bail Electronic Services.

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# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

## AN 80 METRE NOVICE RECEIVER — PART 2

This receiver is relatively simple although at first the circuit may appear complicated for a "simple" receiver. The description over the next few issues should dispel any qualms you may have about its operation.

The receiver is composed of 5 stages, not including the voltage regulator. The converter and local oscillator will be one article, the regenerative IF amplifier and detector another, and the audio stages another. The converter, V4, amplifies the incoming signals after which they are mixed with a signal 455 kHz higher in frequency, generated by the triode section of V4. The conversion or mixing process produces several frequencies. One of them is 455 kHz, which is passed on to the regenerative IF stage centred about V5, where the signals are amplified and converted to audio. This is further amplified by the two audio stages in V6, and fed to the loudspeaker.

### THE FREQUENCY CONVERTER

The frequency converter is the section of the receiver built around V4. Its purpose is to convert the incoming signal on 3.5 to 3.85 MHz — the tuning range of the receiver — to a fixed frequency of 455 kHz, the *intermediate frequency*.

The signal received on the aerial is fed down the coaxial cable from STR2/3 to the aerial low impedance coupling coil L11. This induces voltages in the secondary winding L10 of this RF transformer in proportion to the strength of the incoming signal irrespective of frequency, or almost so.

L11 is what is called *aperiodic*, which means that theoretically it responds equally to all frequencies. However, L10 is tuned, and therefore will favour some frequencies more than others. The tuning of L10 is accomplished by C50, C51, C52 and C53.

The signal is then applied to the signal grid of V4 and mixed with the local oscillator signal generated in the local oscillator (triode) section of this same valve. We will return to the mixing process after the local oscillator has been described.

### THE LOCAL OSCILLATOR

The local oscillator section of V4 consists of the elements connected to pins 3, 7 and 8. The oscillator is a tuned grid type with a plate feedback winding, and functions as follows. Plate voltage is applied via R58 and L13. As current begins to flow in the valve the winding L13 induces voltage in L12 such that the top of L12 goes positive and C56 which is uncharged and remains so for a while, transfers this positive voltage to pin 7, the grid.

With the grid now positive the plate will draw more current. This higher current being drawn across L13 causes a higher voltage to be induced across L12 and passed onto the grid. This action continues until the valve has reached plate current saturation — the plate is collecting all the electrons emitted from the oscillator section of the cathode, or the voltage drop across C56 becomes too great due to the low impedance offered by the grid conduction of the oscillator triode, or a combination of both.

When plate saturation occurs there will be no increasing magnetic field across L13 coupled to L12. No magnetic lines of force will be cutting L12 so no voltage will be induced in it. Positive voltage will not be evident at the top of L12, so C56 will not be trying to put positive voltage on the grid.

In fact C56 has been charging via the grid-cathode diode and now places a negative voltage on the grid. This reduces the plate current, which means that the magnetic field about L13 is collapsing. The lines of force cutting through L12 are now in the opposite direction so that the top of L12 becomes negative in relation to earth. This is a cumulative effect and continues until the triode is fully cut-off. The negative voltage on the grid will continue to increase and the positive voltage on the plate will rise above supply voltage due to the combined inductive properties of L12 and L13 and the stored energy in their magnetic fields.

Having cut off the triode momentarily, the tuned circuit L12 with C57, C58, C59 and C60 is in a state such that the capacitors are charged negatively with respect to earth. The capacitors begin to discharge through L12 and, by mutual inductance, L13 is actuated to produce a still higher than normal voltage on the plate. The valve is still cut off due to the high negative bias on its grid. This bias is rapidly reducing as the voltage at the top of L12 approaches zero, and as it gets below the value of the valve cut-off, plate current is again drawn. This means that L13 will again start to build up its own magnetic field. The tuned circuit with L12 as its inductor is still in control and continues to cause more plate current to be drawn until the grid of the triode goes positive in relation to the cathode. The magnetic field around L13 coupled to L12 is expanding causing L12 to go positive at its top again. This is a regenerative effect and continues until plate saturation and high peak grid current occur in the triode.

We are now back at square one, having taken the local oscillator through a little over one complete cycle. The frequency of the oscillation is controlled by the tuned circuit L12, etc. C56 couples the oscillatory energy to the grid, R57 is the grid leak which sets the oscillator standing bias. The amplitude of the oscillations is self regulating, the bias voltage across R57 varies with the loading of the oscillator, supply voltage and the amount of positive feedback. C56 charges to this stabilised

bias voltage and only the variations of RF voltages developed across the tuned circuit are passed to the valve grid.

The local oscillator triode is unaffected by the voltage to earth from the cathode of V4 as the triode is connected with a resistor direct from grid to cathode. For stable operation of the oscillator it is desirable to have the plate voltage regulated and for it to run continuously whether you are receiving or transmitting. The oscillator is then running at a more constant temperature and will tend to drift less. No particular effort has been made in this receiver to compensate the local oscillator against frequency drift, although it is desirable to keep hot resistors away from the tuned circuit and the capacitors. Coil leads and capacitor leads should be as rigid as possible so that the receiver does not jump around in frequency if moved or bumped on the operating table. The coil itself, and in particular the tuning gang, should be solidly mounted. A solid mounting for the 36:1 reduction tuning dial is also necessary to ensure minimum *backlash*. *Backlash* is the effect observed in some tuning systems such that the position on the dial where a station is tuned varies depending on whether you tune from a higher or lower frequency to the desired station.

### THE CONVERSION PROCESS

Having described how the oscillator and signal input circuits operate it is now time to look at how the conversion process from signal frequency to the 455 kHz intermediate frequency is achieved. Perhaps a definition of *intermediate frequency* is desirable at this point. Intermediate frequency in superheterodyne reception is a frequency resulting from the combination of the received signal and the local oscillator frequency. It possibly received its name from the fact that its frequency was usually lower than the received signal frequency but higher than audio frequency, therefore intermediate between input signal and audio output.

The conversion or mixing process will occur in any non-linear circuit. V4 and its circuitry are arranged so that this non-linear performance is obtained under normal conditions. It will be noted that the oscillator section of V4 has its grid extended into the electron stream of the heptode section. Remembering that this grid goes negative and cuts off the triode section, it is not unreasonable to assume that it also cuts off the heptode section at the same time, which means that the signal grid, pin 2, has no control of the heptode section at this time. This type of converter acts like a gating valve with two controlling grids, either of which control the conduction of the heptode section. If for example pin 7 is trying to go positive at a particular instant and pin 2 is also going in a positive direction but still with negative bias on it, the plate current through pin 6 will tend to increase. With pin 7 still trying to go positive, that is with grid current flowing due to the oscillator operation, and the signal on pin 2 going in a negative direction the plate

current will tend to decrease. If pin 7 is well beyond negative cut-off a positive going voltage on section 2 will tend to bring the heptode section into conduction sooner, whereas if it is going negative it will keep the heptode cut-off for longer.

**CONVERSION AND MIXING PRODUCTS**

The above is basically the process of mixing, and in this process a number of new frequencies are produced. When the signal frequency (Fs) and oscillator frequency (Fo) are present in this common electron stream, where the stage is non-linear due to the oscillator function, the two frequencies will add to and subtract from each other at a rate which is dependent on their relative frequencies. For example if you strike two piano keys which are close together you will hear a third note, or more likely an increase and decrease in the level of the two notes that have been struck. The rate at which this occurs will be the difference in the frequency between the two notes. A similar action takes place in a radio receiver converter-mixer stage. In fact two additional frequencies are produced in the converter output, these being Fo-Fs, and Fo + Fs. These products are much lower in level than the original mixing elements Fo and Fs. In this receiver typical frequencies are Fo = 4000 kHz, Fs = 3545 kHz. Then Fo-Fs = 4000 kHz-3545 kHz = 455 kHz, and Fo + Fs = 4000 kHz + 3545 kHz = 7545 kHz. However, we are interested in only one of these frequencies, that is 455 kHz. L14 is tuned to 455 kHz and so accentuates this frequency and bypasses all other frequencies to earth.

If you have access to an oscilloscope and a couple of audio frequency signal generators, the effect of mixing two frequencies in a non-linear device can be seen on the screen. The odd wave forms displayed will be the products of the two mixing frequencies. The display will in fact have the 4 frequencies present, although they will be hard to pick in most instances.

The waveforms at the plate of V4 heptode will be similar in style to the AF patterns although naturally these will be at RF. The oscilloscope in itself should not be a non-linear device so a germanium diode placed across the input to the oscilloscope, and a resistor of about 1K ohm in series with the output of each generator should give the desired effect. The input to the network should be about 1 volt RMS. The mixing process is a difficult one to understand, and it is hoped this description is of some help when allied with other texts on the subject.

**RF GAIN CONTROL**

The gain of the heptode section is controlled by varying the bias on pin 2 relative to the cathode, and is taken care of by R53. V4 is a variable cut-off heptode and by increasing the negative bias the gain of the stage is decreased. The RF gain control R53 is able to control the gain of the heptode V4 over a range of 80 to 90 dB, which means that it is able to handle signals from below a microvolt to between 30 and 100 millivolts (S-9 + 60 dB on

some S-meters). When the RF gain control is in the minimum gain position the low impedance aerial coil link L11 is also partly shorted to earth, which also reduces the receiver gain.

**IMAGE RESPONSE**

One of the criticisms of the receiver when it was first tried was that its image rejection was not very good. Theoretically L10 and its associated tuning capacitors should respond only to signals within a few kilohertz of the particular frequency to which the set is tuned. Unfortunately this tuned circuit has a lower "Q" than desired, and the response 910 kHz away is significant even though it is considerably reduced in level. The converter will produce the 455 kHz IF frequency if an input signal 455 kHz lower than the local oscillator is presented to the heptode signal grid — or if a signal 455 kHz higher than the oscillator is presented to the signal grid. For example suppose that you are tuned to 3590 kHz (FS) and the oscillator is tuned to 4045 kHz (Fo). By subtraction this gives 455 kHz. Now consider an input of 4500 kHz (Fs)-4045 kHz (Fo) = 455 kHz. It can be seen that a signal at either 3590 kHz or 4500 kHz will produce an IF output on 455 kHz if mixed with a 4045 kHz local oscillator. 3590 kHz is the desired signal and the signal on 4500 kHz is called the *image signal, the second spot*. In this case the image is a signal 455 kHz above the local oscillator signal. Currently the accepted term for describing this phenomenon is *image response* or *the image* depending on the text. The older term *the second spot* was used to describe the fact that in a wide tuning range receiver it was not uncommon to tune a particular station twice when tuning across the band. The station would appear at two spots separated by twice the IF frequency. This is a nice little problem for you to work out for yourself.

The receiver, the subject of this article does not suffer with second spot. Why? The selectivity of the first tuned circuit in a receiver is not particularly good and to overcome the image problems which ensue most amateur receivers use a first IF much higher than 455 kHz.

I have used the example of 4500 kHz because VNG on this frequency at night with high power caused quite a response in the receiver. Stations on and near 3590 kHz were hard to read. To overcome this

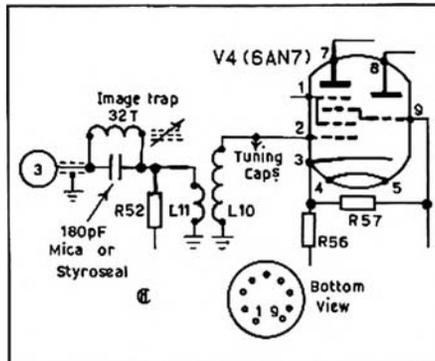
problem an image trap was fitted as shown in the diagram. This tuned circuit is designed to reject signals on and near 4500 kHz with little or no effect on signals within the 80 metre amateur band. The coil is wound on an old TV IF coil former 1/4 inch diameter, and slug tuned. It has 32 close-wound turns of 26 B & S enamelled copper wire, positioned so that the slug can be withdrawn from the winding without coming out of the coil former. This means that the slug is able to swing the frequency of the tuned circuit the maximum amount possible. To set the circuit up for maximum attenuation wait until VNG is heard and then adjust the coil slug until VNG either disappears or is reduced to an insignificant level. In the prototype VNG disappeared completely with this modification.

**TUNING THE FRONT END**

C57 in conjunction with C58 set the tuning range of the local oscillator. If a wider tuning range is required C57 could be increased in value. C59 sets approximately the band that will be tuned by the oscillator. The corresponding capacitors in the aerial circuit would also have to be altered to similar values to those used in the oscillator. It will be noted that the values of the capacitors and the coils are not identical. The aerial circuit is expected to track or follow the tuning of the local oscillator but be 455 kHz away at all times. It is suggested that C50 in the aerial tuning circuit have a trimmer placed across it so that this circuit can be made to track the oscillator circuit across the particular band being tuned.

If you have made the oscillator and aerial tuned circuits as shown in the parts list it should not be difficult to align this portion of the receiver. Hopefully you will have your transmitter operational and have a few crystals available for use within the 3.5 MHz amateur band. Plug a crystal into the transmitter and switch to net. A powerful CW signal should now be audible somewhere within the tuning range of the receiver. Adjust C53 for a peak in the level of this signal — it should come with the capacitor at about half travel.

If it does not and you run out of range either higher or lower capacity is required for C52. Try again with capacity about 20 pF greater or smaller in value. If the circuit now peaks nicely leave it as it is and then check that the tracking is okay. To check this replace C50 with a capacitor of about 15 pF less capacity than shown on the parts list and place a 3-30 pF trimmer across it. It should now be possible when tuning from one end of the band to the other to make the aerial circuit track with the oscillator circuit. C50-trimmer and C53 will inter-react a certain amount but by judicious adjustment the circuit can be aligned quite accurately. The exact tuning range of the oscillator can only be determined by feeding in signals of known frequency or by using a signal generator — a GDO is not usually well enough calibrated for this job. It may be found that the transmitter oscillator is too strong in the net position for the re-



Modified receiver input showing image trap

ceiver, so by adjusting the value of R18 it is possible to drop the level to a useable strength. The value of this resistor was increased to 470k ohm in this particular transmitter. Where the transmitter and receiver are on separate chassis a lower value of resistor may be desirable.

It will be noticed in the diagram that V4 is shown as a 6AN7. The 6AN7 is a more readily available valve than the 12AH8. The valve pin numbering is read from underneath the valve socket. Next month the regenerative IF detector will be described, and in the meantime David Down continues this month with information on how to use the GDO. The coils in the Novice receiver were checked with the GDO.

**THE GDO — WHAT WILL IT DO FOR ME?**

Most operators asked to assemble a set of test bench equipment would perhaps leave the Grid Dip Oscillator until the end,

when in fact it can be one of the handiest instruments for the do-it-yourselfer's shack.

With a GDO, we can:

1. Measure circuit resonance — filters, traps, antennas and their feeders, etc.
2. Use it as a relative field strength meter.
3. Use it as an oscillating detector for frequency measurement.
4. Use it as a signal generator.
5. Operate it as a local oscillator for receiver tests.

The GDO is really only a VFO with a meter to measure RF power. The meter is a microammeter and measures either grid or base current depending upon the particular GDO circuit.

One of its most common uses is for checking resonance. Even with the transmitter power off, the transmitter can be pre-tuned. All that is done is for the GDO to be set to the desired operating frequency, placed near the grid tank circuit, and the grid capacitor dipped. Repeat for

the anode tank circuit, and the transmitter is pre-tuned. After applying power to the rig, a slight trimming may be required.

Coil winding creates more GDO opportunities, especially if you don't like tiresome calculations! Just wind a coil that looks about right, connect the required capacitor determined from your circuit and its parts list (if applicable), and check with the GDO. It will not take long for you to become a good judge of coil sizes, uses and capabilities.

With antennas, put a GDO next to yours, run up the desired frequency on the dial, and you will soon see if your antenna is worth keeping or not!

Spend some time getting to know the GDO — it can be a very valuable shack aid. If you know a nearby amateur who runs a GDO in his shack, ask politely if you can be taught about its operation.

Take this article with you — he may not be a member of the WIA. ■

**COMMERCIAL KINKS**

Ron Fisher, VK3OM  
3 Fairview Ave.,  
Glen Waverley, 3150

Reference to the Realistic DX 160 receiver in the column a few months ago brought a quick response from Keith Ayton VK3YHC. Keith has made a few modifications to his DX 160 that are well worth passing on. He claims that he is now getting improved gain on 15 and 10 metres and at the same time a reduction in cross modulation from local stations.

1. The two RF amplifier FET's have been replaced with a single MPF 121 dual gate MOS FET. This was installed under the printed circuit board. The source, gate 1, and drain connections drop straight into place, but the gate 2 lead needs to be extended about 1/8 inch with a piece of tinned copper wire.

2. The RF attenuator has been taken out of circuit and a short piece of small diameter coax cable has been run directly from the printed circuit board to an SO239 Amphenol coax socket installed on the rear apron of the receiver.

Keith claims that with the RF attenuator removed the input impedance of the receiver remains close to 75 ohms and he feeds it directly from a G5RV antenna without the need for an antenna tuning unit.

**CW NETTING ON THE FT200**

John Adcock VK3ACA has had further thoughts on his earlier method described last year. John says: "I personally think the method works so well that every transceiver should have one". Well here it is for your own decision.

"In November 1975 Commercial Kinks a modification to the FT200 was described to allow netting of the transmitted signal to the received signal when using CW. The method consisted of shifting the carrier

oscillator on 'receive' the same amount as on 'transmit/CW'. In order to net, it was necessary to switch S2 Fig 2 on, and zero beat the incoming signal with the clarifier off. It was then necessary to adjust the clarifier to give the desired beat note. This required two switching operations for each netting.

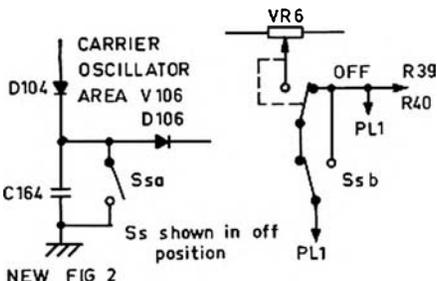
In practice this arrangement was found to be clumsy. A better set up is shown in the new Fig 2. The switch S2 was replaced by a DPDT switch. Ss-a is used to shift the frequency of the carrier crystal on 'receive' as before. The second half of the switch Ss-b is used to bridge out the clarifier switch.

As before the new switch is placed in the top right hand corner of the front panel. This is close to the clarifier switch and it is a comparatively simple matter to extend the wiring. The actual switch used was an NKK type S2022.

The procedure when using the switch is as follows. Turn the switch on and tune in the CW signal with the main tuning knob until zero beat. Turn the switch off and adjust the clarifier to give the desired beat note.

On all subsequent occasions after using the switch to net, the beat note will return to its preset condition.

You will find that this simple modification takes the uncertainty out of knowing whether you are netted or not. Do not be surprised if the other person does not come back on your frequency because most transceivers have no means of zero beating on CW". ■



**INTRUDER WATCH**

All Chandler, VK3LC  
1536 High Street, Glen Iris, 3146

A pattern of Red Chinese thinking has emerged over the past twelve months or so insofar as Commercial or Military point to point communication is concerned, and it is the phenomenon of the same stations changing call signs and frequencies from time to time.

From February until April 1975 on 14031 kHz, MOEX was calling DUQT using a continuous repeating call tape; from April until June '75 OEBL was calling CBFN on 14039 kHz; from June until August '75 it was DNOQ calling OUNC on 14126 kHz; from September until January '76 on 14109 kHz ZCPU was calling YMBK; from February until April '76 XSGU has been calling SUDV on 14155 kHz and now starting on the 18th April on 14239 kHz GCQF is calling TURX. We know these stations are Red Chinese because of the procedure used, and the bearings are always identical. The speed of their continuous tape is about 10 wpm, and the procedure — "v (once) TURX (thrice) de GCQF twice)" repeated ad infinitum, but sometimes breaking off into four letter code at about 25 wpm. I wonder whom they think they are fooling?

I am appealing for Observers with RTTY facilities to come forward because the two major successes that we have achieved in Australia have been through read-outs of Commercial RTTY signals sent to me by such an observer. About two years ago I was given read-outs of a signal heard in the 14 MHz band. It was in plain language (English) transmitting British Embassy traffic and the station was TCX located in Ankara, Turkey. After sending copies of these read-outs to my colleague in England, and he passing them on to his Administration, TCX disappeared out of our band. Again a month or so after I was given read-outs of a station KJG in the same band, and the similar procedure was adopted. The language was foreign, but was subsequently translated as Croat-Serbian and the station was located in Yugo-Slavia. The complaint to the Yugo-Slav Administration produced an apology and the signal disappeared out of our band. Neither of these stations had been identified by Region 2 nor by Region 1, and it was to the credit of Region 3 that action was taken.

The moral of this is obvious. I have not been given any read-outs for some considerable time now, and there are many F1 tele-type signals operating in our bands. I know that many commercials are too fast for Amateur equipment, but there must be some that can be copied. How about it boys? ■

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Number of Filter Crystals	8	8	8	8	8	4	2
Bandwidth	12.0 kHz	15.0 kHz	30.0 kHz	36.0 kHz	40.0 kHz	14.0 kHz	14.0 kHz
Pass Band Ripple	← ≤ 2 dB →				← ≤ 1 dB →		← ≤ 2 dB →
Insertion Loss	≤ 3.5 dB	≤ 3.5 dB	≤ 4.5 dB	≤ 4.5 dB	≤ 4.5 dB	≤ 3 dB	≤ 1.5 dB
Input Output $Z_t$	820 Ω	910 Ω	2000 Ω	2700 Ω	3000 Ω	910 Ω	7500 Ω
Termination $C_t$	25 pF	25 pF	25 pF	25 pF	25 pF	35 pF	-
Shape Factor	(70 dB) 2.4	(70 dB) 2.3	(70 dB) 2.2	(70 dB) 1.9	(70 dB) 2.0	(40 dB) 3.0	(20 dB) 3.6
	(90 dB) 2.8	(90 dB) 2.9	(90 dB) 2.7	(90 dB) 2.5	(90 dB) 2.5	-	(36 dB) 5.7
Ultimate Attenuation	← > 90 dB →				← > 60 dB →		← > 30 dB →
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## A few words from "IZNIBS"

IC-502  
 I would like to correct an error shown in our recent advertising for this model and as you have probably already worked out, an IC-502 does not cover 52-54 MHz, but only 52-53 MHz. Whilst on this subject, it is interesting to note that in USA the FCC have been rather upset by some spurious signals and harmonics from transceivers which may affect other users, especially in the 420-450 MHz band. This was referred to in a recent issue of HamRadio Magazine. We know from conversation with Mr. Inoue that his Company is concerned about the potential problem of "out of band" signals and he goes to very long lengths to ensure that all the ICOM equipment will meet the Regulations in various countries including the USA, and in fact models destined for the USA have a label affixed indicating that they do meet FCC specifications. We have not heard of any such move within Australia for the Authorities to be concerned to the same extent, although I am quite sure that a detectable signal capable of causing interference would be soon pointed out. Maybe there is some room for some specification to be laid down in this area. I can assure you, however, that the equipment we sell is well within the tolerances allowed.

### OUR GUARANTEE:

The equipment we sell carries either a twelve-month guarantee against faulty workmanship or components (in the case of ICOM) and thirty days in the case of Atlas or Uniden. This covers both parts and labour, with the exception of valves and semi-conductors and only if the equipment has not been tampered with or abused.

A word or two of explanation is required about valves and semi-conductors, and I am sure that you appreciate a moment's carelessness could cause P.A. bottle to fail by operating into a high SWR and it would quickly wither and die if full power is held on for more than a few seconds. If properly used tubes will last two years or more, if improperly used they will only last a few milli-seconds. This is why we cannot under any circumstances guarantee tubes.

Similarly, a sniff of RF around a FET and bang goes the FET! Here again, with sensible use, semi-conductors last for years but if mistreated they quickly give up the ghost. This is the reason why we cannot guarantee them. The only exception to this rule are the semi-conductors used in the Atlas, and the Factory is big hearted enough to extend a twelve-month warranty on a "once off" basis.

There have however, been exceptions when we have replaced tubes and semi-conductors under guarantee when we felt that there has been reasonable doubt, but it is at our discretion. The same thing applies regarding tampering and fiddling around. No one wants to sort out some mess under guarantee if someone decides that he knows more than the designer and makes a modification. I personally feel like wrapping the entire rig around his ears but we try to keep our tempers and point out that we cannot repair the damage under warranty but for a small charge, will make it right.

Having thus painted a pretty bleak picture how we avoid helping you in any way, let me hasten to add that if you are reasonable and have a fair demand for service under guarantee, you will find that we give the best in the country!

**73 PETER 31Z**  
 General Manager  
 VICOM International Pty Limited



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# RULES FOR VK/ZL/OCEANIA JUBILEE

## DX CONTEST 1976

NZART and WIA, the national Amateur Radio Associations in New Zealand and Australia, invite worldwide participation in this year's VK/ZL/OCEANIA DX CONTEST.

### OBJECTS:

For the world to contact VK/ZL/Oceania Stations and vice versa, as part of NZART Jubilee Celebrations.

### WHEN?

Phone: 24 hours from 1000 GMT Saturday, October 2 to 1000 GMT Sunday, October 3.

CW: 24 hours from 1000 GMT Saturday, October 9 to 1000 GMT Sunday, October 10.

### RULES:

1. There shall be three main sections to the contest —

- Transmitting phone.
- Transmitting CW.
- Receiving — "Phone and CW" combined.

2. The contest is open to all licensed transmitting stations in any part of the world. No prior entry need be made. Mobile Marine and other non-land based stations are permitted to enter. Their "country status" will be determined by the country which issued the call sign used in the contest.

3. All amateur frequency bands may be used but no crossband operation is permitted. Note: VK and ZL stations irrespective of their location do not contact each other for contest purposes except on 80 and 160 metres on which bands contacts between VK and ZL stations are encouraged.

4. Phone will be used during the first weekend and CW during the second weekend. Stations entering both sections must submit separate logs.

5. Only one contact on CW and one contact on Phone per band is permitted with any one station for scoring purposes.

6. Only one licensed amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a competitor and must submit a separate log under his own call sign. This is not applicable to overseas competitors operating Club Stations.

7. Entrants must operate within the terms of their licences.

8. **Cyphers:** Before points can be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (Phone) or RST (CW) report plus three figures which may begin with any number between 001 and 100 for the first contact and which will increase in value by one for each successive contact, e.g. — If the number chosen for the first contact is 021, then the second must be 022 followed by 023, 024 etc. After reaching 999, restart from 001.

9. **Scoring:** (a) For Oceania Stations other than VK/ZL — 2 points for each contact on a specific band with VK/ZL stations; and 1 point for each contact on a specific band with the rest of the world.

(b) For the Rest of the World other than VK/ZL — 2 points for each contact on a specific band with VK/ZL stations; and 1 point for each contact on a specific band with Oceania Stations other than VK/ZL.

(c) For VK/ZL Stations — 5 points for each contact on a specific band and in addition, for each new country worked on that band, bonus points on the following scale will be added — 1st contact, 50 points; 2nd contact, 40 points; 3rd contact, 30 points; 4th contact, 20 points; 5th contact, 10 points.

Note: (1) The ARRL countries list will be used except that each call area of "W/K", "JA", "UA" will count as "countries" for scoring purposes as indicated above.

Note: (2) Call areas include different prefixes — e.g. W1, K1, WA1, WN1 are all the same call area; just as are UA9, UK9, U9V, UW9 in same call area; or UB5, UK5, UT5, UY5 in same call area and

these are not different call areas. Check this carefully — use Call Book!

(d) **80 Metre Section** — For 80 metre contacts between VK and ZL stations, each VK/ZL call area will be considered a "scoring area" with contact points and bonus points to be counted as for DX contacts. N.B. Contacts between VK and ZL on 80 only.

(e) **160 Metre Segment:** For 160 metres, contacts between VK/ZL, VK/VK, ZL/ZL and ZL/VK to the rest of the world: Each VK/ZL call area will be considered a "scoring area" with contact points and bonus points to be counted as for DX contacts (Rule 9(c)). Note: A contestant in a call area may claim points for contacts in the same call area for this 160 metre segment.

### 10 Logs:

(A) **Overseas Stations:** (a) Logs to show in this order — date, time in GMT, call sign of station contacted, band, serial number sent, serial number received, points claimed. Underline each new VK/ZL call area contacted. Separate log must be submitted for each band used.

(b) **Summary Sheet** to show call sign, name and address in block letters; details of station; and, for each band — OSO points for that band; VK/ZL call areas worked on that band. "All band" score will be total QSO points multiplied by sum of VK/ZL call areas on all bands while "single band" scores will be that band QSO points multiplied by VK/ZL call areas worked on that band.

(B) **VK/ZL Stations:** (a) Logs must show in this order — date, time in GMT, call sign of station worked, band, serial number sent, serial number received, contact points, bonus points. Use separate log for each band.

(b) **Summary Sheet** to show — name and address in block letters, call sign, score for each band by adding contact and bonus points for that band, and "all band" score by adding the band scores together; details of station and power used; declaration that all rules and regulations have been observed.

11. The right is reserved to disqualify any entrant who, during the contest, has not strictly observed regulations or who has consistently departed from the accepted code of operating ethics.

12. The ruling of the Executive Council NZART will be final.

### 13. Awards — World-wide — except VK/ZL.

(a) Attractive multi-colour certificates to the top scorers in each country. (Call area in "W", "JA", "UA"). Separate Awards for phone and for CW.

(b) Depending on reasonable degree of activity, separate certificates may be awarded for top scores on different bands.

(c) Where many logs are received, consideration will be given to awarding 2nd and 3rd place certificates.

(d) NZART Jubilee Plaque to top scorer in each Continent (both on phone and on CW).

(e) Jubilee Participation Certificate to every contestant forwarding a log. These will be posted direct if IRC enclosed, otherwise sent via Bureau.

### VK/ZL AWARDS

Attractive multi-colour certificates —

1. To the top three scorers in each call area of VK and of ZL.

2. To the top three scorers on Individual bands (160, 80, 40, 20, 15, 10) in VK and in ZL — separate awards for phone and for CW.

3. NZART Jubilee Plaques to top scoring VK both in phone and in CW sections.

4. NZART Jubilee Plaques to ZL contestants as per separate list.

5. Jubilee Participation Certificates to all VK/ZL entrants as per 13e above.

14. Entries from VK/ZL Stations should be posted direct to —

NZART Contest Manager ZL2GX,

152 Lytton Road, Gisborne, New Zealand — to arrive not later than December 31, 1976.

From Overseas Stations — to the above address or NZART, Box 489, Wellington, New Zealand — to arrive not later than January 31, 1977.

### SWL SECTION:

- The rules are similar to the transmitting section but it is open to all members of any SWL Society in the world. No transmitting station is permitted to enter this section.
  - The contest times and logging of stations on each band per weekend are as for the transmitting section except that the same station may be logged twice on any one band — once on phone and once on CW.
  - To count for points, the station heard must be in QSO exchanging cyphers in the VK/ZL/Oceania DX Contest and the following details noted — date, time in GMT, call of the station heard; call of the station he is working; RS(T) of the station heard; serial number sent by the station heard; band; points claimed.
  - Scoring is on the same basis as for the transmitting section and a summary sheet should be similarly set out.
  - Overseas Stations may log ONLY VK/ZL stations but VK receiving stations may log overseas stations and ZL stations, while ZL receiving stations may log overseas stations and VK stations.
  - Certificates will be awarded as listed in the section under "Awards".
- Jack White ZL2GX,  
Contest and Awards Manager, NZART.

## CONTESTS

Kevin Phillips, VK3AUQ  
Box 67, East Melbourne, 3002

### CONTEST CALENDAR

June	
5/13	Townsville Pacific Festival Contest
12/13	RSGB National Field Day
12/14	Midwinter Field Day (VHF)
19/20	All Asian Phone Contest
28/27	ARRL Field Day
July	
3/4	Venezuelan Phone Contest
17/19	County Hunters CW Contest
24/25	ARRL Bi-centennial
31/Aug.	Venezuelan CW Contest
August	
14/15	Remembrance Day Contest
14/15	European CW
21/22	All Asian CW Contest

### REMEMBRANCE DAY CONTEST 1976

This contest will be held on the 14th and 15th of August. It is the second contest to count towards the Contest Champions Trophy for 1976. Rules will be in next month's AR. I hope everyone will get their gear in good order and enter the contest and have a good time. I hope to be reasonably active myself, so see you on air.

### RSGB NATIONAL FIELD DAY

Starts 1700 GMT June 12. Ends 1700 June 13. Stations outside Great Britain are not eligible to enter on a competitive basis, but you can work the British portables and submit your check log. A certificate will be issued to the VK station who has the greatest number of contacts with British portables.

Send logs to:

RSGB HF Contests Committee,  
C/o A. Davis,  
41 Gainsborough Road, Crawley,  
Sussex RH10-5LD, England.

### ALL ASIAN DX CONTEST

Phone: June 19-20. CW: August 21-22  
Exchange: For OM's, RS(T) plus age of operator. For YLs, RS(T) plus OO. Scoring is one point per QSO. Non Asians use prefixes of Asian countries worked for their multiplier. Final score: Total QSOs from each band times the sum of the multiplier on each band.

Awards go to the highest scorers, phone and CW, all bands in each country up to the 5th rank where returns justify. Single band and multi on each country only.

Logs should have all times in GMT; fill in prefix column only first time it is worked, and use a separate sheet for each band. A summary sheet showing scoring and other information, and a signed declaration, are also required. Logs must be received no later than September

30th for phone entries and November 30th for CW. Logs go to JARL Contest committee, P.O. Box 377, Tokyo, Central Japan. Include an IRC and SAE for copy of results.

#### VENEZUELAN CONTEST

Phone: July 3, 4. CW: July 31-August 1  
Starts 0000 GMT Saturday. Ends 2400 GMT Sunday.

All bands 80 to 10 used. Exchange RS(T) report plus a 3 figure QSO number starting with 001. Claim 2 points per contact with stations in other countries.

Multipplier: One for each country and each YV call area contacted on each band. Final score is total QSO points multiplied by sum of different countries and YV call areas worked on each band.

A remittance of \$2.00 US is requested, or its equivalent in IRCs for each certificate application. Mailing deadlines are September 15th for phone and October 15th for CW. Send logs to Radio Club Venezolano, P.O. Box 2285, Caracas 101, Venezuela.

#### ARRL BI-CENTENNIAL CELEBRATION

From 0000 UTC July 24th to 2359 25th July. Try to work as many stations within the 50 United States only. Single op and Multi op permitted. Multi transmitter prohibited. Non US participants send signal report and consecutive report starting at 001. Final score is total number of contacts. No multipliers.

Entries must be postmarked no later than 1st September.

#### SOME COMMENTS ON THE NATIONAL FIELD DAY

VK4WIM/4 had a great time. VK3JL/3 wishes CW stations would sign as /3 not as /P. 2JM/2 says the day was very hot and reception conditions bad. 7HE/7 operated from a paddock 25 miles NNW of Launceston with equipment consisting of FT201, 18AVT ground mounted, tent, card table, chair, and barbecue. 3XU ran 500 milliwatts solid state. 3ALZ/3 Doctors Creek was disappointed at the lack of home station activity. 3TX/3 found more phone stations were prepared to have a go at CW for the extra points.

VK5DL/5 writes — At one stage I heard a rather badly sent CQ, and found it to be a cricket outside my tent. 4XZ/4 says it rained, as usual. What about having the contest in October or November. VK2CAX/2 says moths tend to come to a spectacular end by flying into my ATU on transmit. I myself went to the Christmas Hills with many buds, many gear and a 15 KVA alternator to run rigs and heaters etc. I hope all who entered enjoyed the contest and will participate next year. ■

## WHERE, AND HOW MUCH?

Vic Pleuger, VK3AVP

The intention of this column will be to present information to the amateur and electronics experimenter on how, where, and for how much you can obtain components, kits, or equipment, with particular emphasis on hard to get or good value items.

Readers' assistance in the compiling of this column would be greatly appreciated. If you have relevant details on new or alternative sources of materials, according to the given outlines, I would be pleased to hear from you.

It should perhaps be pointed out that the information to be presented cannot hope to cover the whole electronics field. However, this column will always endeavour to remain unbiased with respect to non-advertisers and advertisers in this magazine.

#### INSULATING MATERIALS AND PRINTED CIRCUIT BOARD

Teflon sheet and polycarbonate insulating material is available from Dotmar Products P/L, 268 Blackburn Rd., Mt. Waverley, Vic. Tel. 232 9960, 233 3137. Fibre and mica washers, teflon rod and sheet, polystyrene rod and plastic sleeving is available from E. C. Menzies Electrical P/L, 566 Elizabeth St., Melbourne, Tel. 347 6844.

#### COMPONENTS

Concentric ceramic insulation trimmer capacitors, capacitance value 2-25 pf., solder-in lug type, that

appear to be heavy duty and ideal for transmitter projects are available at a cost of 25 cents each from Ham Radio Supplies, 390 Bridge Rd., Richmond, Vic., 3121, Tel. 42 5174.

UHF feed-thru capacitors and chip type capacitors can be obtained from Tri Components P/L, 38 Avonhurst Dve., Glen Waverley, Vic., Tel. 560 2112.

Enamelled and other winding wire, in 2 kg rolls at a cost of approximately \$7.50 each are available from O. H. O'Brien P/L, 94 Moray St., South Melbourne, Tel. 69 5781.

Double Balanced Mixers (Wideband) in DIL package to cover 1-500 MHz in two versions coping with input levels to +7 dbm or +17 dbm. Cost \$13.70 each. Range available to cover the spectrum of 3 kHz-1.25 GHz. Wideband RF Transformers (Low Level) in DIL package (i.e. Mini DIP-6 pin) to cover frequency range of 15 kHz-600 MHz. Types available feature 50 ohm input to secondary impedances of 50, 100, 200, 450 and 900 ohms. The 200 ohm unit is centre tapped and is particularly useful for balanced modulators and mixers, and covers the frequency range of 0.2-350 MHz. Cost is approximately \$4 each. The above are manufactured by Micro Electronics (USA) and are available from Danava Controls P/L, 19 Lincoln Drive, Cheltenham, Vic., Tel. 93 9140.

Wideband RF power transformers for impedance matching in solid state high power amplifiers to cover the frequency range of 1.8-30 MHz at a rated input of 150 watts maximum, with turns ratios of 1:3, 4, 5 or 6 being available.

RF 1000, 150 watts, ea. \$4.00 (Aust.) plus postage.  
RF 800, 100 watts, ea. \$3.20 (Aust.) plus postage.  
RF 600, 50 watts, ea. \$2.80 (Aust.) plus postage.  
RF 400, 25 watts, ea. \$2.00 (Aust.) plus postage.

These transformers are available from Communications Power Inc., 2407 Charleston Road, Mountain View, California, 94043, USA. ■

## LARA

Ladies Amateur Radio Association

Consequent upon the relaxation of the ban on Amateur Radio examinations, the February AOCF and March Novice examinations were held, with many women sitting for them around Australia. These included LARA members Irena YF/VK3YER, Kate Duncan, Mavis YF/VK3BER, from Melbourne, and Su Challinor from Adelaide. These girls are now patiently waiting for their results.

In Adelaide five of the twenty-five students at the AOCF class, held at the Panorama Technical School this year, are ladies, namely Maxine McEnvoy, Rhondda Holker, Margaret Stallard, Jenny Warrington, and Su Challinor. Betsy Ashton and Hillary Adlam are also attending Novice classes.

It is anticipated that LARA will commence a correspondence course in Novice radio theory for women in the near future. It would therefore be appreciated if those interested in such a course could contact LARA.

The LARA skeds are still being held around the country. The 80 metre net, now back to its original time of 10.00 GMT on Monday evenings — 3650 kHz — is always well attended. Net controller is Myrna VK5YW from Adelaide. Other regular stations appearing are Mavis VK3KS, Anne VK7LY, Heather VK2HD, Mavis YF/VK3BER, Norma VK3AYL, Austine VK3YL, Lorraine VK5LM, Denise VK5YL, Rhonda VK3ZYL (YF/VK3ZYL), Joy YF/VK3BLR, Lorraine YF/VK8BV, Heather YF/VK3FF. On several of the nets all licensed South Australian girls (Myrna, Lorraine, and Denise) have taken part.

In Melbourne the VHF net is held at 8.30 p.m. local time on Tuesday evenings. Control station is Rhonda VK3ZYL, with call-in on Channel 1 VK3RML Repeater. But, provided enough stations have tunable equipment, the group then moves down the band for a netter. Regular meetings are also being held in Melbourne, the dates being the last Saturday of each month. Venues are usually the homes of members.

The LARA newsletter is now being published on a regular basis. Any interested people (YL or OM) who would like to be added to the mailing list should contact a member of LARA. The newsletter includes many interesting articles and will be the main method for communication between members.

For more information about LARA send your enquiries or comments to LARA, C/o 412 Brunswick St., Fitzroy, Vic. 3052. All letters are welcome. Otherwise join in on one of our skeds.

Norma VK3AYL. ■

## AWARDS COLUMN

Brian Austin, VK5CA

#### PREFIX CROSS REFERENCES

AC1 — see A5  
AP — see S2-3  
AX — see VK  
CN9 — see CN2, 8  
CR5 — see CR3  
CR7 — see C9  
CR10 — see CR8  
DX — see DU  
EA0 — see 3C  
FA — see 7X  
FB8 — see FH8  
FB8 — see FR7  
FB8 — see 5FR8  
FD — see 5V  
FE8 — see TJ  
FF4 — see TU  
FF7 — see ST  
FF8 — see TY  
FF8 — see TZ  
FF8 — see XT  
FF8 — see SU7  
FF8 — see 6W8  
FQ8 — see TL  
FQ8 — see TN  
FQ8 — see TR  
FQ8 — see TT  
FU8 — see YJ  
HE — see HB0  
HG — see HA  
HT — see YN  
IM — see IS  
JR6 — see KR6, 8  
KA6 — see KR6, 8  
KG1 — see OX  
KG61 — see JD, KA1  
LA/G — see 3Y,  
CE9AA-AM  
LA/P — see JX, JW  
MP4B — see A9  
MP4D — see A8  
MP4M — see A4  
MP4Q — see A7  
MP4T — see A6  
OF — see OH  
OQ5, 0 — see 9Q5  
PK — see YB  
PX1 — see C3  
VK9 — see C2  
VK9AA-MZ — see P2  
VP2K — see VP2E  
VP3 — see 8P  
VP4 — see 9Y4  
VP5 — see 2F1  
VP5 — see 6Y5  
VP6 — see 8P  
VP7 — see C6  
VQ1 — see 5H1  
VQ2 — see 9J2  
VQ3 — see 5H3  
VQ4 — see 5Z4  
VQ5 — see 5X5  
VQ8 — see 3B6, 7,  
8, 9  
VR2 — see 3D2  
VR5 — see A3  
VS1 — see 8M2  
VS1 — see 9V1  
VS2 — see 8M2  
VS9 — see 70  
VS90 — see A4  
XF — see XE  
YN0 — see YN  
YT — see YU  
YZ — see YU  
ZB1 — see 9H1  
ZD1 — see 9L1  
ZD2 — see 5N2  
ZD3 — see C5  
ZD4 — see 9G1  
ZD5 — see 3D8  
ZD6 — see 7Q7  
ZM6 — see 5W1  
ZS7 — see 3D6  
ZS8 — see 7P8  
ZS9 — see A2  
3W8 — see XV5  
3Z — see SP  
4A — see XE  
4M — see YV  
6D — see XE  
6D4 — see XF4  
7G — see 3X  
8F — see YB  
8Z5 — see 9K3  
9E, 9F — see ET3  
9M4 — see 9V1

#### THE CYPRUS AWARD

The Cyprus Award Certificate has been sponsored by the Cyprus Amateur Radio Society. It will be awarded to any licensed amateur radio operator outside Cyprus who makes a specified number of two-way contacts with licensed amateurs on the Island of Cyprus. The conditions for its award are set out below.

To reduce as far as possible any advantage accruing to stations by reason of their geographical location, and to encourage activity on the less frequently used bands, the certificate will be awarded on a points basis determined by ZONE location and the frequency bands used. This is shown in the table below:

Amateur Bands Mc/s	1.8	3.5	7	14	21	28
Zone	Points scored per contact					
20	4	2	1	1	2	4
1,2,3,6,7,10,12, 19,24,25,26,27,28, 29,30,31 and 32	16	8	4	2	4	8
All other zones	8	4	2	1	2	4

The total number of points required to win the Award is dependent on the number of bands used. If all contacts are made on ONLY ONE BAND — 32 points are required. If the contacts are made on ANY TWO BANDS — 24 points are required.

If the contacts are made on ANY THREE BANDS — 16 points are required.

If the contacts are made on ANY FOUR BANDS — 12 points are required.

Any mode of emission may be used, but operation must be in accordance with standard amateur service practice. Contacts to count must be made after 1st July 1962. Contacts with any one Cyprus station can only count once per band.

To claim the award, copies of log entries should be submitted under the following headings:

- DATE/TIME GMT.
- STATION WORKED.
- FREQUENCY BAND.
- SIGNAL REPORTS IN AND OUT.

Each log sheet should be headed with the call sign, zone number and full postal address, preferably typed or printed in block capitals. These should be supported by the appropriate QSL cards or a certificate from the applicant's National Society certifying that the QSL cards have been produced to them. In countries without a National Society a similar certificate signed by two other amateurs will suffice. Log sheets, accompanied by ten IRCs (or equivalent), should be sent to:

Awards Manager,  
Cyprus Amateur Radio Society,  
P.O. Box 1267 Limassol,  
Cyprus Republic.

The log entries will be checked and at the discretion of the Cyprus Amateur Radio Society the certificate will be awarded. Unsuccessful applicants will be notified of the reason for rejecting their claim. ■

## PROJECT AUSTRALIS

David Hull, VK3ZDH

### JULY PREDICTIONS

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time	Long	Date	Orbit No.	Time	Long
1	16960	01.36	80.20	1	7433	00.06	51.34
2	16972	00.36	65.20	2	7446	01.00	64.96
3	16985	01.31	78.95	3	7459	01.54	78.58
4	16997	00.31	63.95	4	7471	00.53	63.46
5	17010	01.26	77.70	5	7484	01.48	77.08
6	17022	00.26	62.70	6	7496	00.47	61.96
7	17035	01.21	76.45	7	7509	01.41	75.58
8	17047	00.21	61.45	8	7521	00.41	60.46
9	17060	01.16	75.20	9	7534	01.35	74.08
10	17072	00.16	60.20	10	7546	00.34	58.96
11	17085	01.11	73.95	11	7559	01.28	72.58
12	17097	00.11	58.95	12	7571	00.28	57.46
13	17110	01.05	72.70	13	7584	01.22	71.08
14	17122	00.05	57.70	14	7596	01.21	55.96
15	17135	01.00	71.45	15	7609	01.16	69.58
16	17147	00.00	56.45	16	7621	00.15	54.46
17	17160	00.55	70.20	17	7634	01.09	68.08
18	17173	01.50	83.95	18	7646	00.09	52.96
19	17185	00.50	68.95	19	7659	01.03	66.58
20	17198	01.45	82.70	20	7671	00.02	51.46
21	17210	00.45	67.70	21	7684	00.56	65.08
22	17223	01.40	81.45	22	7697	01.51	78.70
23	17235	00.40	66.45	23	7709	00.50	63.58
24	17248	01.35	80.20	24	7722	01.44	77.20
25	17260	00.35	65.20	25	7734	00.44	62.08
26	17273	01.29	78.95	26	7747	01.38	75.70
27	17285	00.29	63.95	27	7759	00.37	60.58
28	17298	01.24	77.70	28	7772	01.32	74.20
29	17310	00.24	62.70	29	7784	00.31	59.08
30	17323	01.19	76.45	30	7797	01.25	72.70
31	17335	00.19	61.45	31	7809	00.24	57.58

### OSCAR 7 MODE B

The following notes were submitted by Bob Arnold VK3ZBB and are reprinted with thanks.

Although Oscar 7 Mode B (432 MHz uplink), is not as popular in Australasia as in Europe and USA it is usually possible to find VK and ZL stations operating on each pass. Some are regulars; others appear intermittently.

During the past 6 months the following stations have been worked from Melbourne:—

VK1VP,  
VK2YAJ, BJO,  
VK3ZUR, ZDW, BFC, ZBB, AMN, ZPA, WM

VK4LO,  
VK5NY, QR, GU, ZPS, MT, ZDG, NC, SU,  
VK6WG, KJ, ZFY, HK, XY,  
VK7ZAH, LZ,  
ZL1AVZ,  
ZL2TFJ, MF, BCG, BFC,  
ZL3AR, TJG.

Stations in JA and VS6 have been worked by VK5 and have been heard in Melbourne; it should be possible for stations north of 35° Lat. to work these call areas on suitable orbits.

Activity in the Pacific is almost non-existent but VK3ZBB and ZL3AR have been heard at ZK1AH. Stewart will have a 432 Tx in the near future to make two way OSOs.

Most stations operate SSB with USB up and LSB down, but on occasions AM and FM modes are effectively used. 10 watts of SSB is sufficient for a good OSO but contacts have been made using less than 300 milliwatts.

A tilted and steerable antenna is desirable.

The regulars on Oscar 7B will welcome calls from new operators particularly those in northern VK, P29 and the Pacific Islands.

### SPECIAL OSCAR 7 MODE B TESTS

All users of the 70 cm to 2M Mode-B transponder of the AMSAT-OSCAR 7 satellite are invited to participate in a special three day low power (QRP) test which will occur on June 16, 17 and 18, 1976. The test will begin at 0000Z, 16 June, when the satellite switches from Mode-A to Mode-B on orbit number 7245. It will be kept in this mode by AMSAT Telecommand stations located in Canada and Australia. The final orbit of this three day test will be number 7282 on Friday, June 18.

All stations using the transponder are urged to run 10 watts effective radiated power or lower, and those who cannot reduce power to this level are asked not to transmit in the 432 MHz uplink pass-band, since their presence will reduce the effectiveness of the many low power users who will participate in the QRP test. Signal reports sent should include the e.r.p. being used (i.e. RST 569 erp 5W) so that those listening can get an idea of how effective low power can be via AMSAT-OSCAR 7 when the high power stations are not hogging most of the available power.

Remember that one watt into a 10 dB gain antenna system will produce the maximum recommended 10 watts effective radiated power. If an exciter runs 10 watts or more output, a half wave dipole will be a big enough antenna to use, and if more attenuation is needed to reduce the e.r.p. an old piece of lossy coaxial cable can be added to the existing transmission line. It does not really matter how the 10 watts e.r.p. is achieved. The important thing is to run QRP for the three day test and send the results along with a station description to:—

Project Australis, 3 Oliphant Court, Mulgrave, Victoria, 3170. ■

## 20 YEARS AGO

Ron Fisher, VK3OM

### JUNE 1956

Just how should the PMG Radio branch communicate changes in the regulations to Amateur Operators throughout Australia. The Editorial page of the June 1956 issue of Amateur Radio looked at the problem and made a few suggestions.

Along with the publication of this Information in AR they stated that it should be simultaneously transmitted over the Federal station VK3WIA.

However VK3WIA never materialised in the form suggested, but over the last month or so tapes with Federal information have been forwarded to each State for inclusion in Divisional broadcasts. Perhaps FE has a voice at last.

An historical note on the opening of the John Flynn Memorial Church in Alice Springs recalled the work of amateurs who assisted the late Rev. John Flynn in the formation of the radio communication service for the Inland Mission. All Traeger VK5AX/8AX and Harry Kauper VK5BG were two notable participants.

Two Metres, But How. Comps Daw VK5EF told the story of how he eventually got on two, after getting on to a lot of other frequencies first. Recommended reading for all those who tried two

metres during the fifties and failed. One of the gadgets that seems to have persisted since immediate post war days and yet has never become popular is the Panoramic Adaptor. K. M. Saxon VK7AI described the construction and operation of one in the June 1956 issue of AR.

The Federal Column states that David Wardlaw VK3ADW had taken over the duties of Victorian Federal Councillor from Russell Bradshaw VK3SX. ■

## REPEATERS

Ken Jewell, VK3ZNJ  
Peter Mill, VK3ZPP

Once again we would be most grateful if more information could be made available to enable the column to continue. In particular we would like to hear from VK6, and the VK4 northern repeater groups. If you are unable to write, send a short note with your telephone number and we will ring you. All correspondence for this column should be addressed to Peter Mill, 2 Ivy Street, Parkdale, Vic., 3195. Also we would welcome any suggestions about this column so that we can assess just what the readers want.

### FEDERAL NEWS

Advice received from those States who have answered the recent letters from the Federal Repeater Secretariat have indicated that the proposed additional channel and change in repeater numbering could be adopted as policy by the time the Federal convention has been held. Some replies have been received back from a few States regarding the 70 cm band plan but more replies are wanted to give FRS a firm idea of what the opinion is of the majority. However, contact with groups around the country shows that the trend is toward the WIA band plan, as will be seen later in this column.

### VICTORIAN NEWS

The proposed repeater on channel 3, VK3RSW, in the Otway Ranges has become a step closer with the purchase of equipment for the repeater. The gear will be all solid state Philips type 1680 Tx and Rx and a 25 watt final board. It is expected that the equipment will be assembled and tested in the Geelong area in the near future. Permission is being sought at the present time. VK3RGL is suffering from a small problem at the present time due to low temperatures on Mt. Anaki and a recent modification on the mute which is opening up intermittently. It is hoped to rectify this shortly. Also an automatic keyer has been completed and should be installed by the time you read this.

The Bendigo group has been reduced to a one man band for the time being and pressure of business has delayed the installation of the duplexer which will give improved coverage. From Ballarat comes the news that the tests have been very successful and a firm licence application is in the process of being prepared for submission shortly. The range of the repeater is difficult to determine at the present time but even with the low site they have stations mobile 80 km away working into it. More details will be available next month.

In Melbourne the 70 cm interest is increasing with an approach by a second group who propose a service repeater for Melbourne using the same frequencies as Sydney. They hope to have sufficient details for a licence application in a few weeks. The gear will be all solid state commercial equipment with a power output of 50 watts and from the site they have available, excellent coverage is expected.

### NEW SOUTH WALES NEWS

On the 7th April, 1976 the Sydney UHF repeater was licensed under the call sign VK3RUS with an input frequency of 433.50 MHz and the output on 438.50 MHz. The equipment is a Willis U10T transmitter and U25 amplifier, with a Willis type UR receiver, and the antennas are 165 metres above the ground. The usual timeout and identification facilities apply to the station. From Gosford Jeff Campbell advises that VK2RAG on channel 5 runs an all valve AWA rig with 30 watts out and is located at the Central Coast Radio Club rooms. It will be re-located at Mangrove Mountain in a few months. For identification the repeater trans-



# VHF FM FROM ONE OF THE WORLD'S LEADERS YAESU

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### GENERAL

**Frequency Range:** 146 to 148 MHz.  
**Number of Channels:** 23 plus 1 priority channel.  
**Mode:** FM.  
**Frequency Stability:** ±0.001%.  
**Circuitry:** 30 Transistors, 23 Diodes, 4 IC, 5 FET.  
**Power Source:** 13.5V DC.

**Antenna Impedance:** 52 ohm unbalanced.  
**Power requirement:** 0.4A receive, 2.2A transmit (DC).  
**Size:** 180(w) x 70(h) x 220(d) mm.  
**Weight:** 2.5 kg.

### RECEIVER

**Sensitivity:** 0.3 μV for 20 dB quieting.  
**Selectivity:** 15 kHz at 6 dB, 25 kHz at 60 dB

**Audio Output:** 2.5 Watts at 4 ohm TRANSMITTER

**RF Output Power:** 1 & 10 watts.  
**Spurious Radiation:** -60 dB or better  
**Deviation:** ± 5 kHz nominal.

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 Extra standard channels \$9.00  
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3.08	3/4	8	3	No. 3010	\$1.40
3.16	3/4	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
5.08	1 1/4	8	4	No. 3018	\$1.75
5.16	1 1/4	16	4	No. 3019	\$1.75
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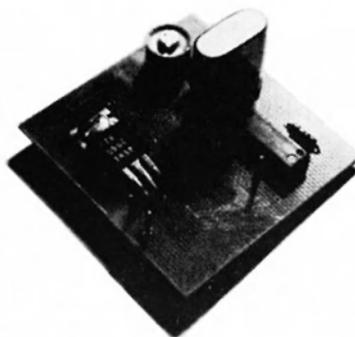
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**TASMANIAN REPEATERS**

**OPERATIONAL**

VK7RAA Channel 4 Mt. Barrow/Launceston Area Audible Ident 1000 km Range VK7PF Project Leader.

**TESTING STAGE**

VK7RHT Channel 1 Mt. Wellington/Hobart Area Audible Ident 100 km Range VK7RR Project Leader.

**CONSTRUCTION STAGE**

VK7RWN Channel 5 Loona/Uiverstone Area Audible Ident ? VK7ZAO Project Leader.

mits its call sign, its location and the time of the day at a speed of 10 wpm every time the repeater is brought up (anyone for CW practice?)

In Sydney the channel 4 repeater, VK2RAS located at Dural, is currently having a 100 foot tower erected at the site which will double the present height of the receive antenna and will no doubt give the system a far greater coverage. The St. George repeater on channel 2, VK2RLE is in the process of being moved from Engadine to a site at Heathcote and details of the equipment will be given when they are available.

**QUEENSLAND NEWS**

From Mike Adams VK4ZDA comes news of the Gold Coast repeaters. On 2 Mx it was found that water was affecting the homebrew antennas and these are now being replaced by commercial antennas which will also give an additional 3 dB gain. The UHF repeater which has the same call sign as the VHF repeater, VK4RGC, has been licensed and is operating on temporary frequencies until the band plan has been officially adopted

when it will change to the permanent frequencies. The equipment has all been donated by John Willis VK4WN of Willis Communications fame and is similar to that being used in Sydney. The equipment is narrow band and the coverage is less than that experienced on the 2 Mx band.

In Brisbane the repeater on channel 4, VK4RBN, will be located at its permanent site by June on Mt. Glorious at an elevation of 800 metres a.s.l. With the antennas in use there is an ERP of 80 watts when the system is fed by the power from the rig which is a DYCOM ECHO III from the USA and has a CW ident at 15 wpm F2.

**TASMANIAN NEWS**

From Hobart great news. The end is in sight after 8 years. Channel 1 Hobart, VK7RHT, has been successfully tested and will be located on the ABC TV tower on Mt. Wellington. If the antenna situation is resolved it should be a goer in about 6 weeks and the expected range indicated by the tests should be 100 kms from a mobile. The receiver is an STC type 131 with an MPF1000 front

end and cascode TIS88 preamp, while the Tx is a Phillips 1674 with a QOE06/40 final giving a power output of 75 watts, and associated timers and identification. Also in Hobart there is some preliminary work being done for a 70 cm repeater for Hobart and they expect to apply for the same frequencies as Sydney. We will give more details as they come to hand.

The Launceston repeater VK7RAA, which has been chugging away for years, is still plagued with the TV Intermod problem but work is in hand to ferret this out.

Located at Mt. Barrow which is 4600 ft. high the equipment is an all valve Phillips type 1674 with an ERP of 40 watts and an F2 CW ident at 12 wpm on channel 4.

**AFTERTHOUGHT**

Many people just take repeaters for granted and do not consider the time and effort that goes into the construction, licensing and maintenance of them. This comment is not only levelled at the individual, but to commercial organisations who are reaping the benefits from the tireless work of a few dedicated enthusiasts. It takes months of work, and up to \$2000 cash in some cases, to put a repeater on the air, not to mention the many cold nights on mountains repairing faults. That is why, amongst the complaints about why the repeater is off or why it has such and such a fault, complaints by those who have little better to do than complain, it is pleasing to note that in Queensland there is very real assistance being given by a dealer in Amateur equipment to the service. ■

# IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

All those who have been active over the past few months have no doubt been aware of some very good conditions since Mid-March this year. Some of the new cycle sunspots have been making their presence felt.

Around April 18th more Cycle 21 spots were observed and at the time of writing another large storm was in progress. WWV indicating a K Index of 6 at 0600 UTC on May 3rd. On 30 April a proton flare was also reported.

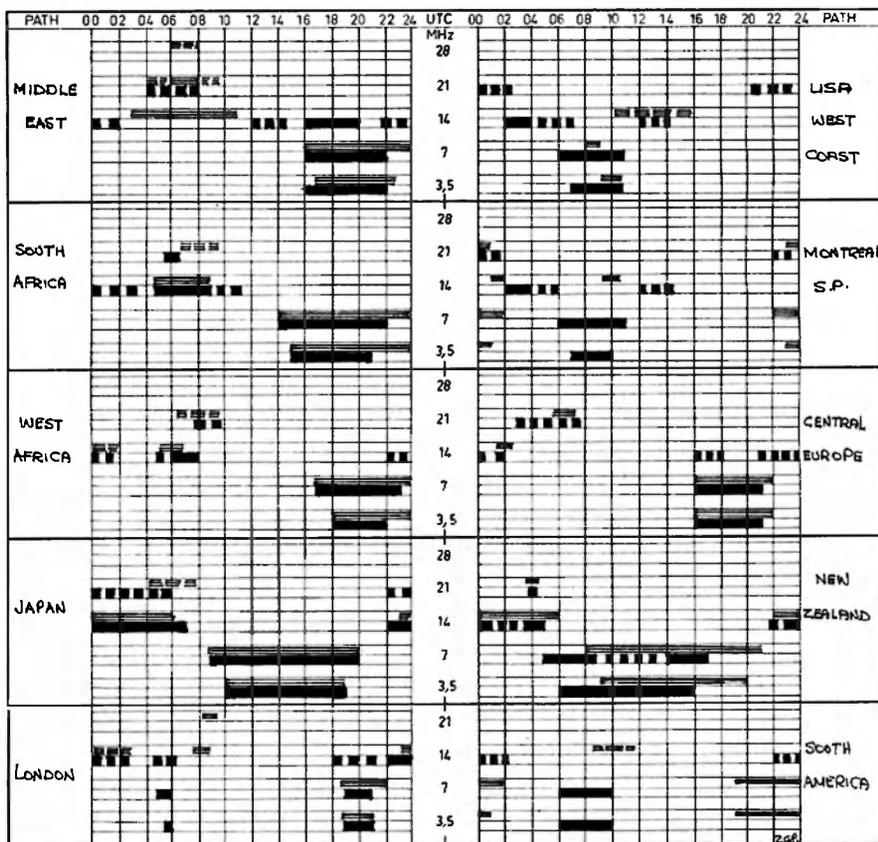
The monthly mean for March sunspots was 23.0 with some relatively high daily recordings after 10th March. The running smoothed mean for September 1975 was 14.5. Projected smoothed numbers are for June 5, July 5, August 4 and September 4.

The prediction chart is drawn from the IPS Gallex series, computer produced by IPS Sydney. The old MUF, ALF curves are no longer available because of cost problems with their production.

From these printouts, band predictions are produced in coded form. I endeavour to transcribe to bar form as shown. Two paths are covered. One from Canberra shown as full or dotted bars. The other from Perth shown as full or broken lines. The full lines and bars indicate best times for each band and path based on forward projections of sunspot data and on the experience of IPS and their knowledge of propagation conditions. Generally they are valid for better than half the month, but not every day. If you know the signs and can read them, you will know when.

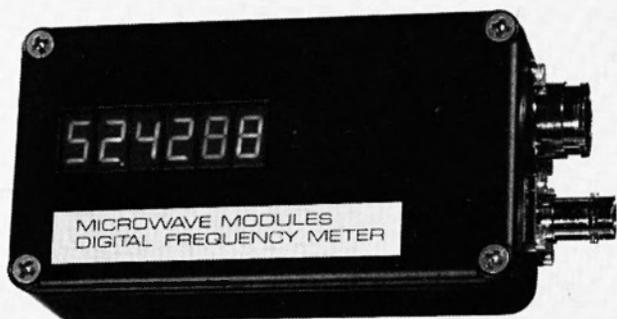
The broken or dotted lines and bars are for times generally of high solar activity. Such as prior to the geomagnetic storm and/or the break-up or return to normal.

It still is largely guess work; no one can really predict, with great accuracy, conditions six weeks ahead. However, once again, those who know the signs need only the indices available to do their own predicting. I have arranged the charts in such a way as to follow the great circle bearings from the respective take off area. Reading from left and down the chart, short path, Middle East, Africa, etc. Right hand side down the page is short path North America, long path Europe, etc. Hope this helps you get a little extra out of the charts.



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IF: 28-30 MHz, 9-15 V 20 mA.  
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Max. input at 144 MHz: 20 W (FM, CW) - 10 W (AM).

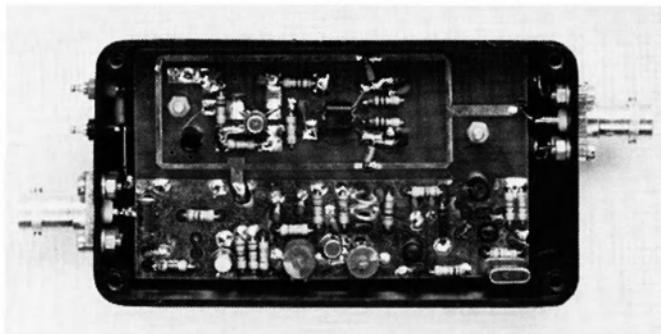
Max. output at 432 MHz: 14 W.

Price: \$45.

**VARACTOR TRIPLER 432/1296 MHz**  
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# VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP  
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## AMATEUR BAND BEACONS

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	VK2WI, Sydney	144.010
VK3	VK3RTQ, Vermont	144.700
VK4	VK4RTL, Townsville	52.800
	VK4RTT, Mt. Mowbray	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.850
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hut	28.170
	ZL2VHF, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHF, Palmerston North	145.250
	ZL2VHF, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

The March issue of "Eastern Zone News" from Gippsland, Victoria, has 38 pages packed with information, and is a credit to those producing it. Included is a request for supporters to erect and maintain a beacon on 2 metres for the Latrobe Valley area, in view of the present increase in interest in 144 MHz SSB. Approval was given at a meeting of the Zone in February for the beacon project to commence, and to apply for a licence.

Further beacon news is contained in "QRM" the newsletter of the Northern Branches of the WIA Tasmanian Division, where mention is made that a radio shack has been erected at Lonah to house a 70 cm beacon, and a 2 metre repeater. Both are in the final stages of completion, and air tests are likely soon. Joe, VK7ZGJ reports their 6 metre beacon is still awaiting PMG approval for its erection on 7EX hill.

Under the heading of "WANTED" in "QRM" is a request for windmill generators, 12, 24, 32, 48, 60 and 110 volts AC or DC etc. Mains regulators, 180 to 280 volts input, 230 or 240 volt reg. output. Daniel VK7ZDA is making these requests, as he is in the process of moving again. Looks very ominous that he might be heading for the sticks without power, and needs something to keep the 2 metre equipment going!

As very few amateurs seem to be on the air at the moment on VHF, news of their activities is somewhat scarce, so there will be a few reprints included this month. They should be of interest to many.

The first comes again from the "Eastern Zone News" and refers to amateur radio in Malaysia, which is encouraged by the Jabatan Telekom (Telecoms Dept.), but there are less than 100 licences on issue. Bands available are 1.8 to 2.0 MHz, 3.5 to 3.9, 7.0 to 7.1, 14.0 to 14.35, 21.0 to 21.45, 28.0 to 29.7, 42.0 to 45.0 MHz, 1215 to 1300, 2300 to 2450, 3300 to 3500, 5650 to 5850, 10,000 to 10,500 and 21,000 to 22,000 MHz. 150 watts DC input all bands except 1.8 which is 10 watts. All the usual modes of transmission are permitted. It appears spark transmissions are permitted on the 7, 14, 21 and 28 MHz bands!

Spot frequency operation is permitted on 2 metres, namely, 144.900 SW DC input; 145.925 15W; 147.900 to 147.980 SW. Two metre stations operate only from the licensee's address. Not portable or mobile.

Because of the renewed guerrilla threat since the end of the Vietnam war, no walkie-talkie radios

are allowed to be imported, sold or operated by the general public. Reason being, should these fall into the hands of the guerrillas, they would be used against the countries interests by setting up cheap radio networks in the jungle hide-outs. Hence no 27 MHz operation takes place, and therefore the special restrictions placed on the Amateur Radio Service, such as no 11 or 6 metre band allocations, and the limited 2 metre frequencies available.

Permits are available for portable or mobile operation on payment of a further fee, but portables or mobiles shall not work each other; therefore, no field days! Also, these stations are limited to 10 watts on 160 metres, and 25 watts on all other bands. No amateur may operate marine-mobile, or in a dock, harbour, or on a ship or aircraft. No portable or mobile can operate in the 144-148 MHz band. So, no FMI!

Separate licence required for broadcast band listening. Regular checks are carried out for unlicensed operation. There is a \$1000 fine, or 12 months jail, and the receivers (including TV) are confiscated.

The Malaysian Amateur Radio Transmitters Society is at rather a low ebb at this time. Such is not to be wondered at considering less than 100 licenced operators in the whole country. Perhaps we in VK are not too badly off after all... Whilst on that point, how would you like to operate with the density of 20,000 on 2 metres FM simplex? No repeaters. That's what the JAs have to do, and the number is on the increase, plus 144 MHz SSB is also becoming more popular. Thanks for good old VK.

## SIX METRES IN VK4

Claud VK4UX writes that on 31-3-76 from 0456 to 0555 he worked 16 Japanese amateurs, covering districts 0, 1, 2 and 7. Signals to 9 plus. At 0528 to 0530 they dropped to S7, but returned to S9 again. The band folded in its usual way, very quickly. Claud thought Ross VK4RO might have been in on the deal, but believed the signals did not get much below Gracemere where he lives. So it looks as though the equinoctial period once again suited some areas, but nothing as far south as VK5.

Claud also mentions there are a few stations in Rockhampton operating 144 SSB. VK4MM, VK4ZKA, VK4ALM and VK4UX. On 29/3 at 1039 VK4ZKA and VK4UX worked Bob, VK4ZZE in Bundaberg, with fair signals each way, and on 30/3 Bob VK4ZZE got down to Brisbane and Gympie using 144 SSB, and also to northern NSW, then his transmitter packed up. (That is what happens when you put too much strain on them over such distances... 5LP).

It is very encouraging to those of us in the south to see the increase in interest and activity on 144 MHz SSB in VK4. With more stations around, contacts must eventually be made to other call areas. The main hope is that 2 metre operators will not become discouraged at any lack of contacts and leave the band. 144 has never had contacts of the type to be found on 6 metres; you have to work for what you get, but the reward is there. I like to think back on my own situation. I have a 30 dB loss hill to the west of me and for years I used to think I would never have an opportunity of working any 2 metre stations in VK6. So much so that I erected a special 10 el. yagi on top of one of my favourite hills nearby with the idea that when the band opened to VK6 I would rush up there with my 2 metre mobile and work them. It never turned out that way. One day, the band opened really well into Adelaide, S9 plus, and finally after much calling I had my first contact with VK6, only strength 4 to be sure, but I made it — from home! Since then, by dint of perseverance, I have now had more than 12 such contacts. The reward was there, I had only to be there at the right time to reap it. So good luck you guys in VK4, your rewards will eventually come.

## MOONBOUNCE REPORT

Lyle VK2ALU once more reports in "The Propagator" on the efforts of VK2AMW at Dapto. Due to being back in hospital, Lyle speaks highly of the work being performed by Charlie VK2ZEN and Charles VK2MT during the March EME tests. JA1VDV and F9FT were worked and VE7BBG, ISMSH and VE4JX were heard. Weak but unreadable signals were heard from SM5LE and ZE5JJ. VK2AMW echoes were between 6 and 10 dB above noise during the test periods.

Lyle also reports VK5MT is working towards 432 MHz EME capability, while ISMSH is hoping to get RTTY equipment to go with his line moonbounce set-up.

The Mt. Gambler (VK5) SERG Newsletter "Blurb" contains some interesting information of the activities of Chris VK5MC and his 144 MHz EME efforts. During March W6PO and WA2BIT were both worked by Chris, with reports to W6PO being 559, and WA2BIT, 549. Signals were heard for 30 minutes with the moon passing through the middle of his rhombic "window".

Stations worked by Chris up to 1-4-76 have been W6PO using a transmitter with an 8877 in the output, 160 el. collinear, and the pre-amp for receive being a U310 JFET. VE7BQH, 160 el.; W8KPY, 3CX1000A, 8 x 16 el. KLM yagi, U310. W8KPY, 8877, 16 x 12 el. KLM yagi, U310. K1WHS, 2 x 4CX250B, 160 el., 2N5397. W4DFK, 8877, 160 el., U310. W7CNK, 8877, 8 x 16 el. KLM yagi, U310. JA6BR, 2 x 4CX250B, 16 x 9 el. yagi, U310. WA2BIT, 8877, 160 el. VE2DFO, 2 x 4CX250R, 160 el., 2N5245. KH6NS, 2 x 4CX250B, 4 x 16 el. KLM yagi, U310. WA7BJU, 8877, 8 x 14 el. KLM yagi, U310. WA7KYZ, 8877, 8 x 14 el. KLM yagi. K2RTH, 160 el. collinear.

From the above it appears that the transmitters and receivers follow fairly closely to accepted patterns, but most experimentation seems to be taking place with the antenna, with even division between banks of yagis and the 160 el. collinear.

I would still like to hear from other EME operators in VK from time to time please, to let others know what you are doing. And what about some of you secretive ones letting the rest of the world know how you are proceeding with your EME capabilities? I know who you are, but would like you to tell me first. VK5 might come right up to the front in EME activity in the not too distant future!

That is all for now. Only one letter this month, so will conclude with this for you to think about: "Our forefathers did without sugar until the 13th century, without coal fires until the 14th, without buttered bread until the 16th, tea or soap until the 17th, without gas, matches or electricity until the 19th, without cars, tinned or frozen food until the 20th. Now, what was it you were complaining about?"

The Voice in the Hills. ■

# MAGAZINE INDEX

Syd Clark, VK3ASC

## CQ MAGAZINE November 1975

A Low Power COSMOS Electronic Keyer in Two Versions; The National AGS Receiver; Ohm's Law of the Universe; Fire in the Ham Shack; Some Ideas on Code Practice; Israel: How to get an Israeli QSL Card; Highly Sensitive Solid State 6 Metre Converter; Ferrite and Powdered Iron Core Toroids.

## December 1975

The DCX/CLG SSTV Monitor; Just Hams; A 160 metre Antenna; Results 16th Annual 160 Metre DX Contest; 3-1500 MHz 10 dB Amplifier; A New Twist to an Old Antenna; A Phone Patch Indicator; Miniature Solid State Tone Encoders Replace Reeds; Review; Heathkit HD-1250 Solid State Dip Meter; Now What Have I Done; QRP; Getting what you built to work.

## January 1976

Solar Activity Update; The Transition Years; A Solid State 13 W RF Amplifier for 1.8 MHz; Radiant Photons and Other Scintillations; Two-Metre Repeater Growth; World Wide WPX/SSB Contest; KLM Multi-2000 2 metre FM/SSB/CW Transceiver; The Impossible Challenge: DXCC QRP; Moonbounce Antennas and EME; Interlaced Elements for Yagi Antennas; Lighting Brightness, Using Slides; Adding Product Detectors; VHF Antennas.

## QST March 1976

RFI Primer; Mobile Marine Under Sail; A VOX for a Very Small Box; Learning to Work with IC's — Pt. 3; A Cure for Intermittent Alley; A Homophic

Speech Compressor; Make Friends with dB; Working Towards WARC; New Tricks for Old Club Programme Nights.

**RADIO COMMUNICATION February 1976**  
A Simple AF RTTY Terminal; An Experimenter's Mast; Principles and Characteristics of FETS. ■

## QSP

**PROVOCATION OF THE MONTH**  
"Why support the WIA, I've had no AR for months" — comment by an unfinancial. ■

**SATELLITES**  
"Conclusion. The next 10 years will be an extraordinarily active and revealing period for satellite communications. Two new satellite services — aeronautical and maritime — will receive decisive tests of economic viability. Broadcast satellites will come into sharp focus and probably begin to proliferate. The greatest expansion will occur in domestic systems, used for telephony, data and television. Their growth will begin to be limited by the orbital arc and pressure will develop to move systems to higher frequencies. International service provided by INTELSAT will expand steadily and call for both technical and operational developments to keep pace with the demand. It will be the second decade of communication satellite service and probably its most important from a historical viewpoint". From an article in Telecommunications Journal Feb. '76 entitled "The future outlook for communication satellite applications", by Albert D. Wheelan of the Hughes Aircraft Company as contained in a paper presented at the World Telecommunication Forum Technical Symposium in Geneva Oct. '75.

**MOBILE AND PORTABLE OPERATIONS**  
"The FCC has proposed deleting the requirement that advance notice be given when amateur radio stations licensees operate their stations at portable or mobile locations for extended periods. It has also proposed to delete the requirement that transmissions from amateur stations operated at portable or mobile locations be identified as such". Worldradio Feb. '76.

**IGNITION RFI**  
The Department of Communications (In Canada) has published new federal requirements for the control of interference with radio reception caused by spark ignition systems of internal combustion engines, to become effective Sept. 1, 1976 for all engines (except aircraft) manufactured in Canada or imported after that date. The rules have teeth". QST Mar. '76.

**ARRL EDUCATIONAL PROGRAMME**  
QST editorial Mar. '76 says, "In discussions with the Commission (F.C.C.) during late 1975 there was developed the concept of a new approach to amateur licensing whereby the League (ARRL) would conduct, through its affiliated clubs, training courses. Provided the content and conduct of these courses were satisfactory to F.C.C. the graduates of such courses would be certified by ARRL as being eligible for amateur licences and licences would be issued forthwith by FCC". "We are going to seize upon this opportunity", says the editorial.

**VU7 PREFIX**  
A note in the Winter '75 issue of the Indian Radio Amateur advises that their Ministry of Communications has allocated the call sign prefix VU7 to amateurs operating from the Andaman, Nicobar and Laccadive groups of islands with apparent effect from 2-12-1975. The previous prefix was VU2 the same as anywhere else in India.

### STOLEN EQUIPMENT

Reported stolen from car parked overnight at Tullamarine Airport is the following—  
Transceiver Drake TR22 144 MHz, serial 72007 fitted with Rptr. Ch. 1, 2, 4 and simplex 146.000, 146.500, 146.940.

Amplifier 144 MHz 10 W type KLM PA2-12 B.

"Sideband" Transceiver fitted with 27.125, 27.880, 27.880, 27.800 and 27.910 MHz xtl (Marine demo).

Stereo cassette/radio player,  
All leads were cut after forcing door lock.  
Any information please to VK2AYD Phone (02) 452 1623 (call collect) ■

# HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

**Tabletop 1200 W PEP linear, 80-10 metres, complete kit of parts, \$110. Asahi 80-10 metre mobile antenna set, as new, together with new, unused, bumper mount, \$75. Gutter mount 2 metre ¼ wave mobile whip, \$5. Yaesu YD844 de luxe desk mike, as new, \$30. VK3ARZ, QTHR (03) 232 8492.**

**FT101 Transceiver, bought May 1973, with fan added, little used, absolutely as new \$480. VK3BFB, QTHR, Phone (03) 93 1638.**

**TCA 1677 Transceiver, complete with mike, plugs and circuit, very good condition, \$35 o.n.o., also Pye Base Station complete with mike and power supplies, model Tx A3302L; Rx, A3004L, \$35, good condition o.n.o. VK3ALT, QTHR, Phone (03) 277 2337.**

**Trio 9R59DS Rx with handbook, as new, \$110 o.n.o. Scaler Magnabase and whip, \$25. G. Hambling C/o Cowell P.O. 5602 S.A. or Phone Cowell 39, A.H. 144.**

**Back Issues of EA (1967-1975) and Practical Electronics (1969-1975), any reasonable offer. Richard Jago VK4ZTD/1, Gowrie Private Hotel, Northbourne Ave., A.C.T., 2601. Phone (062) 49 0708 (Bus.) (062) 49 6033 A.H.**

**Deceased Amateur's Estate. Yaesu FT401 Transceiver, FT100 Mobile Transceiver, Trio CS 1554 Double Beam CRO 57" crank-up tower, realistic DX 160 Rx B & K TV analyst Delica GDO meters, transformers, several parts circuits, ham radio and TV. No reasonable offer refused. Phone Mrs. Stewart (02) 688 9407.**

**Eddystone 840A Comm. Rx AC/DC \$80.00. Phone (02) 525 5574.**

**Bwan 240 Transceiver 20-40-80 m with AC supply, good condition \$195, Eddystone 770 V Rx VHF and UHF 140-500 MHz \$150, Tech TE-20D RF sig.-gen. \$25, AWA AF sig.-gen. \$45, Pye 734 mobile all solid state converted with 4 and 40 \$95. VK3BEJ, QTHR, Ph. (050) 24 5814.**

**Panoramic Adaptor New London Instrument Co. 230/115 V, 50-60 Hz, 200 kHz spread, excellent condition \$70. VK2BTY, 4 Taylor St., East Gordon, Ph. (02) 498 3926.**

**Healthkit 8B400 Tx usb/Lsb 160 W PEP 2 x 6146 final 80-10 m Inbuilt power supply together with SB301 Re usb/Lsb 80-10 m with extra AM and CW filters. Crystal for RTTY reception. Work transceiver or separate Rec. and Transm. All handbooks, both units very clean and good working order. Full price \$375 firm, will not separate. J. Lauten VK4VK, 6 Tosti St., Sorrento, Qld., 4217. Ph. (075) 38 4164 A.H., (075) 31 6201 Bus.**

**Ideal Ham QTH, Blue Mountains NSW. Contemporary house, good shack and car parking under 17 sqs., living, large block suits antennas. Magnificent views, sewerage, many extras to delight XYL. \$38,500. VK2HS, Ph. (047) 51 3534, QTHR as per VK2BHS.**

**Galaxy V Mk. 3 with AC PS, remote VFO and spare tubes, Xtal callb., VOX \$350. VK4DV, P.O. Box 380, Rockhampton, Qld., 4700.**

**Ken KP202 Transceiver with nicade and suitable charger CHB, new CH4 old Chl 144.48 x 144.80, exc. condition with original pkg. and manual \$110. Ken VK2JD, QTHR, Ph. (02) 639 8020.**

**Trio Kenwood TS520, immaculate cond., just out of warranty \$475. CW mic. VK2AAM, Ph. (049) 2 1101 A.H.**

**Yaesu FT501 with power supply, latest model, new condition \$500. VK1BH, QTHR, Ph. (062) 88 6062 Bus. (062) 85 5500.**

# SILENT KEYS

It is with deep regret that we record the passing of —

Mr. W. O. YATES	VK2AWY
Mr. J. P. FRANKLIN	VK2ALP
Mr. R. C. GODSALL	VK2ARG
Mr. G. R. STEWART	VK2AZE

**Halicrafters SX111 Amat Rx in first class order, complete with handbook, \$125. VK4CP, 6/8 Phillip St., Toowoomba, Ph. (076) 32 6139.**

**Yaesu FTDX401, unmarked, brand new condition, fitted 11 m Xtals, complete with handbook, matching speaker, brand new mike and new spare set 6HF's, \$400. J. Moyle VK4ZT, Yarwun, 4694, Qld.**

**Power Supply, dual o/p 20V 11.5 A, 20V 5.25 A, series regulated, short-proof, circuit supplied, WT 40 kg, \$90. P. Hadgraft, 17 Paxton St., Holland Park, 4121, Qld. Ph. (07) 224 2343 Bus. or (07) 397 3761 A.H.**

**Healthkit HW101 Transceiver, complete with AC PSU, \$400. Peter Smith VK1DS, QTHR, Ph. (062) 88 5001.**

**Collins Rx R390/URR, 230 V AC, 0.5-32 MHz. CTS coverage, some 30 tubes, exc. cond., any sensible offers for this superlative Rx? VK3NW/2BNW, ~ Ellismore Ave., Killara, 2071. Ph. (02) 498 3396.**

**Hammarlund HQ 170 Rx 160-2 m amateur bands. Also KW Electronics Viceroy Tx 80-10 m amateur bands, \$280 o.n.o. for the pair. VK2ATT, QTHR, Ph. (02) 476 2699.**

## WANTED

**70 cm Transverter. I have an FT200 Richard Jago VK4ZTD/1, Gowrie Private Hotel, Northbourne Ave., A.C.T., 2601. Ph. (062) 49 0708 Bus. (062) 49 6033 A.H.**

**Part-time draftsman for AR. Regular output required. Terms negotiable. Write, with qualifications, to Executive Office.**

**Service Manual or any technical information on Grundig 500A 13 band transistor Rx. To buy, borrow, copy. Every care taken. J. Flower VK6JF, 132 Hare Street, Kalgoorlie, W.A. 8430.**

**Short loan or buy "Radiocommunications, December, 1964". K. Postler VK5KI, QTHR.**

**Circuit Diagram, loan or copy, B40 Admiralty high frequency receiver. P. Hadgraft, 17 Paxton St., Holland Park, Qld., 4121. Ph. (07) 224 2343 Bus. or (07) 397 3761 A.H.**

**Handbook and/or circuit for copying of AWA car phone unit MR20B, low band 3 ch. with 6146 final. Leo Fowler VK3ZGF, QTHR, Ph. (03) 25 3968.**

**Yaesu FT221 2 metre transceiver. Also required a useful item for the construction of an amplifier using a 4CX250, especially a socket and squirrel cage type blower. Contact Mark Spooner VK5ZVQ, 30 Milne St., Vale Park, 5081. Ph. (08) 261 1360 A.H.**

**FT101 or similar type HF transceiver. A Parr VK4ZIS, 127 Hyde St., North Rockhampton, 4701.**

**Teletype Model 14 TD Transmitting Distributor. VK3ARY, QTHR, Ph. (03) 277 4798.**

## UP-DATE AND IMPROVE YOUR FT-101, FT-101B or FT-101EE WITH A G3LLL RF CLIPPER

This is the Clipper reviewed in AR January '76, and is designed exclusively for FT-101 series transceivers. Simple to fit and adjustments are made without external instruments. Greatly improves transmitted signal and also provides approx. 2 "S" points gain on received Air-tested units available ex stock, \$80 incl. Tax. Enquire from your dealer or —

**ERIC COLYER (VK2BEL),  
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Telephone: (02) 449 4324**

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**UNIDEN** model 2020 AC-DC transceivers 10 to 80 M with 3 crystal filters \$550

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**TRIO-KENWOOD** model QR-666 receiver 170 KHz to 30 MHz AC-DC Now \$250

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 TH3MK3 10-15-20 senior 3 el. Yagi 14' boom \$180  
 TH6DX 10-15-20 senior 6 el. Yagi 24' boom \$225  
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 TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom \$190  
 BN-86 balun for beam purchasers only \$18

## ANTENNA ROTATORS

Model CDR AR-22 junior rotator for small and light beams \$55  
 Model CDR Ham-II for all hf beams except 40 M ones! \$165

**KEN** model KR-400 for all medium size hf beams with internal disc brake \$100

**KEN** model KR-500 for vertical elevation control of satellite tracking \$100

All models rotators come complete with 230V AC indicator-control units.

4-conductor light cable for AR-22 20 cents per yard  
 12-conductor light cable for Ham-II 30 cents per yard  
 8-conductor heavy cable for Ham-II 70 cents per yard  
 6-conductor heavy cable for KR-400-500 60 cents per yard

**DRAKE W-4 SWR—WATT METER** 0-200 and 0-2000 Watt scales \$60

**DRAKE TV-1000 TVI Low pass Filter** \$25

**SINGLE METER SWR METER** \$15

**TWIN METER SWR METER** \$22

## MARK MOBILE ANTENNAS

Helical 6' long HW-40 for 40 M. \$18

High power KW-40 for 40 M. \$25

HW-20 for 20 M. \$16

Swivel mobile mount and chrome plated spring for all \$12

## ASAHI MOBILE ANTENNAS

AS-2-DW-E 1/4 wave 2 M. mobile whip \$8

AS-WW 5/8 wave 2 M. mobile whip \$18

AS-GM gutter clip mount with canle and connectors \$10

M-Ring body mount and cap for 1/4 M. whips \$5

All prices quoted are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over \$100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded. — PETER SCHULZ

## CUSH CRAFT ANTENNAS

Model DGPA 52-27 MHz adjustable ground plane \$25

LAC-2 lightning arrestors \$6

Model AR-2 RINGO 5/8 waves verticals \$20

AR-2X RINGO RANGER double 5/8 waves verticals \$35

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A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each \$60

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**CRYSTAL FILTERS** 9 MHz, similar to FT-200 ones, with carrier crystals \$35

**KYOKUTO** 2 Meter FM 15 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144 to 148 MHz, receive to 149 MHz, no more crystals to buy, includes simplex, repeater and anti-repeater operation. Still only \$300

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**AUTOMATIC MORSE KEYERS** EK-150 with built-in squeeze key paddle AC operated with monitor \$75

**FERRITE CORE BALUNS** cheaper Japanese product for up to 500 W RF with coax conn. \$12

**COAX CABLE CONNECTORS-SWITCHES** Amphenol type male for RG8U and RG58U cable, two types, female chassis mount, double male, double female, all types 100 cents each

Amphenol angle and T-connectors 150 cents each  
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RG-8U coax cable 3/8" diam. 80 cents per yard

RG-58U coax cable 3-16" diam. 30 cents per yard

Add \$1 cutting and handling cost for coax and rotator cable orders

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**DUMMY LOADS**, 50 ohms with Watt meters built-in 0-200 MHz, 0-6 — 0-30 — 0-150 Watt YP 150 \$80

**TRIO-KENWOOD DIP METERS** Model DM-800 0.7 to 250 MHz few only \$60

**27 MHz TRANSCEIVERS** 5 Watt AM 6 channels with 27.880 MHz crystals \$75

1 Watt hand-held 3 channels 27.240 crystals \$50

15 Watt PEP 23-channels AM-SSB model SE-501 \$175

**CUSH CRAFT** model CR-1 27-29 MHz Ringo 5/8 wave antennas \$35

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24 KURRI STREET, LOFTUS, 2232

TELEPHONE (02) 521-7573



ELECTRONICS



**SWAN TRANSCEIVERS**

700CX SS16 16 Pole Filter .....	\$630.00
700CX 700W SSB PEP Input .....	\$570.00
Cygnnet 300 B (2 only) inc. PSU and speaker .....	\$489.00

**SWAN SOLID STATE TRANSCEIVERS**

SS200A SS16B and Standard 300W SSB PEP Input with VOX, Noise Blanker, CW S/T and Semi Break-In, xtal calibr. and complete VSWR Protection .....	\$750.00
MB40A 40 Mx Monobander 160W PEP Input on SSB. 3"(H) x 8'5"(W) x 9"(D) .....	\$289.00

**OSCILLATORS**

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610 xtal Novice .....	\$60.00
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SHURE Mikes 404 Hand .....	\$30.00
444 Desk .....	\$43.00
Twin Meter VSWR Meters and Power Indicators .....	\$20.00

**AC POWER SUPPLIES**

230XC (with Speaker) for 700CX .....	\$150.00
230X (PSU only) for 700CX .....	\$102.00
PS220 for SS200A .....	\$150.00

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2EL 20/15/10 Mx TB2A .....	\$139.00
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Vert. 40/10 Mx 1040V .....	\$124.00
Vert. 80/10 Mx .....	\$44.00

**MOBILE ANTENNAS**

New Slimline 500W PEP Mobile Antennas complete with Base Section, Coil and Top Section 35-15 SL/20SL 15 Mx/20 Mx .....	\$35.00
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Extra Coils for Slimline range. Coils only 15/20 Mx .....	\$10.00
40 Mx .....	\$14.00
80 Mx .....	\$18.00
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Top Section .....	\$18.00
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ALSO New Range of HiQ 2000 Watt PEP Mobile Antennas.	

**LATEST RELEASE DUE SOON:**

SS747 Solid State Transceiver. Digital Readout. Dual VFO Built-in Freq. range any 500 kHz from 3.5 to 30 MHz. 125W output Plug-in PCBs. Broadband tuning — CW S/T and drive control.

All Prices quoted are subject to changes without notice, but are inclusive of Sales Tax. Freight and Insurance extra.

SOLE AUSTRALIAN DISTRIBUTORS FOR SWAN AMATEUR COMMERCIAL RADIO EQUIPMENT:

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**Mini-Mobile/Base Station COMPACT 120 WATT 80 thru 10m TRANSCIEVER**  
**FT-75B High power, for General use. FT-75BS Low power, for Novice use**



**TECHNICAL DATA — FT-75B**

**GENERAL**

Frequency Range: 80 M 75 KHz segment, 40 M 100 KHz segment, 20 M 150 KHz segment, 15 M 240 KHz segment and 10 M 400 KHz segment.

Mode: Upper Sideband for 20, 15 and 10 meter bands. Lower Sideband for 80 and 40 meter bands. CW for all bands.

Frequency Control: Crystal control VXO with 3 channels per band.

VXO Coverage: ±3 KHz for 80 M, ±3 KHz for 40 M, ± KHz for 20 M, ±5 KHz for 15 M and ±6 KHz for 10 M.

Antenna Impedance: 50 Ohm unbalanced.

Size: 210(W) x 80(H) x 300(D) m/m.

Weight: 3.8 Kg.

**RECEIVER**

Sensitivity: 0.5 µV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW.

Selectivity: 2.3 KHz nominal bandwidth at 6 dB down, 4.5 KHz at 60 dB down on SSB and CW.

Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 µV equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1 µV. Attack time 5 millisecond and release time 1.5 seconds.

Audio Output: 2 Watts at 4 Ohm Impedance.

**FT-75B**, Inc. one crystal for each band 3565, 7085, 14,200, 21400 28550 kHz, mic. & Inst. book **\$295**

**FT-75BS**, Inc. crystals for 3565 21175, 27125 kHz, mic. Inst. book **\$276**

**TRANSMITTER**

Input Power: 120 Watts PEP on SSB and 100 Watts on CW at 50% duty cycle. (Slightly lower on 10 meter.)

Carrier Suppression: —40 dB.

Sideband Suppression: —40dB.

Spurious Radiation: —40 dB.

Distortion: —30 dB.

Final Tube: 12GB7 x 2.

JAS7576-23

**FP-75B or BS, AC PSU \$74**

**DC-75B or BS DC PS, inc. mobile mounting bracket \$80**

All prices include S.T., Freight extra. Prices and specifications subject to change.

**90 DAY WARRANTY**



**ELECTRONIC SERVICES**

60 Shannon St., Box Hill North. Vic. 3129. Phone 89 2213

Distributors in Qld., NSW, S.A., W.A.

FRED BAIL VK3YS  
JIM BAIL VK3ABA



VOL. 44, No. 7

JULY, 1976

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### COVER PHOTO

*Group of delegates at the IARU Region 2 Conference held in Miami, Florida in April, 1976.*

From left to right — Back Row: John Alloway G3FKM, Mick Percival 9Y4NP, George Spencer VE41M, Ron Hester VE1SH, Roy Stevens G2BVN.  
Front Row: Peter Parker VP9GO, Charles Tweedie W1DPL/6Y5, Tom Hughes G3GVV, David Wardlaw VK3ADW, Mike Owen VK3KI, Noel Eaton VE3CJ.

# HAM

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10 for \$1.50 — P&P 30c.

FLEXIBLE PLASTIC "CHOCOLATE BLOCK" 11.5  
cm x 4 cm, 12 connectors, terminal strips. 10 for  
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Popular values, 1/4" shaft. 10 for \$4 — P&P \$1.

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TYPE 6426 44VCT at 1 1/2 amp., 6.3V at 1/2 amp.  
\$4.50 — P&P \$1.

TYPE PF3152 50VCT at 1 amp., 6.3V at 1/2 amp.  
\$4 — P&P \$1.

METERS Edge Meter 0-1 mA calibrated 0-5  
1/2" Face x 2 1/2"W x 3"D \$3.00 — P&P 50c

Blank Face 0-1 mA 5/8" x 4 1/4" \$5.00 — P&P 50c

Blank Face 50-0-50uA 3" square \$3.00 — P&P 50c

200uA Meter Calibrated 0-100

2 1/2"W x 2 1/4"H \$3.00 — P&P 50c

Twin Level Meter 1 1/8" x 1 3/8"

250uA \$4.50 — P&P 50c

Signal Level Meter 1 3/4" x 7/8"

250uA \$3.50 — P&P 50c

MAGNETIC EARPIECE to suit most Transistor  
Radios, fitted with 2.5 mm plug. 10 for \$2 P&P 50c

6 ft. 3 CORE AC LEADS with moulded 3 pin plug.  
10 for \$6.50 — P&P \$1.50.

NEON FLASH TUBES (ex Repco). Ideal for Ignition  
timing lights. \$1.50 each — P&P 50c

ELECTROLYTIC CAPACITORS 50 assorted popular  
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RESISTORS 100 assorted 1/2 watt carbon resistors,  
all popular values. \$2 — P&P 50c

WIRE WOUND RESISTORS 100 assorted, 5 and 10  
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"PHILIPS" TYPE CONCENTRIC TRIMMER CAPA-  
CITORS 25 pF. 10 for \$2 — P&P 50c.

XENON FLASH TUBES suitable for Strobe use.  
(Sorry, no trigger transformers). \$1.50 ea. P&P 50c.

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AY6102 Normally \$1.99 ea. 10 for \$5.00 P&P 30c

2N3564 Normally 38c ea. 10 for \$2.50 P&P 30c

BC107B Normally 32c ea. 10 for \$2.00 P&P 30c

EGG INSULATORS Quality porcelain Egg Insulators

35c ea. or 10 for \$3.00 — P&P \$1.

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## NEW LINER 27 MHz Transceiver

Suitable for Novice Amateurs

SW, AM 23 Channel 12V DC  
operation.

S-meter, squelch, ant. & PA  
facility.

\$115 P&P \$3

## MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCIVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION

### SPECIFICATIONS:

Transistors: 13  
Channel Numbers: 3, 27.24 OMHz  
Transmitter Frequency Tolerance:  $\pm 0.005\%$   
RF Input Power: 1 watt  
Tone Call Frequency: 2000 Hz  
Receiver type: Superheterodyne  
Receiver Sensitivity: 0.7 uV at 10 dB S/N  
Selectivity: 45 dB at  $\pm 10$  kHz  
IF Frequency: 455 kHz  
Audio Output: 500 mW to Ext. Speaker Jack  
Power Supply: 8 UM-3 (penlite battery)  
Current Drain: Transmitter 120-122 mA  
Receiver: 20-130 mA.

\$49.50 each or \$95 a pair  
Post & Pack \$1.50 per unit



## 11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the fol-  
lowing frequencies:

27.065	27.155	27.235
27.085	27.165	27.255
27.125	27.225	27.265

\$8.50 A PAIR (Transmit and Receive)

LAFAYETTE HA310 WALKIE TALKIES, 27 MHz, 1  
watt, 3 channel. Fitted with 27.240 MHz crystals.  
PMG approved type. \$69.90 each

1 WATT 2 CHANNEL TRANSCIVER with call sys-  
tem. 27.240 MHz. 12 transistor. PMG approved  
type. \$45 each or \$89 a pair

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# amateur radio

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## QSP SHF FRONTIERS

One of the resolutions of the Federal Council passed at the recent convention was to seek the allocation of Amateur bands above the present maximum frequency allocation of 24 to 24.25 GHz as applied in Australia.

To some it will seem hard to imagine what possible use could be made of these frequencies.

However, the council of the WIA, mindful of the future possibility of radically new techniques becoming available, made this decision in order that the amateurs of the future will, as widely as possible, be able to be involved in all areas of the spectrum.

One of the main jobs of the WIA is to preserve and try to improve the privileges of the amateur service for the future generation.

This resolution is one way it can be seen to be in action.

There are still frontiers for the amateur. Do not just read about other people's achievements! How about joining in? The amateur bands in these lesser known areas of the spectrum are for your use.

**DAVID WARDLAW, VK3ADW,**  
Federal President. ■

## EDITOR'S DESK

*Bill Roper, VK3ARZ*

For the past few years general news about division, zone, and club activities has not been included in the pages of AR. This was done mainly for economic reasons.

Instead, this information has been made available within each State, through the medium of divisional bulletins or newsletters, most of which are now included as inserts in AR.

Amongst other things, one interesting advantage of these newsletters is the much later closing date for submission of copy.

However, it is considered that there would be certain advantages in publishing, in a special column in AR, dates and addresses of division, zone, and club meetings and activities — a form of "events calendar".

We have attempted to produce such a calendar in the past, but without much success. We are not clairvoyant. We can only publish information supplied to us.

## QSP

### UNLICENSED AMATEUR-LIKE ACTIVITY

From Ham Radio Report via CORA comes news from the USA of unlicensed amateur-like activity by an "HF" gang using "HF", "HFA" and "HFB" series "calls" in the citizen's band on 11 m. There is a fear that these illegal stations will be using the 10 m band. And whilst on 10 m incidentally, the FCC are reported as permitting repeaters between 29.5 and 29.7 MHz.

### PASSENGERS FLEE FROM BUS BLAZE

Enthusiastic bushwalker, Ned Rowse VK3AEA on a hike on Mt. Buffalo on Easter Monday had taken with him a borrowed hand held transceiver and found Ch. 40 exceptionally good. Whilst descending The Hump he heard the noises of an accident on the mountain road followed by a thunderous boom, then a huge column of fire and smoke and screams from many people. Ned put out a call for help which was answered by VK2ZIE in Beechworth who alerted the local Police. Ned then hurried down to help the passengers out of the

Do you think such an "events calendar" would help your division, zone or club?

Will you, the division/zone/club secretaries and publicity officers help?

And when you do submit the necessary details, why not think up to three months ahead?

If you glance at the left hand column on this page you will note some changes in titles of the people who help make AR magazine a reality.

A tremendous amount of time and effort is needed each month just on the mechanics of production alone.

I can no longer carry this work load, even with the able assistance of Bruce VK3UV. Therefore, Ron VK3AFN has agreed to join the production team and the load will now be split three ways.

Hopefully, one of the many advantages of this change will be more time for us to look closely at the philosophy and policy of AR magazine.

Ron's move means that we now need at least one new Technical Editor.

Any volunteers? ■

blazing bus and offer comfort. The ambulance duly appeared 30 odd minutes later followed by the Police and National Park Ranger. A further call, answered by VK2BOX, resulted in a replacement bus and other assistance. As a matter of interest, an amateur passenger in the bus had been persuaded to travel without his hand held unit.

### LICENCE IRREGULARITIES

The editorial in Radio Communications June '76 deals with the need for amateurs to maintain and improve their technical and operational standards most particularly during the years leading up to WARC 79 and ends with the comment "A suggestion has been made that an Amateur Radio observation service be established in the UK and plans are being made to develop such a system during the next few months . . . While it is inevitable that there will be some who will be against an observation service, most of us will welcome anything which will benefit our hobby. Perhaps the biggest objectors could be our biggest offenders".

### USA REPEATERS

According to QST April '76 the latest repeater count for continental USA is 2034.

# WIANEWS

The AR Special elsewhere in this issue gives an outline of the 1976 Convention matters.

At the Executive meeting late in May the chairman of the Project Australis Group reported in some detail on his visit to Washington. The possibilities of a launch date for Oscar 8 being advanced to 1977 coupled with a difference in configuration of the launch vehicle appear to have created problems in modifications to the hardware. His visit demonstrated the necessity to keep in close touch with overseas developments.

The days when amateur radio societies and groups could safely pursue their own policies independent of anyone else have long ago become obsolete. WARC '79 above all exemplifies the necessity for closely detailed co-operation at all levels in the amateur service.

The Executive approved a change in arrangements for the production of AR consequent upon submissions from Mr. Roper, VK3ARZ. There is to be no call book printed by the Institute this year. Instead, negotiations for a fresh contract with the Department from 1977 onwards were begun with an interview between Mr. Roper and Mr. Williamson of Central Office early in June. The use of our existing EDP membership records illustrates the relative simplicity of producing an offset printing of the call book from computer records.

Mr. Roget will be attending the NZART Golden Jubilee celebrations in Auckland early in June as the official WIA representative. He carries with him a brief on various matters to be discussed with that Society.

The Education Co-ordinator is Mr. Graeme Scott, VK3ZR, a member of the Executive and himself a technical educator. Arising from the 1976 Convention his field of activity is very great since it encompasses not only the educational and instructional areas but also the follow-on areas of examinations and exemptions. The latter are of course of current interest particularly in relation to the long delays now experienced in the results of amateur examinations being announced.

The thoughts expressed at the Convention by Mr. Jim Wilkinson on the subject of the Department itself continuing to run the amateur examinations are interesting. He wondered if it might be more appropriate for these to be undertaken by some suitable educational authority. One's immediate thought on this is, of course, the example of the City and Guilds Institute in London in respect of RAE examinations in Britain and in British overseas territories even as far afield as the Solomons.

Mr. Scott will be assisted by a small sub-committee of his choice but since this is an activity on a national level he will need a vast amount of information from everywhere in Australia.

He will need to know the current attitudes to radio amateur courses of instruction which can or cannot be carried out through Education Department channels, what support, if any, is given by the authorities, what scope exists for classes in such other areas as advanced colleges, adult education facilities, evening classes of any kind, the extent and scope of correspondence courses and a great amount of other relevant background material. It will then become clear to consider the Institute's involvement and whether or not there is a real need for the Institute at a national level to produce standard material to foster

and encourage an interest in radio communications and electronics especially in the fields of amateur radio activity.

The Educational programmes inevitably lead up to examinations and this is something which most candidates will agree needs considerable investigation. Allied to this is of course the exemptions field either through acceptable standards achieved through pre-existent examinations or the development of activity in setting and conducting examinations by some other acceptable organisation.

How soon the results of all these investigations can be brought to fruition depends to some extent on the co-operation of members sending in a wealth of documented material suitable for consideration.

A considerable amount of material is already on hand, or is available, from one specialised area — namely YRCS. Additional material is also available or can be sought about Divisional and Club classes at various levels. A lot of feedback on other material is needed and interested members are now asked to send in as much detailed information as they can to Mr. Scott via the Executive's address in Toorak.

Another specialist area on which Executive requires assistance is RFI and accordingly the Moorabbin and District Radio Club have been approached to see if they can suggest somebody suitably qualified to undertake the work of EMC Co-ordinator.

On the Executive itself Mr. Peter Wolfenden, VK3ZPA, has been elected as Executive Vice-Chairman for the coming year and all the existing appointments to sub-committees have been recommended to continue in office.

The Department has now replied that it does not favour the use of "AX" prefixed call signs by amateurs for the period 1st July 1976 to 31st July 1977 but is prepared to authorise this use during the period of HM The Queen's visit to Australia next year to mark the 25th anniversary of her accession to the throne.

The Executive also spent much time in examining ways and means designed to improve membership recruitment, the image of amateur radio in the media and elsewhere by advanced public relations techniques and to show the non-member exactly what the Institute is doing and why. An improvement in the educational area is certainly one way to attract new members and another, via the medium of Divisional broadcast tapes, can and does help in disseminating Institute activities to the non-member listeners. A strong Institute geared ready for WARC 79 cannot be too strongly emphasised.

All these are areas where individual members can assist the common cause not only by supporting the Institute and helping to spread the word on what is being done but also by assisting in recruiting new members or persuading those who have dropped out that at the very least their moral and financial support is valuable.

Amongst other propositions the Executive approved an advertising drive coupled with the production of a new publicity folio to replace the old free issue "So you want to become a radio amateur" which is out of print.

Above all, the Executive felt severely hampered by the lack of the services of a well qualified publicity expert. If any reader knows of a good PR man who can spare a little time for the Institute on a voluntary basis do please let us have his name quick.

Finally, if all this isn't enough, the Executive hopes that members will not forget to write to their Division about the Arnold Report in April AR. ■

## QSP

### CLUB LIABILITY INSURANCE

"Many clubs and societies do not have adequate insurance to protect them against claims arising from injury to or damage to the property of members of the public. The RSGB reminds members that the consequences of a serious claim can be disastrous for an unincorporated club holding no capital, and these consequences may result in individual members being faced with liabilities quite beyond their means". Radio Communications June '76.

### NETHERLANDS D-LICENCE

April QST reports further about the Netherlands new amateur licence with very limited VHF privileges in an effort to persuade illegal operators of 27 MHz equipment to enter amateur radio legitimately. The first exams held on 26-11-1975 resulted in a pass rate of 64% of the 1160 applicants. Type approved equipment may only be used but VERON is working to have this restriction lifted.

### CHANGE OF NAME

For DX-ers information the former Republic of Dahomey is now officially named the People's Republic of Benin. Telecommunications Journal March '76.

### SISTER CITIES INTERNATIONAL

QST for Feb. '78 records that the ARRL has formally adopted a "Co-operative Understanding" with Sister Cities International. The editorial goes on to say "No one can deny that amateur radio needs more international exposure; and SCI is one way to obtain it".

### 160 M BAND

News in "Break-In" April '76 is that New Zealand amateurs have now been granted the use of an additional 10 kHz segment in the 160 m band. This is from 1803 to 1813 kHz.



**DRAKE**

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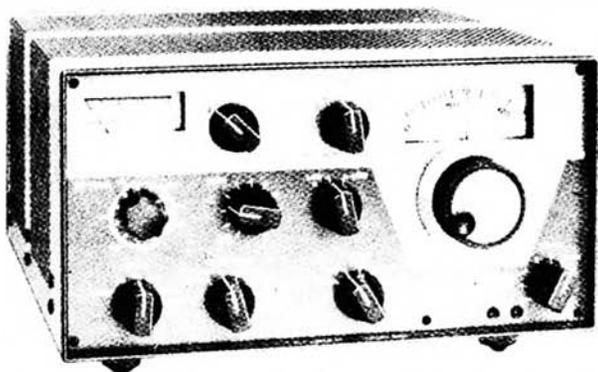
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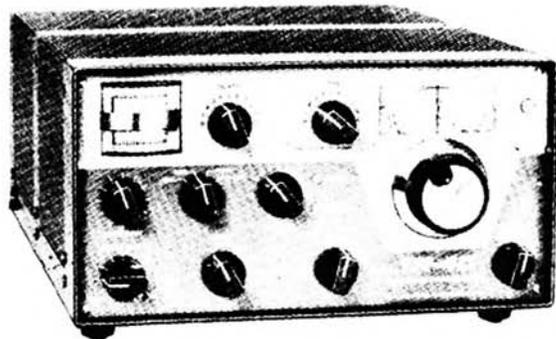
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# DOUBLE DELTA BEAM

L. H. Vale VK5NO  
29 Carlton Rd., Gawler, S.A. 5118

A new and unique antenna is described by one of our regular contributors. It may not be as elegant in appearance as a Yagi, but it is no less graceful in appearance than a quad. It is sturdy and probably equal in performance to any rotatable beam available to the amateur today.

The double delta antenna is the result of attempts to make a beam that would be able to be put single-handed onto the top of a fifty-foot TV tower that could be let down to lay almost along the ground; it was hoped that such an antenna could be made simply and cheaply without sacrificing performance. A beam was first made for 15-metres and results were so good that, after a month, it was taken down and replaced by a 20-metre model. A month or so later that again was taken down and the 15-metre beam, with a slight modification, was put inside the 20-metre beam and they were both fed from the same coax and coax balun. So far attempts to put a 10 metre beam inside of the other two to make a tri-bander have not been successful, because of interaction effects.

However, after a year and some necessary mechanical improvements, the beam is still in frequent use.

The main disadvantages of the beam are its size and the fact that it is bi-directional; that is, it has a front-to-back ratio of 1:1. I have not found the bi-directionality to be objectionable; rather I find it quite an asset, but no doubt it would be quite unacceptable to some.

It is presented as being an original idea with the hope that others may be interested enough in it to improve on it.

In plan view, the overall dimensions are about the same as a two-element Yagi but like a quad, it has a vertical dimension also; in this case about 0.4 of a wavelength, as against the quad's 0.25 wavelength.

Fig 1 is a schematic diagram of the antenna. Two deltas or triangular elements, each with sides of half a wavelength, are mounted with their bases parallel and horizontal and their apexes at a common point vertically above the centre-point of the base rectangle. At the common apex point the delta-sides from diagonally-opposite corners are connected together. The feed point is midway along one of the base sides. The antenna radiates perpendicularly to the base sides, equally well in both directions, with a figure 8 pattern in the horizontal plane.

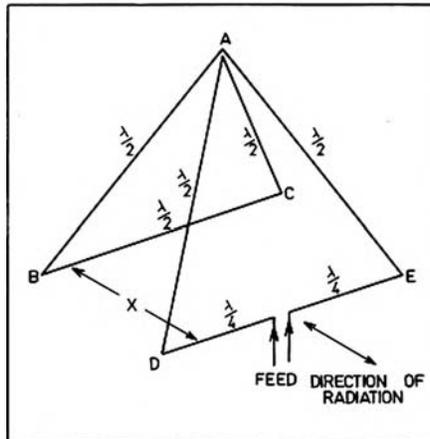


Figure 1:  
Schematic diagram of Double Delta Beam

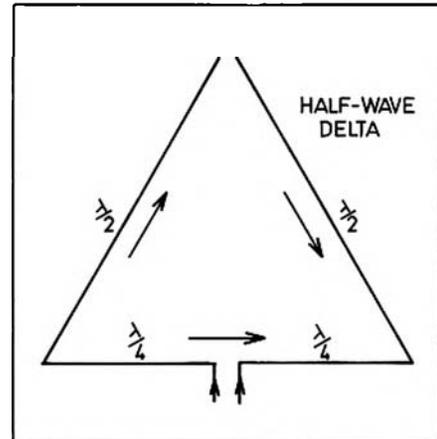


Figure 2A: Delta Antenna Configuration

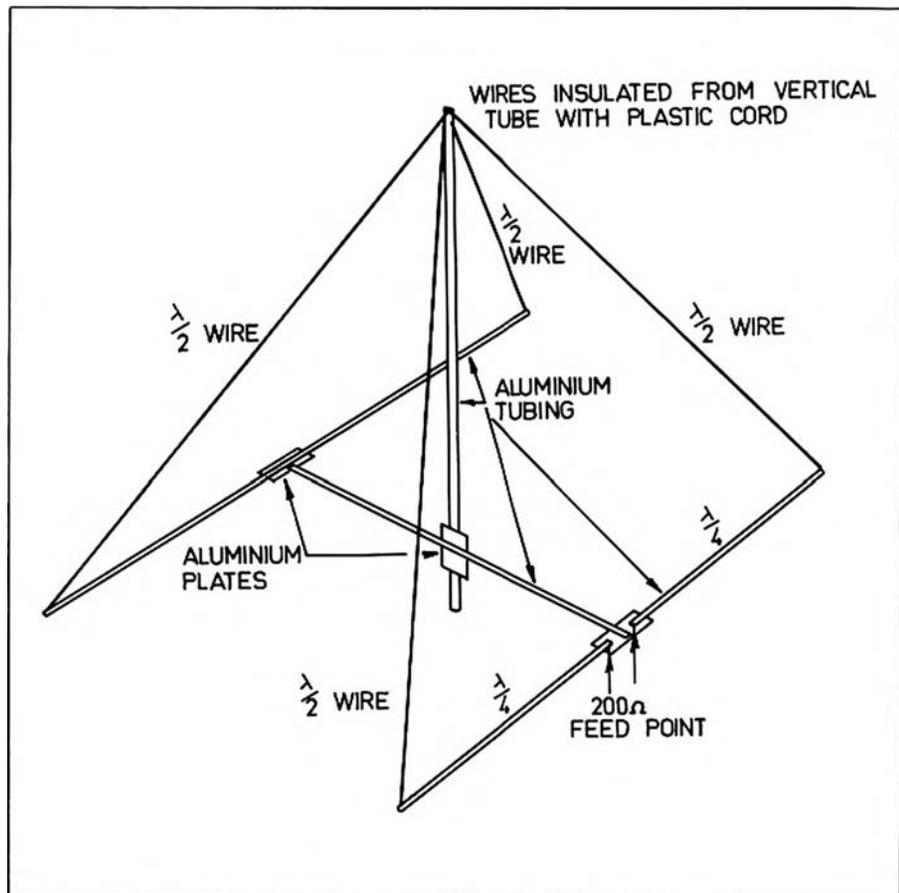


Figure 3: First Constructional Method

The impedance at the feed point varies with the dimension X. With X = 12 feet for 15 metres (18 feet on 20 metres) the

feed point impedance is close to 200 ohms, allowing a balun to be used to obtain a low SWR on 50 ohm coax feed cable.

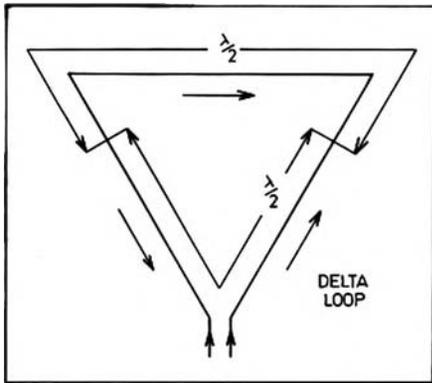


Figure 2B: Delta Antenna Configuration

The antenna could be described as two contra-rotating single-turn helices connected at the points remote from the feed point; in Fig 1, midway along side BC.

Some of the reasoning behind the development is as follows: (refer to Fig 2). A single delta antenna can have at least two sets of dimensions. In the "delta loop" (shown in the usual configuration) the sides are each one-third of a wavelength long, so that the total length around the loop is two half wavelengths.

The feed point, being half a wavelength from the short circuit on the opposite side of the loop, is low impedance. The small arrows on the diagram represent the phasing of the current in the antenna at a given instant; it will be seen that the loop gives the effect of two half wave dipoles in phase (the upper one with the ends folded down and the lower one bent upwards in the centre) with their average effective spacing less than a quarter of a wavelength apart in the vertical plane.

The "half-wave delta" has sides of half-a-wavelength, but the point opposite the feed point (in this case the apex) is open circuited so that a low impedance is reflected to the feed point. Each of the sides is still phased correctly for broad-side operation but the larger size of the loop makes it more directional than the delta loop with one-third-wavelength sides. It would be expected that the lack of bent half waves should reduce side lobes but I have not had the means to investigate this.

For the double delta I have simply connected two of these half wave deltas together at the apex in such a way that they are in opposite phase to each other (in the fashion of an 8JK beam) so that radiation in the vertical plane and the horizontal plane off the side of the beam tends to cancel, further increasing the directional effects of the single loop. The antenna would presumably be more effective if the planes of the deltas were parallel and vertical rather than sloping in toward the apex, but this would complicate construction.

Two methods of construction have been used; these are illustrated in Figures 3 and 4.

In the construction of Fig 3, the two base elements are made of aluminium tubing supported by a horizontal boom in

the fashion of a two element Yagi and, from the centre of the horizontal boom, a vertical boom is added to support the remaining wire sides of the deltas at the apex, where the wires are cross-connected. This method of construction has been found to be very good electrically insofar that extremely deep nulls were obtained off the side of the beam, but it leaves much to be desired mechanically, as it is necessary to insulate one of the base tubes at the centre feed point and also it is not possible to make the beam self bracing.

A more satisfactory method of mechanical construction is shown in Fig 4. The antenna elements are now made entirely

of wire (in my case 40/0076 flexible hook-up wire because this was available). A cross spider of 22 mm aluminium tubing is used to support the base sides of the elements and the whole beam is self-guyed with plastic venetian blind cord. It has been found necessary to insulate the spider at the centre hub (which is a piece of 1/8" aluminium sheet to which the spider tubes are fixed by U bolts), and also mid-way along their length, with 1 1/4" plastic conduit, which is a sliding fit over the tubing. At the centre hub the plastic conduit fits over the tubing and into the U bolts, tightening down firmly; in the centre about 2 feet of conduit has saw-cuts at the end enabling it to be clamped over the

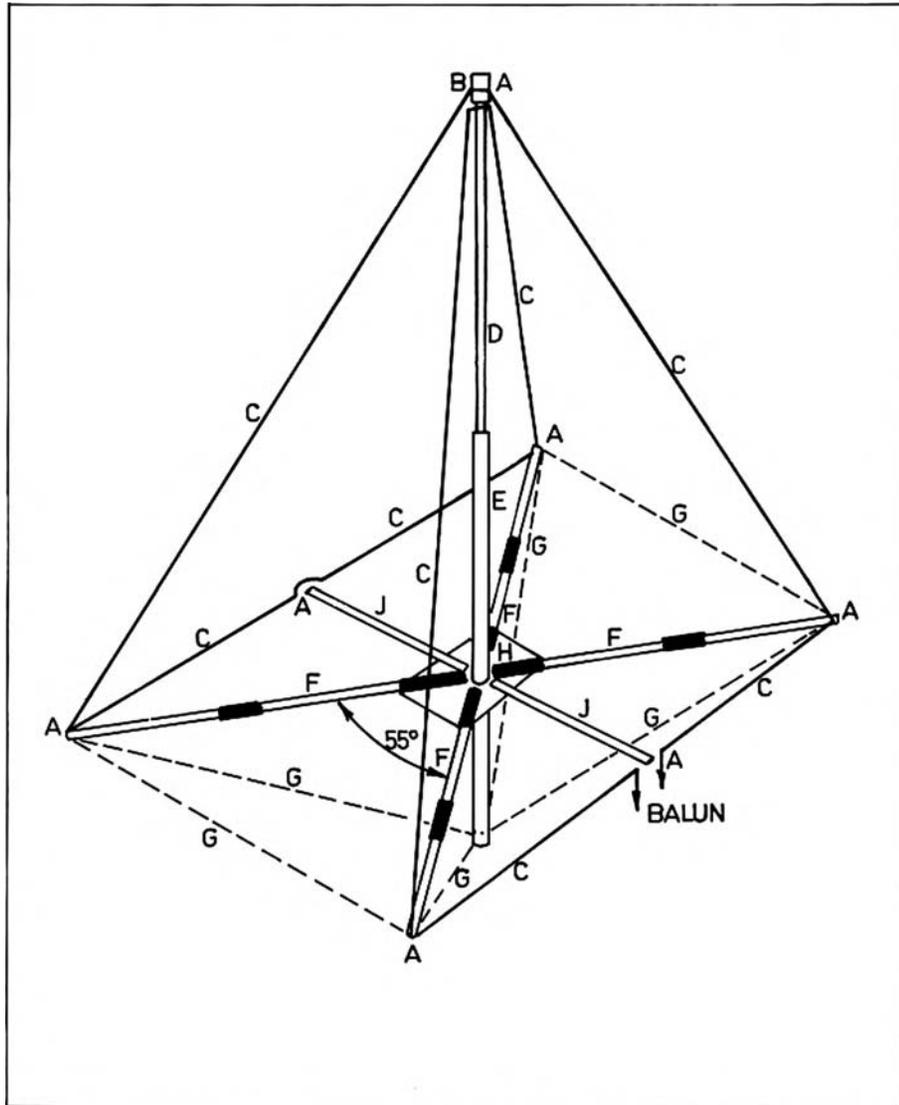


Figure 4: Present Constructional Method

#### KEY TO FIGURE 4

- A. Wires insulated from metal with plastic cord.
- B. Small metal plate fixed to vertical boom.
- C. Wire elements. 40/0076 hook up wire.
- D. 40 mm Aluminium tubing, 6 m long, telescoped and clamped into 2" tubing (E).
- E. 2" x 16G aluminium tubing, 18' long.
- F. 28 mm aluminium tubing, 6 m long. Insulated

- G. Plastic cord bracing wire.
- H. Centre hub 1/8" aluminium plate. Spider tubes are fixed with U bolts (insulated with 1 1/4" plastic conduit). Hub is fixed to vertical boom with 4 brackets and hose clips.
- I. 28 mm aluminium tubing 9' long (14 MHz) fixed to hub with U bolts.

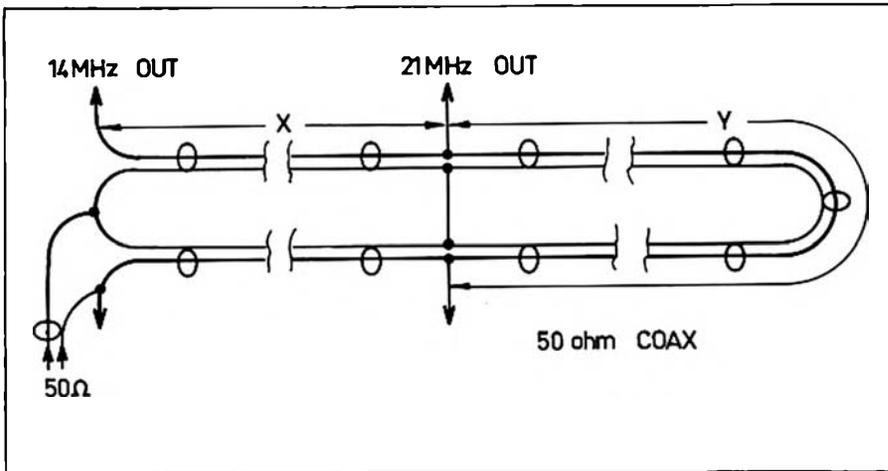


Figure 5: Coax Balun

tubing with automobile hose-clips, making certain that the two tubing ends are separated inside the conduit. Completely insulating material for the spider would probably enable the off-the-side nulls to be reduced but the effect of this on the main lobes would be negligible.

It has been found necessary to make the vertical boom as rigid as possible. The antenna should be considered as hanging from the apex. The present vertical boom (for a 20/15 metre dual-band double delta) consists of an 18 feet length of 2 inch 16 gauge tubing, 2 feet of which is inserted into the top of the tower, into which is telescoped a 6 metre length of 40 mm tubing, up to the apex. The centre hub supporting the spider is located 7 feet up from the bottom of the 2 inch tubing (5 feet up from the top of the tower).

Dimensions of my beam are given in Fig 4. I have found it necessary to prune the length of the elements to obtain a low SWR, but this brought no noticeable improvement in performance. The dimensions of the first 15 metre double delta were subsequently found to be about a foot per side too short; this gave me a very

high SWR (about 3:1) but had no other effect on performance.

Small lengths of tubing are added to the spider to support the balun and feed cable and also a stub on the 15 metre beam.

The feed impedance at resonance is 200 ohms, so that feeding the beam with a balun of 4:1 impedance ratio enables the SWR to be reduced to 1:1. A coax balun is used here as that also enables beams for both 15 and 20 metres to be fed from the one coax feed line. A schematic diagram of the coax balun with dimensions for 15 and 20 metres is shown in Fig 5. Only those portions required need be used. The dimension Y is an electrical half-wavelength in the 50 ohms coax used at the required 15 metre band frequency and  $2X + Y$  is the same for the 20 metre band frequency.

To prune the elements to size, the SWR readings were taken over the band; this showed which way pruning was required. Ideally all six half waves should be pruned to keep them the same length, but I only pruned one delta, with no apparent effect on performance. In fact, apart from obtaining a low SWR at the resonant frequency,

and that does seem to be the "in" thing, the whole pruning exercise had no apparent effect on performance.

The existing 15/20 metre dual-band double delta beam is constructed with the method shown in Fig 4 and uses a coax balun as shown in Fig 5. The 15 metre beam apex is 2/3 of the distance up the vertical boom to the 20 metre apex and the base wires are supported 2/3 of the distance out of the spider tubing. It is necessary to put a quarter-wave open stub in the centre of the 15 metre base element opposite the feed point in order to avoid interaction with the 20 metre beam. This stub is made from 300 ohm air spaced cable and is supported by the centre boom.

To insert the beam into the top of the tower (which is made to accommodate 2 inch tubing) one of the diagonal spider members is unbolted from the centre hub and also the adjacent small piece of support tubing. The tower is lowered to be almost on the ground (I have a winch and tackle to do this) and the bottom of the vertical boom, which has been laid along the ground, lifted up and inserted into the top of the tower. The tower is then raised sufficiently to enable the spider tube and the support tubes to be reflexed into the centre hub, the coax connected, the beam pruned if required and the tower raised.

In conclusion, without making any special claims about performance, it should be said that as a home made beam it works well; it is cheap, simple and non-critical to make. It has been variously described by certain individuals as a "bloody monster" and a "double damask dinner napkin" and no one so far, having seen it, has shown any inclination to make one. However this article will save me the effort of trying to describe it verbally on the air; more specifically, how it differs from a delta loop beam.

There are probably several ways it could be improved and made uni-directional if required; I should be delighted to enter into discussions with interested hams.

## UPDATE YOUR FT101 - BRIGHTEN YOUR FRONT PANEL

A deficiency on all early model FT101 transceivers which was recognised and rectified by Yaesu starting with the Model B was lack of indicator lights to show when the clarifier control is in the "on" position, and to a lesser extent, when the internal VFO is in use.

In particular, if the clarifier control is set such that the receive frequency is a few hundred cycles offset from the transmit frequency, it may well take a few overs before one wakes up that the other station is NOT off frequency!

LED indicators can be easily fitted to older model FT101s, the necessary connections being simple and quickly done. The clarifier indicator is wired to the socket for PB 1185 (regulator and calibra-

tor board) while the internal VFO indicator is wired to the 6 volt supply point to the VFO box.

Prior to starting work it is suggested that the transceiver external case be removed together with some circuit boards to allow a little elbow room.

Case removal is self-evident and easily done. At this stage turn the pre-selector control fully anti-clockwise as a precaution against damage to the tuning slug

Don Paice VK3ADP  
21 Allister St., Mount Waverley, Vic. 3142

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Frequency Range: 146.0 to 148.0 MHz. 23 Channel FM Transceiver All solid state construction. RF power output 10W or 1W with switch. Receiver Sensitivity: 1.0µV @ 30 dB S/N Power Requirements: 13.5V DC @ 2.3A max. Size: 134x58x216mm Weight: 1.8 kg. Comes with microphone, mobile mount, manual and DC leads. Supplied complete with one set of crystals on channel 40 (146.0 MHz) Cat. D-3007 ..... \$189.00

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Easy to read panel with illuminated S/RFO meter. Dual conversion receiver with tuned RF meter. Powerful transmitter gives full four watts output. Automatic noise limiter. Omni power operation, P.A. switch.

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General Circuitry: 17 transistors, 9 diodes, 1 I.C.  
Frequency Control: ± 0.005% crystal  
Channels: 23 all supplied  
Controls: On/off volume, variable squelch, PA, channel selector.  
Antenna: Removable speaker, PA speaker  
Jacks & Connections: 13.8 volts DC, positive or negative ground  
Power Source: 7" (H) x 5 1/2" (W) x 9" (D)  
Unit Size: 3 lbs.  
Weight: Mike with coiled cord and connector, mike clip and mounting hardware, DC power cord.

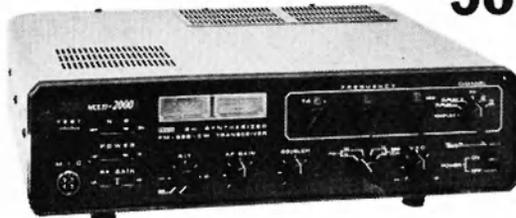
**RECEIVER**  
Receiving System: Dual conversion superheterodyne with tuned RF, AGC, built-in ANL  
Sensitivity: 0.5µV for 10 dB (S+N)/N  
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Automatic switching.  
Tune band capacity.  
Top loading coil.  
Band selection SWR curves.  
True wave resonance on all bands.  
SWR of 2:1 or less at band edges.  
Omni directional and low radiation angle.  
25" in height.  
Extra heavy duty tapered swaged steel.  
less aluminum tube.

# KENWOOD COMMUNICATIONS EQUIPMENT

## TS-700 TRANSCEIVER



\$645.

**KENWOOD TS-700A ALL MODE TRANSCEIVER**  
TS 700 All-Mode Transceiver is for 2-M operation and is equipped for SSB, FM, CW and AM. Features sending and receiving capability on 22 channels with 11 crystals from 144 MHz to 148 MHz. Rugged final stages are fully capable of sustained operation. This results from maximum performance transistorization throughout. Has Noise reflector type squelch circuitry. AC/DC capability, and dual tuning mechanism with bandspread for maximum convenience. Operation is further highlighted by noise blanker, amplified type AGC circuitry, dependable S-meter, and built-in marker oscillator.  
Cat. D-3100 ..... \$645.00

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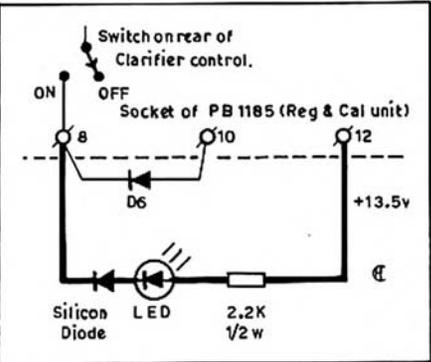


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**FT101 Clarifier Control Indicator (additional wiring in heavy lines)**

mechanism. Temporary removal of the internal speaker is also a wise move.

**CLARIFIER INDICATOR**

Carefully drill a suitable hole through the front panel such that the selected LED will very neatly fit through from the rear side of the panel. Start with the smallest size drill you have and work up a drill size at a time.

A suitable location for the hole is about 6 mm or so to the left of the '2' calibration behind the clarifier control knob. Epoxy the LED into place from the rear of the

panel — i.e. push the LED into the hole and dab some epoxy cement on the back.

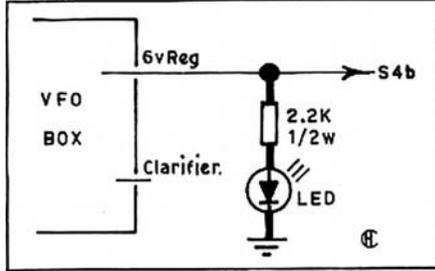
Circuit connections are as shown in the circuit diagram and are easily made. Some modification of the value of the series limiting resistor may be required dependent on the LED used. Physically, the one used was 1/8 inch diameter and about 1/4 inch long.

The indicator LED will glow only when the clarifier circuitry is in use.

**INTERNAL VFO INDICATOR**

The ideal location for this Indicator LED is just to the left of the 'INT' lettering at the internal/external VFO switch. It is necessary to remove the black plastic dial escutcheon — a task which appears far more formidable than doing it will be. Three screws hold the escutcheon in place and these must be removed from the rear of the front panel.

The escutcheon need not be completely removed — wiring to the meter control slider switch will prevent this but will allow enough movement for it to be swung out while a hole is drilled and the LED fitted. Before epoxying the LED into place attach 2 wires to it and bend the leads from the LED such that they will be parallel to the front panel after fitting the LED. The wires can conveniently be routed through an existing hole in the front panel used for the dial lamp wiring.



**FT101 Internal VFO Indicator (additional wiring in heavy lines)**

Replace the escutcheon and wire the LED as per the circuit diagram. Caution — do not forget the series limiting resistor.

On the FT101 modified the 6 volt connection to the VFO runs through a feed through capacitor (the one with a single blue wire) on the rear of the VFO box under the chassis. The wiring can be run in with other wiring in a loom.

Replace the circuit boards, test the modification, and then reassemble the outer transceiver case.

Additional current drain is negligible and is in the order of several millamps.

Addition of these indicators will add to the ease of operation and thus operating pleasure when using an earlier model of this fine transceiver. ■

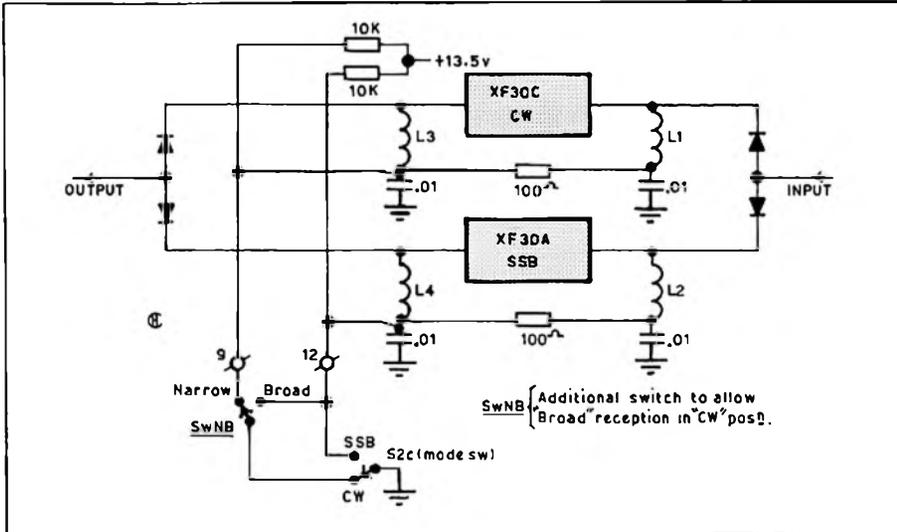
# MODIFICATION OF FT101 TO ALLOW USE OF NORMAL SSB FILTER FOR CW OPERATION WHERE OPTIONAL CW FILTER IS FITTED

The optional CW filter when fitted to the FT101 transceiver is excellent for use when copying CW signals on, say, 20 metres when the DX is coming in. However, the normal SSB filter is both adequate and desirable when quickly scanning the CW segments for signals, and for normal CW operating when signals are in the clear.

Reference to the FT101 circuit diagram will show that diode switching is used to change filters and, in effect, the appropriate filter is switched into use by earthing, via a segment on the 'mode' switch, either pin 9 (for CW filter) or pin 12 (normal SSB filter) on circuit board PB 1183 (filter board).

It is possible to manually switch from the CW filter to the SSB filter by use of the mode switch; however, the addition of a miniature SPDT switch will enable either filter to be used with the mode switch left permanently in the CW position for CW operation.

The additional switch can be installed between the mode switch and the audio gain control on the front panel with connections being made to the appropriate pins on the socket for circuit board PB 1183. While drilling the panel it is a wise



**FT101 Crystal Filter Circuit**

precaution to remove the internal speaker to stop metal chips etc. being attracted to the speaker magnet.

The circuit diagram shows the appropriate connections for this worthwhile modification. ■

Don Palce VK3ADP  
21 Allister St., Mount Waverley, Vic. 3142

# STARTING MOBILE OPERATION

Maurie Evered VK3AVO  
13 Sage Street, Oakleigh, Vic.

This article describes the sequence of events that occurred when I decided to try mobile operation. If you are contemplating an attempt at this fascinating side of our hobby it could be of assistance to you.

My urge to try mobile operation started when the family acquired a caravan and this seemed an ideal opportunity to start my mobile career in earnest. I had previously operated mobile on the two metre FM bands from the Melbourne metropolitan area with an FT2FB and a gutter mounted quarter wave antenna, but of course we are spoiled here by the excellent coverage of the repeater VK3RML, and successful mobile operation from country or bush areas is a much stiffer test of your equipment.

The first question to be answered was on which bands to operate, HF, VHF or both. Mobile operation at VHF is no longer confined to "line of sight" operation because of the excellent system of two metre repeaters established around Australia by hard working repeater groups, and the choice of HF or VHF was not an easy one to answer. Either rig (FT101 or FT2FB) is admirably suited to mobile operation so it became largely a question of how to get the most for any money spent. I needed a mobile HF antenna and mounting system or a full complement of crystals to cover the full number of repeater and simplex channels. There was little difference in these two relative costs. In my case HF operation won out because —

1. It offered a greater range than VHF in Australia.
2. It eliminates the VHF "dead spots" that occur in mountainous country.
3. I wanted to try my hand at mobile DX operation on the higher HF bands.

This of course was a personal choice and is open to a lot of argument and discussion. My answer to "why not use both HF and VHF" is again personal —

1. Extra space is required to mount both rigs in the vehicle.



2. HF could do anything VHF could do as far as I was concerned.

The standard amateur text books and magazines devote a lot of space to the needs of the mobile operator and should be read as an introduction but you cannot beat local information. As usual my fellow Hams were ever ready to give helpful advice. What follows will be written under a series of headings for ease of presentation and reading.

## CHOICE OF ANTENNA

The pros and cons of the different types of mobile aerials have been flogged for years in both the spoken and written word, and I will not prolong the argument here. If you wish to read further about this fascinating subject check the list of references given. I chose the MARK HW 3 because —

- a. It enables operation on three amateur bands without coil changing. You merely change bands and retune your transmitter or transceiver.
- b. It is of the "top loading coil" type of antenna providing an excellent current distribution on the radiating rod. I have always been impressed by the performance of this type of antenna particularly on 20 metres. I remember Harry VK3XI in particular. His signal from northern Queensland had to be heard to be believed.

- c. The HW3 maintains a good SWR across the bands particularly on 20, 15 and 10 metres.

Details of this antenna can be seen in the accompanying photographs. The antenna was obtained from Bail Electronic Services.

## HOW AND WHERE TO MOUNT THE ANTENNA

As I intended pulling a caravan and going off the beaten track certain popular sites for mounting an HF antenna were precluded —

- a. Ski-bar type mounts — the antenna could easily be "wiped off" by low tree branches.
- b. Rear bumper mount — the close proximity of the large mass of metal in the van causes severe detuning.

The choice became virtually automatic. On the front bumper of our HT Holden. When this spot was chosen one difficulty was immediately obvious. The bumper on this model sits very flush with the body and any rod mounted vertically from the bumper would certainly contact the metal of the bonnet. This difficulty was easily overcome by the use of a Hy-Gain BPR 415 mounting kit. This kit is a clever combination of bits and pieces that can be adapted to fit just about any type of bumper bar.

The final problem in this "section" was how best to route the coax cable from the

antenna mount to the operating position. Here I sought the advice of Don Paice VK3ADP, a very experienced and highly successful mobile operator on both HF and VHF.

We decided to run the coax from the bumper, through a convenient body hole, along the inside of the left mudguard (there are already clips here holding other wires and these clips can easily hold the coax as well) through a drilled and grommetted hole in the firewall and so to the interior of the car.

This method means the coax cable runs inside the engine compartment and according to some mobile operators may pick up more interference than if run outside the compartment. This leads to our next topic of discussion.

### HOW TO GET RID OF ELECTRICAL INTERFERENCE

In my case little difficulty was experienced as the noise blanker on the FT101 quietens ignition hash like magic (see AR February 1974 for full report). The only other suppression used was the fitting of "carbon" ignition leads; these are standard on this vehicle. Incidentally there are two little known facts about the type of lead —

It is most effective at frequencies well above the broadcast band, particularly at 40-50 MHz. You cannot judge the performance properly on your BC car receiver. (See Electronics Australia February 1968 p. 77).

These leads do not have an indefinite life and should be replaced every one to two years.

Suppression of vehicle noise is a very specialised subject and will only be briefly covered here. It always helps if you can get advice from someone who owns the same type of vehicle as you do. I suggest you try the following order —

Check that spark plugs are clean and

properly gapped, and that ignition points are not badly pitted. Check too the distributor cap for cleanliness. These areas are often overlooked.

Install carbon type ignition leads.

Install a 0.5 uF capacitor from the SW terminal on the coil to a closely adjacent earth point.

Screen the HT lead from the coil to the distributor and the lead to each plug from the distributor.

Check the "continuity" of all metal parts — engine, chassis, exhaust pipe etc. When these are reliably bonded electrically the noise level often drops dramatically.

Now a brief coverage of other possible sources of electrical interference in your vehicle —

### BATTERY CHARGING COMPONENTS — GENERATOR, VOLTAGE REGULATOR OR ALTERNATOR

The car generator system can create an annoying whine in the receiver. This results from the brushes sparking as the commutator passes over them. Firstly clean or replace the brushes and clean the commutator surface. A coaxial feed-through capacitor of 0.1-0.5 uF should be mounted on the generator frame and used to filter the generator armature lead. In very stubborn cases a parallel L/C circuit can be used here, tuned to the receiver operating frequency.

Voltage regulators contain relay contacts which jitter open and closed, creating a ragged and hashy sound in your receiver. Coaxial feedthrough capacitors are used to filter the battery and armature leads from the regulator box.

Alternators generally are less troublesome than generators and the same rules of suppression apply. A coaxial capacitor or tuned trap is connected to the alternator output lead. Do NOT connect a capacitor to the generator or alternator field terminals. An alternator suppression kit is available from advertisers.

### WINDSCREEN WIPER OR HEATER MOTORS

Connect a 0.5-3.0 uF capacitor from the input terminal to earth.

### FUEL GAUGE

Noise from this unit may be obvious if with the ignition on and the engine not running you bounce the rear of the vehicle (at the front of a Volkswagen) of course. Connect a 0.1 uF capacitor across the terminals of the tank unit.

### HOW TO FIT UP THE FT101 FOR MOBILE OPERATION

This may seem a strange statement but two "additions" were made to the transmitter (see accompanying photographs). Firstly a Kyoritsu SWR meter was mounted in the rear left hand side of the lid. I removed the four rubber feet from the meter and used the same bolts and nuts to attach the meter to the FT101 through the slots in the lid. In this position it does not affect the cooling of the rig in any way, and the SWR meter is a must in any mobile antenna line for both tuning and monitoring relative output. It stays in

position even when the rig is used at home base.

Secondly a morse key was attached to the lid (again see the photograph) after a strip of thin leather was stuck to the base of the key to prevent scratching the lid of the rig. As before use fine bolts and nuts through the slots in the lid.

I always remember Ken VK3GKs advice in this respect. CW is very useful when the going gets tough and signals are weak. Several CW contacts were made on 20 metres from the stationary vehicle.

The DC lead for the FT101 works best if connected as directly as possible to the car battery. I ran it through a hole in the firewall for a direct battery attachment. While on the subject of leads, remember to always take your 240 volt lead with you. It relieves the load on the battery when operating from a powered caravan site.

### HOW AND WHERE TO MOUNT THE FT101

There is an excellent mobile mount available for the FT 101 (try Bail Electronic Services) that fits across the transmission hump but in my case the solution was much easier. The middle front seat (assuming three across the front seat) is always empty when we go bush and provided an excellent spot for the rig with no discomfort to passenger or driver.

It is secured in position by an elastic strap available from any motor accessory store. This passes through the seat belt hole in one direction and forward and under the seat in the other. There are plenty of anchor points available.

### HOW DID IT ALL PERFORM?

So far most contacts have been made on the 80, 40 and 20 metre bands, as 15 and 10 are still in the doldrums at the time of writing. Many interstate contacts, including mobile to mobile have been made on 80 and 40 at strength up to S9 plus, but dependent of course on prevailing conditions. On 20 metres DX has been worked, particularly to ZL and W lands. Reports vary but a 5 x 5 was received from the USA. This is not a bad report considering the general state of 20 metres at present.

All that remains to complete the story are several very grateful acknowledgements.

1. Don Paice VK3ADP whose wealth of mobile operating knowledge was of great help in all aspects of the operation of setting up.
2. Lin Brown VK3ARL for helpful advice and testing, particularly on 80 metres.
3. To the many other VK's who willingly tolerated my requests for comments and signal reports.

### REFERENCES

#### AMATEUR RADIO —

- March 1975 p.5 — Vehicle Ignition Noise Suppression, by R. Champness VK3UG. (This article is the best article I have read on this subject.)
- Jan. 1975 p. 17 — Ignition Noise Reduction, by G. Soines VK3AU1.
- Jan. 1970 p.15 — One Way, by B. Warman VK5BI.

RGB HANDBOOK, ARRL HANDBOOK — Appropriate Sections.



The Mark HW3 mounted on the front of Maurie's car.

# A REVIEW OF THE KYOKUTO DIGITAL PHASE LOCKED FM TRANSCEIVER



## KYOKUTO CIRCUIT DESCRIPTION

The heart of the Kyokuto transceiver is the frequency generation section made up with the VCO/PLL and decoder/display units. The voltage controlled oscillator (VCO) operates over a range of 127.1 to 132.09 MHz, the output feeding through two buffer stages and then to the receiver first mixer. The same output signal is also mixed down to a range of 4.00-8.99 MHz with the multiplied output of either of two crystal oscillators on 41.03166 or 41.03 MHz. The selection of these depends on whether the five kHz last digit switch has been operated or not.

The 4.00 to 8.99 signal is then entered into the programmable counter of the PLL unit. Three IC's count either of the 1 MHz, 100 kHz or 10 kHz orders which are then fed to a phase comparator. A front panel mounted LED indicates unlocked conditions.

A portion of this voltage is also used to control varicap diodes in the receiver front end to maintain peak performance over the whole four megahertz covered.

Six seven segment LED display units are controlled from the PLL unit. The first two digits are fixed on 1 and 4 respectively and the last digit is switched from 0 to 5 with the 5 kHz selector switch.

The receiver is the usual double conversion set up but with the first IF at 16.9 MHz instead of the more usual 10.7 MHz. The front end employs two dual gate FETs as RF and first mixer with varicap adjusted tuning between. Ceramic filters are provided at both 16.9 and at the second IF frequency of 455 kHz. Selectivity is rated at  $\pm 6$  kHz at the 6 dB points and  $\pm 12$  kHz at the 40 dB points. However should this degree of selectivity need to be changed, some fourteen optional filters are listed as being available from the manufacturer. These have band widths varying from  $\pm 4$  kHz to  $\pm 17.5$  kHz and are available in either 9 or 15 pole types.

Muting and audio circuits are of the

conventional type and a 50 mm speaker is mounted on the bottom side of the cabinet. Provision is also provided to connect an external speaker via a 3.5 mm socket.

The transmitter line up commences with either one of three crystal frequencies. These are 17.5 MHz for repeater up, 16.9 MHz for simplex and 16.3 MHz for repeater down operation. The signal goes via a buffer stage to a balanced diode mixer where the output of the VCO is combined to produce the final transmit frequency. Six stages then bring the power up to the ten watt level. Transmit audio employs limiting and has a 12 dB per octave cut off above 3 kHz. This is one of the very few amateur FM transceivers that uses true frequency modulation and this is achieved with a varicap diode in the VCO unit.

Three power supply sections are included. One provides 9 volts for the receiver, and the second acts as over voltage protection for the transmitter final stages being set at a maximum of 14 volts. When low power is selected, this same regulator reduces the final voltage to any desired point. In fact the power can be adjusted from almost nothing right up to the full available output — a very handy feature if an exact amount of output is needed to drive an amplifier or to act as a reference. And finally the TTL circuits are provided with a regulated 5 volt line.

## THE KYOKUTO ON THE AIR

After some years of using a normal channel switched FM transceiver on two metres and associating channel numbers with switch positions, it is a little strange to have to think in actual frequencies. On first acquaintance with the Kyokuto quite a bit of head scratching and consulting of old copies of Amateur Radio was indulged in. However like most things of this nature, it soon falls into place.

Let us look at the front panel and see how it all works. From the left is first the audio gain combined with a pull on, push off, power switch. Next is the squelch

As we have mentioned in previous reviews of Amateur Radio, quite a few Japanese electronic companies specialising in commercial radio gear are turning their hands to limited amateur production. One such firm is the Kyokuto Denshi Co. Ltd., of Tokyo. This firm specialises in the manufacture of aircraft radio equipment and it is thought that the transceiver to be reviewed is an adaptation of one such piece of gear.

The Kyokuto model FM144-10SXR 11 is a fully synthesised FM transceiver covering the entire two metre band from 144.0 MHz to 148.0 MHz in five kHz steps. As originally produced, they have receive capability over the above range and transmit capability from 146 to 148 MHz. However the Australian Distributors now include a modification which enables the rig to transmit and receive over the full two metre band. As we shall later see, it does this with excellent results. Measurements of the transceiver are 54 mm high, 165 mm wide and 195 mm deep, and the weight is 2.1 kgs. This is about the same as other FM transceivers previously reviewed in the magazine.

Considering the compact size of the unit, a remarkable number of functions are included. The more important of these are: dial up frequency selection over the entire two metre band; LED digital readout of the frequency selected; provision for repeater operation with 600 kHz offset both up and down allowing normal or reverse mode. Transmitter power output is switchable to either ten or one watt with the actual switch located on the microphone. A total of 43 transistors, 21 IC's and innumerable diodes are employed in the fully solid state circuit. A mobile mounting bracket, mounting hardware, plus the usual connecting cable and spare fuses, are supplied with the set.

The Kyokuto is imported and distributed in Australia by Sideband Electronics Sales from their new location at 2 Kurri Street, Loftus, 2232, N.S.W.

control which also selects the 0 or 5 kHz last digit, also with a push pull action.

Third knob controls the selection of the MHz point. That is it selects either 144, 145, 146, 147 or 148. But again this control has another function. The sixth position selects a pre-arranged call channel. Full details are included in the instruction manual on how this can be set up on any frequency needed.

With the fourth knob we come to the main frequency selector. This is a dual concentric control with the larger rear section switching the 100 kHz points and the front section switching the 10 kHz points. So it is easy to see how a particular frequency is dialled up. Normally in Australia only the 146 MHz section will be used, so that all channels can be selected with the concentric knobs only.

To the right of the main frequency selector is a three position toggle switch which shifts the transmit frequency up or down 600 kHz in relation to the receive frequency for repeater operation. With the central position transmit and receive occurs on the same frequency for simplex working. A few points are worth noting in relation to the functioning of this control. Firstly only the transmit channel is shifted; if reverse repeater operation is required it is necessary to dial up the new receive frequency and then off-set the transmitter in the opposite direction.

Also with an up or down shift selected, no visual indication is given on the transceiver. In other words the digital readout still indicates the receive frequency.

On quite a few occasions I found that I was transmitting 600 kHz up or down when trying to work a simplex channel. It's a pity that some form of visual indicator is not provided.

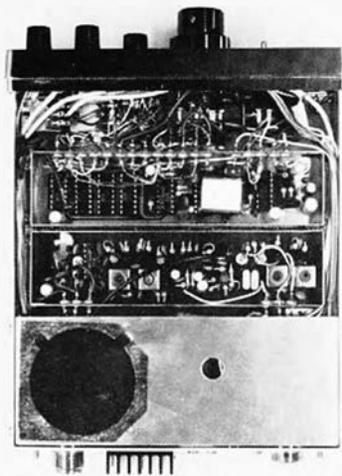
On the right hand side of the panel is a now standard four pin screw-on microphone connector and above this is the signal strength output meter. The meter is illuminated in a deep green colour. It looks very pretty but is not easy to read from a distance due to a lack of contrast.

Above the main channel selector knob are two LED indicators. The left hand one lights when the mute is opened either due to a signal coming up on the channel selected or to the squelch not being far enough advanced.

The right hand LED shows when the PLL is unlocked. The handbook states that the transmitter should not be operated if this occurs but omits to say what should be done to correct the trouble. However after many hours of operation no problems were experienced.

The digital LED frequency readout is very clear to read under normal lighting conditions but in common with all readouts of this type, it becomes impossible to read under strong light conditions.

Audio from received signals was clean and of good balanced quality so long as the station was not deviating beyond about 6 or 7 kHz. This is definitely a narrow band receiver, at its best with signals of 5 kHz deviation. If wideband transmissions



Underneath view of the unit with the cover removed.

are common in your area, one of the wider filters specified in the manual might be more to your liking. However with the trend to narrower signals it's perhaps better to ask the other station to turn things down.

The transmitted audio was judged to be clean and well balanced. It appears after checking quite a few Japanese FM transceivers that manufacturers in that country have adopted a common audio characteristic for these rigs, so that in general they sound first rate to each other.

#### THE KYOKUTO ON TEST

Transmitter power output was first checked using a Horwood dummy load watt meter. With 14 volts applied from a well regulated bench supply the output at 146.5 MHz was 15 watts exactly. At 144.0 and 148.0 MHz the output had only dropped the meter reading to 12 watts. In the low power position the output was one watt; however as mentioned earlier this can be set to any figure required.

While these tests were in progress the current drain was measured. Receive only; 625 mA. Transmit low power (1 watt output) 2 amps. Transmit with full output 3.6 amps. In the receive mode with full audio output 800 mA peak.

This is of course a little more than normal FM transceivers. The increase is due to the additional circuitry associated with the synthesizer and digital readout. Receive sensitivity figures equalled the best so far achieved in our tests on FM equipment. They were:

- Quieting at .5  $\mu$ V —28 dB
- 1  $\mu$ V —33 dB
- Signal to noise ratio.
- .5  $\mu$ V —33 dB
- 1  $\mu$ V —40 dB

The mute opened with a signal of about .1  $\mu$ V.

Receive audio output is rated at 4 watts with 10% distortion. Checked with a

steady tone, audible distortion was evident above 2 watts. However it is possible that peaks of audio would reach 4 watts with low distortion. In any event there is more than enough output to cope with even the noisier location.

Transmit and receive frequencies were checked with an external counter and were found to be within about 500 Hz of the nominal frequency. It was a simple job to set them spot on. However, as the procedure is not covered in the instruction book and as suitable test gear is required, readers are warned against tweaking it up. The error involved is extremely small and would pass unnoticed in normal operation.

#### INSTRUCTION BOOK

The instruction book covers the basic operating procedures fairly well. There is also a section on the theory of operation of each section. Two photographs show the location of the preset controls; however there is no printed circuit layout or any details of adjustment of the frequency determining components.

#### CONCLUSION

The performance of the Kyokuto is first class in all respects and in fact could be almost considered the FM rig to end all FM rigs. While the initial cost is somewhat higher, it is the full cost in that you will never need to buy another crystal. You are also free to roam the wide open spaces that still exist on the two metre band and to set up private nets far from the ears of the operators with their switched channel sets.

Enquiries for the Kyokuto should be directed to Sideband Electronic Sales at P.O. Box 184, Sutherland, N.S.W. 2232. ■

## BOOK REVIEW

#### MANUAL OF QUESTIONS AND ANSWERS FOR THE NOVICE LICENCE

by K. Howard VK2AKX  
Second Edition. Published by the Westlakes Radio Club

A valiant effort has been made to produce this manual which endeavours to provide all the necessary knowledge to pass the theory section of the Novice Amateur Operators Examination. And Keith Howard has almost hit the bulls-eye with this shot. It is in general a useful and timely publication.

However there are one or two omissions which it is to be hoped will be remedied in the next edition. For example the section dealing with resistors does not discuss the color code system although this was the topic of a question in the March examination. The third edition will provide an opportunity to polish up and rectify the occasional ambiguous explanation and a few inaccuracies. To give one example, a simple rectifier voltmeter is claimed to indicate the RMS value. (Of course it indicates the average value but it may be calibrated to read RMS if the applied waveform, say a sinusoid, is always the same.)

One could of course find fault with the most professional publications and it would be unfair to say anything other than that for the most part this manual adequately explains the necessary theory. Even with the few blemishes noted it is well worth its modest price and at the moment it appears to have no peer or rival. VK3AFW

#### QSP

##### READERS OF AR

The Honorary Secretary of a well known amateur radio group recently wrote asking for a note to be included in AR about their forthcoming Convention. The letter was addressed to the Victorian Division.

## THE 1976 FEDERAL CONVENTION OF THE WIA

The 40th Federal Convention of the Institute was held in one of the Conference Rooms of the Diplomat Motor inn in St. Kilda, Melbourne, on Friday, 7th May to Sunday, 9th May, 1976. The Federal President, Dr. David Wardlaw, VK3ADW, ably chaired the convention. All substantive members of Executive were present and took an active part in their own specialist areas; Mr. Keith Roget, VK3YQ on financial matters, Mr. Ken Seddon VK3ACS on repeater affairs and Mr. Peter Wollenfend, VK3ZPA on VHF/UHF policies.

### DIVISIONAL REPRESENTATIVES

The Divisions were represented by their Federal Councillors as well as Alternate Federal Councillors in some cases. For VK1 Mr. Ed Penikis VK1VP, assisted by Mr. Neil Sandford, VK1ZT; for VK2 Mr. Tim Mills, VK2ZTM assisted once again by Mr. Geoff Cuthbert VK2ZHU; for VK3 Mr. Phil Fitzherbert VK3FF assisted by Mr. Peter Edwards, VK3ZU; for VK4 Mr. Norm Wilson VK4NP assisted by Mr. Alex McDonald VK4TE; for VK5 once again the pair of Mr. Ian Hunt, VK5QX and Mr. Colin Hurst VK5HI; for VK6 and VK7 Messrs. Neil Penfold, VK6NE and Mr. Peter Frith, VK7PF respectively.

### VISITORS

Mr. Jim Wilkinson, First Assistant Secretary as head of the Radio Frequency Management Division of the Posts and Telecommunications Department came along on the Saturday as an invited guest and answered numerous questions of interest to amateurs, especially relative to WARC '79 and amateur examinations.

Others who gave up time to attend and answer questions were Mr. Michael Owen, VK3KI, on IARU and WARC '79 matters, Mr. Peter Mill, VK3ZPP, assisting on repeater discussions, Mr. Bill Roper, VK3ARZ, on Publications questions, together with interesting comments from visitor Mr. Don McKay ZL3RW editor of Break-In, Mr. Alf Chandler, VK3LC, on Intruder Watch affairs, Mr. Ken Phillips, VK3AUO, as Federal Contest Manager and last, but by no means least, Rev. Bob Guthrie of the Federal YRCS Co-ordinator.

This convention could be labelled "The Prayerful Convention" since it concluded with the following, specially composed for the occasion by Rev. Guthrie —

"Almighty Father of the Universe,  
we acknowledge with humility  
the vastness of this universe  
in which we have sought  
to direct our thoughts  
relative to using our technology  
in expanding the means  
of human communication.

Thank You  
for making possible  
a universal area  
in which we can accomplish  
a more effective fulfilment  
of peaceful co-existence.

As we part  
be near to us in our varied  
journeys that we may  
continue our efforts to further  
our aims in amateur radio.

Through Him who  
communicated a wavelength  
of philosophy as a guidance  
for human relationships".

Amen".

### ARNOLD REPORT

There were several areas of current prime importance discussed in depth at this Convention. The Report by Mr. Bob Arnold — see April AR — was too new on the scene for thoughts to be fully crystallised. More feedback from members is required to enable Divisional Councils to arrive at suitable conclusions before the end of the year. Meanwhile Executive was charged with the task of developing proposals for further work to be done on the report.

### FM AND REPEATERS

A second area — in this case discussed at length in a Working Group outside the 32 hours of actual Convention sittings in the 57 available hours (inclusive of sleep and meal periods) — dealt with FM, generally, at VHF and UHF frequencies, including repeaters. In some specific areas additional work still remains to be carried out by the Federal Repeater Sub-Committee and the VHF/UHF Advisory Committee.

### 2 m REPEATERS

It was agreed that the 2 m FM repeaters should henceforward be designated and referred to by the input channel number. It will be remembered that channels in the 2 m amateur band are numbered 0 upwards every 50 kHz from 144.000 MHz. Hence channel 30 is 145.500 MHz (the beginning of the existing numbering system), channel 40 is 148.000 MHz and so on. Therefore the existing 2 m repeaters become known as 42 — or "2" if you drop the first digit — 148.100 MHz formerly Ch. 1), 43 (3) = 146.150 (Ch. 5), 44 (4) = 146.200 (old Ch. 2), 45 (5) = 146.250 (old Ch. 6), 46 (8) = 146.300 (old Ch. 3), 47 (7) = 146.350 (same as old Ch. 7), 48 (8) = 146.400 (old Ch. 4). The Department is to be approached to accept an amendment to the WIA 2 m band plan whereby 146.050 MHz (i.e. channel 41) be classified as the input frequency for a new repeater channel with its output on 146.650 MHz. It was agreed that the band 145.800 MHz to 146.000 MHz inclusive for other than approved satellite modes be actively discouraged.

### 70 CM BAND PLAN

The WIA 70 cm band plan (see March '76 AR p.4) came in for considerable scrutiny particularly because of the repeater windows required to be finalised for channels. In the process a number of amendments were made to the band plan itself and other items were referred back for further consideration. See AR August '75 p.7. The 440 to 441 MHz FM Simplex window is deleted and the experimental segment is enlarged to become 440-443 MHz.

### 70 CM REPEATERS

70 cm repeater inputs are in the segment 433-435 MHz with the outputs in the segment 438-440 MHz. In these segments channels, at 25 kHz points, are numbered corresponding to the frequency — thus, 433.025 MHz becomes channel 302 by dropping the first two digits and the last digit, 439.795 becomes channel 997, and so on for intermediate points. Repeater channels will have 5 MHz separation. Those channels, which are free from 2 m harmonic interference, designated as primary repeater channels are 352/852, those of the next priority are 322/822 and 367/867 and others are listed as 307/807, 337/837, 442/942, 457/957, 472/972 and 487/987.

### 70 CM SIMPLEX

The primary simplex FM frequency in the 70 cm band is 439.000 MHz (Ch. 900) and secondary frequencies are 438.825 (Ch. 882) and 439.125 (Ch. 912). The use of 438.000 MHz as an FM simplex channel is to be discouraged. All the 70 cm matters now require to be discussed with "Central Office" for approval.

### EDUCATION AREA

Another Working Group was charged with examining the entire field of agenda items dealing with education, examinations, exemptions and YRCS.

It was agreed that the Executive should appoint a WIA member qualified to investigate and make recommendations (a) concerning instruction to candidates of all ages in the arts of radio communications (particularly amateur radio naturally) and (b) to correlate his findings to the nature and levels of examinations and possible exemptions therefrom.

It was indeed most unfortunate that the ideal person for this work passed away shortly after the Convention after having agreed to make a preliminary assessment. The YRCS obviously forms a part of these investigations especially as this movement nationally appears not to be in good

health and many of those involved appeared, to many of the delegates, to have concentrated their energies on constitutional affairs in preference to teaching the young. Perhaps for this reason, among others, the Federal Council did not ratify the 1974 YRCS Constitution framed at Maitland. A three month period of grace has been given in respect of all previous YRCS constitutions. Agenda items aimed at lowering the age limits for Full and Limited licensees were not passed.

### 11 M BAND

At the 1975 Federal Convention it was agreed that guidelines were needed for amateurs using the 11 m band because of the numerous complications involved. At the 1976 Convention a set of guidelines was adopted and is published elsewhere in AR so that amateurs using this band may have some guidance. The nature of these guidelines were checked out by "Central Office" prior to the Convention.

As a result of adopting these guidelines the Federal Council promulgated a gentleman's agreement for all amateurs using the band, as follows —  
26.960 — 27.030 MHz CW only  
27.030 — 27.230 MHz Phone and CW.

### WARC '79

"You are going to hear more and more about WARC '79" is the message from this Convention. Members who read WIANEWS regularly will have some idea of the work already being done by the WIA in the Australian Preparatory Group (APG) covering all the services in preparation for the formulation of the Australian Brief for this enormously important Conference.

Report on the visit overseas by the Federal President during April, the visit and work done by your IARU Liaison Officer (Mr. Michael Owen) and some of the thoughts of Mr. Jim Wilkinson were heard and discussed at some length during the Convention.

Nothing in the immediate future is of greater importance to the amateur service than WARC '79. The co-ordination work of the IARU for the amateur cause is well documented and tremendously advantageous to us in Australia. In the years ahead we need unity and increased membership to enable the Institute fully to play its part. These are the main messages.

### FINANCES

A financial sub-committee is now operative. The Convention adopted a budget for 1976 which included an estimate of income based upon a very modest increase of 50 cents in the Federal element of subscriptions for 1977 subject to review by the end of August. Coupled with this, the sub-committee recommended that indexation principles should be applied to the Federal element of subscriptions based on the Consumer Price Index movements. If this had been applied during the past year it was calculated that a Federal element increase of \$2.00 would have been justified. The Executive's financial situation was adjudged to be now in good shape in readiness for the tasks ahead of a routine nature.

### NOVICE LICENCEES

The Convention agreed, after much discussion, that full membership is recommended as the appropriate grade for Novice Licensees subject to such Divisional Constitutional conditions as may be locally desirable. The condition was necessary because most of the Divisions are operating on a variation of the Uniform Divisional Constitution which required that Grade A (or full members) must possess or be of the equivalent standard, to AOCPL.

It was also agreed to wind up the Novice Licence Investigation Committee set up in 1970/71 with grateful thanks to the Chairman and members for their work. A motion that the two year tenure for Novice Licensees should be altered so that extensions of time could be granted in exceptional cases was withdrawn because the Institute already has this assurance.

## GENERAL

The following were adopted —

- Negotiate for certain improved and expanded RTTY conditions;
- Examine the Amateur Advisory Committee situation;
- Seek extended broadcast times and conditions;
- Press for proper syllabuses for amateur exams;
- Adopt standardised FM bandwidths/deviations;
- Specify and adhere to WICEN spot frequencies;
- Encourage use of non-pollutant energy systems;
- Seek allocation of certain of the higher GHz frequency bands;

- Try again for Limited Licences to use CW on 144 MHz up;
- Negotiate for 4 exams each year;
- Investigate wider advertising for joining the WIA;
- Negotiate for cross-band and also higher band ATV repeaters.

Space does not permit reporting on many other items discussed. A proposal that the RD Contest Trophy should remain in VK5 in perpetuity when that Division has won the Contest 6 times consecutively was not adopted but the Trophy does need a new base to accommodate more shields. It was in Darwin during Cyclone Tracey and was even-

tually unearthed bent and tarnished from underneath tons of rubble. The VK5 Division had it repaired and refurbished in gold plate so it has indeed some history behind it.

As usual contests and awards came up for some discussion but the principle was followed that if the appropriate Manager cannot resolve some problem or other he should refer it to Executive. Only if the Executive cannot reach a decision would the matter go before Federal Council.

The existing Executive was re-elected to office en bloc for 1976/77. ■

# THE EXECUTIVE ANNUAL REPORT 1975

The Wireless Institute has just come through a very exciting period. As was mentioned in the last annual report of the Executive the massive inflation had put us in considerable financial difficulty and the matter was considered extensively by the last Convention. We decided that the only satisfactory way to handle the situation was for the Divisions to give the money to wipe out the deficiency that had arisen in the past. These contributions were to be on a pro rata basis. The Councilors made it clear that each Division would like to handle the matter in its own way. A time table was set and I am proud to say that all the contributions have been paid in full despite problems which arose in some Divisions.

As well as this the Council made some suggestions about the Federal Office which I will report on when dealing with that aspect of our activities. The Council decided that one of the past causes of financial problems was that the budget was set too far ahead of its actual implementation, and in 1975 it was decided to review the budget in September in order to give time to make any alteration, if it was needed, to change membership fees which had to be finalised by the end of October because of the computer deadline. This was done and it is to the credit of those who set the budget that no change had to be made.

The fact that at the moment we are out of our financial problem does not negate the point made last year that our present system is slow to react to the financial climate.

## INVESTIGATOR'S REPORT

Bob Arnold VK3ZBB was chosen as the investigator to inquire into and report on the administrative, financial and constitutional organisation of the Institute in its whole and in its several parts. The report has been completed, circulated to the Federal Councilors, published in Amateur Radio and due for consideration at this Convention. I would like to thank Bob who made this report at no cost to the Institute.

## EXAMINATIONS

During the last year the lengthy industrial dispute leading to the ban within the Department of Posts and Telecommunications on the conducting of all examinations led to a dearth of new licensees, a recruiting ground for new WIA members. These bans were an internal governmental problem, were a hardship to many and caused ill-feeling and loss of faith particularly amongst the potential novices. These views were conveyed to the Minister whose reply did little to comfort those waiting to take the examination. The bans were lifted earlier this year.

However the bans represented only one of the two examination problems as seen by the Executive — the other is the severe delay in marking papers and publishing results.

As the only exams conducted since the split-up of the Australian Post Office took place just prior to the writing of this report, it is impossible to tell whether there will be any improvement. However, taking the Government attitude to economies in staff into account it is hard to imagine that the situation will improve very much. The Institute has been investigating an alternative way to provide for exemptions for potential amateurs to hold station licences, or at least provide assistance in the conducting of exams.

## THE EXECUTIVE

Keith Rogel VK3YQ the Honorary Treasurer maintains his expert handling of financial affairs, keeping us well informed as to the situation at any given moment. Keith has also been able to speak with authority when matters concerning office routine or changes were considered. Jim Lloyd VK3CDR the Executive Vice-Chairman has been active in the WICEN area and also concerned with repeaters. Russell Kelly VK3NT who joined the Executive this year spent a considerable time investigating the EDP system with a view to increasing its usefulness to us. Unfortunately, Russell felt it necessary to resign due to a possible conflict of interest. He will however continue his work in relation to the EDP system. Ken Seddon VK3ACS has taken the Repeater Committee under his wing. Peter Wolfenden VK3ZPA has kept us well informed on VHF/UHF matters. Peter is the Chairman of the VHF/UHF Advisory Committee. Graeme Scott VK3ZR was co-opted to replace Russell Kelly until the 1976 Convention. Graeme is a teacher at the Box Hill Technical School and is a great help on the educational side. Also attending most of the Executive meetings were Bill Roper VK3ARZ the Editor of Amateur Radio and David Hull VK3ZDH the Chairman of Project Australia. Their expert advice was invaluable to us.

At this stage I would like to pay tribute to Peter Dodd our Secretary/Manager for the way in which he instigated economies in the office which were a distinct help at this time of financial problems. I would also like to thank Peter for his great help throughout the year both personally and on behalf of the Executive and Federal Council.

## THE OFFICE

At the Convention several suggestions were made into possible changes in the office. On the 3rd July the Executive held a special meeting to look at these matters in depth and in the light of the facts and figures produced the Executive judged that the then existing employees were able to provide the best service at the most economical cost and that there would be the best back up in the case of illness. Colonel Perry volunteered to cut back his hours of attendance but was prepared to work more at a stage when the work load increased.

This year it is very pleasing to see the increased way in which Federal Councilors are participating in the "between Convention" affairs of the Institute, by using the Executive Office as a clearing house for the exchange of information and ideas. This will make the Federal Convention more meaningful as many subjects will already have been commented on in the correspondence which has been circulated around amongst the Councilors. It is also pleasing to see that a significant number of Agenda Items have been received in sufficient time to publish them in Amateur Radio.

## POST OFFICE — DEPARTMENT OF POSTS AND TELECOMMUNICATIONS

Since the last Convention the split-up of the Australian Post Office has left the administration of amateur radio to the Radio Frequency Management Division of the Department of Posts and Telecommunications. We have been in constant communication with personnel of the Division on a number of important matters. There have been several meetings to discuss specific problems including one with the Permanent Secretary to the Depart-

ment, Mr. Fred Green. The main topics discussed were WARC 1979 which is mentioned elsewhere, examinations, repeaters, Call Book, Novice licensing removal of the necessity for special television permits and radio teletype. We have always received a fair hearing and the main problem during the year was industrial action within the Department and the lack of staff.

## WORLD ADMINISTRATIVE RADIO CONFERENCE GENERAL — 1979

In October information was received from the Postmaster-General's Department anticipating the formation of a preparatory group. The WIA was later invited by letter to attend the first preparatory group meeting on 25th February. The draft terms of reference were:

- (1) To prepare and submit Australian proposals for the World Administrative Radio Conference 1979;
- (2) To develop Australia's attitude to proposals of other administrations;
- (3) To recommend an overall Australian position including alternative positions for the work of the Conference for inclusion in the Australian brief for the Conference;
- (4) To make recommendations on the composition of the Australian delegation;
- (5) To establish committees to serve the needs of particular services and to appoint chairmen and vice-chairmen of these committees.

Dr. David Wardlaw attended on behalf of the WIA. The Amateur Service and the Amateur Satellite Service was to be studied by Committee No. 2, chaired by the WIA. It is to be noted that this is a committee of the Australian preparatory group for WARC general 1979 and naturally will be receiving submissions from all amateurs on matters relating to the amateur service and amateur satellite service which will be under consideration at WARC general 1979.

The WIA nominated Dr. David Wardlaw as chairman and a preliminary meeting was held on the 5th April which will report to the second meeting of the Australian preparatory group due to be held on the 28th April. The other six committees cover aeronautical, broadcasting, maritime, space, radio determination and a composite committee for the fixed mobile safety standard frequency and special services.

## IARU

There has been considerable activity on the IARU front this past year with the distribution of the reports of the meetings of both Region 1 and Region 3. Also IARU headquarters is sending monthly WARC 1979 newsletters to all societies to keep them informed as to what is happening throughout the world. The Region 3 news produced by the JARL has reached us and has been distributed to the Divisions.

Following the Region 2 conference in Miami, Noel Eaton VK3CJ President of the IARU has called a World IARU Conference to discuss WARC 1979 in all its facets. The vital importance of this conference became apparent to the WIA especially at this stage of our own WARC 1979 domestic preparations and so it was decided that the President should attend in Miami, the expenses being a charge on the ITU fund. A further report will be given at the Convention.



# ADVANCED AMATEUR COMMUNICATION EQUIPMENT FROM A WORLD LEADER — YAESU



## Bail Electronics Staff at your service — Left to right

Fred Swart  
Greg Whiter  
Fred Bail  
Jim Bail  
Brian Stephens  
Also part-time staff not shown:  
Ken Jane  
Alan Angwin



**FT-101E TRANSCIVER:** 160-10 Mx, SSB, AM, CW, PA two x 6JS6C, 260W PEP input SSB. Built-in dual AC/DC power supply. BUILT-IN RF SPEECH PROCESSOR. Solid state except for Tx. PA and driver. IF noise blanker, FET Rx RF clarifier, built-in speaker. Export mod. 240V AC, 12V DC, inc. 160 & 11m. **\$698.**

**FT-101EE:** Same as above, but without speech processor. **\$649.**

**FT-101 SPEECH PROCESSOR** unit, includes fix ch. osc. **\$70.**

**M-101 MOBILE MOUNT** for FT-101E. **\$26.**

**FT-200 TRANSCIVER:** 80-10 Mx, PA two x 6JS6C, 260W peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator, operates from a separate power supply. **FP-200:** Yaesu AC power supply for FT-200, in matching cabinet with built-in speaker. Power supply and transceiver. **\$468.**

**FT-75B TRANSCIVER:** SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised valve PA, a superb little rig. 80W PEP. Microphone and five crystals included. **\$295.**

**FT-75BS:** Same as above, but low power for Novice use. Includes three crystals, 3565, 21175 and 27125 kHz. **\$276.**

**FP-75B/BS AC POWER SUPPLY:** 230V for FT-75B/BS. Built-in speaker, power cable and plug. **\$74.**

**DC-75B/BS DC POWER SUPPLY:** 12V for FT-75B/BS. Includes built-in speaker, mobile mount, power cable and plug. **\$80.**

**FL-101 TRANSMITTER:** Solid state 160-10m, PA two 6JS6C, all facilities. Companion unit to FR-101. **\$515.**

**FL-101 SPEECH PROCESSOR:** For installation in the FL-101. **\$62.75.**

**FRG-7 WADLEY LOOP RECEIVER:** All solid state, 0.5-29.9 MHz in thirty 1MHz bands. Electronic band selection. **\$259.**

**FR-101D RECEIVER:** All solid state, 23 bands inc. all amateur bands 160-10m plus 6 and 2m, FM, CW, etc., etc. **\$723.**

**FR-101D DIGITAL:** Has all the options of the FR-101D as well as DIGITAL READOUT. **\$889.**

**FR-160 FIXED CHANNEL MARINE and AMATEUR RECEIVER:** 12ch. (6ch. AM, 6ch. SSB.) 1.6-4.5 MHz SSB/AM. 240V AC, 12V DC, built-in spkr. **\$189 plus Crystals.**

**FT-501 DIGITAL READOUT TRANSCIVER:** 80-10m, SSB CW. 500W peak input, includes 2-speed cooling fan, noise blanker, clarifier, VOX and etc. Inc. matching AC PS. **\$865.**

**FL-2100B LINEAR AMPLIFIER:** 80-10Mx, uses 2x572B triodes in G.G., twin fan cooled, styled to match FT-101E. **\$435.**

**FT-620B SIX METRE SSB AM, CW, TRANSCIVER:** 10W solid state, inc. calibrator and AM filter. **\$475.**

**FT-221 TWO METRE TRANSCIVER:** Features all mode operation — SSB/FM/CW/AM — with repeater offset capability. 144-148 MHz coverage using advanced phase-locked loop circuitry. **\$595.**

**M-620/221 MOBILE MOUNT** for FT-620B and FT-221. **\$26.**

**S200R TWO METRE SYNTHESISED FM TRANSCIVER:** 200 channels, 10W solid state. Simplex, repeater, and priority channel facilities. **\$435.**

**FP-2 AC POWER SUPPLY** suitable for use with FT-224, S-200R, etc. 240V AC in, 12V DC 2A out, with built-in speaker and charger. **\$69.**

**FTV-650B SIX METRE TRANSVERTER:** Converts 28 MHz. SSB to VHF, and includes receiving converter. 50W PEP. Primarily designed for coupling with Yaesu transmitters and transceivers. **\$195.**

**FTV-250B TWO METRE TRANSVERTER:** Similar FTV-650B. 10W-15W output, but all solid state and built-in AC PS. **\$230.**

**FT-224 TWO METRE TRANSCIVER:** 10W, 23 Channels, plus one priority channel, direct frequency readout. Includes 40, 50 & 51, plus one rpt.(Other rpters. available at \$9.00 per ch.) **\$199.**

**FT-2 AUTO FM TRANSCIVER:** Similar to FT-224, but with addition of automatic scanning facility, etc. Includes B, 50 and one repeater channel. **\$398.**

**M-2 AUTO MOBILE MOUNT,** for FT-2 Auto. **\$15.**

**YC-355D FREQUENCY COUNTER:** 200 MHz. **\$259.**

**YO-100 MONITORSCOPE:** Matches the FT-101E, but can be used with other Yaesu equipment. (IF kits 455 kHz and 9 MHz optional extra). **\$199.**

**YP-150 DUMMY LOAD/POWER METER:** For use over the frequency range 1.8-200 MHz. Three power ranges, 0-6W, 0.30W, 0-150W with built-in cooling fan. **\$88.50.**

**FF-50DX 3-SECTION LOW PASS FILTER** for TVI reduction. **\$29.50.**

**F-101 FAN.** **\$35.**

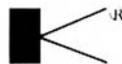
**SP-101 MATCHING EXTERNAL SPEAKERS** for FT-101, FR-101, FRG-7. **\$38.**

# ES FROM BAIL ELECTRONICS



SCALAR  
ANTENNAS

HI-MOUNT



## VHF ANTENNAS

23, 3-element 2m Beam	\$18.00
28, 8-element 2m Beam	\$38.00
215B 15-element 2m super-beam	\$69.00
GPG-2 2m 1/2 wave ground-plane	\$27.50
64B 4-element 6m beam	\$48.00
66B 6-element 6m beam	\$79.00
VS-6GH 6 metre 1/2 wave G.P.	\$28.00
ARX-2 three half wave 6dB gamma loop matched vertical	\$39.00
ARX-450, 435-450 MHz three half wave 6dB Ringo	\$36.00
AR-6, 6m 1/2 wave Ringo 3.75 dB	\$36.00
A144-7, 7-element 2m Beam	\$25.00
A144-11, 11-element 2m Beam	\$35.00
A144-20T, 20-element 2m "Twist" Beam	\$72.00
A50-3, 3-element 6m Beam	\$37.00
A50-5, 5-element 6m Beam	\$57.00
A430-11, 11-element 430 MHz Beam	\$25.00

## VHF MOBILE ANTENNAS

265 1/2 wave Magmount for 2m, inc. co-ax	\$41.00
270 Double stacked 1/2-wave fibreglass whip for 2m	\$45.00
271 Model for 270	\$6.00
AS-2HR, 1/2-wave SS 2m gutter mount, inc. co-ax	\$35.00
AS-2PAD as above, but fibreglass whip	\$37.00
AS-2HRF 1/2-wave cowl mount type	\$42.00
AS-6RD 6m centre loaded SS whip with gutter mount	\$19.00

## STANDARD VHF TRANSCEIVERS

SR-C146A, 2m hand held 5 chan. 2W transceiver, inc. carrying case and 4 chns	\$159.00
SR-C432A, 70cm hand held 6 chan. 2W transceiver, inc. carrying case and 1 chn (435 MHz)	\$199.00
SR-C430 70cm 12 chan. 10 watt mobile transceiver inc. 1 ch (435 MHz)	\$295.00

## STANDARD ACCESSORIES

CMP08 Hand mic. for SR-C146A and SR-C432	\$18.50
CAT08 Rubber antenna (helical) for SR-C146A	\$8.00
Heavy Duty Carrying Case for hand held units	\$13.50
AC Adapter and charger for hand held units	\$36.00
Mobile Adapter for hand held units	\$11.50
AC Charger only	\$9.00

## BALUNS

HY GAIN	
BN-86, broad-band ferrite Balun, 2 kW for Beams and Doublets	\$25.00

## ROTATORS

CDR	
Ham II, 230 V AC	\$189.50
CD-44 Medium duty rotator, 230V	\$128.00
AR-22L Light, low cost rotator, 230 V	\$65.00
Cable, 8 Conductor, for Ham II CD-44 (with rotator purchase)	75 cents yd.

## ANTENNA ACCESSORIES

HY GAIN	
LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs.	\$39.00
LA-2, smaller size co-ax arrestor	\$8.75
KW TVI filter 5 Section, SO-239 connectors. A superior job with excellent attenuation	\$48.00

## Q CRAFT

Porcelain Egg insulators	50 cents
WIDE RANGE of Co-axial cable and connectors in stock.	
K-20 70 ohm Twin feeder	27 cents per yd.

## KWELECTRONICS

Multi-band dipole traps with ceramic "T" centre insulator, 80-10m bands per pair complete with insulator	\$26.50
Co-axial cable switch, 3 positions	\$24.00

## B & W

Co-axial cable switches, 5 position, Model 590G	\$29.00
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## SWR METERS AND DUMMY LOADS

### Q CRAFT

SWFS-2, single meter type, combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2 1/4"	
3-150 MHz, UHF connectors	\$16.50
SWR-2, dual meters, 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2 1/4"	
3-150 MHz, UHF connectors	\$24.00
SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kW in three ranges. A very elegant instrument.	
7 1/2" x 2 3/4" x 3 3/4"	\$54.00
FS-600A Peak Reading Wattmeter SWR meter 20, 200, 500 and 1000 watts 230 VAC operation. 3.5-30 MHz, very accurate	\$57.00
FS-301 Wattmeter/SWR meter 20, 200 and 1000 watts 3.5-30 MHz	\$38.00

## KWELECTRONICS

Z Match Antenna Couplers, 80 metres to 10 metres. Beautifully finished in communication grey (see review "QST" July, 1972):—	
KW E-Zee Match, screw terminals at rear, size 5 1/2" x 6" x 12"	\$76.50
KW-107 Supermatch, as above with addition of SWR meter, power meter with large 50 ohm dummy load to read up to 1 kW PEP, UHF sockets at rear.	
A superb piece of equipment, 7" x 8" x 13"	\$209.00
KW-109 High power version of KW-107, larger condensers and coils	\$245.00
KW-103 SWR Power Meter uses toroidal coil pick-up for continuous operation 52 ohms 1 kW max. to 30 MHz SO239 UHF sockets very accurate	\$55.00

## HEATH KIT

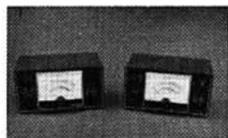
HN31 Cantenna Kit 1 kW oil cooled (oil not included)	\$33.00
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## OTHER ACCESSORIES

EKM-1A Audio Morse CP Osc with speaker, one transistor, and tone control, requires one UM3 cell, in metal case 3 1/2" x 2 1/2" x 1 1/2"	\$10.95
TC-701 Morse Practice Osc. with built-in key and spkr. Inc. battery and auxiliary earpiece. Copy of morse code on case. Two can be wired together to form a practice communication set	\$16.50
MC-701 Mic. Compressor, battery operated. Available with 4 pin mic. connector	\$45.00

## MORSE KEYS

EK-108A Electronic keyer, super quality, IC with dot memory. Built-in monitor & paddle. Solid state "relay". 230 V AC	\$79.50
EK-108D, DC, same as EK108A but takes 2 size 'D' cells	\$72.00





# LARGE RANGE OF ACCESSORIES



**OPTIONAL CRYSTAL FILTERS.** (Inc. CW & AM filters for FT-101). \$55.

**MATCHING VFOs:** FV-101B, FV-200, each \$120.

**YC-801 DIGITAL READOUT ADAPTOR** for FT-101E, inc. built-in AC PS. \$189.

**YD-844 DESK MICROPHONE:** Yaesu De Luxe PTT Dynamic type with stand, spring and lock PTT switches. PTT also actuated when lifted from deck. \$39.50.

**RS SERIES HF GUTTER MOUNT MOBILE ANTENNAS:** RS Base and Mast (doubles as 1/4 wave on 2m). \$16.00. Coil and Tip Rods: RSL-3-5, \$16.00. RSL-7, \$14.00. RSL-14, \$13.00. RSL21, \$12. RSL-27/28, \$11.

As the sole authorised Yaesu agent and factory representative for Australia, we provide presales checking of sets, after-sales services, spares availability and 90-day warranty.

Quote type and serial number of set when ordering spares. All prices include sales tax. Freight is extra. Prices and specifications subject to change without notice. Allow 50c per \$100 for insurance.

## ANTENNAS AND ANTENNA ACCESSORIES

### HF MONOBANDERS

204BA, 4 element 20m. Beam	\$194.00
203BA, 3 element 20m. Beam	\$168.00
VS-20CL 3 elem. W.S. 20m beam, inc. Balun	\$154.50

### HF DUO BAND

VS-22 3 element 15-11/10m, Inc. Balun	\$118.00
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### HF TRIBAND BEAMS

TH6DXX, 6-element trap Beam	\$248.00
TH3Mk3, 3-element trap Beam	\$199.00
TH3Jr, 3-element trap Beam	\$146.50
HY-QUAD 2 element Quad Beam	\$225.00
VS-33 (Equiv. TH3Mk3), Inc. Balun	\$179.00

### NOVICE BEAMS

CB-3 3-element 11m	\$49.50
CB-5 5-element 11m	\$68.90
Long John 5-element (wide spaced) 11m	\$92.75
Eliminator II, 2-element Quad. Sw'ble polarisation, 11m	\$89.00
Big Gun II, 4-element Quad. Sw'ble polarisation, 11m	\$185.00
SDB-6 Stacked 6-el Beam (3 + 3)	\$128.00

### HF VERTICALS

VS41/80KR 10m thru 80m, inc. 11m	\$80.00
14AVQ, 10m thru 40m trap Vertical	\$69.00
18AVT, 10m thru 80m trap Vertical	\$98.00
12AVQ, 10m thru 20m trap Vertical	\$50.00
18V 10m thru 80m base loaded Vertical	\$39.00
18HT 10m thru 80m Tower	\$275.00
VS-RG Radial Kit for VS-41/80KR	\$22.50
Golden CLR-2 1/2 wave, 11m heavy duty G.P. 4 dB	\$63.70
CLR-2 1/2 wave, 11m G.P.	\$48.00
GPGP 1/4 wave, 1m G.P.	\$24.00
GOLDEN ROD 1/2 wave, 11m 3.75 dB	\$37.00
CR-1 1/2 wave Ringo, 11m 3.75 dB	\$43.00
HOPE-10GP. 10/11 metre helical groundplane	\$64.00

## HF MOBILE WHIPS AND FITTINGS

### HY-GAIN & ASAHI MOBILE ANTENNAS

HELL CAT 3 35" Magnetic base, 11m	\$33.00
AQUA CAT 108" Marine, 11m (no ground plane req'd.)	\$69.00
HELL CAT 9, 58" Marine (no ground plane req'd.), 11m	\$36.50
W-102 102" S.S. Whip	\$15.55
HOPE-10R 10/11 metre adjustable gutter mounted helical inc. cable and connector	\$38.00
HOPE-10B 10/11 metre adjustable helical equipped with ball mount and spring	\$35.00

THUNDERSTICK 108" fibreglass whip	\$19.00
SUPER STICK similar to Thunder Stick, but double section	\$21.00
GUTTER CLIP for whip tops	\$2.20
HOPE-15R 15 metre adjustable gutter mounted helical incl. co-ax and connector	\$39.00
HOPE-IORE 10/11 metre whip top only (as used in Hope-10R)	\$23.00
HOPE-15RE 15 metre whip top only (as used in HOPE-15R)	\$26.00
CIT-1H 10/11 metre base loaded, boot or rooftop mount, incl. co-ax and plug	\$19.95
CIT-2H 10/11 metre centre loaded gutter mounted whip, incl. co-ax and plug	\$19.95
AS-303 HF Mobile antenna set, centre loaded, incl. heavy duty ball mount and spring	\$108.00
AS-NK matching S.S. Bumper Mount for AS-303	\$14.00
VS-6GH 6 metre 3/4 wave ground plane	\$28.00
AS-2DW 2 metre 1/4 wave gutter mounted whip incl. co-ax and connector	\$23.00
HOPE-2R 2 metre gutter mounted helical, only 22 cms long, incl. co-ax 2 connector	\$32.00
VS-TOWN 2 metre flexible gutter mounted helical	\$15.00
HU-2HR 2 metre Hidaka 3/4 wave gutter mount incl. co-ax and connector	\$35.00

## SCALAR MOBILE WHIPS

M-22T 1/4 wave 2m whip top	\$5.95
M-25T 3/4 wave 2m whip top	\$15.00
M27-R60T 5ft. 11m C.L. whip top	\$19.45
M-35T 4.5 dB Gain, 435 MHz S.S. whip top with spring	\$18.00
M.B. Standard base	\$4.20
MB UHF base	\$5.25
MAGBASE inc. 12ft. of RG-58/AU	\$37.95

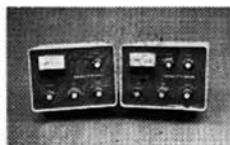
## MARK MOBILE

### Helical:

HW-80-8 80m, 8 ft	\$39.00	HW-15, 15m, 4ft.	\$18.00
HW-80, 80m, 6ft.	\$25.00	HW-11, 11m, 4ft.	\$18.00
HW-40, 40m, 6ft.	\$23.00	HW-11, 11m, 6ft.	\$19.00
HW-20, 20m, 6ft.	\$19.00	HW-10, 10m, 4ft.	\$18.00

### FITTINGS: (Suit all makes with 3/8" x 24 thread).

BPR, bumper mount	\$15.00
BDYF, heavy duty adjustable body mount	\$15.00
HWM-1, fixed body mount	\$14.00
SPG, heavy duty spring	\$11.00
SPGM, light duty miniature spring	\$6.00
Asahi AS-KRB, flat roof mounting adapter for vertical trap antennas	\$15.00
VS-BM Ball Mount & Spring	\$18.00





# YAESU AMATEUR EQUIPMENT

## HI-MOUND

- HK-710** De luxe heavy duty morse key. Heavy base. A really beautifully constructed and finished unit. Fitted with a dust cover, standard knob and knob plate **\$29.50**
- HK-708** Economy key, all black ABS resin base and chromed mechanism **\$9.95**
- HK-707**, Similar to above but with dust cover and standard knob **\$15.00**
- HK-808**, Commercial hand key with ball race pivots, heavy poly marble base and plastic dust cover **\$45.00**
- MK-701** Side Swiper key to actuate an Electronic keyer **\$29.50**
- BK-100 (BUG)** Semi-automatic bug key, full adjustable **\$38.50**

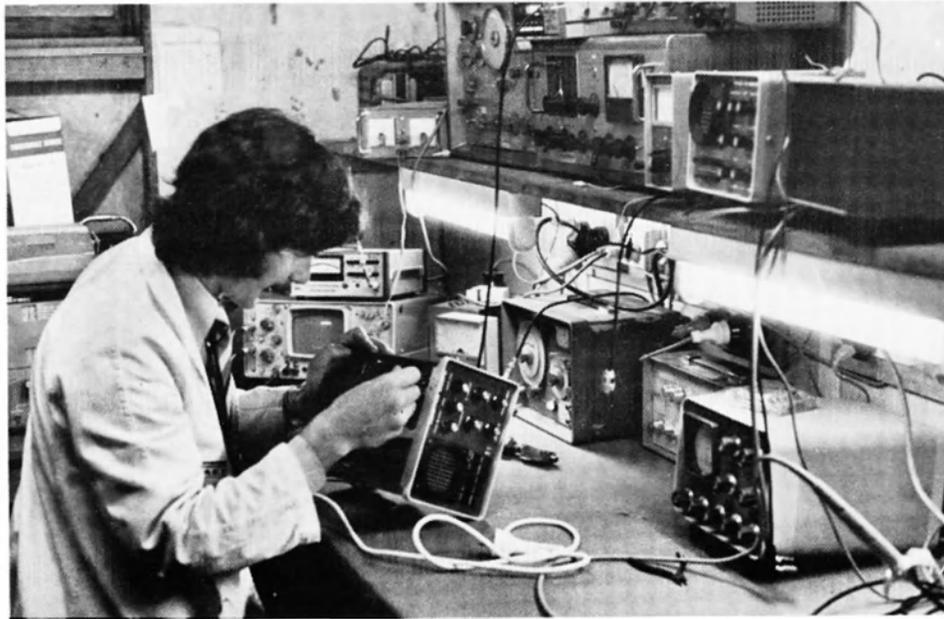
## MONITOR RECEIVERS

- SC101**, Automatic scanning receiver, 4 VHF chns., 4 UHF chns. RF stages, tuned to 146 and 435 MHz **\$135**, Xtals extra.
- MR-2**, Mini Monitor. 12 ch. pocket receiver VHF. **\$100**, Xtals extra

Also available: equipment for novice and Marine use on 11m band. Antennas, beams, Walkie Talkies, base stations, and accessories. Digital clocks, SSTV, Generator noise filters.

**Servicing facilities for all types of Amateur and Novice equipment. We check all sets before sale and provide a 90 day warranty.**

All prices incl. S.T. Postage and freight extra. Add Ins., 50c per \$100. Prices and specifications subject to change without notice. Availability depends on stock position at time of ordering.



A fully equipped workshop provides prompt attention to your service requirements and full pre-delivery checking of transceivers, etc. Pictured *Left* is Greg Whiter, workshop manager who is assisted by Fred Swart, technician, and Brian Stephens, workshop assistant and despatch.

**baill ELECTRONIC SERVICES**  
**FRED BAIL VK3YS**  
**JIM BAIL VK3ABA**

**60 Shannon St., Box Hill North, Vic., 3129.**  
**Ph. 89 2213**

Radio amateur equipment from B.E.S. also available by:

- |     |   |              |
|-----|---|--------------|
| WA  | Radio Communication Services H. R. PRIDE, 26 Lockhart St. Comp. 6152            | Ph. 63 4379  |
| SA  | F. J. B. PTY. LTD. 20 Stanley St. Plympton 5038                                 | Ph. 293 2155 |
| TAS | G. T. ELECTRONICS 131 Westbury Rd. South Launceston 7200                        | Ph. 44 4713  |
| NSW | Aviation Training STEPHEN KUHLE 104 Robey St. Mascot 2020                       | Ph. 667 1650 |
|     |   | AH 371 8448  |
|     | Amateur & Novice Comm. Supplies W. F. BRODIE, 23 Dalry Street, Seven Hills 2147 | Ph. 624 2691 |
|     | DIGITRONICS, 186 Parry St. Newcastle West 2302                                  | Ph. 69 2040  |
| QLD | H. C. BARKLOW 82 Charles St. Aikenhead Townsville 4814                          | Ph. 79 9179  |
|     | MITCHELL RADIO CO. 59 Alpin Rd. Albion 4013                                     | Ph. 57 8830  |
| ACT | QUICKTRONIC Jim Blunt Shop 11 Albee Cr. Phillip 2606                            | Ph. 81 2824  |
|     |   | 82 2864      |

## RTTY

At the last convention restrictions on amateur RTTY transmissions were discussed with a view to having them liberalised. The Executive referred the matter to the AARTG who have produced a report on which to base our submissions on desirable changes to the amateur regulations. Already preliminary discussions have taken place. The main points of the report are as follows:

- A suggestion for a relaxation but not elimination of the contentious issue of CW identification by RTTY operators.
- A choice of two codes is specified — approval of ASCII would open the way for the amateur service to make use of the ASCII coded equipment as used in the computer industry. The codes are — the 5 unit teleprinter code corresponding to international telegraph alphabet No. 2, and the 8 unit American standard code for information exchange, i.e. ASCII. It is also felt that subject to special application other coding methods should be permitted.

## CALL BOOK

This year the Call Book was produced by the Hunter Branch in order to decentralise the workload from Melbourne, and our grateful thanks go to them for the job. The Publications Committee has suggested that the next Call Book should be produced from the computer printout, and the Executive has endorsed their suggestion. The best method to use our computer files for the purpose is under investigation at the moment.

## MAGAZINE AMATEUR RADIO

During the year Bill Roper VK3ARZ and the Publications Committee have maintained the high standard — the December issue being a mammoth 60 pages. As you will see from the financial report we have been able to keep printing within budget; however postal charges are taking a larger and larger slice of the amount required to get

"Amateur Radio" to the members. Alternative methods of distribution have been suggested by some members but at the moment no feasible alternative to the mail can be seen as our membership is so diversely scattered. The current cost of postage alone for AR works out at about \$1.20 per member per year.

## REPEATERS

There has been an exchange of ideas between the Institute and the Ministry of Posts and Telecommunications on the formulation of a revised set of conditions for the operation of repeaters which is to be applied on a national basis. Since VK5 relinquished the Federal Repeater Committee an ad-hoc Executive Repeater Sub-Committee has been set up in Melbourne with Ken Seddon VK3ACS, an Executive member, as chairman. Matters being considered are — the draft conditions already mentioned, the need for additional 2 metre repeater channels as the seven already allocated appear insufficient in certain geographic areas and the 70 cm repeater channels.

## INTRUDER WATCH

During the year Alf Chandler, VK3LC and Ivor Stafford, VK3XB who acted in Alf's place while he was overseas, raised the question of the effectiveness of amateur reports. The matter was referred further by Executive and as a consequence the Intruder Watch reporting stationery has been redesigned to fit in with departmental requirements. Alf has been appointed the Region 3 Intruder Watch Co-ordinator and this gives him great scope to carry on with his liaison with Regions 1 and 2.

## WICEN

At the last Convention the ACT Division offered to provide a Federal WICEN Co-ordinating Committee. This has been done with Rex Roseblade VK1OJ as the Co-ordinator. Rex has made contact with the National Disaster Organisation and has brought the amateur's worth in emergencies to their notice.

The Executive Vice-President on behalf of the Executive also made a personal call on Major-General Stretton, Director-General NDO.

## PROJECT AUSTRALIS

During the year the Australis group has been mainly concerned with planning for further satellites and it is pleasing to note that Australia is considered one of the major countries as far as the Amateur Satellite Service is concerned.

To all our co-opted officers I would like to express my own thanks and also on behalf of all the members. Furthermore, I would like to add my personal thanks to the members of Executive for their help during the year.

## ATTENDANCE

The following is a statement of the attendances at Executive meeting during the year to mid-April since the date of the last Convention:

Name	Attended	Possible Attendances
Dr. D. A. Wardlaw	14	14
Surg/Capt. S. J. Lloyd	7	
Mr. K. V. Roget	13	
Mr. K. C. Seddon	13	
Mr. P. A. Wollenden	13	
Mr. R. J. L. Kelly	6	9
Mr. G. F. Scott	4	5

(Mr. W. E. J. Roper attended 10 and Mr. D. J. B. Hull attended 6 meetings).

## IARU HQ MEETING

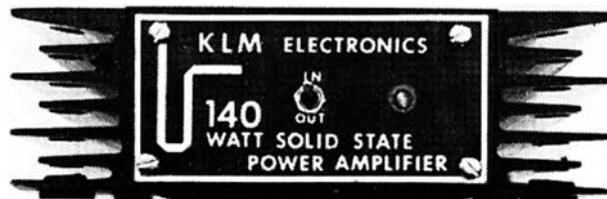
The meeting in Miami with representatives of all Regions and many Societies was extremely valuable and will be reported on separately to save time. I also visited ARRL HQ and VE3CJ in Canada.

D. A. WARDLAW,  
President.

# KLM PRODUCTS

*they're heard when others aren't*

- **HIGH GAIN ANTENNAS IN KIT FORM**
  - (1) All parts except elements and booms.
  - (2) All parts except booms.
- 144-148 MHz — 8 Models including 2 for circ. polarization.
- 420-470 MHz — 5 Models including 16 el. 12 ft. boom 15 dB gain.
- 52-54 MHz available shortly.
- **QUARTER WAVE SLEEVE BALUNS**  
2-way and 4-way power dividers and couplers:
  - 144-148 MHz
  - 420-470 MHz
- Tubing, Lowloss coax., connectors, etc.



- **SOLID STATE AMPLIFIERS (13.5V DC Nominal)**  
To suit your FM/CW/SSB rig (no tuning micro-stripline circuitry).
  - 144-148 MHz — 14 Models including 7 linears.
  - 420-450 MHz — 5 Models including 2 linears.
  - 52-54 MHz available shortly.

Write for full information sheets:

SOLE AUSTRALIAN AGENTS —

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Interstate Representation:

**GOLD COAST COMMUNICATIONS**

17A Ashton St., Labrador, Q. 4215 (075) 37 3926 (Mike)

# Wireless Institute of Australia Executive Financial Report

For the year ended 31st December, 1975 the Institute incurred a Net Surplus of \$13,452.00.

The Executive has taken reasonable steps, before the Statement of Income and Expenditure and Balance Sheet were made out to ascertain that action had been taken in relation to the writing off of bad debts and making of provision for doubtful debts and to cause all known bad debts to be written off and adequate provision to be made for doubtful debts.

At the date of this report, the Executive is not aware of any circumstances which would render the amount written off for bad debts, or the amount of the provision for doubtful debts, inadequate to any substantial extent.

At the date of this report, the Executive is not aware of any circumstances which would render the values attributed to current assets in the accounts misleading.

At the date of this report no charges exist on the assets of the Institute which have arisen since the end of the financial year and does not secure the liabilities of any other person.

There does not exist any contingent liability which has arisen since the end of the financial year.

No contingent liability or any other liability has become enforceable within the period of twelve months after the end of the financial year which in the opinion of the Executive will or may affect the ability of the Institute to meet its obligations when they fall due.

Since the end of the previous financial year the Executive has not received or become entitled to receive a benefit by reason of a contract made by the Institute or a related corporation with the Executive or with firms of which they are members or with companies in which they have substantial financial interests.

The results of the Institute's operations during the financial year were in the opinion of the Executive not substantially affected by any item, transaction or event of a material and unusual nature. There has not arisen in the interval between the end of the financial year and the date of the report, any item, transaction or event of a material and unusual nature likely, in the opinion of the Executive, to affect substantially the results of the Institute's operations for the next succeeding financial year.

K. C. SEDDON, Councillor  
K. V. ROGET, Councillor

## BALANCE SHEET AS AT 31ST DECEMBER, 1975

	1975	1974
<b>MEMBERS' FUNDS</b>		
Accumulated Fund	\$6,067	(\$7,385)
Reserve Fund	627	627
Special Funds — ITU	7,766	7,206
IARU	3,050	3,306
	<b>\$17,510</b>	<b>\$3,754</b>

Represented by:

	1975	1974
<b>CURRENT ASSETS</b>		
Cash at Bank — General Account	\$1,951	\$3,578
IARU Account	—	446
Short Term Deposit	5,750	—
ITU Deposit	8,000	—
Special Bonds	—	7,000
Sundry Debtors — Less Provision for Bad Debts	14,840	5,658
	(2,000)	(200)
Stock on Hand — at Cost	3,532	4,613
	<b>32,073</b>	<b>21,093</b>

## NON CURRENT ASSETS

Furniture and Fittings — at Cost	1,611	2,162
Less Provision for Depreciation	322	551
	<b>1,289</b>	<b>1,611</b>
	<b>33,362</b>	<b>22,704</b>

## DEDUCT CURRENT LIABILITIES

Sundry Creditors	\$1,052	3,325
Subscriptions In Advance	12,166	14,750
Loans — VK6 Division	—	250
VK4 Division	—	125
Provision for Superannuation	1,250	500
Deposits — Maggubs	300	—
Darwin Donations	1,084	—
	<b>15,852</b>	<b>18,950</b>
	<b>\$17,510</b>	<b>\$3,754</b>

## STATEMENT OF INCOME AND EXPENDITURE FOR YEAR ENDED 30TH JUNE, 1975

	1975	1974
<b>INCOME</b>		
Members' Subscriptions	\$40,465	\$29,645
Surplus — Publications (Note 1)	612	4,494
Interest Received	300	198
Levies Received	16,500	—
Call Book	1,982	—
Sundry Income	—	223
	<b>59,859</b>	<b>34,560</b>

## EXPENDITURE

Amateur Radio Deficit (Note 2)	\$15,498	16,804
Audit Fees	150	150
Bank Charges	316	296
Convention Expenses	1,876	—
Contribution — IARU	—	850
Committee Expenses	259	377
Depreciation	322	403
EDP Expenses	2,114	625
General Expenses	298	346
Insurances	594	176
Legal Expenses	29	—
Provision for Bad Debts	1,800	—
Postage & Freight	2,026	1,435
Project Australis	1,180	653
Rent and Rates	1,787	1,759
Repairs and Maintenance	283	79
Superannuation	750	500
Stationery and Printing	1,149	1,250
Salaries and Secretarial	15,371	14,646
Telephone	459	379
Travelling Expenses	146	860
	<b>46,407</b>	<b>41,588</b>

## NET SURPLUS/DEFICIT

Accumulated Fund Brought Forward	(7,385)	(357)
	<b>13,452</b>	<b>(7,028)</b>

## ACCUMULATED FUND

	<b>\$6,067</b>	<b>(\$7,385)</b>
--	----------------	------------------

## NOTES TO AND FORMING PART OF THE ACCOUNTS

### 1. PUBLICATIONS

	1975	1974
Sales to Members	\$11,482	\$8,425
Less Cost of Sales	10,870	3,931
	<b>612</b>	<b>4,494</b>

### 2. AMATEUR RADIO

<b>Income</b>		
Advertising	\$18,452	\$10,204
Subscriptions	890	309
Sundry Income	1,243	571
	<b>20,585</b>	<b>11,084</b>

### Expenditure

Awards	\$65	85
Bad Debts	172	57
Honorariums	2,725	2,520
Postage	5,428	3,673
Publishing and Printing costs	24,471	17,913
Salaries	2,305	1,572
Travelling and Sundries	917	2,067
	<b>36,083</b>	<b>27,887</b>

## DEFICIT FOR YEAR

	<b>\$15,498</b>	<b>\$16,803</b>
--	-----------------	-----------------

## WIRELESS INSTITUTE OF AUSTRALIA EXECUTIVE STATEMENT

In our opinion

(a) The Statement of Income and Expenditure is drawn up so as to give a true and fair view of

the surplus of the Institute for the financial year ended 31st December, 1975:

(b) The Balance Sheet is drawn up so as to give a true and fair view of the state of affairs of the Institute as at the end of the financial year.

K. C. SEDDON, Councillor  
K. V. ROGET, Councillor

## STATEMENT BY PRINCIPAL ACCOUNTING OFFICER

To the best of my knowledge and belief the accounts for the year ended 31st December, 1975, give a true and fair view of the matters contained in Section 162 of the Companies Act 1961, and required to be dealt with in the accounts as presented.

P. B. DODD, Principal Accounting Officer

## AUDITORS' REPORT TO THE MEMBERS OF THE WIRELESS INSTITUTE OF AUSTRALIA

1. In our opinion the attached accounts give a true and fair view of the state of the Institute's affairs at 31st December, 1975 and of its surplus for the year ended on that date.

2. As required by the Companies Act 1961, we report as follows:  
In our opinion

(a) The attached accounts are properly drawn up  
1) So as to give a true and fair view of the matters required by Section 162 to be dealt with in the accounts; and  
2) in accordance with provisions of that Act

(b) The accounting records and other records, and the registers, required by the Act to be kept by the Company have been properly kept in accordance with the provisions of that Act.

## HEBARD & GUNNING CHARTERED ACCOUNTANTS

P. W. HEBARD, Partner  
Melbourne  
4th March, 1976

## MEMBERSHIP STATISTICS

These are compiled from the EDP data at mid-December 1975 input and P & T Department data kindly supplied as at 31.12.1975.

TABLE 1. Totals (Previous year below).

	Total Licenses	WIA licensed members	% member to total licenses	Other WIA members	Total WIA members
VK1	126	83	66	35	118
VK2	2233	957	43	232	1189†
VK3	2144	1074	50	345	1419
VK4	2122	1083	46	366	612
VK5/8	815	457	56	155	664*
	843	451	54	186	
VK6/9X	521	278	53	69	347
	526	268	51	83	
VK7	239	160	67	64	224
	238	160	67	53	
VK0	6	—	—	—	
	5				
<b>TOTALS</b>	<b>6919</b>	<b>3482</b>	<b>50</b>	<b>1091</b>	<b>4573</b>
	<b>6841</b>	<b>3420</b>	<b>50</b>	<b>1093</b>	<b>4513</b>

\*Includes "21 Junior Associates" (3 with call signs).

†Includes Norfolk Is. (5) — Christmas Is. (3).

## TABLE 2. Call Sign distribution of members

	Full				Limited			O.S.	Total
	2 I.	3 I.	"C"	"Z"	"Y"				
VK1	58	5	—	20	—	—	—	83	
VK2	288	400	4	230	30	5	—	957*	
VK3	352	393	6	231	82	10	—	1074	
VK4	310	9	2	123	—	13	—	457	
VK5/8	326	4	—	138	—	5	—	473	
VK6/9X	228	3	1	45	—	1	—	278†	
VK7	105	—	1	53	—	1	—	160	
<b>TOTALS</b>	<b>1667</b>	<b>814</b>	<b>14</b>	<b>840</b>	<b>112</b>	<b>35</b>	<b>—</b>	<b>3482</b>	

\*Includes 1 on Lord Howe Island.

†Includes 2 on Christmas Island.

O.S. = Overseas — includes 19 in PNG.

## TO OUR VALUED MAIL ORDER CUSTOMERS

WE SINCERELY APOLOGISE FOR THE DELAYS IN FULFILLING MAIL ORDERS DURING MAY AND JUNE OUR PREVIOUS DAILY MAIL ORDER SERVICE HAS BEEN OPERATING AT UP TO 14 DAYS DELAY BECAUSE OF UNPRECEDENTED DEMAND OUR STAFF ARE STARTING AT 6:10 AM EVERY MORNING AND WE ARE DOING EVERYTHING POSSIBLE TO INCREASE THE OUTPUT WITHOUT INCREASING MISTAKES. WE BELIEVE THAT WE SHOULD BE COMPLETELY UP TO DATE BY THE TIME THIS ADVERTISEMENT APPEARS

DICK SMITH AND STAFF

## POSITIONS VACANT

### MAIL ORDER STAFF

WE DESPERATELY REQUIRE STAFF FOR OUR MAIL ORDER DEPARTMENT MUST BE CONSCIENTIOUS AND HAVE A GOOD BASIC ELECTRONIC KNOWLEDGE. WHY NOT COME TO SYDNEY FOR A WORKING HOLIDAY?

### AMATEUR RADIO MANAGER

WE AT DICK SMITH ELECTRONICS REQUIRE THE SERVICES OF A SALESMAN WITH THE KNOWLEDGE OF TWO-WAY RADIO, COMMUNICATIONS AND TEST EQUIPMENT. THE APPLICANT PREFERABLY SHOULD HOLD AN AMATEUR RADIO LICENCE AND/OR BE INTERESTED IN THIS FIELD. THE APPOINTMENT IS IN OUR GORE HILL STORE. PLEASE PHONE SANDY BRUCE-SMITH (VK2AD). COMMUNICATIONS MANAGER ON 439 5311 FOR DETAILS.

### MAIL ORDER MANAGER

We require the services of a dynamic electronic enthusiast to work with and supervise a high volume component assembly section in our Mail Order Department.

Comprehensive knowledge of electronic components is needed, coupled with the ability to train and control staff in a department that has a track record of rapid growth.

Please contact John Hemsley on 439 5311 in Sydney, between the hours of 9am to 5pm or phone Sydney 918 8532 after hours.



## DICK SMITH ELECTRONICS

P.O. Box 747, Crows Nest, N.S.W., 2065.  
Phone 439 5311.

**R.H. Cunningham**  
Pty. Ltd.

## Protect your instruments and equipment with **ALERT** cartridge fuses



ALERT fuses are "on guard" against electrical overloads in Electronic, Industrial and Telecommunications installations. Manufactured by Kenneth R. Beswick Ltd., U.K., the ALERT range include British Military Standards, British P.O. Standards, and many of the international specifications.

### Popular Sizes EX-STOCK

- TDC 10:** 1/4" x 1/4" Quick acting 100 ma to 25 amp.
- TDC 11:** 1/4" x 1/4" Slow blow (or delay) 60 ma to 10 amp.
- TDC 13:** 20mm x 5 mm Quick acting 63 ma to 3 amp
- TDC 69:** 3/8" x 3/16" Quick acting 25ma to 10 amp.
- TDC 123:** 20mm x 5mm Slow blow 100 ma to 2.5 amp.

Available from Wholesalers  
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W.A.: 256 Stirling St., Perth, 6000 Ph. 28 3655  
QLD.: L. E. BOUGHEN & CO., 30 Grimes St., Auchenflower, 4056 Ph. 370 8097  
S.A.: Werner Electronic Industries Pty. Ltd., Unit 25, 6-8 Gray St., Kilkenny, 5009 Ph. 268 2801

Telex Melbourne, 31447  
Sydney, 21707 Brisbane,  
41500 Perth 93244

## A few words from "IZNIBS"

**Technicalities.** Recent additions to the Vicom shelves have included a range of DAIWA accessories not before imported to Australia. The most impressive in their antenna couplers is a unit capable of handling - well like the Rolls Royce specifications - power is sufficient! The two speech compressors are extremely well

finished and come complete with built in two tone generator and AC/DC operation. Incidentally, it's the first time we have seen Japanese equipment come into the country with 3 pin plugs already fitted!

For the UHF experimenter we have KURANISHI dummy loads of 120 watt rating up to 500 MHz and DAIWA have an excellent SWR bridge for the 2 metre and 70 cm bands.

TRIO have just released their top of the range TS820. It is to replace the 599 series and incorporates such refinements as optional digital read out IF shift control or "pass band tuning" which enables a shift of unwanted signals from the receiver pass band without changing the receive frequency. Sorry its not all solid state but it does use the same tube line-up as the TS 520. Frequency range is 1.8-29.7 MHz; - Price well - certainly not middle of the road, but looks like a recommended retail of \$830 for the basic unit with the digital read out option about \$160. Drop me a note for further details.

The last report of the Director of Consumer Affairs in Victoria contains the following paragraphs:

"One is constantly astounded at consumers who fail to take even the simplest of precautions in their dealings.

"With the best of intentions and an abundance of staff, it would be impossible for any consumer affairs organisation to gain redress for all the irresponsible consumers who recklessly buy items from backyarders, engage spurious tradesmen who door knock for business, or who sign documents without reading them.

"It was John Ruskin who said:

'There is hardly anything in the world that someone cannot make a little worse and a little cheaper, and the people who consider price alone are this man's lawful prey.'

"It is not the role of consumer affairs to get redress for a person whose only consideration was price . . ."

We of course, have had the experience of amateurs buying equipment from self appointed (and "bargain priced") agents, finding problems and then coming to us somewhat apologetic and red-faced.

Naturally we do what we can, but the above comment sets out quite clearly the position you are in when major consumer items are purchased, or have them repaired.

The moral of all this is obvious - buy from a company who has manufacturer support!

It is interesting to note that the Atlas noise blander works on the same principle as the famous LAMB noise silencer and the grey hairs in our ranks should remember all about it as it appeared in various guises in the ARRL handbook QST etc., for a long long time. We are now offering the Atlas with noise blander and the antenna matching transformer for \$695 and with the small circuit improvements that have been incorporated over the last 12 months, the ideal mobile rig is better than ever.

73 PETER 31Z

VICOM International Pty Limited

**TABLE 3. P & T Department licensees distribution (members in brackets)**

	Full	Limited	Totals
VK1	100 (83)	26 (20)	126 (83)
VK2	1586 (891)	642 (259)	2228 (950)
VK3	1344 (751)	800 (313)	2144 (1064)
VK4	543 (321)	272 (123)	815 (444)
VK5	528 (318)	255 (134)	783 (452)
VK6	392 (230)	126 (44)	518 (274)
VK7	161 (105)	78 (53)	239 (158)
VK8	42 (14)	10 (6)	52
VK9 Christm.	—	—	3
Norfolk	—	—	5
VK0	—	—	6
<b>TOTALS</b>	<b>4696 (4665)</b>	<b>2209 (2176)</b>	<b>6919 (6841)</b>

**TABLE 4. WIA member clubs and groups**

VK1	2
VK2	16
VK3	18
VK4	15
VK5	3
VK6	8
VK7	—
<b>62</b>	

**TABLE 5. Distribution of members (see note after the table) — (overseas excluded)**

State	C/s	"Metropolitan"	"Country"	"Interstate"	N.T.	(Br. Hill)
VK1	Full 2	56	—	2	—	—
	Full 3	4	—	1	—	—
	Associates	19	—	1	—	—
VK2	Licensed	565	376	9	2	(2)
	Associates	120	98	6	2	—
VK3	Licensed	746	304	14	—	—
	Associates	258	83	1	—	—
VK4	Licensed	203	234	7	—	—
	Associates	81	68	1	—	—
VK5/SA	Licensed	344	98	10	—	(4)
	Associates	154	23	4	—	(1)
VK5/NT	Licensed	6 (D.)	10 (O.)	=	16	—
	Associates	5 (D.)	4 (O.)	=	19	—
VK5	Totals Licensed	344	114	10	—	—
	Associates	154	32	4	—	—
VK6	Licensed	209	62	4	—	—
	Associates	46	23	—	—	—
VK7	Licensed					
	Hobart	68	—	—	—	—
	Launceston	40	—	—	—	—
	Other	49	—	—	—	—
	Associates					
	Hobart	25	—	—	—	—
	Launceston	14	—	—	—	—
	Other	23	—	—	—	—
	Total VK7					
	Licensed	157	—	2	(1)	—
	Associates	62	—	1	—	—

**NOTES**  
 1. Members with postal addresses in the post codes stated are classified as "Metropolitan" for the purposes of this table:  
 Sydney 2000 to 2233  
 Brisbane 4000 to 4179  
 Darwin 5789 to 5794  
 Hobart 7000 to 7022  
 Melbourne 3000 to 3206  
 Adelaide 5000 to 5173  
 Perth 8000 to 8169  
 Launceston 7150

1. A total of 15 "Associates" overseas is excluded.

**TABLE 6. "Other" grades in EDP (excludes Clubs —excludes "X" for double callign)**

Grade:	G	L	X	S
VK1	—	2*	—	1
VK2	38	12	—	32
VK3	3	15*	10	165
VK4	15	3	5	25
VK5/8	17	5	24	5
VK6	8	5	—	11
VK7	2	5	2	5
Exec.*	—	10*	—	(1 in ACT others VK3)

\*Excludes "L" members.

**TABLE 7. Pensioners and Students (at that time mixed "G" & "S")**

	Pensioners*	Students
VK1	—†	1†
VK2	48	24
VK3	46	122
VK4	26	14†
VK5	17	5
VK6	12	7
VK7	2	5
	149	178

\*Excludes "L" members.  
 †Grade now discontinued for students.  
 ‡No pensioner grade.

# INTRUDER WATCH

All Chandler, VK3LC  
 1536 High Street, Glen Iris, 3146

The Intruder Watch net is still in operation on 14160 kHz, but the time has been altered to 0000Z or 10 AM EAST every Thursday morning. So far only co-ordinators have availed themselves of the opportunity of participating in this net. However, it is hoped that as it becomes better known observers and members interested in the Intruder Watch will participate.

The object of the net is to disseminate news and information of interest to observers and co-ordinators, and to take ideas and anything of interest for the better running of the Watch.

Preliminary reports of intruders may be voiced, but observations should be followed by written reports on forms provided. Too many verbal reports are time consuming for co-ordinators, and reports made out by co-ordinators for observers lack the original signature which is important to our administration. Co-ordinators should only sign their own reports. However, when reports are phoned in or copied over the air, co-ordinators are at liberty to sign the observers name per their own signature.

The new report forms will have been distributed by the time this is in print, and it is incumbent upon me to instruct members in their compilation. The new forms are for identified intruders only, one station to a form, although many observations of that station may be included so long as it remains on the same frequency. The forms are filed by our administration by frequency, the object being that they can at any moment ascertain what is going on on any particular frequency.

And now I had better go over the form, letter by letter. The letter before each item is there to conform with the requirements of Appendix 8 of the regulations in its original form Appendix 8 specifies "Report of Harmful Interference" and the various designations go down vertically. However, for better filing "A" and "B" have been placed horizontally. Taking the designations in order, "A" in the original says "Name or Call Sign and Category of Station", but we have designated it "A-Ident . . . Callign . . ." This is so that A3 (B/C) stations can be inserted by their name, e.g., "Radio Peking", and A1 (CW) or F1 (RTTY) stations by their calligns. "B-Frequency" is self explanatory, but it is advisable to know whether it is "E" Estimated or "M" Measured.

So much for the horizontal section. "C-Emission" has to be filled in as A1, A3 F1, A3A etc., and if you are not familiar with these modes it would be a good idea to send me a tape, either C90 cassette or reel that will play for 40 minutes so that I can dub my identification tape on to yours. "D-Bandwidth" seems to be a pet aversion with our Authorities and is rather hard to define, it depends upon you receiver selectivity. "F-Nature of Interference: Traffic: Remarks" — In the case of A1, some of the traffic copied including callign and any procedure sign copied. F1 RTTY, a read-out of traffic is very helpful if you have the facilities to copy same. Remarks can include a bearing report if possible. "O-Dates & Times (UT)", as many reports on one signal as possible with Z time; and "E-Strength (RST)" your normal way of reporting transmitted signals. "M", "N" is self explanatory.

This should give a fair idea of what is necessary, and I hope that I receive many reports now that some action is promised by our Administration if sufficient reports are forthcoming.

# MAGAZINE INDEX

Syd Clark, VK3ASC

**BREAK-IN March 1976**  
 The Good Old Days; From Spark to Space; Modernise Your VTVM—Fit a FET; Build Your Gear Safely; International Recognition of Amateur Radio.

**April 1976**  
 All Purpose Testing and Servicing Unit; NZART Annual Report; A Motorized Garage Door; Improving the Argonaut; Predicting Propagation.

**HAM RADIO February 1976**  
 DT-600 Demodulator; Solid State Power Amplifiers; Vestigial Television System; Low Cost Digital Clock; VHF Prescaler for Digital Counters; 50 Years of Television; 1979 WARC; Microprocessors; Antenna Gain; The UAR/T and How it Works; Voltage Troubleshooting.

**March 1976**  
 Crystal Controlled Oscillators; DT-500 RTTY Demodulator; WWVB Signal Processor; High-Speed Divide-by-N Counters; Off the Air Transmitter Tuneup; VHF/UHF Receivers—How to Improve Them; 5/8 Wavelength Vertical for Two-Metre FM; Microprocessors; High Performance Bench Power Supply.

**April 1976**  
 Programmable Contest Keyer; Solid-State Communications Receivers; 741 Op-amp Circuit Design; Corner Fed Loop Antennas; Amateur Radio's Golden Years; Circuits and Techniques; Microprocessors; 80 Metre SSB Transceiver; Universal LCR Bridge; Troubleshooting by Resistance Measurement.

**RADIO COMMUNICATION April 1976**  
 The G8ENN Instant Beam; The Scopex 4D-25 Oscilloscope—Review.

**May 1976**  
 The Case for a Data Processor; Suppression of Vehicle Interference for Mobile Radio Operation; A Simple Magnetic Base; Mobile with Fibreglass Cars; MK Products Slow Scan Monitor PCB's—Review; 28 MHz Sporadic-E; PLL Introduction.

**RADIO ZS February 1976**  
 YACHTING IN THE SEYCHELLES; Crystal Oscillators for Digital Circuitry; TVI/BCI Interference; The Importance of the LC Ratio in Competitive DF Hunting; Quarter Wave and Half Wave Lines on the Workbench; Rip Van Winkle Rides Again; Double Sideband Suppressed Carrier; Assembling a Kit-form Transmitter; Caves.

**March 1976**  
 Hamnet; Electromagnetic Radiation.

**MONITOR January and February 1976, and March 1976**  
 The Institution of Radio and Electronics Engineers has replaced their "Proceedings" with this new Journal. This appears to be an attempt at improving the image of the IREE and the presentation is certainly more lively than the old format. Furthermore it appears that much of the content is now aimed at a broader cross-section of the membership. Your reviewer feels certain that this move will be welcomed by many members of the Institute.

# AWARDS COLUMN

Brian Austin, VK5CA

The following general rules apply to all Awards issued by the Associazione Radiotecnica Italiana (ARI) and should be read together with the conditions which govern each individual certificate.  
 1. All information requests must be sent to the ARI Awards Manager, C/o ARI, via D. Scariatti, 31, 20124 Milano, Italy accompanied by one IRC.

- ARI Awards will be issued to any amateur who will submit to our Manager —
  - a letter, dated and signed, with name, address and call of the applicant. He must certify that all administrative rules in his own country have been respected, in the same way as amateur radio spirit, in effecting the QSO's upon which the application is based.
  - the complete list of QSL's, with call sign, date, frequency, reports, time and type of emission (CW, AM, SSB, RTTY).
  - QSL cards for checking.
  - 10 IRCs or \$1 for foreign applicants. The "Guglielmo Marconi Award" is free (only mail fee).
  - QSL cards must be submitted without corrections, erasures or additions and must be clearly legible. If the type of transmission is not shown, two figures (RS) count as PHONE (AM, not SSB) and three (RST) as CW.
- To get an Award in a specific class, the cards must show the corresponding data in clear manner.
- In application of the decisions of the Region 1 of IARU, all foreign applicants may send a check list of the cards (without QSL's) duly certified by a member of the HQ of their National Amateur Radio Society. The ARI Manager reserves to check, on request, one or more QSL's.
- ARI HQ decisions are final.
- Any cards falsification will result in disqualification.
- Send the applications to the following address: ARI Award Manager, C/o ARI via D. Scariatti 31, 20124 Milano, Italy.

#### CERTIFICATO DEL MEDITERRANEO (CDM)

- The CDM is issued to those amateurs who can show confirmation of a two-way contact since 1st June, 1952 with
  - a fixed amateur station in at least 22 countries of the list (pay attention, in the list there is not peninsular Italy).
  - at least 30 amateur stations of peninsular Italy (total: 52 QSL).
- The same station may be worked once only
- The CDM is issued in two classes:
  - PHONE and CW (AM, SSB, CW, RTTY).
  - PHONE only (AM, SSB).
- The minimum reports considered are RST 338 and RS 33.

#### List of countries:

Spain	Dodecanese Is.
Balearic Islands	Crete
Spanish Morocco	Turkey
French Morocco	Syria
France	Yugoslavia
Algeria	Albania
Corsica	Malta
iesle (before 31-12-1957)	Gibraltar
Sardinia	Cyprus
Sicily	Monaco
Lebanon	Tunisia
Egypt	Israel
Greece	Libya

#### WORKED ALL ITALIAN PROVINCES (WAIP)

- The WAIP is issued to those amateurs who can show confirmation of a two way contact since 1st January 1949 with —
  - a fixed amateur station in at least 60 provinces of the Italian Republic, for foreign amateurs
- The same station may be worked twice or more, if in different provinces.
- The minimum reports considered are: RST 338 and RS 33.

#### List of Italian provinces:

Agrigento	Matera
Alessandria	Messina
Ancona	Milano
Aosta	Modena
Arezzo	Napoli
Ascoli Piceno	Novara
Asi	Nuoro
Avelino	Padova
Bari	Palermo
Belluno	Parma
Benevento	Pavia
Bergamo	Perugia
Bologna	Pesaro

Bolzano  
Brescia  
Brindisi  
Cagliari  
Caltanissetta  
Campobasso  
Caserta  
Catania  
Catanzaro  
Chieti  
Como  
Cosenza  
Cremona  
Cuneo  
Enna  
Ferrara  
Firenze  
Foggia  
Forli  
Frosinone  
Genova  
Gorizia  
Grosseto  
Imperia  
Isernia  
L'Aquila  
La Spezia  
Latina  
Lecce  
Livorno  
Lucca  
Macerata  
Mantova  
Massa

Pescara  
Piacenza  
Pisa  
Pistola  
Pordenone  
Polenza  
Ragusa  
Ravenna  
Reggio Calabria  
Reggio Emilia  
Rieti  
Roma  
Rovigo  
Salerno  
Sassari  
Savona  
Siena  
Siracusa  
Sondrio  
Taranto  
Teramo  
Terni  
Torino  
Trapani  
Trento  
Treviso  
Trieste  
Udine  
Varese  
Venezia  
Vercelli  
Verona  
Vicenza  
Viterbo

(Concluded next issue)

## YRCS

Bob Guthberlet  
31 Bandon Terrace,  
Marino, 5049



Bob Guthberlet at the recent convention.

#### IMPRISONED FOR FOUR DAYS

Having received an invitation from the Federal Executive of the WIA to attend the 1976 Convention for the purpose of presenting the claims of YRCS, I journeyed to Melbourne, arriving on Thursday 6th May, and was conveyed to the Diplomat Motor Inn at St. Kilda, the venue for the Convention. Being a non-member of the Council, my early feelings were that I would become a tolerated interloper, an attitude quickly dispelled by the generous welcome given to me by the Councillors and their substitutes, who had gathered from all parts of Australia to conduct the business and policy of the WIA.

My first thought was that it would prove an easy period of relaxation during which I should be able to take an occasional walk along the St. Kilda boulevard, scan the shop windows, or enjoy the occasional wafting of refreshing sea breezes from the bay. How wrong I was. With relentless pressure and sometimes the discomfort of sitting for hours on a hard seat, I saw nothing of the sights which had been anticipated. Even sharing a room with the indefatigable Secretary-Manager, Peter Dodd, gave me no respite, as he had arranged with the Motel management to awaken us at 5.30 am each day.

It was my hope than on Thursday evening we would be allowed to rest, but it wasn't to be, as preliminary discussions continued until 1 am and this proved to be the pattern for each day's business, starting at 9 am and continuing until the early hours of the next day, with brief meal breaks, during which delegates somehow managed to talk about the many subjects for deliberation. Frankly, I enjoyed seeing a little of Melbourne as we journeyed to the Airport on Sunday evening, although the hazardous traffic manipulating made one feel relieved that Adelaide is a nice quiet City in which to live.

For the first time since its Inauguration YRCS and its future was discussed and debated with dedicated concern, causing me to re-evaluate my previous impressions of a Federal WIA convention. I have returned home with feelings of great respect for those who control and manage the affairs of amateur radio in this country, and, having been given the opportunity to share, with some discomfort, the hours of incarceration, I look back in retrospect and offer my sincere thanks to the WIA Federal Executive and delegates for services rendered. I say to all who are recipients of Institute decisions, please support the WIA and don't rubbish it. It works and is doing all that can be reasonably expected of those willing to spend four days in prison.

Important matters concerning YRCS will be communicated to State YRCS Supervisors in due course of time, the result of which will I hope, give to the Scheme a more stable and effective means of achieving our aims in the interest of those whom we serve.

## PROJECT AUSTRALIS

David Hull, VK3ZDH

#### AUGUST 1976

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time	Long	Date	Orbit No.	Time	Long
		Z	°W				°W
1	17348	01.14	75.08	1	7822	01.19	69.74
2	17360	00.14	60.08	2	7834	00.18	54.62
3	17373	01.09	73.83	3	7847	01.13	68.24
4	17385	00.09	58.83	4	7859	00.12	53.12
5	17398	01.04	72.58	5	7872	01.06	66.74
6	17410	00.04	57.58	6	7884	00.06	51.62
7	17423	00.59	71.33	7	7897	01.00	65.24
8	17436	01.54	85.08	8	7910	01.54	78.86
9	17448	00.54	70.08	9	7922	00.53	63.74
10	17461	01.48	83.83	10	7935	01.48	77.36
11	17473	00.48	68.83	11	7947	00.47	62.24
12	17486	01.43	82.58	12	7960	01.41	75.86
13	17498	00.43	67.58	13	7972	00.41	60.74
14	17511	01.38	81.33	14	7985	01.35	74.36
15	17523	00.38	66.33	15	7997	00.34	59.24
16	17536	01.33	80.08	16	8010	01.29	72.86
17	17548	00.33	65.08	17	8022	00.28	57.74
18	17561	01.28	78.83	18	8035	01.22	71.36
19	17573	00.28	63.83	19	8047	00.21	56.24
20	17586	01.23	77.58	20	8060	01.16	69.86
21	17598	00.23	62.58	21	8072	00.15	54.74
22	17611	01.18	76.33	22	8085	01.09	68.36
23	17623	00.18	61.33	23	8097	00.09	53.24
24	17636	01.12	75.08	24	8110	01.03	66.86
25	17648	00.12	60.08	25	8122	00.02	51.74
26	17661	01.07	73.83	26	8135	00.57	65.36
27	17673	00.07	58.83	27	8148	01.51	78.98
28	17686	01.02	72.58	28	8160	00.50	63.86
29	17698	00.02	57.58	29	8173	01.44	77.48
30	17711	00.57	71.33	30	8185	00.44	62.36
31	17724	01.52	85.08	31	8198	01.38	75.98

Report on May '76 AMSAT Phase III design review meeting, Goddard Space Flight Centre, Maryland, USA.

The meeting was concerned with reviewing completed work and engineering parameters of the next amateur satellite due to fly in 1978.

Attendees included Larry Kayser VE3QB (Amsat Canada), Karl Meinzer DJ4ZC (Amsat DL), Dick Kolby and Marvin Sass (San Bernardino Microwave Society), Dave Hull VK3ZDH (Project Australls), Jan King W3GEV, Tom Clark WA3LND and Perry Klein K3JTE (Amsat HQ). Observers included Lance Gunnar K6GSJ (Project Oscar), Bill Eitel (Amateur Satellite Service Committee), Bill Tynan W3KMW, Marty Davidoff K2UBC, Bob Carpenter W3UTC and Dick Allen W5SXD (Amsat).

Detailed computer examinations of the phase III orbit parameters to be expected after the AKM burn, undertaken for Amsat by NASA personnel and others, were reviewed. The circuitry of the IHU module (Integrated Housekeeping Unit, the main computer module) was explained in detail by Dr. Meinzer. The group noted with satisfaction the results of the successful operation of the basic unit in a hostile industrial environment, concerned with data collection aboard railway trains in Germany. Conducted by Karl's University this experiment involved mounting the unit in a physically and electrically dirty position alongside high voltage relays within the train. Details of the attitude sensing and magnetic torquing circuitry were examined as was the basic interface to the "bang bang" department concerned with the AKM motor firing. Mechanical models of the basic spacecraft and a Thiokol AKM motor were available for review. RF circuitry was not dealt with in any great detail as the technology is not new, being developments

Much has been accomplished in Germany and elsewhere since the last meeting and the program is proceeding satisfactorily to timetable. However one area of prime concern still rests with the procurement of suitable solar cell panels. The purchase of space qualified panels from commercial sources is very expensive (approx. \$30,000 or more for Oscar 8) and the supply of surplus panels from Nasa and Military space programs has virtually dried up. Contributing to this has been the "bleeding off" of space qualified panels by universities and others for use on terrestrial experiments. This unfortunate use of space qualified hardware is a problem that will remain to dog future amateur spacecraft construction. The JA Amsat organisation under Harry Yoneda JA1ANG has been active in pursuing solar arrays through commercial sources in Japan and it is hoped that Harry will meet with success in this field.

During the second week of my stay an international meeting was held to discuss the operations of Oscars 6 and 7 and preplan for Oscar 8. A report on this meeting will be given next month. ■

## REPEATERS

Ken Jewell, VK3ZNJ  
Peter Mill, VK3ZPP

The 1976 Federal Convention has come and gone with decisions made which will affect all repeater users and these will be reported on later in this column. However, to clarify the position of the Federal Repeater Committee to our readers, it is worthwhile quoting from the annual report, prepared by the Chairman Ken Seddon VK3ACS, the section outlining the functions of the FRC: "The Committee does not consider that its function is to make rules, decisions, etc. pertaining to the operation of repeaters but rather to circulate by correspondence (and telephone discussion) the proposals and opinions of all Divisions affecting repeater operations on a national level and where these differ to arrive at a compromise recommendation acceptable to all Divisions".

As you can see the FRC can only function as the voice of all state groups with your co-operation, and keeping your State Repeater Committee or Federal Councillor informed of your activities and thoughts is the way to assist us in arriving at recommendations.

### FEDERAL NEWS

The Federal news for this issue is concerned with results of the Convention. The motions that were passed in relation to repeaters are summarised below:

(a) FM repeaters in the 146 to 148 MHz band will be designated by the input frequency channel number e.g. the existing channel 1 now on 146.100 MHz on channel 42 becomes repeater 42.

(b) The creation of an additional repeater channel as repeater 41 with an input on 146.050 MHz has been adopted.

(c) The channel spacing for the FM portion of the 70 cm band will be 25 kHz.

(d) The channel numbering in the two FM windows of the 71 cm band will be as follows:

433.025 MHz = channel 302 up to 434.975 MHz = channel 497

438.025 MHz = channel 802 up to 439.975 MHz = channel 997

(e) The primary simplex channel in the 70 cm band will be 439.000 MHz, the secondary channel 438.825 MHz, followed by 439.125 MHz.

(f) The repeater channels shall have a spacing of 5 MHz between the input and output frequencies within the two windows 433.00-435.00 MHz and 438.00-440.00 MHz, the input low and output high.

(g) The recommended UHF repeater channels for

### WEST AUSTRALIAN REPEATERS

OPERATIONAL CALLSIGN	Ch	LOCATION OR SERVICE AREA	TYPE OF IDENT	RANGE	PROJECT OFF.
VK6RAP	R42	Perth	FBK	80 km	VK8UU
VK6RAH	R44	Perth	audible	80 km	VK6ZAA
VK6RAA	R44	Albany	verbal	100 km	VK6XY
VK6RBY	R46	Mt. William	FSK	100 km	
VK6RAW	R48	Mt. Latham/Wagin	audible	90 km	VK6IQ
CONSTRUCTION STAGE					
VK6RAK	R48	Boulder/Kalgoorlie	?	70 km	?

Initial use are: primary channels 352/852 433.535 MHz and 438.525 MHz followed by 322/822 433.225 MHz and 438.225 MHz 367/867 433.675 MHz and 438.675 MHz

### VICTORIAN NEWS

The site for the proposed repeater for the Otway Ranges has been checked out and a range of about 100 km would appear to be possible in some directions. However, due to the hilly nature of the area, this will not be the case in all directions. Also there appears to be some concern at the use of channel R46 at this site, but this is only to be used for the testing phase and will not necessarily be the final frequency for the repeater.

At last there has been some progress with the Mt. Macedon R45 repeater as the owners of the proposed site for the transmitter have agreed to allow the rig there on terms acceptable to the group. On site testing can now be carried out by the project leader Peter VK3BX. The Victorian repeater committee reports that the new system of identifying repeaters by the input channel number, R41 to R48, will be adopted in that state in the following form. For ease of operation and simplicity, they will drop the forty part of the number and use R1 to R8. The following table was supplied:

Old system—repeater	New system	Victoria system
8	R41	R1
1	R42	R2
5	R43	R3
2	R44	R4
6	R45	R5
3	R46	R6
7	R47	R7
4	R48	R8

### QUEENSLAND NEWS

The Rockhampton repeater has been granted a licence with the callign VK4RAR on channel R42 and Adrian VK4MM hopes that it will be on the air by August. The control F2 identity and power supply are complete and the 25 watt Allied Communications (Brisbane Coy) transceiver will be cut in two soon. The system will be completely solid state except for two relays and fed to a ground plane through a diplexer. The test site will be the "Range" in the centre of Rockhampton and the final site will possible be the TV transmitter site at Mt. Hopetul which will give a range of around 100 km. There are believed to be other repeaters in Queensland aside from Brisbane and the Gold Coast.

## AFTER THOUGHTS

### A LINEAR AMPLIFIER FOR AUSTRALIAN CONDITIONS

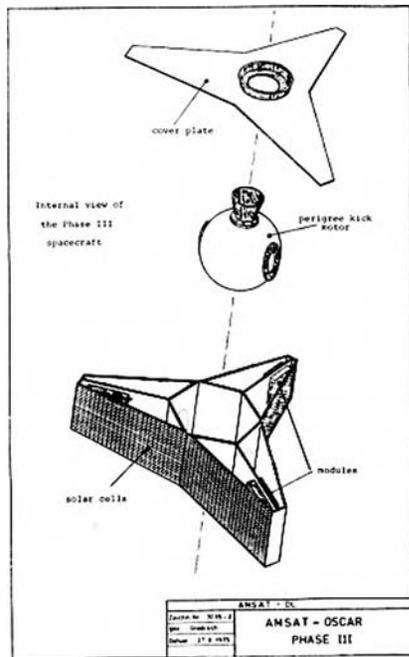
April: p. 15 col. 3, line 8 should read: "Fig 2 shows a typical . . ."

May: p. 9 Fig 11 — Lower end of 10hm WW resistor must be connected to earth side of 5 V filament winding on main Transformer. ■

## QSP

### CITIZENS' BAND

Radio Communication June '76 reported that the RSGB Council had been discussing "some activity in certain commercial quarters towards the introduction of a citizens' band". Mr. Stevens was reported as saying that he did not think it was possible for a citizens' band to operate within the region 27 to 28 MHz as this was used at present for tone controlled devices. "In addition there was a problem with the media, as citizens' band operators were always identified as amateurs".



only of existing techniques. However preliminary transponder frequencies were chosen as follows:—

2 meter input/output: 145.850-145.990 MHz.

70 CM input/output: 435.150-435.295 MHz.

Engineering beacons were set at 145.845 MHz and 435.145 MHz. General beacons were set at 145.845 MHz and 145.995 MHz.

Transponder Input filters will be chosen so as to keep the beacon frequencies clear of transponder ORM, this being a problem with Oscars 6 and 7.

The prototype GSE circuitry from Australls was reviewed and standards chosen for parameters concerned with computer memory storage etc. Consideration will be given to publishing sufficient information on GSE circuitry so as to allow interested amateurs to build up hardware capable of decoding the engineering beacon data.

In general the meeting was most successful.

# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

## AN 80 METRE NOVICE RECEIVER — PART 3 — THE REGENERATIVE IF AND DETECTOR

**The regenerative intermediate frequency amplifier and detector contributes a large proportion of the total receiver amplification and receiver selectivity. By adjustment of the regeneration control the receiver can resolve SSB, CW, AM or NBFM. Additionally, the IF bandwidth is controlled to suit the particular mode being received. Under some conditions the regenerative detector oscillator is, in fact, phase locked to the incoming carrier. The regenerative IF-Detector is an extremely high performance circuit using very few parts, but in recent years it has been largely neglected in favour of more complex circuitry with very little overall performance improvement.**

### THE REGENERATIVE IF-DETECTOR — HOW IT WORKS

The regenerative IF-Detector in the novice receiver is centred around a 6BX6 valve (V5). The circuit consists of resistors R59 to R63 inclusive, capacitors C63 to C68 inclusive, inductors L14 to L16 inclusive and V5 and V7. V7 is a voltage regulator and maintains a constant plate voltage on V5 so that frequency shift due to power supply variations is not troublesome.

L14 and L15, with associated tuning capacitors C63, C64 and C65 form a conventional valve-type intermediate frequency transformer (slightly modified) which is tuned to approximately 455 kHz. The IF transformer as picked out from the junk box does not have C65 fitted, so has to be modified accordingly.

Remove the transformer from its can and unsolder one end of the secondary winding, making sure that none of the very fine wires is broken. In most cases the primary and secondary windings are identical, the secondary being the one near the base. This group of separately insulated parallel wires is called Litz wire. The advantage attributed to Litz wire is that in some lower frequency coils and transformers the Q is increased above that which it would be with a single wire winding. A hole is drilled through the base of the IF transformer close to the other terminals and a small bolt and nut is fitted with a solder lug on each side of the base. The coil end is soldered to this lug, and C65 is soldered from this lug to the free end of C64. The modification is now complete and the transformer may be returned to the can. It is desirable to use a fairly large IF transformer so that this modification is accomplished easily. C65 may be mounted outside of the can if desired.

L14 and L15 are fitted with iron dust slugs. The presence of these slugs increases the inductance of the coils. By adjusting the position of the slug within each winding, it is possible to alter the inductance and consequently the frequency to which the coil is tuned. By careful adjustment using a non-metallic alignment tool, it is possible to get each circuit tuned to the same frequency, which in this instance is 455 kHz. A signal generator set to 455 kHz is attached to the aerial terminal of the receiver and the level adjusted until the generator output is heard in the receiver output. It may be necessary to adjust the frequency of the signal generator to find out what the IF transformer has been tuned to, before being put into the set. The 455 kHz signal from the average signal generator will be strong enough to be passed through the converter stage, although it is not designed to pass this frequency.

The IF transformer is aligned with the regenerative detector set well below the point of oscillation, that is with the moving arm of R59 near to the earthy end of its travel.

The signal from V4 is coupled across L14 to L15 and fed to the grid of V5 via C66 the grid blocking capacitor. The operation of a regenerative IF-Detector has to be considered in more than one way as several functions occur in the one stage using common components. The signal presented at the grid of V5 is rectified as the valve is operated with no bias. The grid and cathode act as a diode detector with R61 the grid leak as the load.

Assuming that the transmission being received is AM, the DC voltage developed across R61 will depend on the strength of the signal, and the AC component (audio) is impressed on to the DC component. The audio component is, in fact, varying the bias developed on the grid of V5. When the voltage becomes more negative due to a negative audio peak, the valve draws less current and the voltage at the plate becomes more positive. When the bias is varying — due to the audio component — in a positive or less negative direction, the valve draws more current, therefore the voltage at the plate of V5 drops. It will be noted that when the grid voltage goes in a negative direction, the plate voltage goes in a positive direction, which indicates that the plate and grid circuits are 180 degrees out of phase.

The screen grid is held at audio frequency earth by C67, although this capacitor has an additional function at RF frequencies. The variations of current in the plate circuit cause the voltage across R63 to vary quite considerably at audio frequency, although this will not be evident on the DC plate voltage readings. This variation in voltage is coupled via C68 to the remainder of the receiver. This is how a non-regenerative detector works — now to show how the regenerative section works.

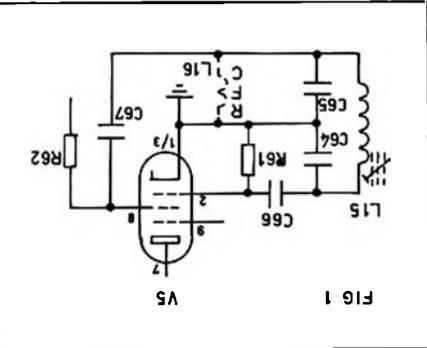
If the circuitry in Fig 1 of this issue is looked at closely, it will be seen that V5

is wired as a Colpitts oscillator — as in the original circuit (May 1976) but redrawn here for clarity — the screen being used as the plate of the oscillator. The actual earthy or common point with reference to earth is unimportant and could even be the grid in some circumstances.

Consider that the cathode of V5 is the common point in the function of the oscillator. The screen and grid are connected at opposite ends of L15 and therefore will have a phase difference of 180 degrees to each other, a condition which is conducive to oscillation. A positive-going voltage on the screen will cause the voltage on the grid to be negative-going, which tends to cut the valve off. This means that the screen voltage will increase further, so causing a higher negative voltage to be developed at the grid. This continues until the valve is cut off, and will continue still further until the energy stored in the magnetic field of L15 is transferred to the two capacitors C64 and C65. When this occurs, the phase across L15 changes and the grid of V5 starts to become less negative, whilst voltage on the screen starts to decrease. Soon the grid will become positive, the screen drawing as much current as possible, and the inductor L15 endeavouring to lower the screen voltage. C64 and C65 will be charged to a maximum voltage with the grid end of C64 being the most positive. The inductor having given its energy to the capacitors now starts to draw current from them, thereby reducing the positive bias on the grid and hence the current being drawn by the valve. At the opposite end of L15 the negative voltage is diminishing so the voltage on the screen is increased. This continues until the voltage on the grid becomes quite negative and the screen voltage endeavours to go progressively more positive to maintain current flow through the valve.

Eventually, the valve is cut off and the whole cycle starts again. The variations in the screen current cause the valve to stay in oscillation supplying the energy to make up for that dissipated in the circuit losses. It might be noted that the valve draws grid current when the oscillatory action swings the grid positive with respect to the cathode.

Under normal conditions, a regenerative detector (in this instance a Colpitts oscillator) is not run in the oscillating condition. It will be seen that the capacitive divider formed by C64 and C65 taps the cathode very close to earth (see circuit May 1976). The feedback is extremely small, so small in fact that the oscillator does not oscillate readily. The point at which the circuit starts to oscillate is controlled by R59 which varies the screen voltage and the valve amplification. Consider that the circuit is just below the point of oscillation. When this is so the RF energy applied to the grid of V5 is amplified by V5 and reapplied in such phase at the earthy end of L15 to bolster the original signal. This positive feedback also increases the Q of the tuned circuit which, therefore, becomes much more selective, being only about 10 kHz wide for many dB



**Colpitts Oscillator-Regenerative Detector**

down in response. The amplified version of the original RF signal is now detected and comes out as audio from the plate circuit at a level considerably higher than if regeneration were not used.

With the regeneration control set just below oscillation, the receiver does a good job on AM signals. When the detector is oscillating, which occurs when the voltage on the screen is increased, the detector is ideal for detecting CW and SSB. The regenerative detector oscillations beat against an incoming CW signal to give a pleasing tone, or in the case of SSB to give intelligible speech. It is possible to receive AM signals with the detector oscillating and in some circumstances the oscillator will lock to the frequency of the incoming carrier, and slight variations in receiver tuning will not be apparent due to this effect.

L16 is used to isolate the cathode of V5 above RF earth so that the grid and screen may appear at opposite ends of L15 and allow the cathode to form a tap on L15 via a capacitance divider. It permits the cathode to be at earth potential for audio and DC.

The next part will deal with the audio amplifier.

**ERRATA**

Page 14, May issue, pin 5 of 6BL8, pin 5 of 6BX6, plus 4 and 5 of 12AH8 and the junction of R51 right hand end should all be joined together. C74 should have a + marked above upper plate. C62 should be wired to one terminal of the IF transformer not some distance away as the diagram might infer. Voltage at pin 5 of V7 is 150 volts. 250 volts on line to plate of V4, pin 6.

**COMMERCIAL KINKS**

Ron Fisher, VK3OM  
3 Fairview Ave.,  
Glen Waverley, 3150

**LOOKING AT THE KENWOOD/TRIO TS520**

The TS520 was first advertised in Australia in the September and October 1974 issues of Amateur Radio at a price of \$500 which at that time included the matching external speaker. At that time many amateurs were

somewhat suspicious of the 520 due to the vagaries of the preceding models, the TS500 and the TS510. However the suspicion proved unfounded and the 520 has become a popular and accepted rig for Australian Amateurs. Perhaps proof of this acceptance is the fact that few if any modifications have so far been published. One or two articles on it have appeared in overseas magazines but these have all described additions to the rig in the way of ancillary circuits rather than actual modifications.

In Commercial Kinks this month two different ideas will be described. They are not really modifications, but rather methods of using the 520 somewhat better under Australian conditions.

Les Daniels VK2AXZ came up with the first one.

The original AC connections on the TS520 is for 220 volts rather than 240 volts, and this puts about 1200 volts on the plates of the 6146s.

After making the change to be described, this drops to about 900 volts under static conditions and also produces a more normal voltage on the tube filaments and dial lamps. The method is simple. Remove the cabinet as shown on page 38 of the TS520 instruction manual and locate the power transformer. If you want to check beforehand it is clearly pointed out in the bottom view photo on page 49. With the set upside down and the front panel facing you, find the royal blue wire going to the 100 volt tap of the transformer right hand side. Cut this off as close as possible to the tag, then strip back the insulation 1/4 inch and resolder it to the 120 volt tapping, which is the next one towards the front.

Don't imagine that you might get more output with the higher voltage. The power output remains the same with the lower setting but you will get much longer life from the tubes and electrolytics.

Thanks to Les for passing this idea on which originated from Barry VK2ACI.

It also appears that the importers of the 520 may be now making this modification before sending the set to the various distributors. To check, just set the meter switch to HV, put the transmitter on air in the sideband position. If the voltage indicates 1000 or more you will need to carry out the above modification.

The next one was brought to our attention by Phil Williams VK5NN. It seems that the 520 can produce a spurious output when operating on the 14 MHz band. The mechanism of the spurious output signal is as follows:

$$(2 \times \text{VFO}) + \text{IF} = \text{XTAL} - \text{IF} - \text{VFO}$$

Solving this as follows:

$$2 \times \text{VFO} + 3.395 = 22.895 - 3.395 - \text{VFO}$$

$$\text{Thus VFO} = 22.895 - (2 \times 3.395)$$

$$= 5.3683$$

The spurious and wanted signal cross over at 14.13166 MHz.

If trouble occurs it is found that the spurious signal is about 45 dB down and

in the CW section of the band (14.095 MHz) when transmitting on about 14.150 MHz. The answer to the problem is to re-adjust L5 on the VFO board.

See figure 21 on page 35 of the 520 instruction manual. This should be set for maximum suppression at about 10.7 MHz. It appears that this filter is set in the factory assuming that the transceiver will be used above 14.2 MHz as in the United States. Repeaking L5 will suppress the unwanted signal to better than 65 dB down in the portions of the band used by Australian amateurs.

Phil notes that when using 520 barefoot there is usually little trouble. But with a linear and a beam a 45 dB down signal can come up to the point of annoying many locals or interstate stations on short skip.

To conclude Phil poses a question. Diode D4 on the RF board causes cross modulation by strong signals on 80 metres. Can anyone suggest a good alternative with a higher conduction voltage or another solution to the problem.

Well, I have never noticed the effect that Phil mentions. If you have, and have found a cure for it, please let us both know.

**IARU NEWS**

To find anything to follow VK3KI's article in June AR page 6 is extremely difficult.

One way is to reiterate his last comment "we cannot be complacent about the future".

There can be little doubt that Intruder Watch activities by amateurs will have some bearing on WARC79. A recent issue of the Indian Radio Amateur indicates an awakening of Intruder Watch activities in that country.

Amateurs not only need to do everything they can to keep the bands they now possess but also need to be alert in reporting, and keep on reporting, intruders found within those bands.

Whilst researching another project recently, it was interesting to note the correspondence which went on with the PMG as long ago as 1953/54 about Radio Pakistan on 7010 kHz and the PMG's statement in one letter of the time which read "While this Administration cannot, of course, condone the use of Amateur channels for broadcasting purposes, in view of all the circumstances, it is considered that the assurance given by Pakistan that it will vacate the channel and, until doing so, will limit operation to times unlikely to affect seriously the activities of Australian amateurs represents a reasonably satisfactory compromise which should prove acceptable to the Institute".

To quote a comment from QST of April 1976, "Just as eternal vigilance is the price of democracy, it is also the price of having uncluttered ham bands". This comment was made about unlicensed SSB stations operating between the 11m and 10m bands.

Also from this issue of QST comes the timely reminder that reciprocal licensees operating in the US must observe the US phone sub-allocations, as well as other FCC regulations pertaining to amateur radio. The converse is also true—the reminder continues—that FCC licensees operating in other countries must abide by the regulations of the host government which issues them operating permission. It need not be stressed perhaps that these principles apply to all reciprocal licence operations.

According to QST for April 1976, Richard L. Baldwin, W1RU became Secretary of the IARU as well as of the ARRL at the 1976 AGM of ARRL and succeeds John Huntoon, W1RW in that post.

# "WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Turns		L'gth Inch	B & W Equiv.	Price
	Dia. per Inch	Inch			
1.08	1/2	8	3	No. 3002	99c
1.16	1/2	16	3	No. 3003	99c
2.08	5/8	8	3	No. 3006	\$1.16
2.16	5/8	16	3	No. 3007	\$1.16
3.08	3/4	8	3	No. 3010	\$1.40
3.16	3/4	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
5.08	1 1/4	8	4	No. 3018	\$1.75
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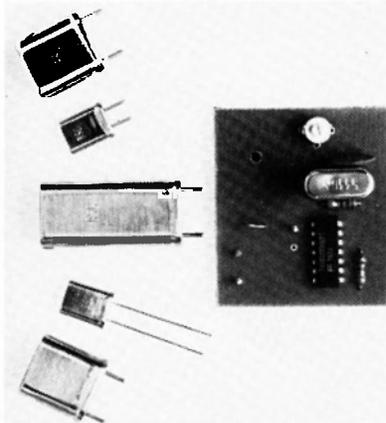
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# GUIDELINES FOR AMATEUR RADIO OPERATION IN THE 80, 15 and 11 METRE BANDS

1. The 11 m amateur band for Australia extends from 26.960 MHz to 27.230 MHz. (It is also allocated for amateur use in New Zealand and Region 2 (the Americas)).

2. The band 26.100 MHz to 27.500 MHz is allocated internationally to the Fixed and Mobile (except aeronautical mobile) services. This is applicable to Australia also. These stations operate (without call signs) on specifically assigned fixed frequencies.

3. The frequency 27.120 MHz (+ or -0.6%: i.e., plus or minus 162.72 kHz — effective permissible limits therefore extend from approximately 26.957 MHz to 27.283 MHz) is designated for ISM (Industrial, scientific and medical) purposes and all services operating within the permissible limits must accept any harmful interference from ISM equipment operating on the frequency stated.

4. In accordance with ITU Radio Regulations — article 5, RR 142 and 143 — the Amateur Service in Australia may use the 11 m allocation with equality of right to operate with any stations in the fixed and mobile (except aeronautical mobile) services.

5. Amateur Novice licensees may lawfully operate wholly within the 11 m amateur band allocation. By a gentleman's agreement they should not use telephony in the segment 26.960 MHz to 27.030 MHz; this segment is reserved by amateurs for CW operations only.

6. In the fixed and mobile services allocations the Radio Control of model aircraft, boats, etc. may use the band 26.957 to 27.282 MHz. The frequency band 27.230 to 27.280 MHz is allocated to licensed portable hand-phone users (commonly used frequency 27.240 MHz). 26.978 MHz and 27.212 MHz are allocated for licensed radio paging operations. There are other allocations for other purposes both above and below the amateur band. There are also other fixed services which can use this band on fixed frequency assignments.

7. Because the 11 m band is allocated for use by a number of services on an equal footing it is imperative that amateur operators must first ascertain that the frequency they intend to use is free and is not in use by any other legally authorised user. Amateurs should also remember that other communication services sharing the band will normally have only one operating frequency and will be unable to shift if it is occupied by an amateur.

8. It is known that the use of this part of the spectrum is favoured by unlicensed or 'pirate' operators. These operators are intruders and should be treated as such. Be very careful indeed that a transmission really is that of an intruder before finding it necessary to select that particular frequency on which to operate your own transmitter in accordance with the conditions set out in the "Handbook for operators of radio stations in the Amateur Service". Be sure to QSY if asked to do so by a legitimate fixed frequency station. Many low powered primary services operating within the band have not been allocated call signs and may, therefore, be using local identifications similar to those used by 'pirate' operators.

9. If it is at all possible you should do everything you legally can to identify the intruder and determine his location. All available details should be reported quickly to the WIA. Intruder Watch Co-ordinator and copy your report to your local Regulatory and Licensing Branch of the Radio Frequency Management Division, Postal & Telecommunications Department. You are not entitled to take any other action, except those set out above, when you find there is an intruder in any amateur band including the 11m band. Be sure to avoid having any contact with an intruder.

10. If (by the nature of the words used or matter discussed etc.) you suspect that a station is operating with an amateur call sign which is not likely to have been authorised by the rightful owner of that call sign you should make a report on the same lines as in paragraph 9 above. If you can first contact the rightful owner of the call sign to confirm your suspicions so much the better.

11. Except for properly authorised emergency traffic, amateurs are not permitted to make contact

on the air with non-amateur stations (including Citizens Band, etc.).

## SUPPLEMENTARY INFORMATION

A. Radio control of model aircraft frequencies in common usage indicate that their Channel 1 is 26.995 MHz, Channel 2 — 27.045 MHz, Channel 3 — 27.095 MHz, Channel 4 — 27.145 MHz, Channel 5 — 27.195 MHz and Channel 6 — 27.245 MHz. Intermediate channels are Channel 1½ — 27.020 MHz, 2½ — 27.070, 3½ — 27.120, 4½ — 27.170, 5½ — 27.220 and 6½ — 27.270. Interference to model aircraft transmissions could cause the model aircraft to crash with disastrous results to an expensive machine and possible hazard to anyone on the ground beneath the crashing model.

B. Radio control of model boats frequencies believed to be commonly used begin at 26.975 MHz increasing 20 kHz per channel to 27.255 MHz — i.e., 26.975, 26.995, 27.115, 27.135, 27.155, 27.175, 27.195, 27.215, 27.235, 27.255 MHz.

C. USA Citizens Band channels. Channels 1 to 22 are within the Australian 11m Amateur band. Channel 1 is 26.965 MHz, 2 — 26.975, 3 — 26.985, Channel 4 is 27.005 and the next 3 are each 10 kHz higher in frequency — i.e., 27.005, 27.015, 27.025 and 27.035. Channel 8 is 27.055 with the next 3 in 10 kHz increments higher, Ch. 12 is 27.105 with 13 to 15 each 10 kHz up, Ch. 16 is 27.155 with 17 to 19 each 10 kHz up, Ch. 20 is 27.205, 21 — 27.215 and 22 — 27.225 MHz.

D. The New Zealand "Citizen Band" frequencies are all outside (below) the Australia 11m amateur band.

## ADDITIONAL NOTES FOR AMATEUR OPERATORS IN THE 15 AND 80 METRE AMATEUR BANDS.

1. The 80 metre Amateur band in Australia extends from 3500 to 3700 kHz and the 15m band from 21000 to 21450 kHz. The band 21000 to 21450 is also allocated to the Amateur Satellite Service.

2. These two bands, in Australia, are exclusively Amateur bands.

3. In the ITU Regulations only the band 21000 to 21450 kHz is allocated exclusively in all Regions to amateurs. In the 80m band the ITU allocations for all Regions extend from 3500 to 3800 kHz but in Region 3 extend up to 3900 kHz and in Region 2 (the Americas) up to 4000 kHz. In all the three Regions these bands are allocated to Amateur, Fixed and Mobile (except Aeronautical mobile in Regions 1 and 2) on an equal basis.

4. In Australia, the band 3700 to 3900 kHz is allocated to the Fixed and Mobile Services.

5. In India the Amateur band on 80m extends from 3890 to 3900 kHz and the band 3500 to 3890 kHz is allocated to the Fixed and Mobile Services. In New Zealand the 80m Amateur band extends from 3500 to 3900 kHz as it does in many other countries. In Indonesia amateurs share the band with other services and in Japan the Amateur band is 3500 to 3575 and 3793 to 3802 kHz.

6. By an Amateur Service gentlemen's agreement the segments for CW operation only extend from 3500 to 3535 kHz and 21000 to 21150 kHz. The remainder of these Amateur bands may be used for both phone and CW operations. RTTY frequencies are 3620 kHz and 21090 kHz.

7. Australian Novice Licensees are permitted to operate within the segments 3525 to 3575 kHz and 21125 to 21200 kHz in accordance with licensing conditions applicable to them (i.e., crystal-controlled transmitter with power not exceeding 10 W Pm (30 W Pp in the case of A3A or A3J modes) with types of emission A1, A3, A3A, A3B, A3H, A3J and F3 ± 3 kHz).

8. In accordance with an Amateur gentlemen's agreement for band sharing, the following are the CW only segments for Novice Licensees:— 3525 to 3535 kHz and 21125 to 21150 kHz. In the segments 3535 to 3575 kHz and 21150 to 21200 kHz Novice Licensees may operate on phone or CW.

9. Words of caution to Novice licensees:

(a) Like every amateur, listen on your frequency and ensure it is unoccupied before transmitting. (Note: Most amateurs listen very much more than they transmit);

(b) Do please adhere to good amateur practices

and observe the Amateur's Code (see AR June '74 p. 8 or any ARRL Handbook);

(c) Be careful to ensure that the entire signal you transmit, inclusive of sidebands, falls within the permitted band segments;

(d) These two bands are international DX bands and you can therefore expect to contact overseas stations when conditions are right — the better your antenna system the greater will be your chances of working DX, other things being equal. Be careful therefore to QSY if another amateur asks you because he is working a weak DX station on the frequency and maybe you cannot hear it at all. This could occur on a 3528 kHz net frequency especially.

10. Intruders. If intruders are heard on the 80m or 15m bands the same procedures apply as already stated for the 11 metre band. Late at night on 80m you may hear masses of strange signals but most of these may be quite legitimate if they derive from countries overseas where this portion of the band is not exclusively amateur.

11. Because of the DX capabilities of the 80 and 15 metre bands it is better to confine cross-town contacts to the higher frequency bands when the lower frequency bands are open for DX working. Remember too that if you operate mobile or portable on any band you must have your licence (or proper photocopy of it) with you — see para. 44 of the Handbook for Amateur Operators; this also assists with identification if you are stopped for checks. Also take care that if you have a rig fixed in your car (etc.) and the car is used by someone else (your XYL or friend) the rig should be disconnected or disabled whilst that other person has use of the vehicle. ■

## CONTESTS

Kevin Phillips, VK3AUQ  
Box 87, East Melbourne, 3002

### CONTEST CALENDAR

#### July

- 3/4 Venezuelan Phone Contest
- 17/18 Colombian Contest
- 17/19 County Hunters CW Contest
- 24/25 ARRL Bicentennial
- 31/Aug. 1 Venezuelan CW Contest

#### August

- 14/15 REMEMBRANCE DAY CONTEST
- 14/15 European CW
- 28/29 All Asian CW Contest

#### September

- 11/12 European Phone Contest
- 18/19 Scandinavian CW Contest

#### Colombian Contest

0001 GMT July 17 to 2359 GMT July 18

Exchanges will be on a world wide basis on all bands 3.5 to 28 MHz. Phone and CW. There are three classes, single operator, single band and all band, multiplier operator single transmitter. Exchange RS(T) plus a 3 figure number starting with 001.

Scoring: QSO's with HK's 5 points, North American stations 3 points, other countries 2 points and with same country 1 point. The multiplier is determined by the sum of DX countries worked on each band. Final score is sum of QSO points from all bands multiplied by the sum of different countries worked on each band.

Award winners must have at least 50 QSO's on log. Use separate log sheet for each band. Include summary sheet and declaration with logs. These must reach LCRA, Concurso Independencia, Apartado, Postal 584, Bogota, Colombia, by the 30th Sept. 1976

#### Country Hunters CW Contest

0000 GMT July 17 to 0600 GMT July 19

Exchange QSO No., category, (F-fixed, P-portable, M-mobile) RST, state, province or country, and country for US stations.

Scoring: QSO's with fixed stations 1 point, 3 points for portable and mobile stations. Multiply total QSO points by number of US countries worked.

Mobile and portables calculate their score for contacts made within a state.

Frequencies: 3575, 7055, 14070, 21070, and 28070. Logs must be sent to CW County Hunters Net, c/o Jeffrey P. Bechner, W9MSE, 673 Bruce Street, Fond du Lac, Wisc. 54935, by September 1st.

**REMEMBRANCE DAY CONTEST 1976**

The rules for this year's contest are basically the same as last year, as there was an increase in the number of logs received. The only change concerns the calling procedure of "Substitute Operators". Previously substitute operators called on phone "CQ RD" followed by the call of the station

they are operating, then the word "log" followed by their own call sign, e.g., "CQ RD from VK4BBB log VK4BAA", and on CW it is "CQ RD de VK4BBB/VK4BAA". This may lead to confusion as a station who hears the call may log the wrong call i.e., VK4BBB. As no station other than the substitute operator requires to even know of VK4BBB's existence in this example, it seems unnecessary to send it at all. This year, substitute operators will only use their own call signs and put in a log for their own operation.

**Contest Champion Trophy**

The RD Contest is the second contest from which

points are awarded towards the trophy. The first for this year was the National Field Day 1976. I hope to produce a list with points counting towards the trophy next month. The trophy was donated by Peter Brown VK4PJ to encourage participation in our VK contests, and is worth trying for. It is a perpetual trophy and will have the winner each year engraved on it.

**All Asian CW Contest**

The date for this contest has been changed since last month — it is now on 28-29th August. Other rules remain the same, but there are awards for each single band this year.

# 1976 REMEMBRANCE DAY CONTEST

**RULES**

A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitably inscribed certificate.

**OBJECTS**

Amateurs in each VK call area, will endeavour to contact other amateurs:—

1. In other VK call areas, P29 and ZL on all bands 1.8 through 30 MHz.
2. In any VK call area (including their own) P29 and ZL on authorised bands above 52 MHz and as is indicated in rule 5.

**CONTEST DATE**

0800 hours GMT on Saturday 14th August 1976 to 0759 hours GMT on Sunday 15th August 1976.

All Amateur stations are requested to observe 15 minutes silence before the commencement of the contest on Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

**RULES**

1. There shall be 4 sections to the Contest:

- (a) Transmitting Phone
- (b) Transmitting CW
- (c) Transmitting Open
- (d) Receiving Open

2. All Australian amateurs (VK call signs) may enter the contest whether their stations are fixed, portable or mobile. Members and non-members of the Wireless Institute of Australia are eligible for awards.

3. Amateurs may use these modes:

- (a) Phone
- (b) CW
- (c) RTTY
- (d) SSTV

However, only one entry may be submitted for sections (a) to (c) in rule 1. An open log is one where points are claimed for more than one mode. AM, SSB and FM are grouped as one mode, i.e., Phone.

4. Cross mode operation is permitted but both stations may only claim points as for a phone/phone contact. Cross band operation is not permitted, excepting via a satellite repeater.

**5. SCORING**

(a) On the 3.5, 7 and 14 MHz bands a station in another call area may be contacted once on each band using each mode. That is you may work the same station on each of these bands on Phone, CW, SSTV or RTTY.

(b) On the 1.8, 21, 27 and 28 MHz bands a station in another call area may be contacted twice on each band using each mode provided that not less than 12 hours has elapsed since the previous contact on that band using that mode.

(c) Between 1600 hours GMT and 2100 hours GMT on Saturday, intra call area contacts may be made on the 1.8, 7, 21, 27 and 28 MHz bands once for each mode on each band.

(d) Between 0300 hours GMT and 0759 hours GMT on Sunday, intra call area contacts may be made on 1.8, 21, 27 and 28 MHz bands, once for each mode on each band.

(e) On the bands 52 MHz and above, the same station in any call area may be worked using any of the modes listed in rule 3 at intervals of not less than 2 hours since the previous same band/mode contact. However, the same station may be contacted repeatedly via satellite not more than once by each mode on each orbit.

(f) All CW/CW, SSTV and RTTY contacts count double. Note rule 4 re cross mode contacts.

6. Multi licenced operator stations are not permitted. Although log keepers are permitted, only the licenced operator is allowed to make a contact under his own call sign. Should two or more licenced operators wish to operate any particular station, each will be considered as a contestant and must submit a log under his own call sign.

7. Club stations may be operated by other than licenced members and contacts credited to the Club station call sign. Rule 6 applies to the licenced operator in attendance. All operators must sign the declaration.

8. Entrants must operate within the terms of their licence.

9. CYPHERS. Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of 5 or 6 figures will be made up of the RS (telephony) or RST (CW) reports plus 3 figures that will be incremented by one for each successive contact. If any contestant reaches 999, he will start again with 001.

10. ENTRIES. Must be set out as shown in the example, using one side of the paper only and

standard WIA log sheets if possible. Entries must be clearly marked "Remembrance Day Contest" on the envelope, and must reach the Federal Contest Manager, WIA, Box 67, East Melbourne 3002, in time for opening on Friday 17th September, 1976. Early submission of logs will be appreciated.

11. TERRESTRIAL REPEATERS. Contact via terrestrial repeaters are not permitted for scoring purposes. However, contacts may be arranged through the repeater and if successful on another frequency, that contact counts for scoring purposes.

12. PORTABLE OPERATION. Log scores of operators located outside their own call area will be credited to that call area in which operation takes place, e.g., VK5XY/2. His score is added to the VK2 scores.

13. ALL LOGS shall be set out as in the example shown and in addition MUST carry a front sheet showing the following information:

- Name
- Address
- Section
- Call sign
- Claimed score
- Number of contacts
- Modes used
- Declaration: "I hereby certify that I have operated in accordance with the rules and spirit of the contest".
- Signed
- Date

All contacts made during the contest must be

**SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW, SSTV and RTTY CONTACTS COUNT DOUBLE**

From	0	1	2	3	4	5	6	7	8	9	P29	ZL
VK0	—	6	6	6	6	6	6	6	6	6	6	2
VK1	6	—	1	1	2	3	5	4	6	5	5	2
VK2	6	3	—	1	2	3	5	4	6	5	5	2
VK3	6	4	1	—	2	1	4	3	6	5	5	2
VK4	6	3	1	2	—	3	6	5	4	3	3	3
VK5	6	5	2	1	3	—	4	3	3	6	6	4
VK6	6	6	2	1	4	2	—	3	5	6	6	4
VK7	6	5	1	1	3	2	5	—	5	6	6	2
VK8	6	5	1	1	2	3	6	4	—	3	3	4
VK9	6	5	3	3	3	4	5	6	3	—	6	5
P29	6	5	3	3	4	4	5	5	5	6	—	5
ZL	6	5	3	3	4	4	5	5	5	6	5	—

Read table from left to right to work out points for the various call areas.

ALL INTRA-CALL AREA CONTACTS ON 52 MHz AND ABOVE, OR AS INDICATED IN RULES 5(c), (d), and (e) are worth one point.

**EXAMPLE OF TRANSMITTING LOG**

Date/time GMT	Band	Mode	Call sign worked	RS(T) sent	RS(T) rec'd	Points
---------------	------	------	------------------	------------	-------------	--------

**EXAMPLE OF RECEIVING LOG, VICTORIAN SWL**

Date/time GMT	Band	Mode	Call sign heard	RS(T) sent	Station called	Points
14 Aug 76						
0612	7	P	VK5PS	58002	VK6RU	1
0615	7	CW	ZL2AZ	559004	VK4KI	4
0618	14	P	VK0ZZ	57006	VK6FI	6
0624	14	P	VK6FI	58004	VK0CB	4
1620	28	P	VK3WI	59077	VK3ZZ	1
15/0750	1.8	CW	VK3YQ	599360	VK3XU	2
0754	52	P	VK3YXX	58137	VK3ZXX	1

Note times for intra call area loggings shown in rule 5.

shown in the log submitted. If an invalid contact is made, it must be shown, but no score claimed. Entrants in the "Open" section must show the various mode contacts in numerical, i.e., chronological order.

14. The Federal Contest Manager has the right to disqualify any entrant who during the contest, has not observed the regulations or has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set out logs.

15. The ruling of the Federal Contest Manager of the WIA is final and no disputes will be entered into.

#### AWARDS

Certificates will be awarded to the top scoring stations in sections (a) and (c) of rule 1, in each call area, and will include the top scorer in each section of each call area operating exclusively on 52 MHz and above. Each VK, ZL and P29 call area will count as separate areas for awards. There will not be an outright winner. Further certificates may be issued at the discretion of the Federal Contest Manager. The Division to which the Remembrance Day Trophy will be awarded shall be determined in the following way:

Average of top 6 logs plus (number of logs entered divided by the number of call area licences, multiplied by total points from all entrants from call area in sections a, b and c).

VK0 scores are added to VK7 and VK8 to VK5. Scores by VK9 stations are added to the mainland call area geographically nearest. Scores claimed by ZL and P29 stations are not included in the scores of any VK call area.

Acceptable logs for all sections shall show at least 5 valid contacts. The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

#### RECEIVING SECTION (Section d)

1. This section is open to all Short Wave Listeners in Australia, Papua New Guinea and New Zealand, but no active transmitting station may enter.

2. Contest times and loggings of stations on each band are as for transmitting.

3. All logs shall be set out as in the example. It is not permissible to log a station calling "CQ". The detail shown in the example must be recorded.

4. Note the times and conditions set out in rule 5.

5. Club stations may enter this section. All operators must sign the declaration.

#### AWARDS

Certificates will be awarded to the highest scores in each call area. Further certificates may be awarded at the discretion of the Federal Contest Manager. ■

## VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP  
Forreston, 5233

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	K4RTT, Mt. Mowbray	144.400
VK5	VK5VF, Mt. Lofly	53.000
	VK5VF, Mt. Lofly	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.850
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RMT, Launceston*	52.400
	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
ZL1	ZL1VHF, Auckland	145.100

ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

\*denotes addition.

A telephone call from Joe VK7ZGJ this month proudly announced to me that the Launceston six metre beacon was at last granted a licence and was operational. It is operating on a continuous schedule with 850 Hz FSK, with an ident every 20 seconds. It is running about 25 watts to a half wave dipole orientated north and south. It is very pleasing to see another beacon on the air, further filling the gaps in the Australasian beacon coverage. It is to be hoped that eventually a decision may be made to instal a cloverleaf or similar type of antenna to give an available signal in all directions, the back of the antenna supplying information on short skip conditions to Hobart, and the remainder providing information to VK6 to the west, ZL to the east and the remainder of VK in between. Joe would be very pleased to receive any reports of reception of the beacon.

Under the heading of "Observations" in the Eastern Zone (Gippsland area) Newsletter of VK3, there is a brief comment that an application has been made for a two metre beacon for that area.

I note also that Joe VK7ZGJ made a comment in his VHF notes in "QRN" that a 432.475 MHz beacon has been approved for the North West coast area of Tasmania, and will be in operation shortly. A beacon placed there should be a lot of interest to many people, particularly those in Mt. Gambier and VK5 generally, and the Albany boys. Providing there is some amateur activity available to back it up, it could prove interesting when band conditions are right, and provide another State on 432 for many. I am particularly pleased to note the frequency has been placed towards the upper end of the first 500 kHz segment of the 432 MHz area, close enough to be remembered for monitoring purposes, but far enough away not to cause problems for low end of the band operation, and right away from the EME segment which is now extending up to 432.050.

The Townsville Amateur Radio Club notes that Graham P29DJ calls most nights on 144.100 with CW from 1000Z. Provided Graham has a reasonable take-off south, there seems to be no real reason why he should not eventually be heard in the northern parts of Queensland, if not elsewhere. I am not sure what the distance would be between Graham and Townsville for instance, but I would not think it to be any further than say from Adelaide to Albany, approx. 1920 km or 1200 miles and over water most of the way. If I lived in Townsville I would certainly be doing my utmost to cover that distance.

Just back to beacons again for a moment, it is of interest to note in the WA VHF Group Bulletin that a readout of the operating frequencies of the two Perth beacons on 21/4/76 gave them as 52.300109 and 145.0003130 MHz, which indicates a rather precise frequency stability for each beacon. Has anyone else read theirs lately?

Further to my note in May issue regarding 2 metre activity in Broken Hill, I have received a letter from John VK2ZXU from that city advising that activity is not great up there, with the only really active station being Frank Bridgewater (call unknown) on 2 metres FM. John mentions he VK2ZXU, would one day like to operate again on the lower part of 2 m, but as he puts it "With something better than his old AM rig!" Talking with Ray VK3ATN one night he mentioned VK2ZI was supposed to have a 70 watt linear amplifier for two metres. Perhaps these few lines will help to spark a bit of fresh interest in the Broken Hill area, after all it is only 480 km from Adelaide and about 900 km from Melbourne. Both should be CW contacts, and SSB under the right conditions.

On 432 MHz Ray VK3ATN has launched into some renewed activity, particularly employing his EME dish for that band. Good results have been obtained with Les VK3ZBJ in Melbourne, and with Chris VK5MC in Mt. Gambier. Ray also has a good 2 metre path to Les and contacts seem to be available almost at any time.

Six metres has been rather quiet of late. Most uses the band is put to these days in VK5 is for

crossband contacts to 2 metres. Many summer time sporadic E operators will be sorry to learn that Kerry VK5SU has packed up his bags after making his last contact from Ceduna on 29/5/76 and left to take up work at Moree in Northern NSW. Kerry was situated in a prime position for 6 metre DX to everywhere, as evidenced by the number of times he won the Ross Hill Memorial Contest. Of latter times he turned his hand to 144 and 146 MHz with results in keeping with the distance he was situated from centres of population, but a nice half way point for the boys in Albany. I am sure we all wish Kerry every success with both his work and amateur radio from his new location; he may find it more difficult to grab as many contacts there as he did in Ceduna, but time will prove if this is so. Anyway, he will be a great asset to NSW and should be able to work into Brisbane from Moree on 2 m, and will come within the occasional range of 6 metre stations in Japan via F2 conditions. Will be pleased to hear from you Kerry sometime when you get settled in.

From the pages of "The Propogator" comes information that the W/VE/JA segment of the April EME tests were carried out by Charlie VK2ZEN, with the able assistance of Charles VK2MT on the CW side. Results were quite good, with first time contacts being made with W4NUS and VE4JX. Contacts were also made with VE7BBG and JA1VDV.

The May EME tests to include those with WA6LE1, of the Stanford Research Institute using their 150 foot dish on 432.095. Most of the time the tests would be conducted with their normal power of 1 Kw input, but some tests were scheduled for an output power of 20 Kw if permission could be obtained from the FCC. Moonrise for these tests at VK2AMW would be 1615Z or 0215 EAST, so hope Lyle and his helpers were able to get some results from that one.

Others to take part in these high power tests included VK3ATN, VK5MC, VK5MT, VK5NY and VK5ZPS. These are the operators I know about at this stage, many others probably had a listen. Ray VK3ATN reports hearing WA6LET at up to 6 dB above noise at times, with good CW copy, but he thought the signal was weaker than the November tests. He copied the first readable signal at 1737Z, signals 3 x 2, consistent though weak.

Chris VK5MC listened using 4 yagis, signals reasonable it is reported. Roger VK5NY heard the signals 3 to 4 dB above the noise on his 32 element extended expanded collinear array, first hearing WA6LET at 1722Z at an elevation of 1½ degrees. At this stage unable to get anything definite from the other operators.

In talking to Roger VK5NY he reports the good news that Western Victoria will again be coming into the news with some fresh SSB operation on 144 MHz. Ray VK3AV is operating on 144.100 each Sunday morning at this stage looking toward Adelaide following the WIA broadcast which concludes around 0000Z. Ray is located at Horsham. Alan VK3ZFJ has moved from Melbourne to N Z and is setting himself up for 144 and 432 MHz SSB. Both these stations should be audible in Adelaide and Melbourne, so other operators should keep them in mind.

A late note has come to hand from Allan VK4RF in Brisbane which mentions six metres opening up on 26/5 for the first time since 8/2/76 when he worked VK3AQR at 0235Z, 5 x 9 both ways. Later at 0400Z VK5VF the SA beacon was heard continuously until 0800, but no amateurs. Allan says no JA's have been heard as far south as Brisbane so far this year.

That's about all the news for the moment, so will close with the thought for the month: "When a man looks a woman straight in the eyes, she'd better do something about her figure".

The Voice in the Hills. ■

## AROUND THE TRADE

R. H. Cunningham Pty. Ltd. advise that as from Monday, 10th May, 1976 a new office was opened in Western Australia at 256 Stirling Street, Perth, 6000, telephone 28 3655. ■

# VK3ALI ON THE AIR

Dr. G. Ungar, VK3AOU.

VK3ALI is on the air again! This is the call sign of the "Austin Electronics Society", situated at the Austin Hospital, Heidelberg, Melbourne. The station was operational in 1970/71 when a licensed amateur was on the Medical Staff, but went QRT when he left.

In 1974, Dr. Gerald Ungar (VK3AOU, ex-G3XIF) joined the staff of the Spinal Injuries Centre of that hospital. Delighted to find the station there, he tried to put it on the air again using the old 2 metre equipment, which was however found to be unserviceable.

Some members of the Heidelberg Rotary

Club heard of the station and its problems and the Club offered to finance its re-equipment. Accordingly, a Uniden 2020 transmitter, TH6DXX and rotator were obtained.

With the help and encouragement of the Administration of the Hospital, the Engineering Department made a 20 foot mast, and installed the antenna on the roof of a boilerhouse, giving a total height of the antenna above the top of the hill on which the hospital is situated of about 50 ft. Its effectiveness is shown by contacts in 25 countries and 4 continents in 6 weeks, in a total operating time of under 30 hours.

The station is situated in the rehabilitation ward of the Spinal Injuries Centre, and is on the air whenever Dr. Ungar is free from his other duties — usually during the mid-day break on Tuesdays, Wednesdays and Thursdays and sometimes later in the afternoons of these days. At present 20 and 15 metres are used, but

80 and 40 will also be available when an antenna for these bands is installed.

The objective is to "expose" the patients to amateur radio — while many quadriplegics and paraplegics return to work, some are largely restricted to their own homes, and a few to private hospitals or nursing homes for many years. Amateur radio can therefore add another dimension to their lives, giving an absorbing interest and a chance for contact with people "outside". In some cases also, both in Australia and overseas, an interest in amateur radio has led to the employment of severely disabled people in electronics or as professional radio operators.

Another item of general interest is station VK3ZZ and the owner club — The Disabled Radio Amateurs Club, 79 Buckhurst St., South Melbourne, Vic. 3205 — believed to be the only organisation of its kind in Australia. ■

## IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

In recent months I have run across journals that have, in retrospect, analysed the previous months propagation conditions and with charts, showing the variations to normal over the various bands.

One in particular deals with European conditions from HF right through to UHF. They have been correlated into sporadic E, Tropospheric or any other type of opening. It would appear that late '75 produced some very good 70 cm openings right around Europe. Mention was made of the 10 metre beacons and a list of same is reproduced here for those interested.

28.170 ZL2MHF, 28.175 VE3TEN, 28.180 ZC4CY, 28.190 JA1IGY, 28.195 DJ0IJI, 28.200 3B8MS, 29.000 DL0AR.

Earlier this year ZL2MHF was heard at good strength in Melbourne.

To those interested in the do-it-yourself predictions, the use of the Solar Flux and A indices can be augmented by a simple solar observation system using a telescope, projecting the sun's image onto a screen to observe visible sunspots. With the increasing number of Cycle 21 spots appearing, it is worth the effort to take a daily look for spots.

Cycle 21 spots appear in high latitudes both North and South of the sun's equator, whilst Cycle 20 spots appear around the equator.

First signs following spot sighting is an increase in the Solar Flux, usually following a spot appearing around the Eastern rim of the sun. A good spot will travel across the sun in approximately 13 days to disappear around the Western rim. A really good one should appear again a total of approx. 26 days after first sighting.

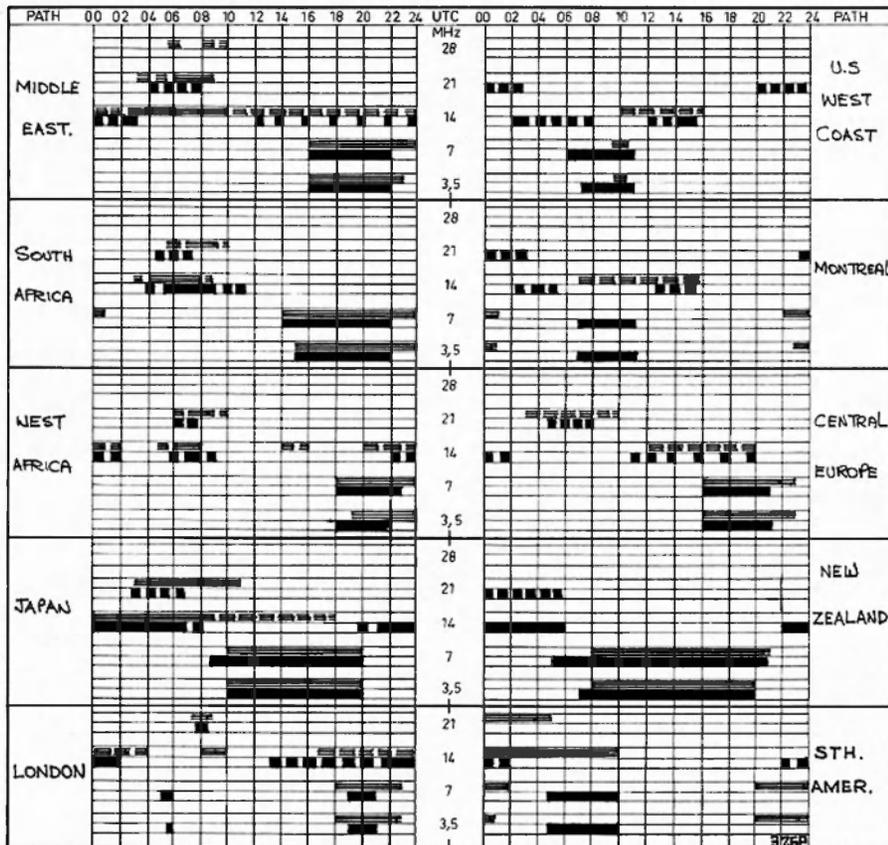
Comparison of the Solar Flux scan charts also plot the travel of the spot across the sun's face. A rule of the thumb shows a quiet sun (no spots visible) as a Solar Flux of around 68.

A daily count of 20, Solar Flux 75	
35	80
40	90
50	95
100	120

As is well known, the daily count is seldom known generally, only the monthly mean and the 12 month running smoothed mean. These daily variations are quite useful and an indication of conditions now. So use of the Solar Flux (ex. WWV) and the A index (low good, high poor) can assist the amateur greatly. Learn to recognise the signs and use them to your advantage.

Keep an ear on 10m in July and August, this would appear to hold some promise this year.

May has finished with some 18 days without visible spots. The Solar Flux fell to a low of 66 similar to last year at this time. July, August '75 saw a rise in solar activity; it is quite possible it will happen again this year. Be prepared. ■



### CHART LEGEND —

LINES: FROM WESTERN AUSTRALIA.

BARS: FROM EASTERN AUSTRALIA.

SOLID BARS/LINES: BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.

BROKEN BARS/LINES: LESS THAN 50% OF THE MONTH.

(Useful at period of increased solar activity.)

ALL TIMES: UNIVERSAL (GMT).

PREDICTIONS: COURTESY I.P.S. SYDNEY.

ANTICIPATED GEOMAGNETIC STORMS: JULY 9, 15.

ANTICIPATED EXHALTED CONDITIONS: JULY 7-9, JULY 13-15, AUGUST 1-3.

LISTEN WWV DAILY HOUR PLUS 14 MINS.

WWW/H DAILY HOUR PLUS 18.45 MINS FOR YESTERDAY'S SOLAR FLUX AND A INDEX.

# HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

**KW 2000A Viceroy Transceiver** 160-10m, complete with AC and DC power supplies, in perfect working order. \$350. Bob Cunningham VK3ML, QTHR. Ph. (03) 20 7780.

**FT101B Transceiver**, no marks, no mods., works FB, with CW filter and manual. \$520. Tom House VK2BTH, 34 Wolseley Rd., Lindfield, 2070. Ph. (02) 467 2773.

**FT101 Mk 1**, \$360. Hallicrafters SR150 80-10 XCVR, VOX, cal. etc. with P/S speaker etc., \$250. SBE34 AC/12V DC solid state XCVR, 125 watts 80-15, very compact, \$250. Heath SB101 deluxe XCVR with matching speaker P/S, as new, \$325. VK3OM, QTHR. Phone (03) 560 9215.

**BWD 804 DC—6MHz CRO** with external dual trace adaptor, still has 6 months warranty, \$200 ONO. Realistic DX160 all-band Rx with inbuilt 6-digit clock, still under warranty, \$150 ONO. 6M Transceiver as per Sept 88 AR, not yet operational, beautiful metal work, best offer. ET1 crosshatch/dot generator, \$15 ONO. FT101B remote VFO, \$75 ONO. Reason for sale of above is unpassable offer of FT101B. Mike VK1ZMV, QTHR. Ph. (062) 83 2215 Bus.; (062) 81 1312 A.H.

**18AVT All-Band Vertical** for 80-40-20-15-10, self-supporting on base mount, \$50. Ron May VK1PM. Ph. (062) 83 2213 Bus.

**Baudera 8G478 signal generator** with spare Klystron, 1.2-4.2 GHz, \$50. 3 WJ Backward Wave Osc. 2-4 GHz, \$20 each. Ex-PMG crystal mixer and IF pre-amp plus 40 MHz IF strip, spare crystal, \$15. Power supply 100-200 volt, 100 mA stabilised, metered, \$15. C42 w/o P/S \$10. John Svéd, VK3ZVZ, 12 Great Valley Rd., Glen Iris, 3146. Ph. (03) 25 4953.

**FTDX401 Transceiver**, 80-10m, includes 11m, noise blanker, CW filter, good condition. No mike or speaker, but in original carton. John Kitchin VK6TU, QTHR. Ph. (092) 49 9342 A.H.; (092) 26 5278 Bus.

**FTDX580**, ex. cond., oscilloscope Heath 0-12-U MTR13, multi chan. "A" — "2" Melb. Leader multi chan. 53.032 MHz. Photographic enlarger — all good condition. Sensible offers. Roy VK3ARS, 30 Cook St., McCrea, 3938.

**QM70 High Power 2 Metre Transceiver**, \$180 ONO. Phillips cassette deck 2500, \$15. G. Hambling, QTHR, VK5AS.

**VHF High Band FM 2m Base Station**, valve type, never used in service, separate Rx, PSU (AC type) Tx, and full metering panel, Rx is single channel double conversion type with 60 kHz filter, Tx has xtal oven, and a QOV03/CO driven into a QOV03/20 final, mounted on a 19 in. rack, brand new condition, \$85. VK3AQB, 76 David Ave., E. Kellor, 3033. Ph. (03) 337 4902.

**Crystal Filter Plexo Technology Type 1488**, 10.7 MHz (FM) plus/minus 15k min, 2 dB ripple, 2 dB loss, 5k in/out, min. flat pack, \$25 or exchange for SSB filter, VK2ZRD, QTHR, but P. Code 2082.

**Crystals Pys H1Q**, 45.100 MHz D, 45.666 MHz D, 45.000 MHz K. Offers VK2ZRD, QTHR, but P. Code 2082.

**Amateur Radio Journals** — March 1969 to Dec 1975, 81 vols. (May Vol. 37, No. 5 not received), \$40.50 ONO. A. G. Hall, P.O. Molloy, 4880, N.O.

**Trap Dipole AL48DXN**, 40-80m, has had little use and is complete, \$20. VK3AEP, QTHR. Ph. (03) 90 2568.

**ZL Mini Quad** for 14 MHz, galv. pipe and dowel construction, 9 ft. boom, exc. cond., \$35 ONO. VK3ZR, Ph. (03) 89 4645 A.H. QTH NOT R.

**FT580** with 600 Hz CW filter, noise blanker and FV401 VFO, mint condition, \$430. VK2SM, QTHR.

**MR-8A** on 52.525 and 52.656, YL1240 PA, 25W O/P, 12BY7 driver, ch. sw., \$50 ONO. BS-6A Mini-Base, 240V AC, 10 ch. name yours, \$100. MR-6A Mobile, 3 channels, prov. for 6, \$40. 52/54 MHz SSB Tx, self-contained in FL50; 6146B PA, 50W/p, ext. RF out, 80 through 10; Int VX0; FV50 VFO Incl., \$75 ONO. 144/148 MHz SSB Tx, mod. FL50 as above, no HF left except 20m, FV50B VFO, QOE03/20 PA, 50 W/p., \$75 ONO. FR50 HF Rx 80-10m, cer. resonators in IF, good perf., match. speaker, \$100 ONO. Complete Novice Sat-Up, FR50B, FL50, FV50C, Rx has Kokusai M/F Bandw. 80-11m, Tx has VCXC and Mod for novice power required. Will convert back to 50W all band rig, \$350 Incl. FRDX400 Del. All filters, FM module, 6 & 2m conv. Drake 5B N/B. All 10m plus, 11m plus, 27.5 to 28, \$350 — no offers. FTV650, clean, just bought, \$100 ONO. All the above gear supp. with circuits/manuals. Selling due to passing Full Call and lack of space — many other VHF goodies. Please call (03) 88 1110 AH, if not home, leave message and phone No.

**Drake TR4C Transceiver**, brand new, AC-4 PSU, RV-4C VFO, 34-PNB noise blanker, KW-107 super-match, Shure 201 mike, \$1000 or part exchange lower price rig, VK2ASH, QTHR. Ph. (02) 270 5184 Bus.

**Two 4-125A Tetrodes** plus ceramic bases and anode heat diss. caps, suit 400 watt PEP linear for 80-10m, similar to the VK3AAR described in May AR. \$40 including postage from VK2ZDJ, 45 Blumer Ave., Griffith, NSW 2680.

**Power Supply**, 3 outputs, 10V-10A regulated, 10V-10A regd., 24V-5A not regd., rack mount, 32 kg. \$80. P. Hadgraft, 17 Paxton St., Holland Park, G. 4121. Ph. Bus. (07) 224 2343, AH (07) 397 3751.

**Transceiver FT101**, complete with microphone, carrying case and instruction book, factory mod. kit for 160m installed, first class order, in all respects, \$395. VK3ARP, QTHR. Ph. (03) 80 4279.

**Heathkit SB102** — 80-10m Transceiver, 180W PEP, USB-LSB-CW, 2 x 6146 finals, fitted with extra 400 Hz CW filter together with HP23 AC power supply and handbooks. Unit is 2 years old and as new, will freight on \$350 firm. VK4VK, 6 Toot St., Sorrento, 4217. Ph. (075) 38 4164 after 18.30h local.

**Yaesu FT2FB 2m Transceiver**, ch. 37, 40, 43, 50, simplex R1, R2, R3, R4, R5, R6, old R1, R4. Paul F. Bell VK1ZPB, 28 Nullagine Street, Fisher, ACT 2611. Ph. (062) 81 2824 Bus. (062) 88 7953 AH.

**FT2FB** as new simplex ch. 40, 50 and 64, repeaters 42/54, 45/57 and 48/60 with mic., manual and metered reg. power supply, \$160, also Lafayette HE30 GP Rx, 530-30000 kHz band spread, manual, original carton, etc. \$50; both ONO. VK2OR, QTHR. Ph. (02) 86 4558.

**ICOM IC-22A**, 2m FM Transceiver, ch. 1, 3, 4, 5, 40, 50, with manual mint condition, little use, mobile mounting cradle, 240V AC — 12V DC regulated power supply and 10 el. yagi with TV mast, the lot \$220, buyer arrange collection. VK2PT, QTHR. Ph. (049) 43 1308.

**Kateumi Mic. Compressor**, MC-225, with instructions, works well, \$20 ONO, VK3LJ, QTHR. Ph. (053) 32 3412.

## WANTED

**RF Ammeter**, 0-3A (or similar). VK3LJ, QTHR. Ph. (053) 32 3412.

**Minibeam HQ1** or B24. VK6PF, 37 Landsborough Way, Padbury, WA 6025.

**Past issues of Amateur Radio Magazine**, 1969: March and July; 1970: Feb, May and Dec; 1971: April; 1972: June and July. VK3ZDJ, QTHR. Ph. (03) 857 6824.

**Buy or loan manuals and/or circuits diagrams** of sig. generators Marconi TF801A and Palec 8G1. S. Parr, VK2ASP. Ph. (02) 93 1302.

**18AVT** in good condition. VK3AKU, QTHR. Ph. (03) 598 5892.

**Windlight**, or parts for a windlight, propellers especially, any voltage output, inverters DC in, 240V AC out, or similar, would be pleased to hear from anyone with experience in this field. Also require 50-75 ft. crank-up tower (not for windlight). All replies will be answered. L. MacDonald, VK3YHA, 317 Eureka Street, Ballarat, 3350.

**Handbook and/or Circuit Diagram**, copy or purchase for Elco 25W HF Transceiver type 6619. T. Connell, Box 718, Madang, PNG (air mail).

# SILENT KEYS

It is with deep regret that we record the passing of —

Mr. C. R. JONES VK2BJA  
Mr. R. F. BURTON VK3IH  
Dr. D. WATSON VK3OD  
Mr. J. B. BATTRICK VK3OR  
Mr. R. HOWES VK3ZEW  
Mr. A. M. BROOKS VK6AH  
Mr. N. MARNIE VK5NM  
ARTHUR W. THURSTAN VK2AV.

The sudden death of Art, on 28/8/76, saddened many in VK and overseas. Art applied the discipline, gained as a scientist, to the amateur art, and kept abreast of the new techniques, and procedures, in his radio interest spanning half of the century.

To anyone privileged enough to partake of the hospitality of the Thurstan home, and there were many, a vivid memory of Art, and Janet, will remain.

Art's main activity was in the CW field and, as a founder of the CW net, he retained his interest in the promotion and performance of the net to the end.

Vale Master.  
VK28M

Crystals between 3525 and 3575 kHz, RF choke 2.5 mH 4P1 60 mA rating, and twin gang tuning capacitor, approx. 415-450 pF per section. John Windebank, Kangaroo Ground Rd., Warrandyte, 3113. Ph. (03) 844 3222.

## CONVENTION

**CQ Convention, Rockhampton 28-29 August** — for fun in the sun. Prelude to Capricana Festival. Official switch on VK4RAR. All the usual activities and more. Member of Executive present. Smorgasbord Dinner. More details: WIA CQ Branch, Box 496, Rockhampton, 4700.

## DISPOSALS

Free for the taking away: 35 ft. Antenna Pole, tapers from 6 in. at base to 3½ in. at top, painted white. VK3DA, QTHR.

## STOLEN EQUIPMENT

Uniden 2020, Serial No. 50910013, stolen from QTH at Frankston on 16th June, 1976. Any information please to Brenda VK3KT, telephone (03) 787 5350.

# 20 YEARS AGO

Ron Fisher, VK3OM

July 1956

Amateur Radio for July 1956 featured the report of the first TVI field test. This was carried out by five members of the NSW Division TVI committee. They had constructed a receiver covering the frequencies of the local television channels, which they then used to measure the relative harmonic output of two different transmitters.

N. C. White, VK3ZAW described how to convert the SCRS22 generator from 24 volts operation to 12 volts operation. At this time, transistor power supplies had just not quite arrived on the scene and so either vibrator or genmotors were needed. The amount of primary current needed by these monsters would flatten a car battery in short time.

July was a lean month for technical articles with the rest of the issue being taken up with the Remembrance Day Contest rules, some amendments to the National Field Day results as well as the usual monthly columns.

Notes from each of the divisions took up considerable space in Amateur Radio in those days. July ran to three full pages of very small print. The Editorial page for July looked at that section of the Amateurs Code that states, 'The Amateur is a Gentleman'. No doubt if this was rewritten today we would need to change this to 'The Amateur is a Gentleperson'. However which way it is stated, I hope it still applies. ■

# SIDEBAND ELECTRONICS SALES

**ATLAS** models 210-X and 215-X 80 to 10 & 160 to 15 M transceivers inclusive factory installed noise-blankers. **only \$600**

**ICOM** model IC-202 2 M SSB portable transceivers 144-144.4 MHz. **now only \$180**

Model IC-502 6 M SSB portable transceivers 52 to 53 MHz. **now only \$175**

YES, we feel some newcomer in this game requires a bit of honest competition and there is more to come after we get really organised and our teeth bitten into it deeply!!

**UNIDEN** model 2020 AC-DC transceivers 10 to 80 M with 3 crystal filters **\$550**

**TRIO-KENWOOD** model TS-520 AC-DC transceivers 10 to 80 M. **Still only \$530**

**YAESU-MUSEN** model FT 101-E AC-DC transceivers 10 to 160 Mw. speech processor **\$650**

**TRIO-KENWOOD** model QR-666 receiver 170 KHz to 30 MHz AC-DC. **Now only \$225**

**BARLOW-WADLEY** model XCR-30 MK II portable DC communications receiver **\$180**

## HY-GAIN ANTENNAS

14AVQ 10-40 M. verticals, 19' tall, no guys **\$65**

18AVT-WB 10-80 M. verticals, 23' tall, no guys **\$90**

TH3JR 10-15-20 junior 3 el. Yagi 12' boom **\$135**

TH3MK3 10-15-20 senior 3 el. Yagi 14' boom **\$180**

TH6DXX 10-15-20 senior 6 el. Yagi 24' boom **\$225**

HY-QUAD 10-15-20 cubical quad Yagi 8' boom **\$200**

TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom **\$190**

BN-86 balun **\$18**

## ANTENNA ROTATORS

Model CDR AR-22 junior rotator for small and light beams **\$55**

Model CDR Ham-II for all hf beams except 40 M ones! **\$165**

KEN model KR-400 for all medium size hf beams with internal disc brake **\$100**

KEN model KR-500 for vertical elevation control of satellite tracking **\$100**

All models rotators come complete with 230V AC indicator-control units.

1-conductor light cable for AR-22 **20 cents per yard**

12-conductor light cable for Ham-II **30 cents per yard**

8-conductor heavy cable for Ham-II **70 cents per yard**

6-conductor heavy cable for KR-400-500 **60 cents per yard**

**DRAKE W-4 SWR—WATT METER**

0-200 and 0-2000 Watt scales **\$60**

**DRAKE TV-1000 TVI Low pass Filter** **\$25**

**SINGLE METER SWR METER** **\$12 and \$15**

**TWIN METER SWR METER** **\$22**

## MARK MOBILE ANTENNAS

Helical 6' long HW-40 for 40 M. **\$18**

High power KW-40 for 40 M. **\$25**

HW-20 for 20 M. **\$16**

Swivel mobile mount and chrome plated spring for all **\$12**

## ASAHI MOBILE ANTENNAS

AS-2-DW-E 1/4 wave 2 M. mobile whip **\$8**

AS-WW 3/8 wave 2 M. mobile whip **\$18**

AS-GM gutter clip mount with cable and connectors **\$10**

M-Ring body mount and cap for 1/4 M. whips **\$5**

## CUSH CRAFT ANTENNAS

Model DGPA 27-52 MHz adjustable ground plane **\$25**

LAC-2 lightning arrestors **\$4**

AR-2X Ringo Ranger double 3/8 vertical for 2 M. **\$35**

ARX-2 extensions for the Ringo 2 M. vertical **\$15**

A147-11 II elements 2 M. Yagi **\$35**

A147-20T combination horizontal-vertical 2M Yagi 10 el. each **\$60**

A144-20T same as A147-20T but for combination vert.-hor. polarisation **\$60**

CR-1 27 to 29 MHz 3/8 Ringo vertical **\$35**

**CRYSTAL FILTERS** 9 MHz, similar to FT-200 ones, with carrier crystals **\$35**

**KYOKUTO** 2 Meter FM 15 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144 to 148 MHz, receive to 149 MHz, no more crystals to buy, includes simplex, repeater and anti-repeater operation. **Still only \$300**

**TRIO-KENWOOD** model TS-700A FM-AM-CW-SSB transceivers, full 144 to 148 MHz coverage, 10 Watt output VFO controlled, self contained AC-DC operation **\$575**

**FERRITE CORE BALUNS** cheaper Japanese product for up to 500 W RF **\$12**

**COAX CABLE CONNECTORS-SWITCHES** Amphenol type male for RG8U and RG58U cable, two types, female chassis mount, double male, double female, all types **100 cents each**

Amphenol angle and T-connectors **150 cents each**

3 Position coax switches **\$10**

RG-8U coax cable 3/8" diam. **80 cents per yard**

RG-58U coax cable 3-16" diam. **30 cents per yard**

Add \$1 cutting and handling cost for coax and rotator cable orders

**P.T.T. DYNAMIC MICROPHONES** 50K or 600 ohms with 4-pin Jap. plugs **\$10**

**27 MHz TRANSCEIVERS** 5 Watt AM 6 channels with 27.800 MHz crystals **\$75**

1 Watt hand-held 3 channels 27.240 crystals **\$50**

15 Watt PEP 23-channels AM-SSB model SE-501 **\$175**

All prices quoted are net SYDNEY, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over \$100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded.

## NEW ADDRESS—

# SIDEBAND ELECTRONICS SALES

P.O. BOX 184 SUTHERLAND

POSTCODE 2232. TELEPHONE 02-521-7573

For personal attention, 24 Kurri Street. LOFTUS. POSTCODE 2232

PETER SCHULZ, VK2ZXL





VOL. 44, No 4

AUGUST 1976

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### COVER PHOTO

Warrant Officer Bernie Simmonds operating the Collins mobile communications centre on 21 MHz. This equipment is fully automated, self-tuning on all frequencies and was displayed at the Royal Australian Corps of Signals Golden Jubilee celebrations last November.



# RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

## NEW LINER

### 27 MHz Transceiver

Suitable for Novice Amateurs

5 W, AM 23 Channel 12V DC operation.

S-meter, squelch, ant. & PA facility.

\$115 P&P \$3

## AMATEUR TRANSCEIVERS

YAESU FT101E 160-10m SSB, AM and CW Transceiver with RF speech processor fitted 240V AC and 12V DC PSU inbuilt. \$670

KENWOOD TR7200G 2 metre FM Transceiver, 10 watt and 1 watt operation fitted with crystals for operation on 146.1 and 146.4 repeater channels 12V DC. \$215

KENWOOD TR2200G handy 1 watt, 12 channel transceiver for 2 metres FM. Fitted with 4 sets repeater crystals. Inbuilt ni-cad charger. \$180

ICOM IC202 2 metre SSB Transceiver, 3W PEP, SSB operation. Provision for external antenna, DC input etc. \$185

MULTI 7 2 metre FM Transceiver fitted with 7 repeater, 7 anti-repeater and 3 simplex channels, 10 watt and 1 watt output. 12V DC operation. \$230

KEN KP202 stubby helical antennas. \$6.50

## 27 MHz (11 METRE) EQUIPMENT

LAFAYETTE HA310 Walkie Talkies, 1 watt 3 channel fitted with 27.240 crystals. PMG approved. \$135 pair

LAFAYETTE MICRO 66 5 watt transceiver, 6 channel operation, fitted with one set crystals. \$139

LAFAYETTE 27 MHz fibreglass cowl mount mobile loaded antenna, 36" long, complete with base and coax. \$23.95

LAFAYETTE 27 MHz combination AM Radio and 27 MHz loaded antenna complete with splitter harness, cables and plugs. \$28.95

LAFAYETTE 27 MHz gutter mount mobile antenna complete with coax cable and PL259 plug. \$22.50

1/4 WAVE STAINLESS STEEL 27 MHz mobile antenna with heavy duty spring, base and insulator. \$30

6 CHANNEL 5 watt AM 27 MHz mobile transceiver. PMG approved for 27-880 MHz operation with crystals for 27.880. \$101.50

LAFAYETTE "Range Boost" 1/2 wave vertical antenna for 27 MHz base station use. \$59

LAFAYETTE 1/4 wave ground plane antenna. \$35

52 OHM COAX CABLE, 1/4" diameter, 55c metre

PL259 COAXIAL CABLE PLUGS. \$1.60 each

REDUCER to suit for 1/4" coax. 40c each

SO239 COAX CHASSIS SOCKETS. \$1.40 each

## AUCTION SALE

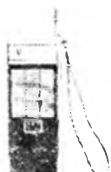
Due to the proposed re-building of Bridge Road, Richmond during the next twelve months we have decided to temporarily move our operations at 390 Bridge Road, to our Bulk Store at 104 Highett Street, Richmond. As previously advertised we are desperately short of space and with the re-location of our business, the need has become even more urgent! An Auction Sale of new and used equipment comprising: components, test equipment, transmitters, receivers, transformers, cable, relays and hundreds of other items is proposed for the near future and will be held at 390 Bridge Road, Richmond.

You are again invited to call at our Bulk Store and inspect the large range of equipment which must be cleared. No reasonable offers will be refused!

Catalogues are now being prepared for the Auction and should be available soon from any of our three present locations.

## MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCEIVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION



### SPECIFICATIONS:

Transistors: 13  
 Channel Numbers: 3, 27.24 OMHz  
 Transmitter Frequency Tolerance:  $\pm 0.005\%$   
 RF Input Power: 1 watt  
 Tone Call Frequency: 2000 Hz  
 Receiver type: Superheterodyne  
 Receiver Sensitivity: 0.7  $\mu$ V at 10 dB S/N  
 Selectivity: 45 dB at  $\pm 10$  kHz  
 IF Frequency: 455 kHz  
 Audio Output: 500 mW to Ext. Speaker Jack  
 Power Supply: 8 UM-3 (penlite battery)  
 Current Drain: Transmitter 120-122 mA  
 Receiver: 20-130 mA.

\$49.50 each or \$95 a pair

Post & Pack \$1.50 per unit

## 11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.155	27.880
27.085	27.165	27.235
27.125	27.225	27.255
27.240	27.910	27.265

\$6.50 A PAIR (Transmit and Receive)

## 2 METRE CRYSTAL SPECIAL

We have purchased a quantity of crystals to suit the KEN KP202 Transceiver and offer them at a special reduced price while they last.

Transmit Crystals	Receiver Crystals
146.10 MHz	146.70 MHz
146.20 MHz	146.80 MHz
146.30 MHz	146.90 MHz
146.40 MHz	147.00 MHz
	146.50 MHz
	146.55 MHz

\$3.50 EACH

LOOKING FOR BARGAINS?



## BRIDGE ROAD, RICHMOND STORE SPECIALS

DIODES 1 amp, 1 kV Mini Diodes. Type A14P. 10 for \$1.50 — P&P 30c.

FLEXIBLE PLASTIC "CHOCOLATE BLOCK" 1.00 cm x 4 cm, 12 connectors, terminal strips. 10 for \$4 — P&P 75c.

POTENTIOMETERS 10 assorted new carbon pots. Popular values, 1/4" shaft. 10 for \$4 — P&P \$1.

TRANSFORMERS TYPE 6426 44VCT at 1/2 amp., 6.3V at 1/2 amp. \$4.50 — P&P \$1.

TYPE PF3152 50VCT at 1 amp., 6.3V at 1/2 amp. \$4 — P&P \$1.

METERS Edge Meter 0-1 mA calibrated 0-5 1/2" Face x 2 1/2"W x 3"D \$3.00 — P&P 50c

Blank Face 0-1 mA 5 1/8" x 4 1/4" \$5.00 — P&P 50c

Blank Face 50-0-50uA 3" square \$3.00 — P&P 50c

200uA Meter Calibrated 0-100 2 1/2"W x 2 1/4"H \$3.00 — P&P 50c

Twin Level Meter 1 1/8" x 1 3/8" 250uA \$4.50 — P&P 50c

Signal Level Meter 1 3/4" x 7/8" 250uA \$3.50 — P&P 50c

MAGNETIC EARPIECE to suit most Transistor Radios, fitted with 2.5 mm plug. 10 for \$2 P&P 50c

6 ft. 3 CORE AC LEADS with moulded 3 pin plug. 10 for \$6.50 — P&P \$1.50.

NEON FLASH TUBES (ex Repco). Ideal for Ignition timing lights. \$1.50 each — P&P 50c

ELECTROLYTIC CAPACITORS 50 assorted popular values. \$5 — P&P 50c

RESISTORS 100 assorted 1/2 watt carbon resistors, all popular values. \$2 — P&P 50c

WIRE WOUND RESISTORS 100 assorted, 5 and 10 watt. I.R.C. wire wound. \$8 — P&P \$1.

POLYESTER TUBULAR CAPACITORS 100 assorted capacitors, all good popular values. \$4 — P&P 50c.

"PHILIPS" TYPE CONCENTRIC TRIMMER CAPACITORS 25 pF. 10 for \$2 — P&P 50c.

XENON FLASH TUBES suitable for Strobe use. (Sorry, no trigger transformers). \$1.50 ea. P&P 50c.

TRANSISTOR SPECIALS

AV6102 Normally \$1.99 ea. 10 for \$5.00 P&P 30c

2N3564 Normally 38c ea. 10 for \$2.50 P&P 30c

BC107B Normally 32c ea. 10 for \$2.00 P&P 30c

EGG INSULATORS Quality porcelain Egg Insulators 35c ea. or 10 for \$3.00 — P&P \$1.

BATTERY HARNESS to suit 9 volt 216 batteries. 10 for \$1 — P&P 50c.

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B. Due to circumstances beyond our control, prices quoted in this advertisement are subject to alteration without notice. New equipment available at our Bridge Road Store.

# amateur radio

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Copy is required by the third of each month. Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.

The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

**Advertising:**

Advertising material should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 25th of the second month preceding publication. Phone: (03) 24 8852.

Hamads should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 3rd of the month preceding publication.

**Trade Practices Act:**

It is impossible for us to ensure that advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly.

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# QSP UNITY IS STRENGTH

It is a fact that the Trade Union Movement has got where it is through the principles of unity and numerical strength.

Amateur radio societies need to emulate these principles.

Why?

Because the testing time for amateur radio is going to be WARC 79 and the years following it.

All the officers of the IARU are convinced of this. All the officers of the ARRL are alert to the danger signs. All the officers of the RSGB, WIA and other societies find the evidence irrefutable.

Regrettably this is a deadly serious matter. It is not rumour or conjecture.

What can "Mr. Average Amateur" do about it?

Firstly he can help build up the numerical strength of his amateur society — the WIA — by going out of his way to recruit new members and help to keep them.

Secondly he should do everything he can to encourage his fellow amateurs to comply with the spirit of amateur radio.

Thirdly he can do his bit by using the amateur bands — as many bands as he can, as often as he can. And moreover explore and use the higher UHF/SHF/Microwave frequencies.

As might be expected, higher membership brings other benefits such as more people to share the costs, more ideas coming into the system and hopefully more members to help where help is needed. I commend most strongly your full support for our recruiting drive and help in the other areas listed above. Suitable recruiting brochures are now available, backed up by an advertising campaign.

D. A. WARDLAW VK3ADW, Federal President.

## QSP

**FAX**

From Radio Communication, March '76 It is learnt that UK Amateurs are now permitted to conduct facsimile transmissions on 3.5-3.8, 7-7.1, 14-14.35, 21-21.45, 28-29.7 and 144-146 MHz. Upon reprinting the licence forms emissions A4 and F4 with a bandwidth not greater than 6 kHz will be included. This does away with individual special applications.

**AUSTRALIAN STANDARD 3159-1976**

This was first published as ASC 159 in 1959, revised as AS 3159 of 1972, and is now issued as a revised AS 3159-1976. It refers to equipment produced and used for household, office or entertainment purposes and similar general use operating at supply voltages not exceeding 250 V single phase. The standard covers a very wide range of items (including single units or modules as well as equipment designed for connection to extra-low voltage or batteries having circuits which operate above extra-low voltage) and includes tape recorders, record players, radios, TVs, power supplies, etc., but is not intended to restrict the use or performance of transmission equipment. The specification is to be read in conjunction with Part 1 of the SAA Wiring Rules and AS C100 and also refers to AS C145 Radio Interference Suppression Devices, AS 1044 Limits of Electromagnetic Interference for Electrical Appliances and Equipment, and AS 1053 Radio Interference Limits and Measurements for Television and Radio Receivers. AS 3159 is entitled "Approval and Test Specification for Electronic Sound and Vision Equipment".

**RADIO COMMUNICATION EXHIBITION — LONDON**

A circular from the RSGB advises that their Radio Communication Exhibition will be held this year from 30th July to 1st August at Alexandra Palace. This is in the Muswell Hill area of Nth. London. An international night for overseas visitors is to be held on Friday evening 30th July. Anyone in the UK at that time should not miss this exhibition of amateur and other gear.

**JOTA 1976**

Do make a note that time moves on. The 19th Jamboree on the Air will be 16th and 17th October 1976. Suggested starting time is 00.01 h local time on Saturday the 16th and ends at 23.59 h local time on Sunday. This is Scout Communications Year. Thus the Scouts will need greater help than ever. World Scout frequencies are useful for calling CQ Jamboree when free. They are 7090, 14290, 21360 and 28990 kHz for phone, 3590, 7030, 14070, 21140 and 28190 kHz for CW. If you want more JOTA details why not join in the Australian Scout Radio net, first Sunday of each month from 9.30 to 11.00 h EAST around 7070 kHz or near 14290 kHz from 11.00 to 13.00 h EAST same day.

**ITU**

"The latest member of the International Telecommunication Union is the Republic of Guinea-Bissau. The ITU now has 148 members. In accordance with United Nations principles the latest ITU member will have one vote at conferences, as do all nations who take part". Radio Communication May '76.

**PREFIXES**

According to Radio Communication May '76 the ITU has provisionally allocated the callsign series D6A-D6Z to the State of the Comoros.

**QSP**

Here is a listing of some less well-known HF standard time and frequency transmissions. They may be a useful band opening indicator.

Station CHU in Ottawa runs 5 kW on a continuous basis on 3.33, 7.335, 14.670 MHz.

The following USA Armed Services stations may also be useful.

All frequencies are in MHz.

NPG, 12.966; LOL, 17.183; NPM, 13.649; FTK77, 10.775; DAM, 16.980; and NSS, 5.4485, 8.090, 12.135, 16.180, 20.225, 25.590.

**THOUGHT FOR WARC 79**

"At present, VHF repeaters are spaced 25 kHz apart as are the "S" (simplex) channels, with 50 kHz spacing on UHF. It seems to us that we are laying ourselves wide open to the idea that amateurs on the VHF/UHF's will not be assigned bands in the future, but a few spot frequencies. Are we not inviting this by this obsession with 'channels'? What is there to stop a non-amateur faction proposing that the two metre band be halved and the amateurs allocated a few channels at 12.5 kHz spacing. In the UK, there is a concentration of SSB activity in the 144.15-144.35 MHz region, followed by a relatively little used band from 144.35-145.0 MHz. To make a case for the retention of the present 2 m band, we must make more use of this wasted space". Edit. In Mobile News May '76. And, by the way, in the UK they only have 144-146 MHz as their 2 m band.

**OLYMPIC GAMES**

QST for June '76 has the news that special agreements will permit the handling of third party messages during the Olympic Games in Montreal from 3rd July to 15th August. The special agreements negotiated to that date were between Canada and 32 other countries of which Hong Kong, Korea and the Philippines were the only ones in Region 3. Incidentally, on this subject the same issue carries an article about the dangers at ITU conferences of third party traffic, and quoted this as the explanation why one African delegate voted against amateur radio at the 1971 Space Conference.

# WIANEWS

Central Office was bombarded with letters during June on a number of 1976 Convention Motions requesting various amendments to the Handbook.

Several more are still in the pipe-line for further work to be done on them.

June was a quiet month on WARC 79 as the agenda for the Conference is expected at any time.

A new development on the Australian CB scene put in an appearance during June when a group in Sydney organised a meeting on the 10th to launch the promotion of a CB service by legitimate methods. The alleged pirates concerned publicly stated they had ceased their transmitting activities in order to achieve their goal.

The Institute cannot condone pirate operations because the amateur service is a legal service and must operate within the law. The attempt to obtain legality of CB operations is too new to draw any conclusions except that the changed situation will surely be of considerable interest in many ways. It has not passed unnoticed.

There was an interesting editorial in April QST about their own legal CB service in the USA which merits study by those who might seek to update themselves on the subject.

Mr. Roget, VK3YQ, a member of the Executive, attended the NZART Golden Jubilee celebrations in Auckland early June. A letter from him referred to the address given by Dr. William Pickering head of the Jet Propulsion Laboratory in California and himself a Kiwi and an amateur of long standing. VK3YQ

commented "one message clearly spelt out is that digital communications is a must for the future".

Another speaker at the Auckland conference was the New Zealand P.M.G. who announced that Novice Licensing would take effect there from March next year — one year tenure, 6 wpm Morse and lower grade technical requirements.

At the June Executive Meeting the Federal President, Dr. Wardlaw VK3ADW, announced his intention to attend the CQ Convention in Rockhampton on 28th/29th August and hoped to visit both Townsville and Brisbane whilst in Queensland if local amateurs in those centres might like discussions.

At their June meeting the VHF/UHF Advisory Committee finalised recommendations for beacon segments and these are now in the hands of Divisional Councils for comments. Another item was the preparation of submissions to the P and T. Dept. relating to the Broadcasting Inquiry.

The Executive also received a proposal from the Federal WICEN Co-ordinator, VK1QJ that the primary channels for WICEN nets should be 3600, 7050 and 14100 kHz plus secondary channels. This is also in the hands of Divisions for comments. VK1QJ attended a seminar at Mt. Macedon and commented afterwards that all services should have no doubts about what WICEN is and can do.

Publicity for the WIA was another matter finalised along with a recruiting drive. Members should therefore expect to see advertisements in all the main Australian Electronics magazine during August and new recruiting folders should become available at the same time.

A videotape was made of the immensely interesting lecture on aerials by G6CJ, "Dud" Charman, given to members of the VK3 Division late in June. When this has been edited and copied it is hoped it will form the nucleus of a Federal videotape library for controlled use at group meetings. ■

## QSP

### EXAM SYLLABI — USA

"The FCC in its continuing efforts to maintain a meaningful and equitable examination program for the Amateur Radio Service, is releasing new study guides. They are in the form of a syllabus which outlines the various categories of questions from which the examinations are devised, and include sample questions representative of those appearing in the actual examinations. In the past the FCC study guides have contained questions which, until recent years, were generally not arranged in any reasonable or logical fashion and usually quite similar to, or even identical to, those found in the examinations. The new study guides will reduce the possibility that an individual may acquire an amateur radio license simply by memorizing the answers to these specific questions without being otherwise qualified. Additionally, the new guides have been designed to permit much greater flexibility in the selection of examination questions. Such flexibility allows more frequent revision of amateur examinations and therefore results in a more equitable examination program". Worldradio News April '76.

### MORSE CODE TEST — USA

"Instead of the present Morse code testing method, the FCC will administer on a limited, trial basis a multiple choice examination covering a five minute transmission of plain text. Such a test would relieve the applicant of the tedious burden of copying one minute of mixed text without error, yet would provide an accurate gauge of his competency in the reception of Morse code message content, the FCC said." Worldradio News April '76.

### DBSSC

The editor of Mobile News reports in the May '76 issue receiving a letter from their licensing authority that special authority had been given from time to time to use the double sideband suppressed carrier mode by radio amateurs but a decision has now been made that this will be discontinued. It is stated that this is a mode of transmission not permitted by international radio regulations and it is difficult to monitor without special equipment.

### QSL ADDRESSES

In the list on page 5 of AR June 1976 there was a misprint of the street name for VK3 outwards bureau Mr. W. L. Jackson. The name should be Maine Street and not Main Street as printed.

### RFI LEGISLATION — USA

"Most consumers do not understand that when they may encounter interference with their home television or radio set after an amateur or citizen band radio operator moves next door, the source is not a defect in the equipment of their neighbour, but with their own radio or television receiver. This interference can be corrected in almost all cases by the installation of simple filtering or shielding parts and could be accomplished most efficiently and economically if it were done by the manufacturer". Introductory remarks by Senator Barry Goldwater, K7UGA, to his RFI legislation for the US Senate as reported by Worldradio News March '76.

### RFI COMPLAINTS — USA

"The FCC now finds that 80% of the RFI complaints involve transmitters operating on frequencies assigned to the Citizens Radio Service, and complaints involving amateur stations have increased from 4% in 1975 to 7% in 1976 according to a spokesman of the FCC Enforcement Division as quoted in Worldradio News April '76. Most of the amateur station RFI complaints are attributable to audio rectification and front-end overload in television receivers, and hence, are due to design deficiencies in the home entertainment equipment. Roughly 60% of the 24,418 electronic home entertainment device complaints involved TV receivers. An increasing number of individuals are now noted to be taking their complaints directly to their representatives in Congress rather than to the FCC. Another item reported was the problem of power interrupters (which sense and current from one or two mA between the hot side of the AC mains and ground which immediately and automatically opens the circuit) being triggered by transmitters.

### SPEED TRAPS — USA

"A resolution adopted by members of the Albany Amateur Radio Association at a recent meeting declares that 'it is not in the spirit of Amateur Radio or in the 'public interest' to use Amateur

Radio to report the location of police highway radar installations'. The resolution pledges members to refrain from transmitting such warnings over their Amateur Radio equipment. It points out that it is the purpose of all radio amateurs to cooperate in upholding our tradition to support the laws under which we operate". Worldradio News April '76.

### MORSE CODE SPEEDS

"The proof of eligibility (Radio Club of America 5 star citation) for membership rests with the ability to answer the 80 wpm questions properly and with accurate comprehension. Faked up responses are easily detected. Bill (Eitel) said that what sets this method apart from the teletype method is the extension of the customary method of CW break-in conversations. Most of the contacts are around 7035 kHz or 14035 kHz, and added that CW 1 at super speeds will get there when single sideband won't. W2KFA who attended the meeting of the club is capable of reading 100 wpm". Worldradio News April '76.

### EMERGENCIES

"The Guatemala earthquake was a tragedy of enormous proportions to the people in Guatemala. What is less obvious, however, is that many people in the New York metropolitan area suffered deep anguish as well. Their concern, of course, was over the safety of friends and relatives in Guatemala. Normal telephone communications were severed completely. Government agencies were unable to help. All of the local police, fire, public works and citizens band radio systems were totally out of action. Only amateur radio was in a position to help, and help it did". Worldradio News April '76. WICEN activities in VK need your help also.

### HEIGHT RESTRICTIONS ON TOWERS — USA

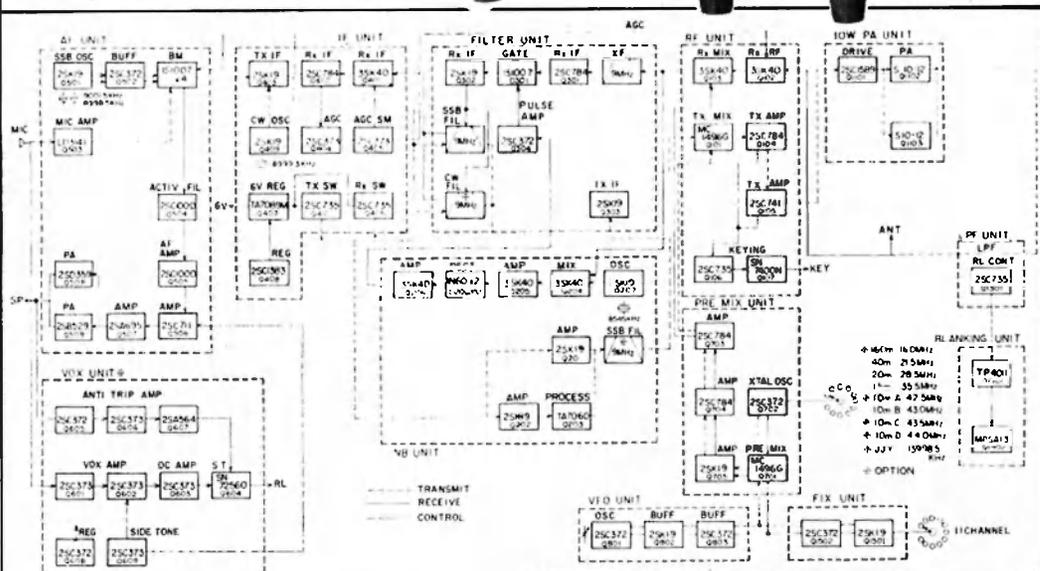
"The City of Maplewood, MN recently amended its zoning code to specifically exclude an Amateur Radio tower from the classification of a building or a structure. Therefore, Maplewood amateurs will not have to seek a variance every time they want to put up a tower over 30 feet". FCC regulations allow antennas up to 100 feet in height. Worldradio News April '76.



Latest addition to the YAESU line —

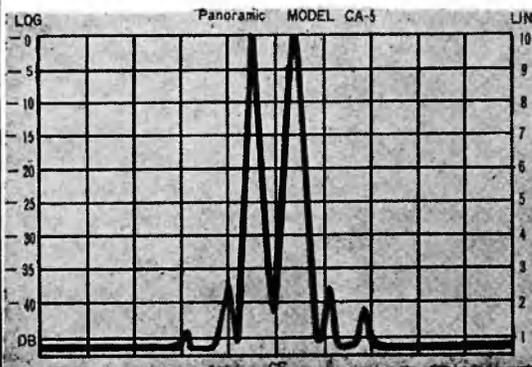
# FT-301S ALL SOLID STATE HF TRANSCEIVER

The FT-301S is an advanced fully solid state H.F. SSB and CW transceiver covering 160 mx thru 10 mx, including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. built in RF Processor) plus many more additions (compact, solid state final, low power consumption).

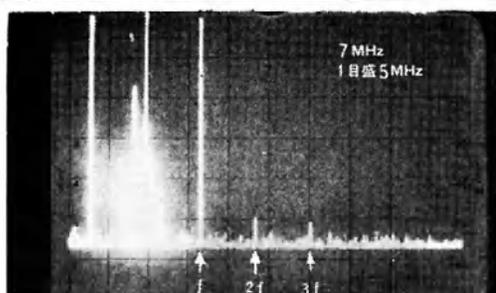


**FT-301S Block Diagram**

Even crystal locked channels and 10 Watts PEP make the FT-301S particularly suitable for the new Novice and, at a later date, a 100 Watt outboard linear amplifier will be available from Yaesu, enabling the FT-301S to be upgraded for full licence operation. Additional plus features include automatic high VSWR protection of the final amplifier output transistors and selectable 100 KHz and 25 KHz calibration. Special care is taken to reduce unwanted harmonic radiation by the inclusion of separate double section Low Pass Filters for each band. Stocks of the FT-301S are expected toward the end of September.



Graph shows Intermodulation products



7MHz Spurious Radiation

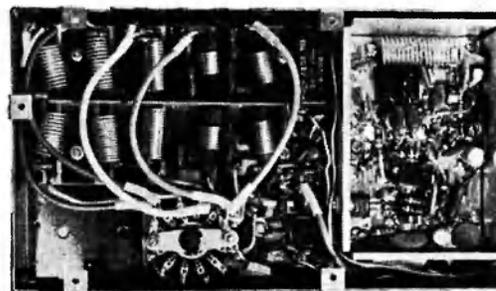


Photo shows double section Harmonic filter used in Final

## Technical Data

- Frequency Range
  - 160m 1.8-2.0 MHz \*
  - 80m 3.5-4.0 MHz
  - 40m 7.0-7.5 MHz
  - 20m 14.0-14.5 MHz
  - 15m 21.0-21.5 MHz
  - 10m A 28.0-28.5 MHz \*
  - B 28.5-29.0 MHz
  - C 29.0-29.5 MHz \*
  - D 29.5-30.0 MHz \*
- WWV 5.0-5.5 MHz
- Aux 27.0-27.5 MHz
- Mode LSB, USB, (A3J)
- CW (A1)
- Input Power A1, A3J, 20 Watts DC
- Carrier Supp. Better than 40dB
- Adj. Sideband Supp. Better than 40dB
- Spurious Rad. Better than -40dB
- Audio Response 300-2700 Hz ±6dB
- Intermod. Distortion Better than -31dB
- Frequency Stability 300 Hz or better within the first 30 minutes and less than 100 Hz after warmup
- Input Impedance 50 Ohm
- Mic Impedance 500 Ohm
- RX Sensitivity 0.5µV for 10dB S/N
- Image Rejection Better than 50dB
- Selectivity
  - SSB -6dB at 2.4 KHz
  - 60dB at 4.0 KHz
  - CW -6dB at 0.6 KHz \*
  - 60dB at 1.2 KHz
- Crossmod Better than 60dB with a 20dB signal at the ant. terminal 20 KHz away
- Audio Output 3W at 10% THD
- Output Impedance 4 Ohms
- Supply Voltages
  - DC 13.5V Receive 0.4 Amp
  - Transmit 3 Amp (at 10W)
  - AC 234V Receive 40 VA
  - (With FP-301) Transmit 110 VA (at 10W)
- Dimensions 280mm wide, 125mm high, 290mm deep
- Weight 7 kg

- \*Options
- Anticipated Prices
- FT-301S Transceiver \$549
- FV-301 Matching VFO \$120
- FP-301 Heavy Duty AC Power Supply \$130 (May also be used to power 100W final)



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# THE SMALLER THE BETTER

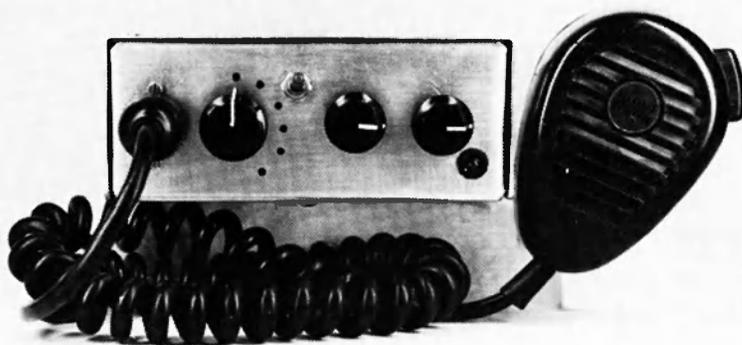
Don Sinclair VK3VH  
6 Tintern Drive, Springvale South

Many modern cars, although they have dash layouts looking like aircraft cockpits, do not leave much room for niceties such as amateur radio transceivers. The following article should enable you to keep sweet with the XYL as well as giving you an insight into miniature techniques.

The unit described is a 2 watt 2 m transceiver, basically an "AR" carphone, and is not designed to be a true portable, but to occupy as little space as possible consistent with sensitivity and power output.

The whole idea of the project was to condense already tried and true circuitry and layout, and come up with a smaller unit.

While the original PC boards were a truly professional presentation, they can be made smaller. This is accomplished, in my case, by using a spirit based pen, and with an original PC board, laid out in front of me, drawing an exact replica of the original straight on to the new board



Not much larger than your fist.

to be dipped. Mind you, it may not come out as you want it first go, but that is the fun of it.

When the RX and TX boards are to your satisfaction (and you have not missed any components), lay out the boards as they

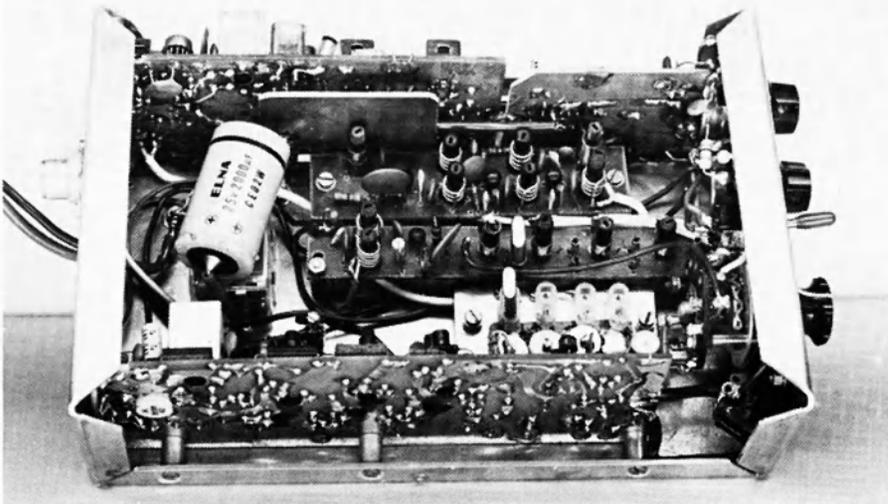
would appear in your intended layout. Naturally, all circuitry must be near the associated switching. You would not have the TX crystals on the other side of the case to the switch, would you?

Most of the boards in my rig have been mounted on their sides giving the rig a very low profile. "K" style crystals have been used throughout, and the TX uses the exact crystal switching and modulation process which I inserted in AR of September, 1975.

The case is the showpiece of any piece of equipment, so it should be made strong and as neat as possible. Approximately 4 hours previous to writing this article the last screw went into the rig and it was air tested. The sensitivity is quite good and an air-test with Bruce VK3UV, using his "Ken" (both ways 2 watts) was very pleasing.

Although not at present a true handheld, a battery pack and rod antenna is to be installed and used for hand-held operation.

Also, the rig will have a switched channel to come out on 145.000 neat, which was triple via a varactor to 435.00 MHz, the 70 cm FM net. A converter will be incorporated to come back to 145 for receive. As the output on 435 will be in the vicinity of 1/2 a watt, a solid state RF amplifier will probably be incorporated to boost the power to a useable level. ■



Inside Don's transceiver, showing the extensive use of vertical printed circuit boards to conserve space.  
Photos: Ken Reynolds

# THE G6CJ AERIAL CIRCUS

At least 200 Melbourne amateurs were present at the Debney Park Community Centre on the night of 23 June, in response to what had been described as "the chance of a lifetime" to hear and see one of the most notable lectures to be presented to VK3s for many a year.

F. J. H. "Dud" Charman B.E.M. (G6CJ), a CW operator of long standing, who is not only a professional engineer with EMI but has spent many years developing and presenting to amateurs in many countries his unique demonstration of aerials in action. This was the 136th time that Dud has displayed his "aerial circus" to an amateur audience, and the equipment has evolved over the period into the present "Mark 3 solid-state" collection.

Dud began by explaining that the whole concept of the performance was to show by the use of models operating in the 3.3 GHz band all the radiation pattern characteristics of many types of aerials. At a wavelength of 10 cm the models themselves could be simply and quickly made from 18 gauge tinned copper wire and bits of plastic, so that even quite complex arrays and their feeders formed a self-supporting assembly. Balanced feed was

The Divisional President, Phil Fitzherbert VK3FF, introduced to the audience Mr

used to all driven elements, with the two-wire transmission lines having a Zo of about 200 ohms. The RF output of the generator was modulated by an audio tone (the traditional 400 Hz) and the radiated power distribution investigated with a hand-held probe detector which fed into an audio amplifier. Thus the audience could hear for themselves how the field strength varied with the relative position of probe and aerial.

Beginning (no surprise here!) with the half-wave dipole, we were quickly shown the significance of polarisation, and the traditional doughnut shape of the pattern was verified. It was shown that the "free-space" radiation decreased smoothly as the probe was moved away, but if a reflecting plane was set up a little distance from the dipole the field between them then exhibited standing waves. This led on to an assembly of two driven dipoles at half-way spacing and 180 degrees phase difference, producing maximum radiation in their plane and a null at right-angles to it. Since introducing a plane reflector at the null produced no change in the pattern, the assembly was revealed most elegantly to be equivalent to a single dipole above earth plus its virtual reflection-produced companion below the earth plane. From here on a metal-topped table was used to represent the ground above which all practical aerials must operate, and the effect of height on the number and elevation of the pattern lobes was clearly demonstrated.

More complex aerials were then investigated, such as long dipoles, long wires, vees and rhombics. Multiple driven-elements then led to the parasitically-excited Yagi arrays, again with emphasis on the relationship between pattern and height. Dud then transferred his attention to slot radiators, showing the current/voltage and polarisation duality between the slot and the dipole. He showed that the slot plane could be allowed almost to disappear (like the smile of the Cheshire cat!) leaving us with the well-known skeleton-slot, and then evolving into the quad. At this stage he passed on to multiple-dipole and slot arrays as used in radar, and



"Dud" Charman demonstrating his work under the watchful eye of the television camera. Photo: Ivo Splichal

showed how minor lobes could be controlled by proper proportioning of the element currents.

After briefly touching on some aspects of guided waves, the climax of the display was reached with the introduction of circular polarisation and helical aerials. The necessity for receiving and transmitting helices to be of the same sense was shown convincingly; but then, when opposite-sense aerials worked perfectly via a reflecting plane which obviously reversed the polarisation, the house broke into prolonged applause and Dud concluded his performance in a blaze of glory!

In the question time which followed, Dud displayed again his encyclopaedic knowledge of his subject, and it seemed that all those who asked questions were more than satisfied with the answers they received. After a vote of thanks moved by the Publicity Officer, John Adcock VK3ACA, the audience responded with acclamation. During the subsequent lengthy period of coffee, biscuits, and rag-chewing, all of Dud's "stock-in-trade" of sundry hardware and tiny aerials was inspected with great interest, and Dud himself was occupied

with informal enquiries and discussion for the best part of an hour.

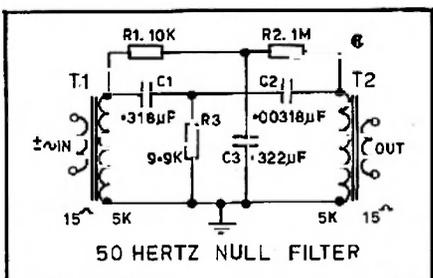
Thanks to the prior organisation of Peter Wolfenden VK3ZPA and his enthusiastic group of ATV operators, the whole of the formal part of the evening was recorded on video-tape, and it is hoped that this can be played to various meetings, conventions etc for the benefit of all those who were unable to be present at the "circus" themselves. Many of those who were there will also look forward to an opportunity to see it all over again. Like all good lecturers G6CJ possesses the ability to make it seem so easy at the time, but in retrospect there was so much information packed into the presentation, that this writer freely admits to some bewilderment at its scope. One could not afford to relax concentration even for a few seconds without missing some point or other.

If you have any interest at all in aerials, if you would like to understand them better without being confused by a mathematical smoke-screen, and you have a chance to see "The G6CJ Aerial Circus" either live or on the WIA video-tape, then DON'T MISS IT! VK3ABP ■

## 50 HERTZ NULL FILTER

Perhaps you have a tape of the last VK6 opening on 432 but when you replay it, somehow the signal is almost killed by a 50 Hz hum picked up when recording. Do not despair, build this circuit and playback through it. It consists of a twin T notch, see figure 1, and will reduce the hum by 40 to 60 dB. Better still, play the tape through the filter and record onto another tape.

FIGURE 1  
T<sub>1</sub>, T<sub>2</sub>, 5 K ohms to 15 ohms speaker transformers.



All resistors 1% tolerance. All capacitors trimmed to within 1% of value.

For other frequencies, say 100 Hz, we

compute new values of C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, as follows:

$$C_1 = \quad = 0.159 \mu\text{F} @ 100 \text{ Hz.}$$

$$C_2 = C_1/100 = 0.00159 \mu\text{F} @ 100 \text{ Hz.}$$

If other Impedance transformers are available it is suggested that you use

$$R_1 = 2Z, R_2 = 100 R_1, R_3 = 0.99 R_1.$$

$$\text{In its usual form, the T filter uses } R_1 = R_2 = 2 R_3, C_1 = \quad \text{and } C_1 = C_2 = C_3/2.$$

However, a greater notch depth is claimed for non-symmetrical circuit. ■

Ron Cook VK3AFW

And now a few words from Arie Bles, VK2AVA of  
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- 1000 plus beams, vertical multi-banders, etc.**
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*My policy of bringing prices down, or keeping them down by open competition with others, if needed, has generally been appreciated and supported by a large section of the Australian Amateur Fraternity. Without after-sales service and honouring all warranty claims I could not have lasted that long. Licensed amateurs are usually shrewd buyers and not the easiest type of customers.*

*But, of course, this action has worried a number of other dealers.*

*However, I shall continue and, if indicated, even expand my activities, regardless of semi-retirement. I am now leaving the retailing to Peter Schulz, VK2ZXL. With this, Peter will continue to get my commercial, financial and technical backing and the benefit of my wholesale imports.*

*Honest trading with a limited profit margin has been and will continue to be my policy.*

*I shall continue to be on the alert for new interesting overseas developments and am proud of having coached Yaesu Musen into developing the Wadley loop FRG-7 receiver!*

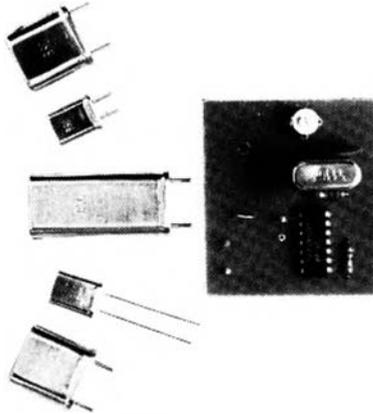
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# BETTER PERFORMANCE FOR YOUR HEATH SB650

John Ingham, VK5KG  
37 Second Ave., Sefton Park, S.A. 5083

The Heathkit Frequency Display Model SB650 has proven to be one of those little luxuries that quickly turns into a necessity! The ability to accurately net to a frequency by sight alone will be appreciated by any ham who has ever kept a sked.

However, after some months of operation, several flaws became apparent in my unit which appeared to be not faults as such, but characteristic of the model in general. Conversations with several other SB650 owners confirmed this to me, and led me to investigate ways of improving its performance. In particular, the problems encountered were:

1. Overheating which led to an incorrect count whenever the unit was operated at an ambient temperature slightly higher than normal room temperature.
2. Occasional random variations in the last digits exceeding that specified by the manufacturers.

In addition, I felt that a further decade of resolution would be an advantage (i.e. to obtain a readout resolution to a 10 Hz instead of 100).

The solutions I have come up with to these problems are separate and do not rely one upon the other. For that reason I will describe them separately even though they can be tackled all together if so desired.

Heathkit specify a Maximum Ambient Operation Temperature of +40 degrees C. (112 degrees F). They also recommend against setting the SB650 on top of heat producing equipment such as receivers, transmitters, etc. Even when such advice is complied with, the average ham operating area can get quite hot, and it only takes (say) the summer sun shining through a window on the unit to lead to problems. I have measured an interior air temperature of over 155°F under these conditions, and certain components, notably the power transformer, get too hot to even touch! The cause of the overheating is obvious at a glance; the unit is enclosed in a double shield with no provision for ventilation at all. Even though it draws only 15 watts, with such good thermal insulation it is no wonder the unit gets so hot.

Heathkit engineers have obviously utilised a double shield for a purpose. However, I have had no trouble with RFI to or from the SB650 since I carried out the following modifications.

As can be seen from Fig 1 the power transformer is mounted on a bent strip of copper or aluminium bus-bar which is at-

tached to a regular finned aluminium heat sink. The bus-bar is thermally insulated from the chassis by the use of a sheet of fish paper and no part of the box or back panel is allowed to come into contact with the bus-bar/heatsink combination.

The bus-bar (3/8" L x 2 1/4" W x 1/4" thick) can probably be obtained as scrap from a local electrical contractor while the heatsink is a Wakefield Engineering Inc. No. 641K1. Cut 9/16" off one side of the heatsink, and file the corners round so that it will fit easily into the outer case.

Now remove a notch 15/16" H x 5/8" W from the bottom corner of the other side so as to preserve clear access to the LMO socket.

Remove the rear panel of the SB 650 and cut off the right hand end to match the heat sink. Now perforate the panel with 3/8" holes above and below the chassis to allow a reasonable degree of airflow. The regulator integrated circuit IC1 is re-located onto the bottom of the heatsink and re-connected to the original wires which are fed below the chassis via

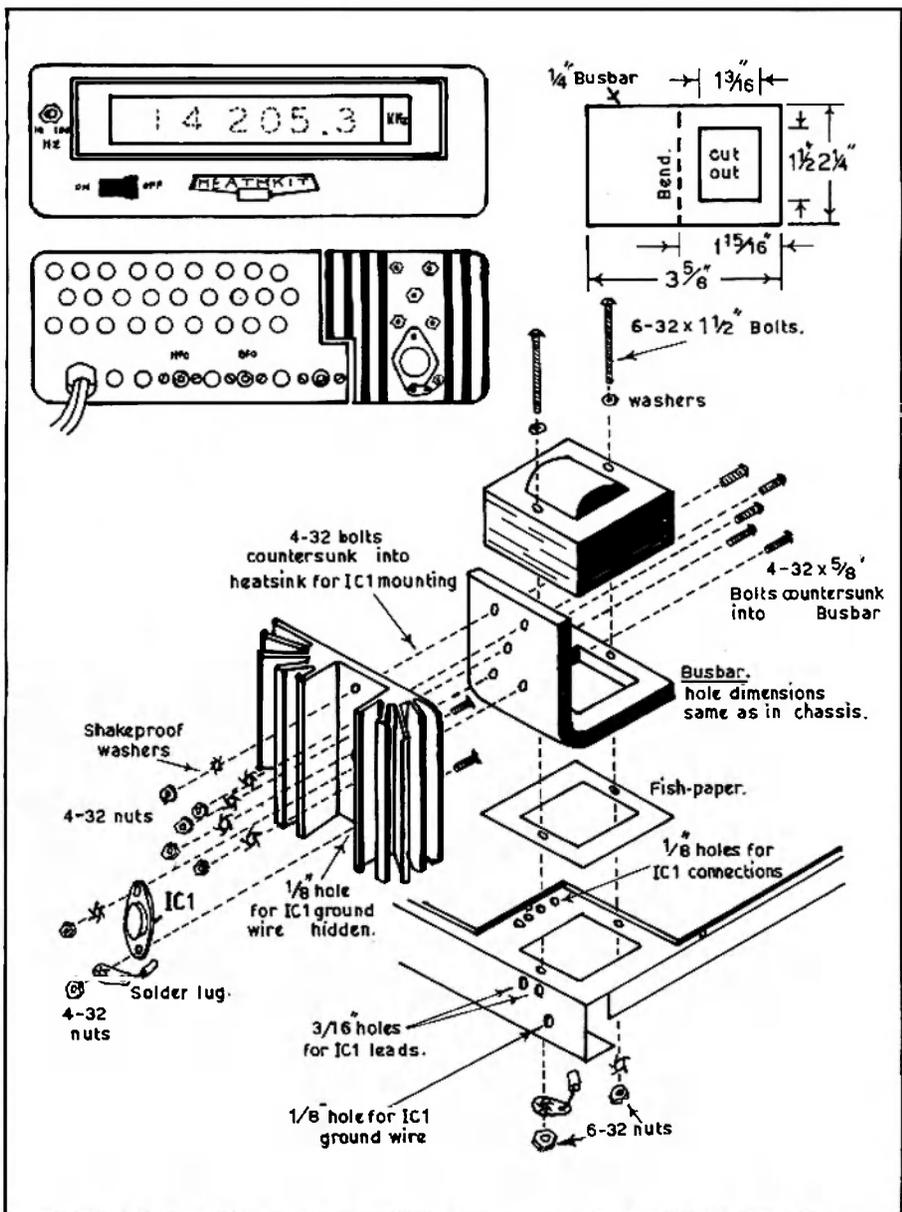


FIGURE 1

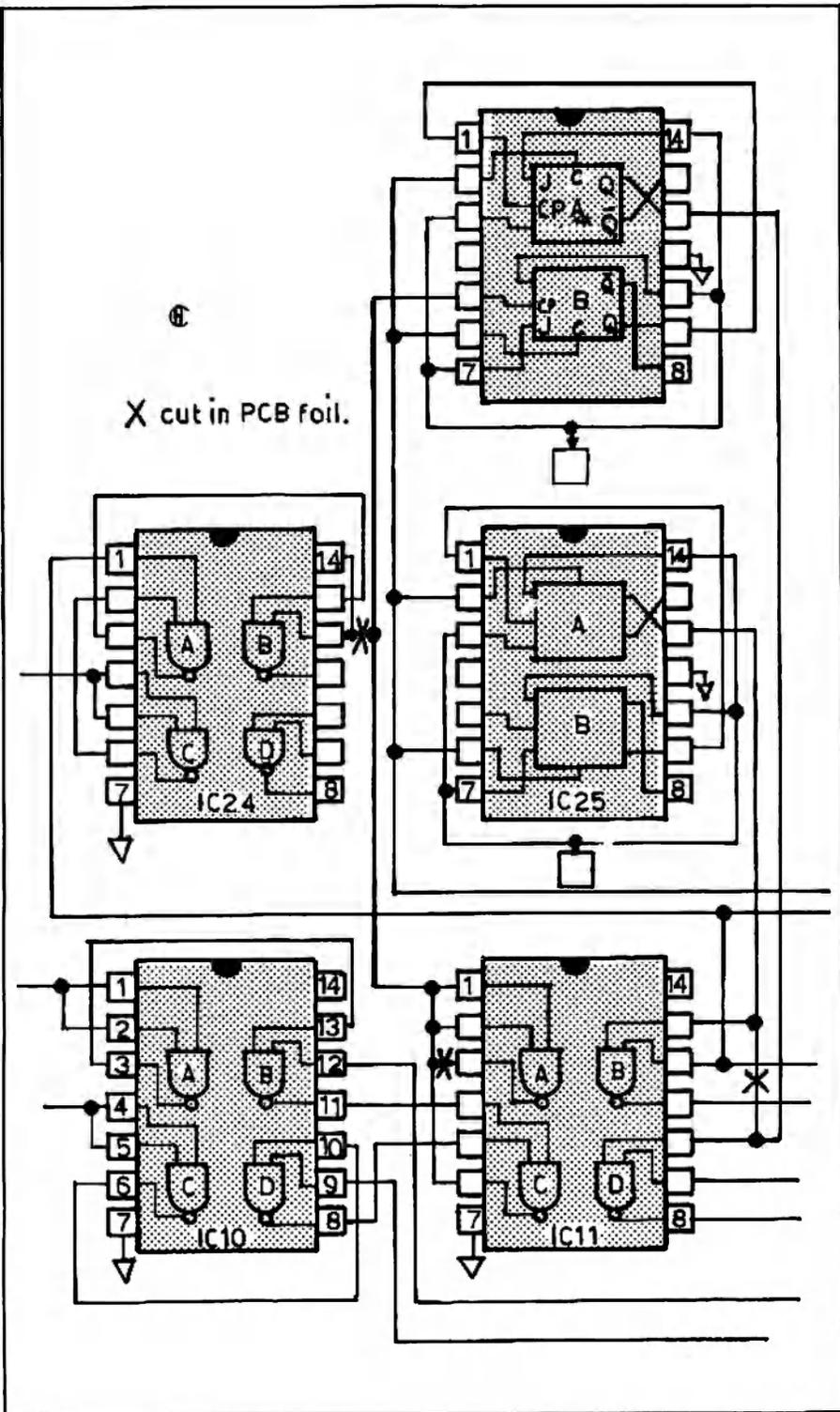


FIGURE 2A

four 1/8" dia. holes drilled alongside the power transformer.

In order to ensure a good *electrical* (as opposed to *thermal*) chassis connection for IC1, I put under its lower mounting nut a solder lug connected to a wire which passed through the heat sink and rear of

the chassis (via a small hole drilled for the purpose) and grounded to another solder lug under the closest transformer mounting nut.

I recommend the use of silicon grease wherever good thermal contact is required. I used International Rectifier Silicon Heat

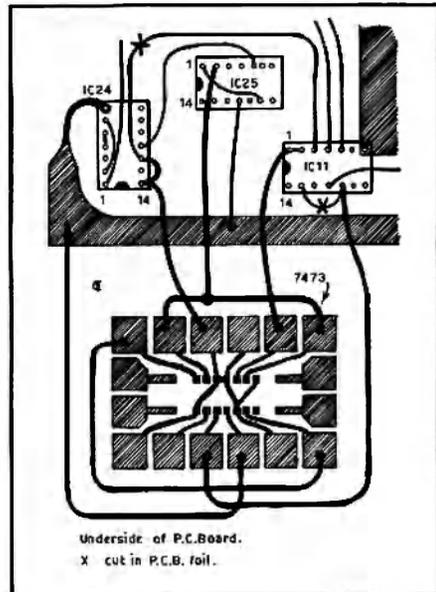


FIGURE 2B

Sink Compound No. SH 119-C.

The difference in the interior temperature of my SB 650 after these modifications was incredible and I have had no overheating problems since. However, the key to success in this matter lies with the use of the fish paper. The first time I tried, I took no particular measures to isolate the heat sink from the chassis and the results were disappointing.

When I first built the SB650, I was surprised to note that the readout would on occasion jump by as much as 500 cycles. For some time I assumed that the cause of this was other than the counter. Then one day when I was using the SB650 as a straight frequency counter (by using only the HFO input) an odd thing occurred. Whenever I fed in a frequency ending with a 9 tending to a 0 the last digit would "blur" and show all 10 figures simultaneously! When I re-connected the HFO and LMO inputs I discovered that the readout was jumping up and down by 500 cycles.

The reason this effect is not often noticed in normal use is that the HFO oscillator in all Heathkit SSB rigs is crystal controlled and it is unlikely that its frequency will fall onto a number ending in between 9 and 0.

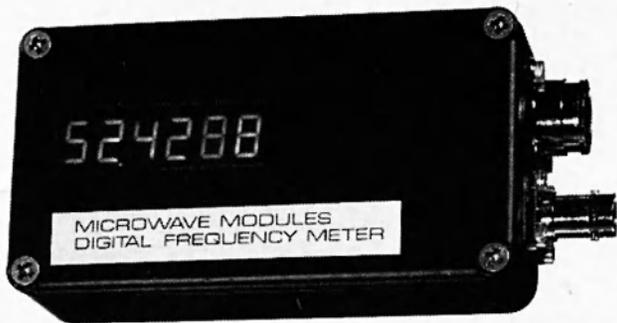
If you have experienced this fault with your SB650 (probably on one band only) you can correct the situation by slightly retuning the HFO oscillator plate coil for that band. However, I wanted to see if I could find a permanent cure for this problem. A close look at the schematic reveals that in order to count the frequencies involved, Heath have used a divide by 4 scaler.

To compensate for the reduction in frequency of the inputs, they have used a clock period of 4 times the expected rate. The readout is still correct, but the counters only have to work at 1/4 of the speed!

Now although the scaler (IC25 Dual J-K

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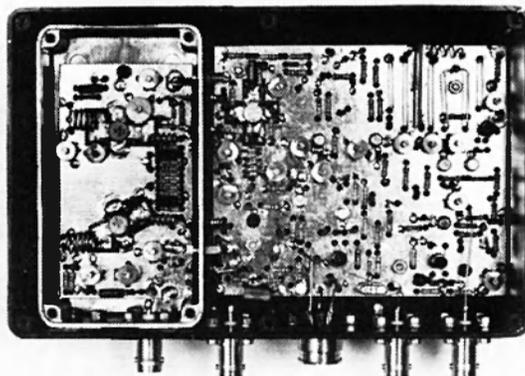
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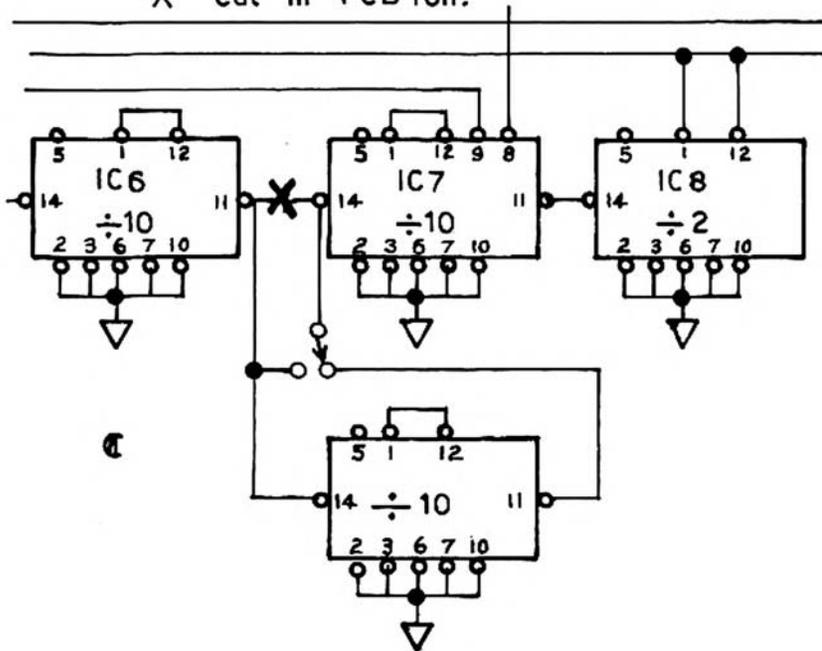


FIGURE 3A

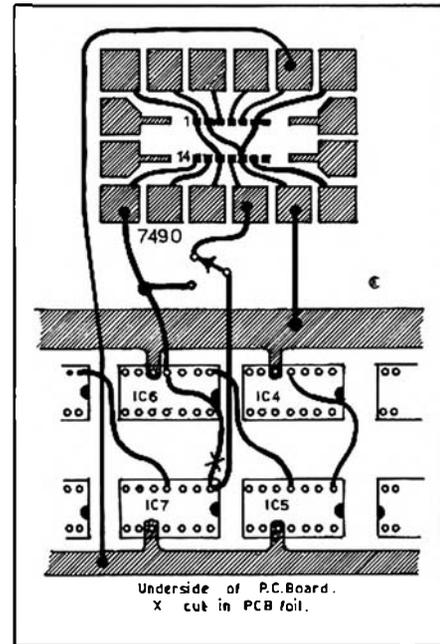


FIGURE 3B

flip flop) is reset at the end of every complete counting cycle, it is not reset after each up or down count. So if there is still a count "left over" in the scaler at the end of the up-count, it is still there when the scaler starts counting for the down-count.

To confirm this I connected two up-down counters (and their decades) in parallel as per IC-12; however, on one of these decades, I tied the count-down input to +5 Volts (as specified in up-down counter SN74192N spec. sheets<sup>2</sup>). I then fed a signal into the HFO input of the SB650 while terminating the LMO and BFO inputs. The result was that sometimes the two decades read the same digit and sometimes the normally connected decade showed one count lower than the other.

I therefore concluded that a stray count was getting from the count-up circuitry into the count-down circuitry. To overcome this I undertook the modification shown in Fig 2 which in effect gives the down-counting circuitry a different divide by 4 scaler from the up-counting circuitry.

This modification worked perfectly as expected right from the beginning. The fact that it makes such a difference in the

final digit stability (in both the "normal display" mode and "frequency counter" mode using only the HFO input) is proof that it should have been included in the original design.

The extra dual J-K flip flop is a SN7473, mounted on a 14 pin dual-in-line socket soldered onto a small PC board 1½" x 2½" (available from Tandy Electronics cat. no. 276-1803).

The PC board may be installed alongside IC11 on spacers from the chassis. The schematic and connection diagram for this modification are shown on Fig 2. The foil on the PC board has to be cut only twice, not three times as you would expect from the schematic!

The final modification is the most straight-forward of the three (see Fig 3). It involves the insertion of another divide by 10 counter between IC6 and IC7 (both divide by 10 counters) in the clock circuitry. This increases the cycle time to 1.6 secs. and the resolution to 10 Hz. The IC is an SN7490. A double pole, double throw, centre off, switch when mounted to the left of the display on the front panel may be used to select either 100 Hz or 10 Hz resolution. The centre off is useful for

"freezing" a readout for recording purposes.

For those who consider the extra effort worth it, the spare set of switch contacts may be used for changing the decimal point. A small hole may be drilled through the light shield between the 2nd and 3rd decades to the right behind which a NE-2 neon may be mounted. Use a black felt tipped marking pen to blacken the edges of the hole.

The physical mounting of the extra IC poses a bit of a problem. I mounted mine underneath the chassis on the circuit board shield using the same IC socket and PC board as used in the modification above.

Although I am not particularly happy about the long leads I used to allow the circuit board shield to be opened, I have had no trouble with this circuit. In fact the modification worked immediately and has proved very handy.

I strongly recommend these three modifications to any Heathkit SB650 owner who wants increased accuracy and reliability from his unit.

#### REFERENCES

1. Wakefield Engineering Inc., Audubon Road, Wakefield, Mass. 01880. Semiconductor Cooling Div.
2. Or ref. Page 72 of Heathkit SB650 Assembly Manual, last sentence.

Ray Johnson VK2AVR

# CRYSTAL SELECTION FOR THE FT101B

## FOR FIXED FREQUENCY OPERATION

A much simpler method of choice than that given in the handbook follows:

1. Select desired frequency and note the reading of the tuning dial — black scale only.

2. Subtract the dial reading from the high value of the internal VFO (9200 kHz). This gives the mean value of the crystal.

- For LSB operation add 1.5 kHz. For USB operation subtract 1.5 kHz. For AM/CW subtract 0.7 kHz.
- The chosen crystal will operate on all bands at the same equivalent scale position.

#### EXAMPLES

**80m Band.** Chosen frequency is 3.592 MHz, crystal value =  $9200 - 92 = 9108$  kHz (it would also give 7.092 MHz on the 40m band) for LSB operation, value = 9109.5 kHz.

**20m Band.** Chosen frequency is 14.210 MHz. Crystal value =  $9200 - 210 = 8990$

kHz. (It would also give 21.210 MHz on the 15m band, and 27.210 MHz on the 11m band). For USB operation, value = 8988.5 kHz.

#### DETERMINATION OF BAND CRYSTAL

If it is desired to substitute one of the bands for listening purposes, the crystal for the new band can be found from the following information:

Fixed IF = 3.18 MHz.  
Internal VFO = 8.70 to 9.20 MHz.  
That is: 1st (variable) IF =  $8.70 - 3.18 = 5.52$  MHz, to  $9.20 - 3.18 = 6.02$  MHz.

Hence, band crystal value = band range limit plus IF limit.

#### EXISTING INSTALLED CRYSTALS

##### EXAMPLE 1 — 80M BAND

Range = 3.50 to 4.00 MHz.  
Band crystal:  
(a)  $3.50 + 6.02 = 9.52$  MHz.  
(b)  $4.00 + 5.52 = 9.52$  MHz.

##### EXAMPLE 2 — 15m BAND

Range = 21.00 to 21.50 MHz.  
Band Crystal =  $21.00 + 6.02 = 27.02$  MHz.

If, for example, one wished to substitute range 2.50 MHz to 3.00 MHz for a little used band, the new band crystal would be  $2.50 + 6.02 = 8.52$  MHz. ■

## TUNE TO 40 METRES, MY WAY

David S. Down, VK5HP

If we are all agreed that it is primarily the antenna system which "makes or breaks" a good QTH, then we can learn much from 5HP's successful antenna development.

Although only licensed in July this year, my experience in operating CW and associated antennas goes back to 1964 when I joined the RAN. As a CW ship to shore operator, I was spoiled, Collins 5 kW TX, Racal RA17 RX, two log periodics and full-size rhombics switchable every 15 degrees were all at my fingertips.

From the sublime to the ridiculous, and my first 5HP transmissions were with a vertical and a horizontal dipole. Not wishing to outlay lots of pennies on gear, I started hunting for antenna inspiration, and with the assistance of articles on the VK2ABQ Triband Beam, I found it!

#### RIBBON ELEMENTS

At the time I had developed a 2 element quad for 40 metres utilising 300 ohm TV ribbon for both elements, thus maintaining the quad at the same size as a 20 metre single conductor version. I was sorting out spider boom construction problems and rotation difficulties, the quad being back on the ground for maintenance (after working very well). This left me without the gain-providing and directional antenna I wanted for 40 metres. Along came the VK2ABQ article.

Mr. Caton, I do apologise for what I have done to your original antenna, but mine works too!

The VK5HP 40 Metre Beam takes about 2 hours to build, costs about thirteen dollars all up, and can be turned by hand or by rotators such as the Stolle (which I am using).

I will assume that anyone still reading this article is sufficiently interested in antenna development to ensure that they have a copy of the VK2ABQ Beam details (as in Electronics Australia, October 1973).

#### CONSTRUCTION

Four Rangoon canes, properly weather-proofed, are fixed by U-bolts to a 15" by 15" square of 3/4" marine plywood in the familiar X-beam configuration. The canes are standard fishing rod blanks as used in some quad constructions.

Four lengths of 300 ohm TV ribbon are required for the elements, which initially form a square 17' 5" per side and secured to the cane tips. Either open or standard ribbon can be used, but ensure that whichever it is, it is firmly secured to the canes and kept from twisting.

The next step is to measure exactly half-way along one side and cut the ribbon to create the feedpoint. Feeding can be with 300 ohm ribbon, 600 ohm line, or coaxial cable plus balun. I used an antenna tuning unit with the ribbon feed at first, and it worked just as well as the coax feed used at present.

Both the sides of the X-beam square adjacent to the feed point side, not the side opposite, are also cut exactly mid-way along, and two pieces of standard tagboard, each of two lugs per side, are used as insulating spacers. One insulator is inserted in each of the two cut sides, ensuring that each side is divided in two by folding the now exposed ribbon ends together and soldering to the tagboard lugs. Precise adjustment is done with the aid of a GDO, and an assistant, if possible. All tuning at this QTH was done with the antenna atop my experimental 30 ft. tower.

#### PERFORMANCE

The SWR across the 40 metre band (CW end anyway!) is better than 1.5:1, and to date I have regularly and reliably worked Japan, USA, Canada, VK2, VK3, VK6 and ZL on 40 CW with RST reports ranging from 449 (JH6URN) to 599 (VK2YK) and all transmissions have been with 15 watts input or less!

As with everything, there has to be the bad news. So there is with this Forty Metre X-Beam — it also works well on

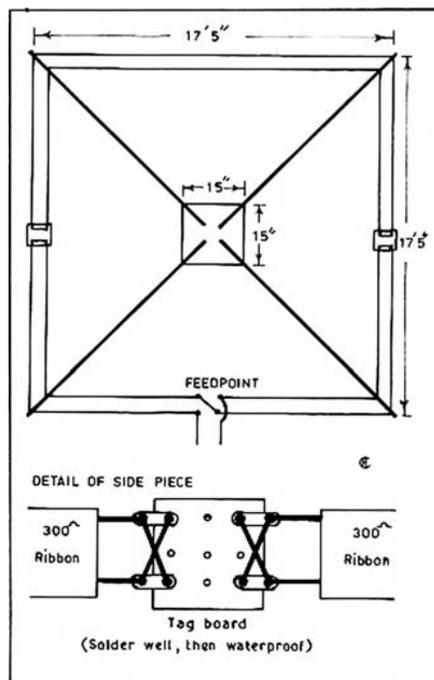


FIGURE 1

Twenty! During November 1975 (the time of writing this article) using the same antenna without modification on 20 metres CW, 3 watts output, from a good takeoff, I have experienced DX pile-ups from which up to 22 stations have been worked in a string, including JA, UA, G, YB, DJ, HA, HB, UT, UC, OH, UB, OE, DL and DK and K/W lands. It almost makes me hesitant to re-install the 40 and 20 metre 2 element quads!

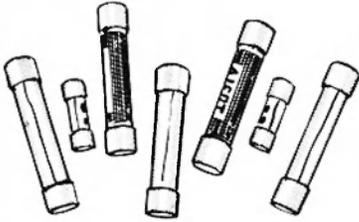
Anyway, the purpose of the exercise has been achieved; namely, a gain-providing, directional antenna for 40 metres (with the 20 m bonus) that is cheap and easy to construct, can be readily manhandled up and down towers and ladders, yet still leaves room for the perfectionist to improve upon. Anyone for stacked 40 metre X-beams?

In conclusion, to those who run full power to multi-multi-element arrays turned by Ferguson tractor engines, may I suggest that you do not know what fun you are missing out on! See you on forty. ■

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**A few words from "IZNIBS"**

**WHAT'S NEW**

Nothing really, but reports from our various overseas contacts and principals show that new ideas are in the works for all activities within the amateur service. We in Australia suffer on two points — we are a small population and when VHF is concerned we have a spread not in keeping with the highly amateur populated areas such as Europe and Japan. Consequently, some of the more desirable pieces of equipment tend to be a compromise when used in Australia.

By the time you read this we should have the first shipment of the new Icom IC215 under way and although unloading problems are causing a bank up in the port of Melbourne, we should be able to give you a definite advice of delivery around about now. The hand-book which comes with this equipment is in the same easy to read style as other publications in the Icom range, and in case you missed the earlier details here are just a few: A total of 92 solid state devices are used to produce a power output of 3 watts in the high position and 0.5 in the low position. The unit is styled exactly the same as the IC202 and it is worth noting that the model number in Japan is the IC212 and is tuned between 144 and 146 MHz. Dial markings are with Japanese channels. The unit incorporates 15 channels to select from — 12 from the channel selector and 3 priority channels from a function switch. The other fortunate thing about it is that the crystals used are the standard IC20 series used in the current IC22. Power requirement takes about 750 mA in the high power position and a little more than half this in the low power. Nicads can be used but it has been our experience, that because of the discharge characteristic of this type of battery they tend to go flat without warning and when you need the equipment most, especially if you are pedestrian portable. Using the recommended dry cells you do get warning of impending shortage of power. Anyway we will wait until we get it and it looks like being a most useful companion unit to the IC22A.

**UHF AND WHAT'S AVAILABLE**

The new repeater plan has slotted an extra channel at 146.05 MHz, but we have had requests for UHF equipment on the appropriate channel set out at the recent WIA convention. Unfortunately, amateur UHF equipment is not subject to the same duty free entry as the other gear we sell and the standard makes such as Icom would have to sell around the \$400 mark. However, by the time you read this we should be able to offer you a neat little transverter unit which will connect to your IC22A, give you 5 watts output on UHF and with a built-in converter bring your UHF signal down to the 2 metre band. Price hasn't been decided yet, but it will be relatively inexpensive and will not limit the use of the IC22A for normal VHF operation. It looks to be a fairly simple way out of getting on to UHF and helping populate this relatively un-used allocation.

Around this time of the year a lot of thought is being given to 6 metre and 2 metre DX contact possibilities and if you didn't read of our July/August low price advertisements in last issue try and get hold of it and see what it is all about. These arrangements still stand and apply also to the Atlas. It looks like some good accessories are coming our way from this supply also. If you think of HF mobile give me a call or drop a line and we will give you the latest. With best 73.

**PETER VK3IZ**  
**VICOM International Pty Limited**

# THE LM3900 PHASE LOCKED LOOP

M. R. Haskard VK5BA  
64 Malvern Ave., Malvern, S.A. 5061

The Phase Locked Loop (PLL) has many possible applications for amateurs. This article summarises the performance that can be obtained from the LM3900 when connected as a PLL.

Recently, students of the South Australian Institute of Technology carried out a number of experiments on PLLs using the LM3900 IC. According to National Semiconductor's Linear Application Note AN46, the LM3900 is suitable for PLL applications to 10 kHz.

What is a PLL? It is a circuit which produces an oscillation which is locked to a reference signal. If the phase of the reference varies, the locked oscillator's phase is varied in sympathy. The two run at the same frequency. Refer to Fig 1 (a).

The addition of a mixer circuit would enable, say, a 144 MHz signal to be locked to a 5 MHz signal. Because the mixer is isolated from the locked VHF oscillator, no mixer chain or 5 MHz components appear in the output. So PLL systems can be used with highly stable, clean, single conversion VHF receivers, transmitters etc. as shown in Fig 1 (b).

The PLL can also be used to decode RTTY signals. As no tuned circuits are used, the frequency shift of the RTTY signal is unimportant.

The circuit used by the students is shown in Fig 2.

## SPREAD IN PARAMETERS

For the circuit in Fig 2, table 1 summarises the results of 6 separate units constructed. Test conditions are  $V_S = +12$  volts and  $V_{IN} = 1$  volt. The free running frequency of the voltage controlled oscillator (VCO) is with the input disconnected. The output of the comparator, under these conditions, goes to a high state (approximately 11 volts out) and the VCO runs at a high frequency — near the top end of the lock-in range.

$V_S$ SUPPLY VOLTAGE VOLTS	VCO FREQUENCY Hz	LOCK-IN RANGE Hz	CAPTURE RANGE Hz
7.5	550	269 - 550	306 - 498
10	558	316 - 503	316 - 503
12	562	272 - 561	319 - 509
14	550	276 - 550	320 - 509

$V_{IN} = 1$  VOLT

TABLE 2

## OUTPUT VOLTAGES

Typical output voltages are shown in Fig 3. Output Vo2 is inverted.

## LINEARITY

The linearity of the comparator and the VCO was investigated. The comparator output fell linearly from 10.2 volts to 5.2 volts for a change in phase between the two inputs from 0 degrees to 180 degrees.

The VCO was also found to be very linear. The control voltage was varied from 1 to 20 volts; this produced frequencies from 20 Hz to 890 Hz.

## INPUT SIGNAL LEVEL

When the LM3900 is operated from a 12V rail the input signal may be between 0.3 and 20 volts. If greater sensitivity is required, the fourth, unused amplifier in the LM3900 package could be pressed into service. The frequency of the locked oscillator is unaffected by input signal variations over the whole of this large range, although small variations may occur.

## TEMPERATURE EFFECTS

The circuit was heated to 50°C in an oven and variations in the VCO frequency, lock-in and capture ranges noted. The supply rail was 12 volts and input signal 1 volt. As the temperature was increased from

20°C to 50°C the centre frequency fell from 335 Hz to 295 Hz. The capture range and lock-in range both remained relatively constant.

## NOISE IMMUNITY

The student investigating the response of the PLL for varying input S/N ratios (white noise) did not complete this section. As expected the PLL gave every indication of operating satisfactorily in poor S/N conditions.

In the case of impulse noise, some results were recorded. For a 1 volt input

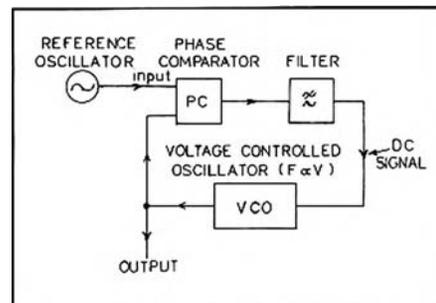


Fig. 1A: PLL Block Diagram

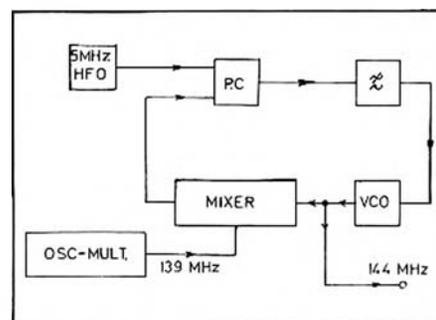


Fig. 1B: VHF PLL Block Diagram

$f_{VCO}$ Hz	Lock in range Hz	Capture range Hz	DC Current Drain mA	$K_P$ = Phase Comparator Transfer Characteristic Volts / radian	$K_{VCO}$ = VCO Transfer Characteristic radian/sec./volt
400	218 - 376	192 - 400	6.4	-1.86	340
455	220 - 460	247 - 410	6.0	-1.59	564
480	250 - 470	300 - 420	6.3	-2.0	420
571	345 - 572	370 - 556	6.7	-1.85	433
685	339 - 685	406 - 616	6.2	-2.0	436
833	526 - 833	555 - 704	7.9	-2.5	416

$V_{SUPPLY} = +12$  VOLTS       $V_{IN} = 1$  VOLT

TABLE 1

signal there appeared to be a noise threshold voltage of 0.9 volts below which the PLL remained essentially in lock. When the impulse noise level was above this threshold voltage, the PLL preferred to

lock onto the impulse noise signal. The impulse noise was simulated using a pulse generator, manually varying (independently) the mark to space ratio from 1:100 to 5:8 and frequency over the range 10 Hz to 10 MHz.

### FREE RUNNING FREQUENCY OF THE VCO

National Semi-conductors state that the frequency of the VCO is —

$$f_{VCO} = \frac{I_1}{2C_1 (V_H - V_L)}$$

Where . . .

$V_H$  is the peak voltage of output Voltage  $V_{O1}$

$V_L$  is the valley voltage of output Voltage  $V_{O1}$

$$I_1 = \frac{V_C - V_{BE}}{R_1}$$

$V_C$  being the high output voltage from the comparator

$V_{BE}$  the base emitter voltage of a silicon transistor.

For operation from a 12 volt supply typical values are:

$V_{BE} = 0.7$  volts,  $V_H = 10.7$  volts,  $V_L = 1.2$  volts and  $V_C = 10.7$  volts.

$$\text{Thus } f_{VCO} = \frac{1}{1.8 R_1 C_1}$$

Using the values given in figure 1 namely  $R_1 = 1$  Mohms,  $C_1 = 1000$  pf  $f_{VCO} = 555$  Hz (compare values  $f_{VCO}$  given in table 1).

The free running VCO frequency can be changed by varying  $R_1$ , and/or  $C_1$ , the

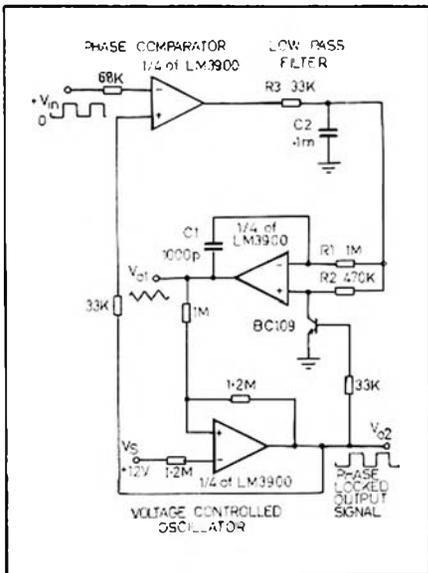


Fig. 2: Circuit Under Investigation

only limitation is that if  $R_1/R_2$  is not 2, the mark to space ratio of the output voltages  $V_{O1}$  and  $V_{O2}$  depart from 1:1. Tests indicated that by varying the  $R_1 C_1$  term, the PLL could be made to operate from below 10 Hz to over 10 kHz. Above 11 kHz, the

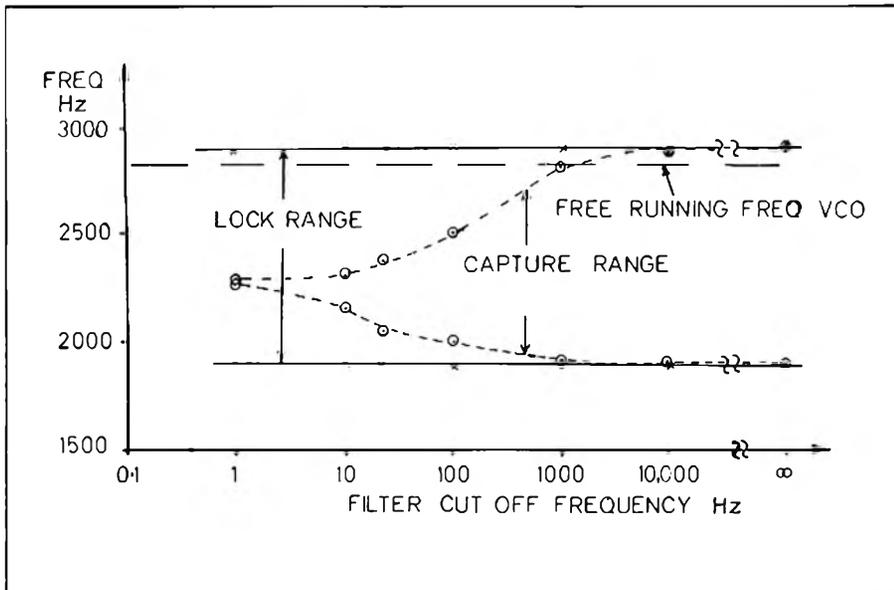


Fig. 4: Effect of changing cut off frequency of low pass filter

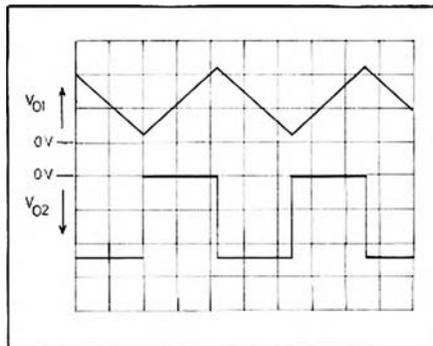


Fig. 3: Y Axis 5V/cm x Axis .5 m sec/cm

circuit would not operate correctly, the limitations being the switching time of the amplifiers.

### CUT-OFF FREQUENCY OF THE LOW PASS FILTER

Changing the cut off frequency of the low pass filter does not affect the lock range, only the capture range. The latter decreasing as the cut off frequency is lowered. For no filter present the lock and captive

ranges are identical. Decreasing the cut off frequency of the filter increases the tune to lock-in, improves the interference rejection of the circuit, but degrades the transient performance of the system.

Fig 4 shows the effect of changing the filter cut off frequency. In the circuit used  $C_1 = 150$  pf,  $R_1 = 1$  Mohms,  $R_2 = 470$  Kohms,  $R_3 = 33$  Kohms, and  $C_2$  made the variable. (See Appendix).

### APPENDIX

From "Phase locked loops" Signetics applications note:

$$W_L = 2 K_v = (K_p K_{VCO})$$

$$W_C = 2 K_v F (I_{VCO}) N \sqrt{\frac{K_v}{I_1}}$$

$$T_1 = R_3 C_2$$

Where . . .

$W_L$  is the lock in range (full) in rad/sec

$W_C$  is the captive range (full) in rad/sec

$K_v$  is the loop gain

$K_p$  is the phase comparator transfer characteristic

$K_{VCO}$  is the VCO transfer characteristic

From table 1 the average values for  $K_p$  and  $K_v$  are ( $K_p$ ) = 1.97, ( $K_{VCO}$ ) = 435

AVG AVG

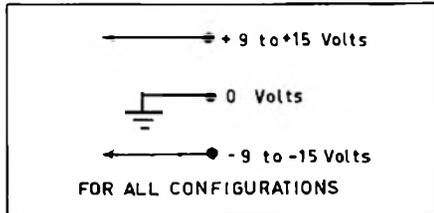
Thus  $W_L = 1754$  rad/sec or  $f_L = 288$  Hz

and  $W_C = 738$  rad/sec or  $f_C = 118$  Hz

These results agree favourably with the reassured ranges given in table 1. ■

microphones with input impedance of 2 megohms and gain adjustable from 0 to 25.  $R$  may be reduced if gain is excessive or increased if insufficient.

Figure 3 shows an alternative pre-amplifier with an input impedance of 4.7 K for dynamic microphones. Gain is adjustable from 1 to 100. Altering  $R_1$  will change the upper limit. Both preamplifiers have



## TRY THIS

Ron Cook, VK3AFN

Bill Rice, VK3ABP

### EXPERIMENTAL COMPRESSOR

Figure 1 shows the circuit diagram of a compressor I built some time ago in breadboard form. The output-input characteristic shows a steep knee, and gain is reduced rapidly when the input exceeds 50 mV rms. Increasing the input from 100 mV to 500 mV increased the output from 1.80V to 1.95V. Figure 2 shows a preamplifier suitable for crystal

some low frequency cut below 300 Hz. Amplifiers used should be I.C. operational amplifiers of XX741 type. The output of the compressor amplifier is rectified by the diode D. For signals below 1.2V the 2N3643 transistor receives

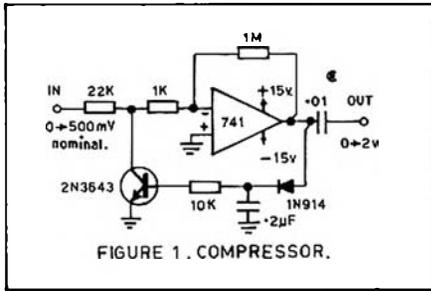


FIGURE 1. COMPRESSOR.

very little base current and its collector-emitter resistance remains high. For larger output signals the base current increases, the collector-emitter resistance decreases, causing the transistor to produce a shunting effect on the incoming

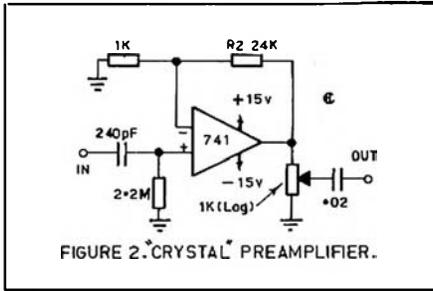
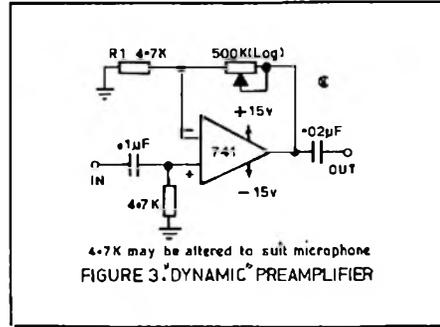


FIGURE 2. CRYSTAL PREAMPLIFIER.



4.7K may be altered to suit microphone  
FIGURE 3. DYNAMIC PREAMPLIFIER

signals. This effectively reduces the circuit gain thus providing AGC or compression action. No collector supply is required for the transistor to operate in this circuit.

Steve Gregory VK3ZAZ  
19 Charles St., Surrey Hills, Vic.

triode, V3, which conducts on impulse, and effectively shorts the IF amplifier anode to ground by way of the .001 coupling capacitor and diode.

Diode D1 develops a bias in the presence of a signal and conducts when a pulse exceeding this signal arrives. Diode D2 is capacitively coupled so as to allow only the negative transient pulses through to V2. It shares the bias developed by D1 thus preventing blanking operation on the signal instead of on the noise.

The potentiometer forward biases the diode D3 and effectively sets the threshold level for blanking.

The "holes" left by the noise pulses are more readily accepted by the human ear than the pulses themselves.

If you have bad QRN and do not have an FT101 with a blanker, try this, it could make things more bearable.

## A CHEAP AND SIMPLE EFFECTIVE NOISE BLANKER

The need arose recently, after shifting QTH, to get rid of some really heavy QRN created by 33kV power lines.

Each time the wind blew, the noise flattened the 6 metre receiver. Here presented is a circuit gleaned from an early RSGB publication, which produces good results for its simplicity.

The unit was fitted to a valve receiver type FR50 and so is presented as a valve unit (!), however, to FET convert would be simple as you see from Fig 1.

Construction was straightforward and the unit was fitted on the rear of the chassis. All signal leads are coaxial cable, power leads are conventional. I used the 150V from the receiver oscillator line. AGC is applied to the amplifier valve, V1,

and the range of operation is excellent for all signal and noise levels.

The threshold potentiometer was a 25k switch pot, located on the front panel and effectively sets the level of noise clipping. On a weak signal the threshold may be adjusted until a buzz appears; below this level if you still have power noise, then nothing will stop the QRN. I took the input from the anode of the 1st Mixer stage at 5.2 MHz, amplified it through the 6BA6 using a standard 5.2 MHz transformer from the Yaesu range. The output was fed to the anode of the 1st 6BA6 in the 2nd IF chain.

The noise pulses coming in are amplified by V1 and rectified by D1 and D2 to produce negative amplified pulses at the grid of the 1st triode, V2. In turn these are inverted and fed to the grid of 2nd

Fig. 1: Noise Blanker Circuit

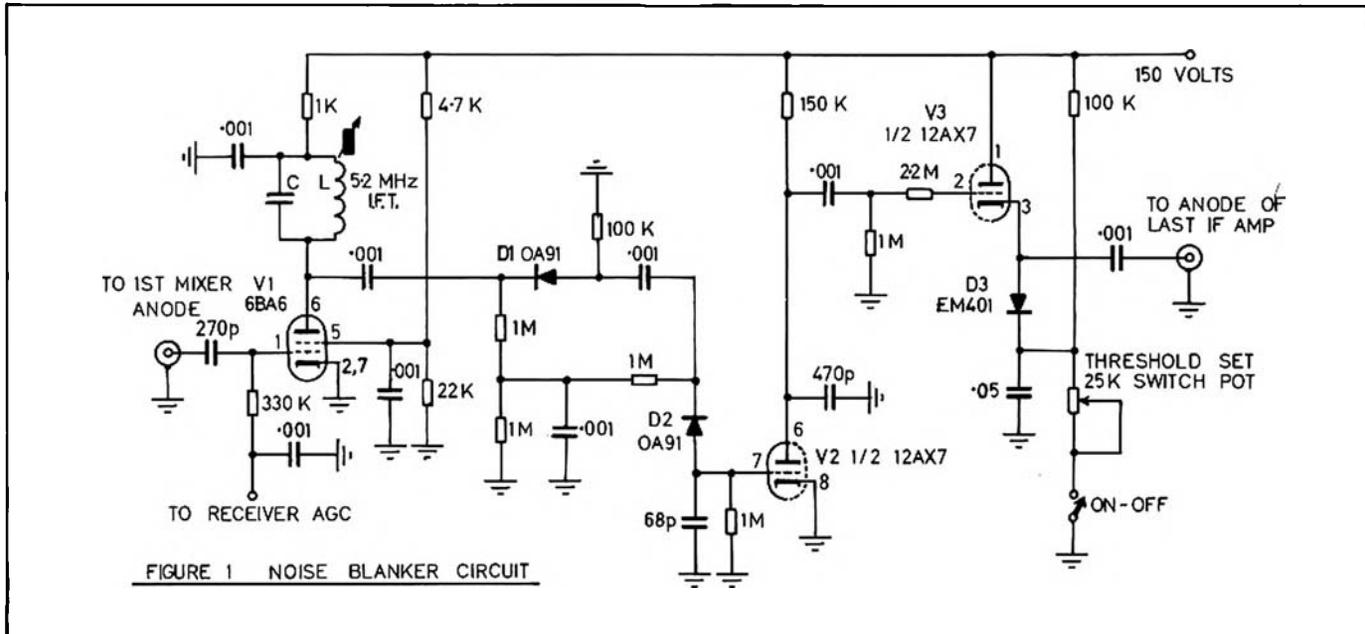


FIGURE 1 NOISE BLANKER CIRCUIT

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Designed for high stability with precision gear and deep drawing aluminium housing. The dial knob and main dial scale feature a unique drive mechanism with a reduction ratio of 4:1, assuring smooth tuning. VFO circuit uses FET for high stability. 91T circuit equipped with indicator showing state of operation. The external VFO-520 is connected to the TS-520 transceiver by a single cable. It obtains its power supply from the TS 520. Cat. D-5201... .. \$99.00

**MODEL SP-520 EXTERNAL SPEAKER**  
The TS-520 has built-in speaker. However, by using the SP-520 external speaker which matches the TS-520 in both design and performance, operation with improved tonal quality is provided. Has 12cm diam. speaker. Maximum input power of 2 watts. Impedance 8 ohms. Frequency response 100 to 5,000 Hz. Cat. D-5202... .. \$26.00



**\$269. QR-666**

**QR-666 ALL BAND COMMUNICATION RECEIVER**  
This model has a three way power supply (AC Batteries and External DC). Receiving frequencies of 170kHz to 30MHz are all covered by 6 bands. Can receive broadcasts in any mode - AM, SSB, CW or with an optional unit FM (87.5MHz - 108MHz). The RF and mixer stages employ dual gate MOS FETs for excellent sensitivity, double signal selectivity and improved AGC characteristics. The IF circuit combining a mechanical filter and a ceramic filter is designed for high selectivity. The coil pack and local oscillator circuits are integrally built-in in the form of a circuit board printed on both sides. All the high performance is built into a compact, up-to-date cabinet, which with drum type dials presents an image that is far advanced from that of the conventional communication receiver. An extremely useful spread dial is provided for ham band reception, which requires perfect tuning. Cat. D-2866... .. \$269.00



**\$232. TR-7200G**

**KENWOOD TR-7200G**  
Rugged design and construction that enables it to withstand the severe and rigorous usage that mobile equipment is subjected to. A superb unit capable of providing consistently high performance under the most adverse conditions of usage. \*22 channels. \*Display indicates channel crystals fitted. \*AF section doubles as PA. \*Diode switch employed for antenna switching. \*Dust/water proof case. Cat. D-3215... .. \$232.00



**TR-2200G \$199.**

**TRANSCEIVER**  
Complete with channel 1-6 & 50. Completely transistorized for long life performance and maximum durability. Communications available with 12 fixed channels. Built-in battery charger. High performance low-pass filter is built in the antenna circuit. Moisture proof case. Cat. D-3210... .. \$199.00



**TV-502 TRANSVERTOR \$240**

**TV-502 TRANSVERTOR**  
TV-502 SPECIFICATIONS  
Frequency Range: 144.0 - 146 MHz. Mode: SSB, CW. Antenna Impedance: 50 ohms. Sensitivity: 1uV for 10dB S/N. Image Ratio: 60dB. IF Rejection: 60dB. Dimensions: 168 W x 153 H x 336 D mm. Power Output: 10 watts. Matching Unit for TS 520 transceiver. Cat. D-3502... .. \$240.00

## WANT TO KNOW MORE?

DICK, PLEASE SEND ME DETAILS ON THE FOLLOWING KENWOOD COMMUNICATION EQUIPMENT.....

MODEL.....  
NAME.....  
ADDRESS.....  
POST CODE.....  
CALL SIGN.....



**DICK SMITH ELECTRONICS GROUP**  
Head Office: Phone 439 5311. Telex AA20036. Cable Diksmi't Sydney.  
Mail Orders: P.O. Box 747, Crows Nest, N.S.W., 2065.  
N.S.W. Branches: GORE HILL-162 Pacific Highway, 439 5311.  
SYDNEY-125 York St., 29 1126. BANKSTOWN-361 Hume Hwy., 709 6600.

**SHOP HOURS**  
MON - FRI: 9 to 8.30  
SAT: 9 to 12



# DICK'S SPECIAL SALE \* AFTER \*\* SALE

## STOCK TAKING SALE!

### BUY NOW AT THESE LOW PRICES WHILE STOCKS LAST!

### PROFESSIONAL METER OSKER BLOC SWR-200

THIS IS THE FIRST INSTRUMENT OF ITS KIND UNDER \$100. At last a truly professional instrument for the keen amateur. Uses the THROUGH-LINE principle. Covers 3 MHz to 200 MHz (guaranteed) with inbuilt channepower for 52 or 75 ohms U.H.F. connector. Each unit is INDIVIDUALLY calibrated with its calibration change attached to the instrument. Four power ranges cover 0.2W, 0.20W, 0.200W and 0.2kW. Measures VSWR: 1:1 to 1:10 and ... \$57.50



**\$57.50**

## SPECIAL FOR THIS MONTH

# NOW ONLY \$550. NORMALLY \$585. SAVE \$35.

MULTI-2000 A SSB/FM/CW TRANSCEIVER

THIS SPECIAL IS ONLY AVAILABLE ON ORDERS DATED PRIOR TO THE 31st AUGUST 1976



**MULTI 2000A TRANSCEIVER**  
The ultimate in 2M equipment, operates on FM, SSB, CW. Transceives between 144.0 and 148.0 MHz in 10kHz steps. Fully synthesised repeater offset. 4 fixed channels (crystals not included) high and low power, noise blanker, wide and narrow band switch etc. Sensitivity FM: 1.0uV, SSB/CW: 0.3uV. RF output: 1W and 10W (PEP). Built in power supply for 240 volt AC or ext. 12 volt DC. Cat. D-3010 ... \$585.00

## \$29.50 RF POWER/SWR METER



COMPACT AND EASY TO OPERATE SWR and power can be easily measured at the same time simply by connecting the meter between the transmitter and antenna.  
Power Range: 0.10W, 100W (2 ranges)  
SWR: 1:1 - 1:3  
Frequency Response: 3 MHz - 150 MHz  
Suitable Connector: M.V. or 75 ohm  
Impedance: 50 ohm, 75 ohm  
Dimensions: 100 x 70 x 87mm. Weighs 900g.  
Cat. O-1360. ... \$29.50



**\$189.00**

## BUY THIS MONTH & RECEIVE

**FREE** ANTI-REPEATER CRYSTALS 1, 2, 3 and 4 VALUED AT \$32.00

\* THIS FREE OFFER IS ONLY AVAILABLE ON ORDERS DATED PRIOR TO THE 31st AUGUST, 1976

**MULTI-7 VHF 2 METER 23 CHANNEL TRANSCEIVER.** This unit is a must for all mobiles. No other unit has the features of the Multi-7 at this price. Frequency Range 146.0 to 148.0 MHz. RF power output 10W or 1W with switch. Solid state construction. Receiver: Sensitivity 1.0uV @ 30 dB S/N. Cat. D-3007. ... \$189.00

## WILLIS-OUT THEY GO! \$265.



WILLIS 432 Mhz 50 WATT AUTOPHONE U432-5. This unit comes complete with microphone, chrome mount ing kit, two sets of high quality crystals and a 90 day factory warranty. The RF power output is 45 watts - 12 Volt DC negative ground 1 Max. 1. Rk sensitivity 0.5 uV for 20 dB ceiling. Height 4.9cm, Width 19.6cm, Depth 20.7cm. Cat. D-3432. ... \$265.00



## 110 SWR/PWR METER

This Meter and Field Strength Indicator is a handy and compact device for amateur and professional use in checking the operation of a transmitter. The bridge method of comparing the power supplied to and reflected from the antenna system is utilized for SWR measurements. For RF power measurements, the average voltage from the carrier detector is measured. The calibration of the RF power meter is so adjusted to fit the 50 ohm line impedance. The 10 or 100 watt range can be easily selected by the front slide switch. Continuous monitoring of the transmitter output is possible by leaving the instrument in the circuit at all times. Cat. O-1352. ... \$17.50

## ATLAS TRANCEIVERS \$625.



Covers the five Amateur bands 80 - 40 - 20 - 15 - 10 meter. Full 200 watt input. Superior selectivity. Plug in PC boards make servicing fast and easy. Solid state circuitry. Quality equipment designed & manufactured in USA. Cat. D-2530. **NORMALLY SELLS FOR \$695.** Dicks price to you \$625.00

## SLOW SCAN TV \$598.00 ONLY

HAM VISION MODEL SS-727M. Receives standard Ham SSTV and Fast TV. Just plug into jack 7 speaker socket. Has provision for remote speaker. Complete station control for SSTV. 240 volt AC operation. Excellent value at this price. Cat. D-2875. ... \$598.00  
CAMERA to go with above model. Cat. D-2880. ... \$598.00



## SALE ICOM-22 CRYSTALS \$5.00

CHANNELS: REPEATER FREQUENCIES 1 - 4 - 5 - 7. SIMPLEX 50 - 51 PAIR. SAVE BY BUYING AT THIS LOW PRICE NOW! Cat. D-6340. ... \$5.00 pair. **NORMALLY \$9.00 PAIR**

## FANTASTIC SPECIAL

\$20 OFF HY-GAIN AERIALS IF PURCHASED WITH FT-101 OR TS-520 BEFORE 30th September 1976.

## HUSTLER HF VHF SAVE \$5.00

## Full Stocks HY-GAIN AERIALS

HY-GAIN AMATEUR H.F. TRANSMITTING AND RECEIVING AERIALS:  
14 AVG  
40, 20, 15 & 10 metres, vertical 19 foot high, ideal for restricted areas and minimal cost. Cat. D-4300 ... \$195.00  
18 AVT  
40, 40, 20, 15 & 10 metres, vertical 24 foot high. The best all band vertical available. Robust construction. Cat. D-4301 ... \$93.00  
TH3MK3  
20, 15 & 10 metres, 3 element beam with 14 foot boom. Average gain 8.5dB, handles up to 1KW RF power. Cat. D-4306 ... \$195.00  
TH3DX3  
20, 15 & 10 metres, 6 element beam - THE BIG ONE. Top performance, maximum gain. Fantastic front to back ratio. Handles up to 1KW RF power, best quality materials. Cat. D-4308 ... \$238.00

AMATEUR ANTENNAS NORMALLY \$80.00  
VHF BASE ANTENNA. G6-144. Deluxe 2 meter colinear for repeater or any fixed station operation. 6 dB gain over a 1/2 wave dipole. Maximum radiation at the horizon. Shunt fed with DC grounding. Radiator: 5/8 wave lower section. 1/2 wave phasing, 5/8 wave upper section. Height 117". Cat. D-4200. ... \$75.00  
HF AMATEUR MOBILE ANTENNAS. Highest efficiency, quality, performance but the best value around at present.  
MD-1 For deck or fender mount. Cat. O-4152. ... \$25.50  
RM-80 Resonator for 80 meters. Cat. O-4156. ... \$26.50  
RM-40 Resonator for 40 meters. Cat. O-4158. ... \$25.50  
RM-20 Resonator for 20 meters. Cat. O-4160. ... \$21.50  
RM-15 Resonator for 15 meters. Cat. O-4162. ... \$21.00  
RM-11 Resonator for 11 meters. Cat. O-4164. ... \$17.00  
RM-10 Resonator for 10 meters. Cat. O-4166. ... \$17.00

## HAM LIBRARY

LOG BOOKS - A MUST FOR ALL "HAMS". RECORD ALL YOUR CALLS! Small Size Log Cat. B-2235 ... \$1.50. Large Size Log Cat. B-2234 ... \$2.00  
AMATEUR RADIO CALL BOOK. 1976 USA Listings - Over 300,000 Names. Cat. B-2260 ... \$15.00  
RADIO AMATEURS HANDBOOK. Famous A.R.R.L. Publication. Over 600 pages covering all topics for the amateur. Cat. B-2218 ... \$8.90  
NOVICE RADIO GUIDE. This is the perfect book for the beginner. Learn faster with this exciting new book. Cat. B-2280 ... \$4.75  
Great Circle Map of the World produced in 3 colours on deluxe kromeplate set paper. A must for every radio shack. Designed with Sydney at the centre but works perfectly for Brisbane, Melbourne & Adelaide. Also lists international amateur prefixes. Q code and Australian amateur frequencies. Ideal for the radio shack wall. Mount your rotator indicator through the centre & have direct read out of bearing. Supplied FREE to Radio Dicks. Simply apply an official letterhead. Limit one only per Club. Cat. B-5402 Add \$1. for packing & postage. ... \$3.00

## MICS. \$8.75

DYNAMIC HAND HELD MIC WITH IN-BUILT TRANSFORMER. Dynamic Moving Coil - Omnidirectional - 300 - 5 kHz. Designed especially for AM & SSB transceivers supplied with 5 wire 2 meter lead that will adapt to any transceiver - even units with electronic switching. Cat. C-1102. ... \$8.75  
NOISE CANCELLING MIC. Ideal for Amateur & PA use. Noise cancelling is achieved by the use of twin inserts which are out of phase. Fit all with high quality PTFE switch and coiled lead. Impedance 250-600 ohms, frequency response from 300-5000 Hz. Cat. C-1105. ... \$8.90

## DICK SMITH ELECTRONICS GROUP

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## SHOP HOURS POSTAL CHARGES

MON - FRI : 9 to 5.30  
SAT : 8 to 12  
ORDER VALUE CHARGE  
\$5 to \$9.99 \$1.00  
\$10 to \$24.99 \$1.50  
\$25 to \$49.99 \$2.50  
\$50 to \$99.99 \$3.50  
\$100 or more \$5.00  
BY COMET FREIGHT - THE MINIMUM PACKING AND HANDLING CHARGE IS \$1.00. WE DESPATCH FREIGHT-RECEIVE THE GOODS.  
FOR C.O.D. SEND \$2.40 EXTRA PLUS \$3.00 DEPOSIT. MINIMUM MAIL ORDER AMOUNT IS \$5.

# VK-ZL CONTEST RESULTS FOR 1975

## OCEANIA

KH8IJ	12748	VR1AA	32062
P29MJ	18784		

## AFRICA

9J2GJ	256
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### AUSTRALIA PHONE

Call	80	40	20	15	10	Total
VK1FT	—	1530	3655	2655	1080	8920
1AQP	—	565	3755	1430	435	6185
1MF	310	220	1075	765	460	2830
1LF	365	—	465	1485	—	2315
2XT*	885	2175	8585	5695	1325	18885
*plus 190 on 160 Mx.						
2APK	805	4110	7975	4460	—	17350
2ARA	1015	1365	4055	3420	—	9855
2ABC	—	—	5775	—	—	5775
2ASC	—	—	3085	655	290	4030
2AHH	—	—	2135	810	—	2945
2OW	—	—	3130	1615	—	2895
2SG	—	—	1540	—	—	1540
3ARY	675	1260	4980	2715	—	9630
3SM	190	290	3865	1220	300	5865
3XB	1340	100	—	—	—	1440
3WT	—	—	860	250	—	1110
3VQ	—	—	55	165	—	220
4AAU	320	775	7640	4860	995	14590
4VU	700	975	8025	4075	575	14350
4UR	—	110	7360	3010	1055	11535
4LX	485	1250	6725	2545	400	11405
4EZ	—	—	9075	2145	—	11220
4PJ	—	—	4210	375	640	5225
4DO	—	—	4360	—	—	4360
4RF	—	—	2790	330	—	3120
4XA	—	—	—	2790	—	2790
4SF	—	—	—	—	1675	1675
4UU	—	—	1570	—	—	1570
VK4QA	300	—	765	—	—	1065
VK5WV	—	890	5490	1670	970	9020
5RK	—	—	—	390	—	390
VK6CT	—	—	—	10425	—	10425
6TU	720	100	2060	1600	—	4480
6II	310	250	2250	1010	—	3820

### NEW ZEALAND PHONE

Call	80	40	20	15	10	Total
ZL1BKX	1355	5340	9420	5090	—	21205
1AIZ	1820	3270	4135	2575	850	12650
1BLS	11695	—	—	—	—	11695
1AKY	700	3030	1660	4845	875	11110
1ANH	—	—	11075	—	—	11075
1PN	—	—	8875	—	—	8875
1AMM	855	385	4115	2280	—	7635
1VD	1315	1530	1825	2370	290	7330
1MQ*	220	545	2520	1430	155	5025
*plus 135 on 160 Mx.						
1AQO*	1645	—	—	—	—	1970
*plus 325 on 160 Mx.						
2AJB	—	—	—	5565	1700	7265
2AH	6190	—	—	—	—	6190
2ACP	1865	—	—	—	—	1865
2HE*	—	—	—	—	—	620
*plus 620 on 160 Mx.						
3GG	1600	1345	4065	865	275	8150
3RD*	375	230	2810	55	—	3570
*plus 100 on 160 Mx.						

### AUSTRALIA — CW

Call	80	40	20	15	10	Total
VK1AG	300	490	760	420	225	2225
VK2APK	110	4035	5395	4065	950	14555
2GW	210	2730	3455	3460	—	8495
2CX	—	555	5515	1860	—	8495
2SG	665	3965	2180	810	—	7620
VK3FH	980	2565	4995	3680	545	12765
3JI	210	1145	6540	—	—	7895
3APN	—	4490	—	—	—	4490
3MJ	315	1015	875	1255	175	3635
3OP	1250	2155	—	—	—	3405
3MR	3195	—	—	—	—	3195
3XB	955	630	970	—	—	2555
3FC	—	560	245	365	—	1170
VK4XA	500	3400	5005	3255	875	13035
4HE	—	5065	—	—	—	5065
4UR	1150	3325	—	—	—	4475
4RF	—	—	—	—	—	3750
4EZ	—	—	1090	—	—	1090
VK5SW	—	480	560	500	—	1540
VK7RY	340	830	275	—	—	2760

### NEW ZEALAND — CW

Call	80	40	20	15	10	Total
ZL1BJH	7875	—	—	3740	—	11615
1AIZ	1755	2830	3180	2935	830	11530
1BLS	—	—	9385	—	—	9385
1AMM	610	1095	3645	2865	—	8215
1HV	730	2250	2855	1720	315	7470
1AFW	—	700	2670	1100	—	4470
1MO	220	210	2900	495	—	3830
ZL2CD	—	—	1940	4660	—	7200
2ACP	—	—	6250	—	—	6250
2AGY	—	—	6195	—	—	6195
2OM	1520	—	—	—	—	1520
ZL3GQ	1190	5025	4925	1735	260	13125
3GG	1310	510	160	1130	260	3375

### PHONE

Call	80	40	20	15	10	Total
JA1ELY	9485	—	—	—	—	9078
JA1IST	3918	—	—	—	—	4420
JH1CNT	2784	—	—	—	—	858
JH1MLK	2736	—	—	—	—	424
JA1HUS	2484	—	—	—	—	924
JA1LDJ	1089	—	—	—	—	12
JF1QJD	480	—	—	—	—	6472
JA1EQH	238	—	—	—	—	1872
JA0BMS/1	196	—	—	—	—	328
JA1AAT	160	—	—	—	—	135
JH2MYN	3024	—	—	—	—	3980
JA3EVN/2	913	—	—	—	—	3956
JA2BNN	273	—	—	—	—	637
JR2BDG	272	—	—	—	—	120
JA2XH	156	—	—	—	—	24
JA2ATE	70	—	—	—	—	2388
JA3YAW	2204	—	—	—	—	1010
JA3AAW	5070	—	—	—	—	24
JA3CMD	2196	—	—	—	—	224
JA3ELU	1615	—	—	—	—	1078
JR3CQC	1296	—	—	—	—	423
JH3JUB	1260	—	—	—	—	336
JA3XRC	204	—	—	—	—	100
JR3BLV	186	—	—	—	—	927
JA3BX	168	—	—	—	—	912

### ASIA

Call	80	40	20	15	10	Total
EUROPEAN BSR	2415	—	—	—	—	2415
UOV3CE	1353	—	—	—	—	1353
UA1CS	740	—	—	—	—	740
UA4FAR	440	—	—	—	—	440
UW3EH	400	—	—	—	—	400
UA4RZ	272	—	—	—	—	272
UA3VAQ	126	—	—	—	—	126
UW1AE	108	—	—	—	—	108
UW3EQ	85	—	—	—	—	85
UW1YY	48	—	—	—	—	48
UA3ST	30	—	—	—	—	30
UA6JAD	—	—	—	—	—	—
ASERBAIJAN	495	—	—	—	—	495
UD6DER	455	—	—	—	—	455
UZBEK	—	—	—	—	—	—
UI8CD	—	—	—	—	—	—
TADZHIK	—	—	—	—	—	—
UJ8GJJ	144	—	—	—	—	144
ASIATIC BSR	4123	—	—	—	—	4123
UW9WR	3568	—	—	—	—	3568
UA0FBZ	3472	—	—	—	—	3472
UV9PP	1989	—	—	—	—	1989
UA0MI	1936	—	—	—	—	1936
UA900	1365	—	—	—	—	1365
UA9U9	800	—	—	—	—	800
UV0EX	336	—	—	—	—	336
UA9FU	—	—	—	—	—	—
UKRAINE	1677	—	—	—	—	1677
UB6WE	968	—	—	—	—	968
UB5MBY	80	—	—	—	—	80
UB5VAA	—	—	—	—	—	—
KAZAKH	660	—	—	—	—	660
UL7YR	72	—	—	—	—	72
UL7QH	20	—	—	—	—	20
UL7PBY	—	—	—	—	—	—
CW	—	—	—	—	—	—

### ASIA

Call	80	40	20	15	10	Total
JA1YFL	9164	—	—	—	—	9164
JE1SSE	8680	—	—	—	—	8680
JA1YFL	8100	—	—	—	—	8100
JA1CMD	7722	—	—	—	—	7722
JH1LKH	2832	—	—	—	—	2832
JA1LB	1152	—	—	—	—	1152
JA1LDJ	890	—	—	—	—	890
JA1KFH	550	—	—	—	—	550
JF1QJD	480	—	—	—	—	480
JA1HP	189	—	—	—	—	189
JA1BNW	180	—	—	—	—	180
JG1EEE	413	—	—	—	—	413
JA1BSU	432	—	—	—	—	432
JA1TIX	120	—	—	—	—	120
JH1CJL	32	—	—	—	—	32
JA1KQX	27	—	—	—	—	27
JF1NCT	10	—	—	—	—	10
JA1AAT	4	—	—	—	—	4
SP9AI	16	—	—	—	—	16
JH1OEL	2	—	—	—	—	2
JA2CPD	7037	—	—	—	—	7037
JA2						



Points Callsign  
 10 VK2CAX  
 9 VK4XZ  
 8 VK3JI  
 7 VK2AHE  
 6 VK7HE  
 5 VK5DL  
 4 VK1DA  
 3 VK3TX  
 2 VK3CM  
 1 VK2ZCT

The next contest counting for the trophy is the RD Contest and I hope everyone who enters has a most enjoyable time and sends in a log to help their Division. See you in the contest.

**1976 BARTG RTTY Contest results:** There were 5 entries from VK and are as follows: No. 39 VK5QX, 26638 points, No. 50 VK5RY, 16256 points, No. 53 VK5IF 14274 points, No. 60 VK3KF 10790 points and No. 69 VK5WV on 4774 points.

**REMEMBRANCE DAY CONTEST 1976**

I would like to see over 1000 logs this year. This would be only about one in seven amateurs in Australia. It is not really a very large number, and I am sure that more than this number are actually on air during the contest.

When you send your log, please think of the Contest Manager and put a front sheet with all relevant details on your log, check for duplications and correct scoring, and send your log early to P.O. Box 67 East Melbourne.

Best of luck to all who enter and may your voices and fists not expire during the contest. ■

# AWARDS COLUMN

Brian Austin, VK5CA

See last month's Notes for General Rules for ARI Awards.

**CERTIFICATO DEL MEDITERRANEO/SWL (CDM/SWL)**

1. The CDM/SWL is issued to those SWLs who can show confirmation of a HRD since 1st January 1960 of 14 countries of the CDM list.
2. The Award is not divided into classes.

**HEARD ALL ITALIAN PROVINCES (HAIP)**

1. The HAIP is issued to those SWLs who can show confirmation of a HRD since 1st January 1949 of
  - (a) a fixed amateur station in at least 40 provinces of the Italian Republic, for Italian SWL.
  - (b) a fixed amateur station in at least 30 provinces of the Italian Republic, for foreign SWL.
2. The list of the provinces is the same of the WAIP (see previous notes).
3. The HAIP is divided into four classes:
  - (a) Phone — one band
  - (b) Phone — two or more bands
  - (c) CW — one band (at least 10 HRDs on CW on the same band, the other HRD may be on Phone).
  - (d) CW — two or more bands (at least 10 HRDs on CW on two or more bands).

**DIPLOMA GUGLIELMO MARCONI (DGM)**

This Diploma is to celebrate the experiments carried out by Marconi in various parts of the world and bring them once again to the attention of radio amateurs. The DGM will be awarded to those who have made contact with (or listened to) the localities in which Marconi conducted his experiments. It is issued by the ARI and is free. To obtain the Diploma it is necessary to send to the ARI a log containing all the details of contacts or listenings made, and

- (a) 40 QSLs chosen from the localities listed below, or
- (b) 35 QSLs chosen from the localities listed below plus the QSL from the official commemorative station 114FGM and one from any other G. Marconi Memorial station (a total of 37 QSLs).

When required (for example):

G = London,  
 I4 = Bologna,  
 EA7 = Cadice, etc.)

the QSLs must indicate the city or the region of the locality well specified. For the return of the QSLs send the return postal expenses.

The DGM can be obtained in AM, SSB, CW, RTTY, SSTV and mixed. There is no limitation to the band (with respect, obviously, to normal regulations). The Diploma will begin 1st January 1973. The first Diplomas will be awarded on the occasion of the 1974 Marconi Celebrations. The list of Diplomas issued will be published in the official Journal of the ARI.

The QSLs must be sent to: ARI — V. Scarlatti 31 — 20124 Milano — Italy.

The locations to be contacted or listened to are the following:

- Country/Region or city/Prefix**  
 Capo Verde Isl./—/CR4  
 Portogallo/Lisbona/CT1  
 Madeira Isl./—/CT3  
 Marocco/—/CN8  
 Spagna/Cadice/EA7  
 Irlanda/—/EI  
 Francia/—/F  
 Corsica/—/FC  
 Inghilterra/Londra/G  
 Inghilterra/Flatholm Isl./GB  
 Inghilterra/Wight Isl./G  
 Irlanda del Nord/—/GI  
 Scozia/—/GM  
 Svizzera/—/HB  
 Vaticano/—/HV  
 Italia/Bologna/I4  
 Italia/—/I5  
 Italia/Roma/I0  
 Italia/Fondaz G. Marconi Villa Grifone/114FGM  
 Italia/Torre Tigullio Marconi (GE) IP1TTM  
 Italia/Sicilia/IT9  
 Italia/Sardegna/ISO  
 Giappone/—/JA  
 Argentina/Buenos Aires/LU-A-D  
 Belgio/—/ON  
 Brasile/Rio de Janeiro/PY  
 Svezia/Stoccolma/SM  
 Svezia/Gotland Isl./SM1  
 URSS/Leningrado/UA1  
 Canada/—/VE1  
 Newfoundland/—/VO1  
 Labrador/—/VO2  
 Australia/Sydney/VK2  
 Bermuda/—/VP9  
 USA/Mass./W1  
 USA/NY e NJ/W2  
 USA/Missouri/W0  
 USA/Illinois/W9  
 India/—/VU  
 Gibilterra/—/ZB2  
 Yugoslavia/—/YU2  
 Libia/Tripoli/5A  
 —/Memorial Stations/—

## LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,  
 Dear Sir,

**THOUGHTS ON THE ARNOLD REPORT**

Although the Arnold Report as a whole is well thought out and comprehensive it seems to me that sufficient consideration has not been given to the fundamental changes which have taken place in Amateur Radio over the last twenty-five years. The suggested name change and a few sentences in the preliminary recommendations are about the only specific comments which have been made concerning these changes.

It would be good if those who are interested in the future of amateur radio were to look back through some of the magazines of the late 1930s and 40s and realise just how much things have changed. I recall a copy of Wireless World which showed an early mobile rig. The first horse carried the operator who had a microphone mounted on a complicated harness fixed to the collar of the horse.

The second horse carried about a ton of equipment and a mast like a small broadcast tower, and a third horse carried the accessories. In a copy of the RSGB handbook in the 40s detailed instructions were given for drilling holes in the window

of an automobile in order to fit an aerial and lead-in for mobile work. And so on.

Right up to the middle of the 1960s it was almost unheard of for anyone to buy commercial VHF equipment. "Appliance operators" were people who used converted wartime surplus.

The point is that in those times, before taxis and every other kind of commercial vehicle were equipped with two way radio, the amateur was about the only person who had these facilities and he had to build the equipment himself. Thus when there was an emergency requiring the use of mobile equipment the amateur was the only person who could supply it. The problem of pirates hardly arose because if one was capable of building the equipment one would normally know enough to pass the examination. For effective overseas communication Morse was an obvious asset if not a necessity.

What is the situation today? There are almost a hundred thousand two way mobile installations in Australia alone, of which the amateurs form only a tiny minority. Every second vehicle has a VHF whip mounted on the roof and even in the remotest country areas there is, if anything, a surplus of two way communication. In this situation the illegal mobile operator can go for his life with practically no chance of being discovered.

The cost of equipment has changed in an equally dramatic manner. On one page of a hobbies magazine way back in 1928 there was an advertisement for a horn type loud speaker, the latest of its type. One could actually tell one announcer's voice from the other. The price of this "hi fi" speaker was ten pounds. This was of course a small fortune in those days. On the opposite page was an advertisement for an eighteen inch hobby lathe complete with chuck and screw cutting facilities. The price of this lathe was — wait for it — eight pounds ten shillings. Try to swap a loudspeaker for a screw cutting lathe nowadays and see how far you get!

The unpalatable fact we have to face is that over the last twenty-five years the amateur, from having a virtual monopoly on radio communication, has become an insignificant drop in a vast sea of every imaginable kind of commercial and private facility. Add to this the fact that commercial equipment is cheaply and readily available to anyone who wants to buy it and we have the situation that the old arguments which justified amateur radio have vanished.

Apart from unusual and exceptional situations the emergency service contribution by amateurs will be very small. The fact that even the most experienced home constructors cannot compete with commercial gear — try to build a smaller and more efficient rig than the KP202 for instance — takes a lot of punch out of the argument that amateur radio contributes anything to development of the state of the art. One justification, namely that amateur radio has an educational influence, is still valid but the neglect by the Institute of the youth radio movement hardly strengthens their argument.

What then is left to justify amateur radio? Simply this. It is a pastime and recreation which is better than many others which receive widespread approval. If it is reasonable for vast areas of precious parkland to be set aside so that people can congregate once a week to yell at a mob of men chasing a dirty bit of leather, or at a mob of horses running round in circles, then there is no further justification needed for allocating air space for the purposes of sport and recreation. This argument would incidentally go down far better with the general public than the current outmoded and academic arguments normally put forward by the Institute.

There is however a complete change of attitude which will sooner or later have to be made by the Institute and its members and that is in regard to the phoney pseudo-professionalism which at the moment influences our activities. If one joins a normal organisation one is not treated as a second class citizen until one has gained some academic qualification. One is accepted and evaluated on the basis of one's practical contribution to the organisation. The quickest way for the Wireless Institute to destroy itself will be to discriminate against the new novice licencees. It is most noticeable incidentally, that the advocates of "professional standards" never advocate such standards

for themselves, such as for instance putting forward the suggestion that existing amateurs should be required to re-pass the examination every five years or lose their licence.

If the Institute was really looking forward It would envisage the possibility of some purely operator "citizen band" licence being issued for recreational purposes and work out how such people could be brought into the organisation.

To sum up . . . Over the last twenty-five years the character and purpose of amateur radio has completely and fundamentally changed and its future justification will be on a sporting and recreational basis. The Institute and its members will have to discard outworn attitudes and encourage a new type of amateur who has been brought up on commercially built equipment. Finally there must be far more attention given to encouraging youth radio groups on both a technical and recreational basis.

Roy Hartkopf VK3AOH.

Scout Association of Australia,  
Victorian Branch HQ,  
384 Elizabeth Street,  
Melbourne, 3000, Vic.

The Editor,  
Dear Sir,  
Word has reached me that there are radio amateurs who in the past would have been quite keen to participate in that event which unites amateur radio and scouting for one weekend annually, i.e. Jamboree on the Air (JOTA), but have not done so because they were not approached by a scout group and asked for assistance.

If this is so, in my capacity as the Scout Association's Victorian Branch Co-ordinator for JOTA, I would like to rectify the situation by making available my name and address and asking that these be published in "Amateur Radio". If interested amateurs would please drop me a line or leave a message at Branch HQ, I will be only too pleased to put them in touch with a scout group in their vicinity.

Yours sincerely,  
Paul Thomas.

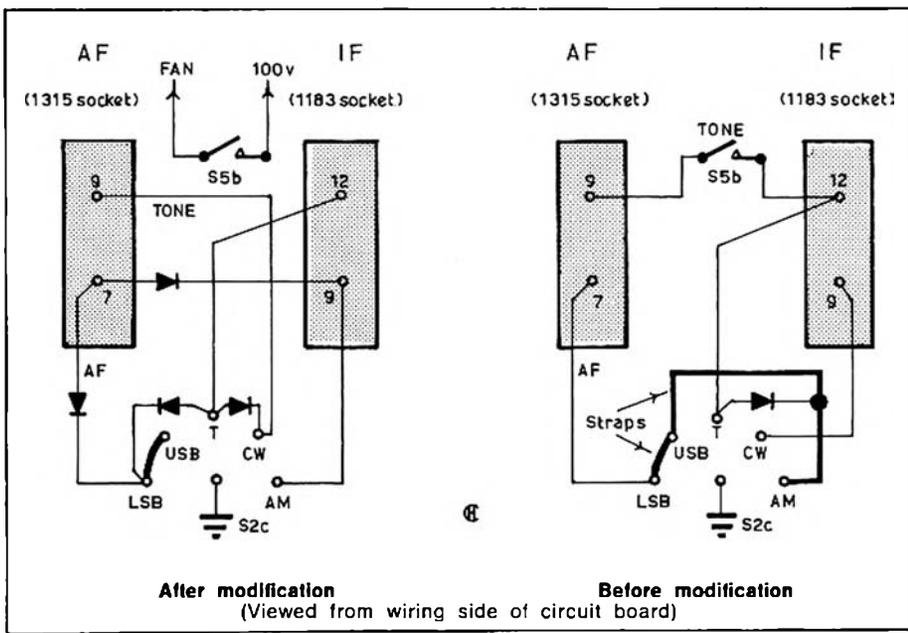
The Editor,  
Dear Sir,  
Since the publication of my letter about modifications to the FT 101B AR Dec. 1975, I have

# PROJECT AUSTRALIS

David Hull, VK3ZDH

## SEPTEMBER PREDICTIONS

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time Z	Long °W	Date	Time	°W	
1	17736	00.52	70.00	1	8210	00.38	59.39
2	17749	01.47	83.75	2	8223	01.32	73.01
3	17761	00.47	68.75	3	8235	00.31	57.89
4	17774	01.42	82.50	4	8248	01.26	71.51
5	17786	00.42	67.50	5	8260	00.25	56.39
6	17799	01.37	81.25	6	8273	01.19	70.01
7	17811	00.37	66.25	7	8285	00.18	54.89
8	17824	01.31	80.00	8	8298	01.13	68.51
9	17836	00.31	65.00	9	8310	00.12	53.39
10	17849	01.26	78.75	10	8323	01.06	67.01
11	17861	00.26	63.75	11	8335	00.06	51.89
12	17874	01.21	77.50	12	8348	01.00	65.51
13	17886	00.21	62.50	13	8361	01.54	79.13
14	17899	01.16	76.25	14	8373	00.54	64.01
15	17911	00.16	61.25	15	8386	01.48	77.63
16	17924	01.11	75.00	16	8398	00.47	62.51
17	17936	00.11	60.00	17	8411	01.41	76.13
18	17949	01.06	73.75	18	8423	00.41	61.01
19	17961	00.06	58.75	19	8436	01.35	74.63
20	17974	01.01	72.50	20	8448	00.34	59.51
21	17986	00.01	57.50	21	8461	01.29	73.13
22	17999	00.55	71.25	22	8473	00.28	58.01
23	18012	01.50	85.00	23	8486	01.22	71.63
24	18024	00.50	70.00	24	8498	00.22	56.51
25	18037	01.45	83.75	25	8511	01.16	70.13
26	18049	00.45	68.75	26	8523	00.15	55.01
27	18062	01.40	82.50	27	8536	01.09	68.63
28	18074	00.40	67.50	28	8548	00.09	53.51
29	18087	01.35	81.25	29	8561	01.03	67.13
30	18099	00.35	66.25	30	8573	00.02	52.01



had some inquiries as to details of the rewiring to use an AM filter type XF30B as used in the FR101 receiver. Below is shown a semi pictorial sketch showing the circuit as is, and as modified. It is necessary to add two additional blocking diodes and these can be any silicon switching type diodes, preferably with a low capacitance. While doing the modification it is a good idea also to disconnect S5b and use it to operate the fan as shown so that the fan is not running continuously on receive. It is however essential to make two modifications to the AF board PB 1315. The 470 ohm resistor, R 17 from pin 6 of the IC, Q4, must be removed from the line to pin 7 on the socket and put to ground. This will eliminate the vox jitter which occurs on the CW mode. Because of

the modifications the line to pin 7 on the socket, which will still have the emitters of mic amp transistors Q2 and Q3 connected to it, will be raised by about 0.7 volt. This affects the bias on the mic amp transistors and the base resistor R6 should be altered from 33k to 56k otherwise there will not be enough mic gain. The modifications to the mode switch S2c and to the socket connections of the IF and AF boards should be clear from the sketch. Be careful to locate the correct tags on the mode switch. It is easy to pick the wrong one! Make sure the diodes are the correct way round! The XF30B filter is installed in the CW filter position exactly as shown in the instructions for the CW filter XF30C.

Roy Hartkopf VK3AOH.

Report on Oscar 6, 7 and 8 "operations" meeting, Washington, DC, May 76, WIA Rep.: VK3ZDH.

This meeting attended by representatives of most of the major amateur satellite organisations, was concerned mainly with command and operational problems of Oscars 6 and 7 and forward planning for Oscar 8.

The meeting was chaired by Rich Zwieko K1HTV Amsat VP operations, who is responsible also for worldwide command station co-ordination. Each command station was reviewed in terms of automation status, coverage, command effectiveness etc., and major problems were discussed in round table conferences.

It became very apparent that the general policy of using individually owned and operated command stations, is much more efficient long term than the alternative policy, adopted in some countries, of group operated stations situated in universities and such. Group stations have in the past suffered somewhat from conflicts of interests, and whilst they were generally better financed, tended to swallow up such financing in buildings etc. and not produce in terms of command effectiveness. Remote locations also suffered from lack of instant access in times of emergency. On the other end of the scale, countries where the command situation is virtually a one man band (such as ZL), tended to be spasmodic in operation and difficult to service effectively. Command station problems directly affect the operation of the satellites (particularly Oscar 6) over the geographic region of the station concerned, and this can lead to unrest and ill feeling between regions.

Problems of this nature lead directly to the poor operation of Oscar 6 over Europe in its first 18 months.

Also apparent at the meeting was the reduction in command effectiveness of the Northern hemisphere, compared to the Southern hemisphere. This is a direct result of trying to command with

Amateur power levels through the QRM and QRN produced by the USA-Europe-Japan "megalopolis". Unfortunately the greater area of the earth's surface seen by Oscar 8 will only increase this problem, however the greater reliance of 8 on internal computer control and the increased sophistication of the command link should overcome this.

The meeting then went on to review some of the major experiments conducted on Oscars 6 and 7. These included:—

(a) Emergency locating transmitter tests: This is perhaps one of the most significant tests conducted on the amateur bands for some years. Amsat was approached early last year by Dr. Daniel Brandel of NASA who proposed to use the satellites for a ranging experiment using the type of transmitter normally carried by civil aviation aircraft for emergency location purposes.

Similar power and antennas to the EL7 transmitters were used, but on the Oscar frequencies. The experiment proved a great success, even with somewhat primitive ranging apparatus, resolutions of better than 3 km were obtained. An accuracy of this nature would allow search authorities to quickly locate a downed plane in the Australian outback or the Canadian northwest. The results have helped Dr. Brandel in his feasibility study for NASA in a way that no other service could have provided.

(b) Medical Experiments: Bill Hook W3QBC outlined the transmission of EKG and EEG waveforms from point to point in the USA and explained the service these could provide for treatment of heart (for example) patients in remote and emergency conditions. The experiments which were most successful used the technique devised by David Nelson K7RGE at the University of Arizona Hospital.

(c) ASCII code transmission and Remote mini-computer accessing: These experiments conducted between Randy Smith VE3SAT and Dick Allen W5SXD proved the feasibility of program and data

swapping between similar units via the satellites. As this is a fundamental plank in the anticipated command operation of Oscar 8, the success of this experiment has great importance for Amsat and associates.

(d) Other experiments reviewed included a mass broadcasting (to private homes) experiment conducted by the Hungarians under Prof. Geschwindt of the University of Budapest, Mobile in motion experiments by W2GN/M and the host of school educational experiments conducted under the ARRL Satellite Education program.

Most of the second day of the meeting was taken up in forward planning for Oscar 8. This is one satellite that due to its coverage will require an immediate operational "band plan" from switch on. Discussions centred around the best method of implementing this through publicity etc. Command station location was again discussed and it was decided that the basic "Oscar 7" set up (VE and VK) with the addition of W and DL would be most suitable. ■

## INTRUDER WATCH

All Chandler, VK3LC  
1536 High Street, Glen Iris, 3146

Since its inception in Australia in 1967 the Intruder Watch has slowly taken shape until it is a viable and integral part of Amateur Radio. The idea put forward at the WIA inaugural meeting was that — "it is an attempt to preserve the few remaining frequencies available to the Amateur Radio Service", and it was said that — "there is a pressing need to remove intruders from Amateur frequencies because the frequencies are becoming crowded to the stage where Amateurs find difficulty in finding a clear spot to operate", and went on to say — "Generally speaking anyone may use any frequency until someone objects. This means that intruders who use amateur frequencies illegally may claim that they have the right to the frequencies because no one has objected", and — "this is vital at the international level. Unless Amateurs can prove that they have objected to intruders using their bands, they have no case before an international Tribunal. It is thus important that we have a record of intruders and the action we have taken to object to them". This conception is still valid, and the Intruder Watch has been organised on a Divisional basis with the Federal Co-ordinator resident in Melbourne. His responsibility is to co-ordinate all reports forwarded through the Divisional Co-ordinators, so that they reach the Postal and Telecommunications Administration regularly for filing, or for action whichever is applicable. Another aspect of his responsibility is the compilation of monthly summaries for inclusion in the World IARU Monitoring Service monthly summary.

Divisional Co-ordinators are responsible in their respective Divisions for collecting reports from Observers, and forwarding them on a monthly basis to the Federal Co-ordinator. They are also responsible for disseminating news and know-how to their Observers, and for recruiting Observers.

As well as the above the Federal Co-ordinator has taken upon himself the task of educating members in the identification of intruder signals heard in the Amateur bands. With such in mind a tape recording has been produced wherein all modes of signals are reproduced. A copy of this tape is available to any member who is interested enough in the Intruder Watch to request such. However, to delay costs we do ask members to supply their own reel or cassette. For reel recorders dubbing can be done at 1 7/8, 3 3/4 or 7 1/2 IPS, but the reel supplied must be able to run for forty minutes. A C90 is required for cassette recorders.

Recently, with the restructuring of the PMG's Department, the Licensing Policy and Operations Branch has been alerted to offer a much better liaison than in the past with the WIA in the Intruder Watch field, and our Co-ordinator is enjoying much more co-operation. This is exemplified in their request to re-design our report forms so as to comply with their filing arrangements. This has been done, and the new forms will be in the hands of our Co-ordinators and possibly dis-

tributed by the time this is published in our Magazine.

The new forms, a copy of which was reproduced in May AR are to be used only for stations or signals that can be identified. When I say "identified" I mean a call sign must have been copied for A1 (CW) or F1 RTTY, and a verbal identification heard from A3 (AM broadcasting). Our Administration is only interested in signals that can be identified, and it is incumbent upon us to supply them with identifications so that they can alert their monitoring stations to listen for them. They are much too busy with other services, and their requests to be able to look for intruders in the Amateur bands. Don't think that the Amateur Service is the only one that suffers from intruder intrusions. I am told that all services, and including emergency frequencies are subject to interference from time to time. However, priority is given to essential services.

With the above in mind a drive has been instituted to recruit more Observers. From our Administration's point of view it is essential that we have more Observers because, quoting their own words — "Unless we get many reports of a particular intruder, its frequency, identification and traffic passed it lacks credibility, and we cannot alert our monitoring stations to listen to it, nor file a complaint to any other Administration. We must be positively sure that the intruder really is an intruder and sure from which country it emanates. There must be no slip-ups otherwise we are in straits from our Government".

Another aspect of the Intruder Watch that members may have overlooked is the necessity to supply our delegate to the WARC Conference being held in Geneva in 1979 documentary evidence of regular and persistent intruders heard in our bands over the years. By scrutinising past reports several patterns have emerged which will serve to emphasise the importance of observations.

At the Hong Kong Conference of Region 3 Amateur Radio Associations, it was resolved to come into line with Region 1 in forming what is known as the IARU Monitoring Service. This is now in operation with headquarters resting with the WIA. However, so far there has been little evidence of any Intruder Watch organisations in any other country in Region 3 except Australia, so we have to take the whole burden of observations.

Thus it behoves the Australian Amateur to uphold his tradition of help and alertness in tracking down and reporting intruders and I am hopeful of an even more vigorous Intruder Watch in the near future.

Note — State Co-ordinators are as follows —  
VK1AOP, Ted Pearce, 45 Carnegie Crescent, Narrabundah, 2604.  
VK2AFG, Les Weldon, 11 Raymond Avenue, Northmead, 2152.  
VK3XB, Ivor Stafford, 16 Byron Street, Box Hill South, 3128.  
VK4KX, Murray McGregor, 6 Murray Street, Red Hill, 4059.  
VK5LG, Leith Cotton, 64 Weroona Avenue, Parkholme, 5043.  
VK6, Albert Cash, 54 Frederick Street, Shoalwater Bay, 6169.  
VK7MX, Max Ives, P.O. Box 12, Devonport East, 7310. ■

## WICEN ACTIVITY

A major WICEN activity was held last January in Elder Park (just north of the Adelaide "Square Mile") in assisting the Good Neighbour Council with communications at the Australia Day Fair. A total of 21 operators manned VK5WI/P and other portable units around the area on 146.5 MHz on this occasion.

For the first time in South Australia, WICEN was able to demonstrate the full potential of amateur radio as a message handling media through the handling of



Gordon Bowen VK5CXU

the third party traffic. This activity was approved by the Regulatory and Licensing Branch for which we are thankful of their co-operation.

WICEN was able to demonstrate to the public how amateur radio provides excellent communications. A candid photo shows Gordon Bowen VK5CXU relishing a quiet moment at one of the portable locations.

I would like to take this opportunity to personally thank all members who ably assisted in this excellent public relations exercise.

Alan Raftery, VK5BW,  
VK5/B Senior WICEN  
Co-ordinator

## LARA

Ladies Amateur Radio Association

"FOXHUNTING"  
OR "WHICH TREE DID WE LOSE THE BEAM OH MA?"

LARAs first year has been remarkable for many things but perhaps our best known activity as a group, in VK3 especially is foxhunting — or as purists prefer — "vixen-hunting".

Several of LARAs founder members in VK3 are also keen foxhunters, so one of the first get-together activities suggested was a foxhunt — with a difference (or two).

As a pleasant change from belting around the countryside at dead of night (as in VHF group Friday night foxhunts) we in LARA belt around the countryside on Sunday afternoons instead, when we can at least see where we're going even if we don't recognise it! We have a barbecue as well, with or without the traditional chocolate cake, and, most important of all — each team of "hounds" must include at least one lady hound or "YL".

The first foxhunt we had was in fact, unofficially "won" by two gentlemen, but as they were unable to decide which of them should be the YL for the occasion, they were penalised 40 points and retired, muttering into their respective beards. The fox (or vixen) in this inaugural hunt was Irene Robinson with her OM Jeff VK3YER, and young YL Kirsty, who at 4 is LARAs youngest member so far. No casualties were reported and all hounds arrived for the barbecue with the VK3 President



**Norma VK3AYL and hounds**

of LARA trailing the field by about 1/2 hour — we wonder why.

Since this first hunt there have been several happy days in the field — occasionally in the field right up to the axles, unfortunately — and several YL hounds have been introduced to amateur radio in this way. Winners are not always the experienced YL operators and one winner had never seen a transmitter before her starring debut.

We recommend this sport as it is always fun and occasionally hilarious. Sometimes the fox is hidden in infuriating places but hounds are not allowed to bend the beam over the head of the running fox who will say "But it's obvious where you hid it — Isn't it!" — it's just not ladylike!

No specialised knowledge is needed, but an acquaintance with freeway overpasses, one-way streets, inaccessible cul-de-sacs and hidey holes all over the city comes in handy. A street directory is also helpful to those wondering where the whatever they have got to now. "This is the fox. We have been found for 2 1/2 hours now and if you are still in Bourke Street you are in the wrong place" — and so on.

Due to an unfortunate misunderstanding in last month's timetabling, no LARA notes reached AR and all eager readers missed the news that LARA is now one year old — happy birthday, "ra ra" and all that. July 30th was selected as the birthday party day in VK3 and appropriate celebrations are planned for this happy occasion.

To celebrate achievements by members during the year we firstly salute Iren Robinson whose work as treasurer of the VK3 division of the Institute has been appreciated by most of the VK3 members in general, as well as those in LARA who wish Iren continuing success, especially in the August exam.

Secondly to Mavis Russell, congratulations on passing telegraphy at the February exams.

At the time of going to press we do not know of other YLs successful in exams so far this year (some haven't even heard results yet!) but congratulations to those successful already and best of luck to all those sitting for the exam this month. ■

## AFTER THOUGHTS

### MODIFICATIONS TO A 2M SOLID STATE TRANSVERTER

Peter Williamson VK4ZWP  
3 Rabaul St., Soldiers Hill, Mt. Isa, 4825

Since the original article was prepared, the availability of specialised test equipment, including a Spectrum Analyser, some minor modifications have been made to the unit, and test figures taken.

#### (1) MODIFICATION

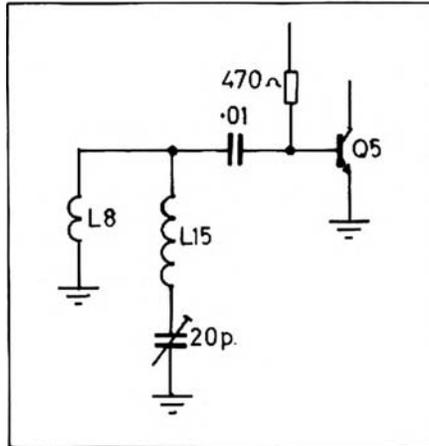
Add a 130 MHz trap to the base of the power amp Stage Q5. The new coil is designated L15.

L15. 5T 20 SWG TCW 5/16" I.D. 1 DIA spacing between turns.

#### (2) ALIGNMENT

Tune 20 pF trimmer for minimum 130 MHz output — note most amateurs' test equipment will not be sensitive, or selective enough to find the precise dip. Therefore an alternative alignment is as follows — tune transverter as per previous instruction, then with single tone input adjust 20 pF trimmer for minimum output at 144 MHz. Then increase capacity until output power just returns to normal. This procedure is not optimum but will be approximately 3 dB down on it.

(3) TEST FIGURES — Spurious Emissions Test equipment SYSTRON DONNER DC — 10 GHz Spectrum Analyser HP DC-500



**Figure 1 — 130 MHz trap**

## A STRANGE CIRCUIT

invented by G. Miles VK2KI .....

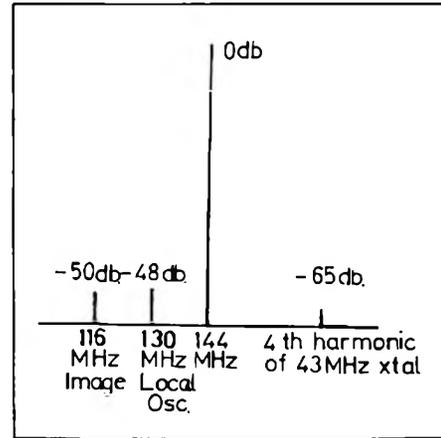
**Occasionally a circuit is constructed that works well but according to theory it shouldn't work at all.**

**Gil, VK2KI, has built such a circuit. Here is the story; perhaps you can offer an explanation.**

In February 1975 the technical editors received the first of several letters from Gil describing a noise reduction circuit. Gil wrote *Because my location is surrounded by home units and I am unable to erect an antenna well up in the clear, I am subject to very severe noise particularly the continuous background type. Over the years blankers and silencers of the IF and AF variety have been tried but none so effective, simple and easy as this circuit.*

The circuit consists of only two items, a 100 pF variable capacitor and a coil of 16 turns of 18 gauge enamel on a one inch diameter former. These components are wired in series and enclosed in a metal box. The capacitor is grounded at one end and the top end of the coil is connected via coaxial cable to the receive contact of the aerial change-over relay of Gil's FT200. The circuit tunes to both 7 and 14 MHz (presumably series resonance).

Gil explains that the noise usually runs



**Figure 2**

MHz ATTENUATOR — Single 1 kHz tone input to exciter (Home Brew 14 MHz).

(4) Since writing, the transverter has been fed into a power amplifier consisting of a QQE03/10 and a QQV06/40 providing 80 W RMS OUT SINGLE TONE for Oscar 6 & 7 work. The circuit used is the same as in the previous TUBE type 2 M transverter published in AR.

Plugging in a suitable XTAL was all that was required, re-tuning only providing a 1.5 dB increase in output. Spurious emissions with the linear were better than the measuring capability of the analyser (7-70 dB). ■

at a steady S3 to S4 and most signals are around S4 to S5. In use the circuit is tuned until the noise level dips. Says Gil "it would seem that such a circuit would indeed "suck out" both signal and noise. Not so! Certainly the signal drops but the noise seems to go down faster than the signal and I am quite happy to listen to S2 or S3 signals on headphones if the noise disappears."

Of course in theory a series tuned circuit should attenuate both signal and noise by equal amounts eventually resulting in a degradation of the signal to noise ratio as the the signals get weaker and thus the receiver's internal noise becomes more prominent. So does the circuit work and if so how?

Gil reports that Ray, VK3RS, Des, VK3ADH and VK3AM have built similar circuits and achieved the same results. Also Bob, VK3ML, and Snow, VK3MR, have been treated to a demonstration by Gil and both agreed that it works effectively. So apparently it works, but why?

Overload by noise, local signals or some effect related to intermodulation or misalignment of the FT200's have been proposed as possible reasons why the circuit works. None of the associated explanations are very convincing. Therefore this article has been published to see if any reader can propose a convincing explanation. Over to you.

de VK3AFW

# SIDEBAND ELECTRONICS SALES

**ATLAS** models 210-X and 215-X 80 to 10 & 160 to 15 M transceivers inclusive factory installed noise-blankers. **only \$600**

**ICOM** model IC-202 2 M SSB portable transceivers 144-144.4 MHz. **only \$180**

Model IC-502 6 M SSB portable transceivers 52 to 53 MHz. **only \$175**

YES, we feel some newcomer in this game requires a bit of honest competition and there is more to come after we get really organised and our teeth bitten into it deeply!!

**UNIDEN** model 2020 AC-DC transceivers 10 to 80 M with 3 crystal filters **\$550**

**TRIO-KENWOOD** model TS-520 AC-DC transceivers 10 to 80 M. **Still only \$530**

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# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

## AN 80 METRE NOVICE RECEIVER — PART 4 — THE AUDIO AMPLIFIER AND POWER SUPPLY

The audio amplifier is probably the easiest section of the receiver to understand as each stage has only one function to perform. The audio amplifiers are linear amplifiers operating in class A.

### DC VOLTAGES

The audio amplifier includes all components from C68 to C76, R63 to R77, V6 and T10. The two valve sections of V6 each receive bias due to the voltage drop across their respective cathode resistors R77 and R73. Initially each valve has no negative bias applied to its grid to control its conduction. As soon as each valve section commences conduction, a voltage drop occurs across each cathode resistor. The voltage at pin 8 and pin 7 will go positive as the plate supply to both valve sections is positive. Pin 9 and pin 2 are both at DC earth through high value resistors, although for clarity, they can be considered as being wired straight to chassis for the purpose of this explanation. With pins 9 and 2 at earth potential and pins 8 and 7 several volts positive with respect to earth, it will be seen that pins 9 and 2 are, in fact, negative with respect to pins 8 and 7. If pin 8 is 5 volts positive, this means that pin 9 is at earth potential which is 5 volts in a negative direction from the cathode. The values of R67 and R73 are such that the valve sections stabilise at a particular value of cathode current which corresponds to a suitable bias to obtain linear operation.

### AC OPERATION

Having established the DC operating points of the valves, we move on to the AC operation or audio amplification of the two sections. The voltage at the plate of V5 will vary at an audio rate depending on the input RF signal and the setting of R59. Take it as read that this does in fact occur — last month's issue should have made this clear. This variation in voltage at the plate anode of V5 which is a combination of DC and superimposed AC is applied to one plate of C68. Under static (no signal) conditions the voltage on the plate of V5 will be between 25 and 130 volts positive (see table), and one plate of C68 is connected to this potential. The other plate is connected to earth via R64 and is, therefore, at zero potential. Suppose V5 plate is at 100 volts positive, then C68 is charged to this same potential. Consider that the influence of the AC component on the plate of V5 is to lower the plate/C68 voltage to 50 volts instantaneously. The capacitor C68 is charged to 100 volts and

it cannot discharge instantly as it must discharge through R64 at 0.47 Megohm resistor. The plate of C68 connected by R65 to the grid of V6A is therefore driven negative with respect to earth to the value of negative 50 volts. The capacitor still has 100 volts dropped across it, but the audio component has been coupled across it from the plate circuit of V5 to the grid circuit of V6A. The audio signal applied to the grid of V6A causes the bias to vary at an audio rate, which from previous discussion you will remember causes an amplified version of the audio signal to be developed in the plate circuit. V6A and V6B are coupled together in the same way as V5 and V6A are coupled and the operation is the same with the exception that the audio signal is increased by about 15 times in voltage.

C68, C69, R64 and R65 form an elementary bandpass filter designed to pass the voice communications frequencies of 300 to 3,000 Hz with little attenuation, and to attenuate all other frequencies as much as is possible. The network in the grid circuit of V6B does exactly the same thing. The cathode bypass capacitors in both sections of V6 are relatively low value so that their bypassing effectiveness is minimal below approximately 300 Hz, in this case forming an elementary high pass filter, in other words passing all frequencies above 300 Hz. The values of the capacitors and resistors in these networks are determined by the impedances of the circuits into which they work, the frequencies that are required to be passed and the shape factor of the filter. It is not intended to go into the design criteria of filters in this article, and they may form the basis of some future article.

### AUDIO OUTPUT

The output from V6B is coupled via a speaker transformer to a small loudspeaker. By examining the table showing the voltage to be expected at each valve element, it will be seen that only 10 volts is dropped across the speaker transformer. However, when the voltage on the grid of V6B is fluctuating at an audio rate, the current drawn in the plate circuit will also endeavour to vary. The speaker transformer T10 has an appreciable amount of inductance and acts like a choke. You will recall from elementary notes that one of the characteristics of chokes is to oppose any change to the value of current flowing through it. Therefore, if the current drawn by the valve is reduced, the choke endeavours to get it to draw more by increasing the voltage to the valve plate. The converse is also true — if the valve endeavours to draw more current, the choke opposes this and the voltage applied to the valve is reduced. The transformer will, therefore, have an apparent resistance or more correctly, an impedance to the flow of AC/audio which is much higher than the measured ohmic resistance of the primary winding. The valve, therefore, has a high impedance AC/audio load but a low resistance DC supply.

The speaker transformer used in this receiver has a 14,000 ohm primary imped-

ance to a 3.5 ohm secondary impedance. Just as a tractor, road grader, etc., needs large reduction gearing between the high speed engine and the road wheels, so does the valve which is a high impedance device need the equivalent of gearing to match the low impedance of the speaker. A value of 14,000 ohms for the primary may not be optimum as there are no data sheets to the author's knowledge on the 6BL8 used as an audio amplifier. A 10,000 ohm to 3.5 ohm transformer should also be quite satisfactory. The impedance ratio of the transformer used, T10, is obtained by dividing 14,000 by 3.5 which equals 4,000:1. This is the impedance transformation ratio. The turns ratio of this transformer is obtained by getting the square root of 4,000 which equals approximately 63:1. This means that 63 volts applied across the primary will appear as 1 volt across the secondary, but the current will be 63 times as great — if the transformer were 100 per cent. efficient, which it is not. It is easier to obtain a 7 or 5K ohm speaker transformer with a 3.5 ohm secondary. Speakers with 3.5 ohm impedance are not always easy to obtain, but 8 ohm speakers are readily available. Now, if an 8 ohm speaker is used on the 3.5 ohm winding, the transformation of its impedance back into the primary will be  $8/3.5 \times 7K \text{ ohms} = 16000 \text{ ohms}$ , or  $8/3.5 \times 5K \text{ ohms} = 11400 \text{ ohms}$ . You can, therefore, use a valve type speaker transformer other than 14K/3.5 ohm if you are prepared to do a little calculation of impedance transformation ratios.

The output from the speaker transformer is fed to a stereo type phone jack with a set of changeover contacts as per the circuit diagram in May issue. The audio can go direct to the internal speaker or can be fed to an external speaker, or can feed a pair of headphones wired to the ring and sleeve of a stereo plug. R76 is adjusted in value until the volume is at a satisfactory level for the operator. R77 serves a similar purpose for monitoring the modulator output. This is now redundant as off air monitoring is achieved via the receiver in a desensitised mode.

The receiver is used to monitor the transmitter by keeping almost all of it operating even when the transmitter is operating, only the hexode section of V4 being switched off. With the hexode inoperative the sensitivity of the receiver is quiet low and consequently it is not overloaded by the transmitter on the same chassis. However, it is still necessary to control the actual level of the monitored signal fed to the speaker and to our ears. R70, R71 and R72 control the level of the monitored signal applied to the grid of V6B. R71 and R72 have no effect on the signal when on receive, as they are floating above earth. When the transmitter is brought into operation pin 5 of STR2 is earthed via a relay contact within the transmitter section. It is important that the position of R27 be altered to that in the diagram in May issue, otherwise RF will be fed into the grid of V6B and cause distortion. R27 which is only 100 ohms



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QTR-24



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SWL station could be complete without one. Stocks expected around late September.

Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load-power meter.

**QTR-24 PRICE \$27**



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Application	SSB- Transmit.	SSB Receive	AM	AM	FM	CW RTTY	CW RTTY
Number of Filter Crystals	5	8	8	8	8	4	8
Bandwidth (6dB down)	2.5 kHz	2.4 kHz	3.75 kHz	5.0 kHz	12.0 kHz	0.5 kHz	0.5 kHz
Passband Ripple	< 1 dB	< 2 dB	< 2 dB	< 2 dB	< 2 dB	< 1 dB	< 0.5 dB
Insertion Loss	< 3 dB	< 3.5 dB	< 3.5 dB	< 3.5 dB	< 3.0 dB	< 5 dB	< 6.5 dB
Input-Output	Z <sub>i</sub>	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination	C <sub>t</sub>	30 pF					
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	> 45 dB	> 100 dB	> 100 dB	> 100 dB	> 90 dB	> 90 dB	> 90 dB
Price	\$31.95	\$45.45	\$48.95	\$48.95	\$48.95	\$34.25	\$63.95

In order to simplify matching, the input and output of the filters comprise tuned differential transformers with the "common" connections internally connected to the metal case.

Registration Fee: \$1.00; Air Mail: 31c per 1/2 oz. Shipping weights: Filters 2 oz. ea., Crystals 1/2 oz. ea. All Prices in U.S. Dollars.

**Matching Oscillator Crystals**

XF900 Carrier	9000.0 kHz	\$3.80
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XF902 LSB	9001.5 kHz	\$3.80
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F05 Crystal Socket (HC 25/u)		.50

Oscillator crystals 50kHz through 150MHz available to order. Parallel resonant (30pf) to 20MHz, series resonant above 20MHz. Write for quotation to your requirements (include mechanical size and frequency).

**Matching FM Crystal Discriminators for XF-9E**

	Freq.	Dev.	Slope	Price
XD-9-01	5 kHz	-40 mV/kHz		\$24.10
XD-9-02	± 10 kHz	-24 mV/kHz		\$24.10
XD-9-03	12 kHz	-50 mV/kHz		\$24.10

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places the relay contact and the line to the grid of V6B that many ohms above RF earth. It must be remembered that some of the relay contacts have quite a high level of RF on them and that they are close to this monitor audio line. It is also important that the line to R72 be shielded to overcome any additional chance of RF getting into the grid of V6B.

### SUMMARY

The transmitter and receiver work well both independently and together. The transmitter puts out about 8 watts on AM and 10 watts on CW, it features press to talk for AM operation and semi-breakin operation on CW. It has full monitoring facilities for the transmitted signal, the monitor being an off air type—the best type. It is possible to monitor the AM signal to check quality, bandwidth and for spurious signals within about 100 kHz. The CW signal is monitored for key clicks, bandwidth and used as a keying monitor. The receiver is sensitive, stable, reasonably selective, does not drift excessively, is able to handle both weak and strong signals without stress, and is easy to operate. All in all, the unit works well and should for you too.

In some circumstances C65 may need to be varied in size, perhaps down to 0.027uF, to get good regeneration. It has been observed that some 6BX6 valves are microphonic, so try several obtained from old TV sets or new ones and use the best one.

### PRECAUTIONS

As has been stressed before, the layout of components is extremely important. This transceiver is no more tolerant of gross layout errors than any other piece of electronic equipment. If you are inexperienced at construction practices, it is suggested that you make the receiver (if built separately to the transmitter), on a chassis about 20cm by 28cm to allow ample room in which to work. Spread the work out, keeping each section of the receiver to itself and on no account intermingle succeeding sections unless you know exactly what you are doing. *Keep earth leads short*—earthing is every bit as important on 80 metres as it is on VHF. *Keep inputs away from outputs* or you could easily have trouble with oscillation, erratic operation, poor sensitivity, distortion, etc.

*It is most strongly advised that you read March and April 1974 Newcomers Notebook for information on equipment layout—it could save you much heartache and frustration with this project or any other project that you may care to undertake.*

If possible, obtain all parts before you start building so that you can physically lay them out to see how everything will fit. It is not much good allowing an area 5 cm square for a component only to find that you require an area 7 cm square to accommodate it. It is equally important that this component be placed in its correct position and not wired in later from a spot remote from the particular circuit of which it forms an integral part. Good luck and good operating.

### RECEIVER ELECTRODE VOLTAGE TABLE — Measured to earth — Chassis

Valve Type	12AH8	6BX6	6BL8-T	6BL8-P
Cathode	3.6-30v*	0v	5v	3v
Grid	0v	0v	0v	0v
Screen	90-120v*	0-50v†	—	200v
Plate	210-250v*	25-130v†	—	240v
Triode Plate	100v	—	90v	—

\*Varies with setting of RF gain. †Varies with setting of regeneration control.

### COSTS

Most newcomers will probably have access to old valve type radios and TV sets and the availability of items from these sources has been carefully considered in the design of this transceiver. The stripping down of a couple of old sets would, in most cases, provide the more expensive components such as tuning capacitors, transformers (power speaker, I.F.), and possibly some of the valves, free of cost. Many of the smaller items such as knobs, sockets, resistors, fixed capacitors, etc., would also be re-usable. Do not re-use paper capacitors as they are invariably leaky.

used with a prototype transceiver. The operation of a power supply will not be described here as this is covered quite adequately in the various amateur handbooks available from our advertisers or from *Magpubs*. The output voltage of the power supply varies with the amount of current drawn from it, which explains why the voltage to the receiver is 360 volts but only about 310 volts on AM transmit. It is important that C1 is earthed to the same spot as the centre tap of the high tension winding, otherwise earth loops can be created throughout the chassis, which could cause unnecessary hum in the receiver.

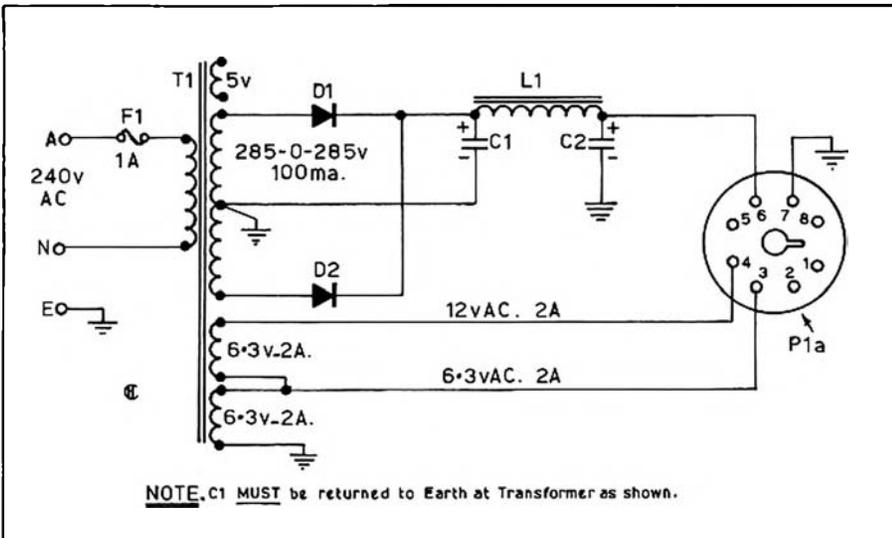


Figure 1 — Power supply for novice transceiver

On this basis, and depending on one's willingness to "make the most of things", it is estimated that the complete rig could be built for between \$20 and \$60 which is a fraction of the cost of even the cheapest commercially available transceiver modified for novice use.

The receiver covers the whole of the 80 metre amateur band (not just the novice segment) on CW/AM/SSB, and subject to crystal availability, the transmitter will cover the same range on CW and AM.

The unit, therefore, has a much wider application than its name might suggest. Being moderate in both size and weight, it could be a useful "second string" for portable operation even after obtaining a full call.

### POWER SUPPLIES

A number of people have asked about a power supply for the Novice Transceiver. The supply shown in figure 1 is the one

It might be pointed out that this is only one of many variations of power supplies that can be used to power the transceiver. Voltage doubler type power supplies, bridge rectifier systems and so on can be used equally as well as the unit described.

Some newcomers have asked how they could operate the heater system off 6.3 volts AC. This is simple, wire all valves

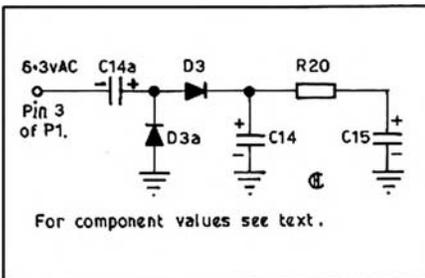


Figure 2

with one end of their heaters to earth and the other end to a 6.3 vac line run around the chassis to each unearthened heater pin. Observe the slight difference in wiring with the 12AH8 If used. The relay supply still needs to be run from 12 volts DC so a voltage doubler needs to be wired to the heater line as shown in figure 2. The component values are as per the list in September 1975 issue of Newcomers Notebook. C14A and D3A are the same as C14 and D3.

**POWER SUPPLY COMPONENT LIST**

- F1 = 1 amp fuse with fuseholder.
- T1 = Old valve type power transformer. 240 volt primary, 285-0-285 volt centre tapped secondary at 100ma, 5 volt 2 amp winding (unused), 2-6.3 volt 2 amp winding wired in series aiding to give 12.6 volts at 2 amps.
- D1 = EM410 silicon power diode. 1000 volt 1 amp diode. Must have a peak inverse voltage rating of at least

3 x 285 volts = 855 volts. Rating of diode is therefore adequate.

- D2 = EM410. As for D1.
- C1 = 16uF 450 volt working electrolytic capacitor.
- C2 = 16uF 450 volt working electrolytic capacitor.
- L1 = 3 to 10 henry 100 ma choke. Old TV type choke ideal, as they have low winding resistance. If the Inductance is lower than 3 henries, the capacitors C1 and C2 can be increased in value, up to about 50uF.
- P1a = Octal socket wired so that transceiver can plug into the power supply.
- R1 & R2 = 2 100k ohm 1 watt resistors wired in series across C2. They are not shown on the circuit diagram. These are used as bleeders to discharge the power supply capacitors when no load is applied to the

power supply. The capacitors usually retain most of their charge for several minutes after the supply is switched off and, therefore, the supply is dangerous to handle. With bleeders fitted the capacitors discharge within 15 to 60 seconds.

Miscellaneous hardware, chassis, wire AC plus, grommets, etc.

**ACKNOWLEDGEMENT**

The assistance of Dick Goslin, VK3N?? in the compilation of this series of articles on the Novice Transceiver, has been of great value. Dick has successfully built the transmitter and receiver as separate entities and not in the form of a transceiver as the author did, by the time that this appears in print, it is hoped that Dick, along with many other patiently (?) waiting would-be Novices who sat for the March examination have their call signs and are making their presence felt on the bands. ■

**COMMERCIAL KINKS**

Ron Fisher, VK3OM  
3 Fairview Ave.,  
Glen Waverley, 3150

This month it's back to the FT101 with a couple of interesting faults that have been sorted out by Roy Hartkopf VK3AOH.

A nasty little fault concerns the shifting of the transmit frequency when the clarifier control is moved. The normal temptation is to tear the set apart looking for a leaky diode or capacitor in the clarifier control circuit. However before doing this, try shorting the ends of the clarifier together simply by joining pins 10 and 11 on the reg and calib unit MJ (6). You may find that as the clarifier is rotated the frequency will still shift. If this happens it will be because the varicap diode D1 in the VFO Osc is generating a voltage by rectification, because the RF applied to it is greater than the static voltage from the clarifier.

The cure is either to raise the static voltage or lower the RF applied to the varicap, or both.

The information in two different FT101 handbooks is wildly conflicting, and I suggest that since the clarifier is fed from a 6 volt line, the rectified voltage at the point where the clarifier line enters the VFO OSC unit (measured with a VTVM with the clarifier leads disconnected) should be about 3 to 4 volts maximum. If necessary select a capacitor, C4 in the VFO OSC unit to give this. Then make sure the clarifier static voltage is high enough to prevent rectification taking place. The most likely cause of this fault would seem either to be a manufacturing fault or an increase in the value of capacitor C4.

The next one is not really a fault but an odd effect caused by a popular modification to the FT101.

'One way of stopping the fan from running on receive with AC operation (heaters

off) is to use the second pair of contacts (S5b) on the heater switch and permanently short the connection from the emitter of the side tone oscillator to the mode switch. This has the bonus that one can practice CW using the sidetone with the heaters off; but if one uses the transceiver on 12 volt DC operation and sets the mode switch to the CW position with the heater switch off there will be a continuous side tone. This is because the only thing that prevents the sidetone oscillator from working is the negative bias applied from the regulator past the key through pin 10 of the AF board to the base of the sidetone oscillator. On DC receive only, the transistor power supply of the 101 is not operating and so no negative bias is developed. It is of course up to the individual whether or not the original modification is worth while or not, but don't tear the set apart looking for a 'fault' when this occurs.'

**COMMERCIAL INTEREST**

Readers of this column may have noticed a small advertisement in 'AR' recently announcing the new G3LLL RF clipper designed for the FT200. Eric Colyer VK2BEL who is the local agent for the G3LLL clippers was kind enough to send me a copy of the installation instructions for the new unit. The actual work is a little more involved than connecting the unit to the FT 101 (see AR January 76) but not beyond the average amateur with a spare afternoon. Included in the installation notes is a concise method of setting up the AGC system of the 200.

It is hoped that a unit might be made available for review in the near future. ■

**BOOK REVIEW**

**THE RADIO AMATEURS' HANDBOOK, 53rd EDITION — PUBLISHED BY THE ARRL**  
Over 4½ million copies have been sold since first published in 1925. This latest edition has several new features, keeping up with the state of the art. Some chapters have been rewritten and among these are those relating to wave propagation, SSB transmitter testing and station assembly. There are also many amendments to other areas and several new constructional projects.

Some of these are: the inclusion of a general purpose 9-12 volt variable power supply with a continuous load of 2 amps, and incorporating current limiting.

A solid state digital readout amateur band receiver covering 1.8 to 28 MHz in 500 kHz steps is given much attention.

New VHF and UHF receiving techniques have also been included. New features on an audio oscillator with selectable frequency range, filters for TV harmonics, a two tone audio generator for SSB testing and a 7 MHz mini beam, appear for the first time.

The ARRL Handbook continues to progress, and caters for beginners and experienced amateurs alike. — VK3UV. ■

**Trade Review**

The combination of THETAGRID and special transfers is a system for producing 1 off PCB's without the mess that etch resistant paints and inks can cause. Also, if, like me, your hand tends to wobble when drawing lines, then Thetagrid is the way out.

The THETA company have taken PCB laminate and covered it with a grid of 0.1 x 0.1 square inches. On to this one can stick etch resist transfers of full size foil patterns for ICs and transistors etc.

The required foil pattern is laid out directly on the board to be etched using the Thetagrid grid lines for alignment. The transfers are pressed firmly onto the board and smoothed to remove any slight wrinkles or bubbles that may occur by rubbing over the carrier sheet with a pencil. Although not supplied in the sample received, tapes for straight and bent conductor runs are apparently available.

It is possible to use some brands of the layup tape designed for making PCB photographic masters as a resist for direct etching, however the etch fluid tends to attack some of the adhesives and this can lead to etching away of the board tracks.

The grid pattern is removed from the board by the etching solution. It does not affect soldering.

The results of tests were quite satisfactory.

\*Further data obtainable from THETA, P.O. Box 10, MARTOCK, SOMERSET TA 12 6 LT ENGLAND.

VK3AFW ■

# MAGAZINE INDEX

Syd Clark, VK3ASC

QST April 1978

One KW — Solid State Style, Part 1; Learning the Work with Integrated Circuits; An ITV Cure for 6 Metres; Propagation — Past and Prospects; 360 deg. Steerable Vertical Phased Arrays; How to Use Zener Diodes; CW Super Selectivity; The Guatemalan Earthquakes — February 1978; How Much Does Gasoline Cost in Brazil.

RADIO COMMUNICATION June 1978

Audio Operated Squelch; Learning About Logic; Datong Frequency Agile Audio Filter.

SHORTWAVE MAGAZINE March 1978

marine VHF for Yachts; HF Band Converter.

April 1978

About Slow-Scan Television; Switching Applications of the Transistor; About HMS Mercury — The Royal Naval Amateur Radio Society; Mini-Rhombic Layout; Lecher Line System; S-Meter for the R1475.

# VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP

Forreston, 5233

## AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.800
	VK4RTT, Mt. Mowbruan	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RT, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RMT, Launceston	52.400
	VK7RTX, Devonport	144.800
	VK7RTW, Lonah*	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hut	28.170
	ZL2VHF, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHF, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

\*Denotes new station.

On the beacon question, the boys in Tasmania will be pleased to know I have received a letter from John, VK4VK, in Sorrento, Queensland, indicating he heard VK7RRN, the new Launceston beacon on 52.400 on 9/6/76 at 0530Z at S5 for about 30 minutes. No VK7 operators were heard however. And so mid-winter DX pops up occasionally. I note also that John works 144 MHz SSB from time to time, so that's another we can add to the potential VK4 list of 2 metre SSB operators.

A letter comes from Winston VK7EM advising of the operation of a newly installed beacon with the call sign VK7RTW on 432.475 MHz from 31/5/76. Power output is approximately 20 watts into a bi-directional antenna orientated roughly NW to SE, with 800 Hz FSK ident. The beacon is operated by the North Western Branch of VK7 and Winston is responsible for its operation. So that is really good news and should be of interest to many.

George VK4GS has written an interesting letter with news of happenings in the Northern part of Queensland up to 16/6. He reports not many 6 metre openings to JA this year so far, and a few winter DX contacts to southern VK States. Ross VK4RO in Ayr, Joe VK4JH, Bob VK4RQ and Bill VK4ABG all in Townsville, Mario VK4MS in Ingham, and Graham P29DJ near Pt. Moresby are the present 6 metre stalwarts at present, with himself on occasionally. George also mentions that apart from himself, all the above plus several more in Townsville and Cairns have 144 MHz capability and keep an ear open for signals. Looks like my bit of talking when I visited Northern VK4 last year convinced some of you guys of the potential of 144 MHz, and it is pleasing to know so many are willing to try. Long distance contacts, and I mean really long distance will not come easily, but when conditions are right there will be the usual 400, 500 mile paths, with Es conditions giving 1000 miles and more. It is a matter of being patient and keeping the gear in good order by regularly using it for 100 to 200 mile contacts.

George also mentions VK4RO, VK4JH and VK4MS have 432 MHz SSB equipment and are all in the process of constructing helical antennae. It appears also that P29DJ is interested in the same band. Again this information will be noted with interest by those stations south of you, and we may yet see the day when contacts are possible between VK4 and other areas of VK. The fact that amateurs are prepared to have gear on bands which may only provide the occasional contact is something truly in the greatest of ham spirit, and I commend you all.

In addition to the above, George VK4GS sends a letter he received from Hatsuio JA1VOK in Japan, and the interesting parts to our readers is condensed herewith. Local QRM is very bad in Japan during the peak periods of Es openings. AG6JDX worked several times in April. VS6BE in Hong Kong worked 0500Z on 9/5 and on 11/5 worked 4 different times. The only beacon in Japan is the one we have listed, JDIYAA.

Japanese operators on 6 metres work CW between 50.050 and 50.100, SSB 50.100 to 50.250, AM 50.250 to 50.800, FM 50.850 to 52.000. On 2 metres, they operate CW 144.070 to 144.100, SSB 144.100 to 144.300, and FM 144.320 to 146.000.

Hatsuio operates between 144.050 and 144.300 with CW or SSB using an 8 element yagi 19m high with a 500 watt transmitter. He proposes upgrading his antenna performance. Present polarisation is horizontal. He is very anxious to contact VK stations on 144 MHz and looks particularly to VK6 and VK8 operators, and now probably VK4 with the increased 2 metre capability in the northern area. Propagation tests are apparently being carried out around 102 MHz and indicate March and September to be the best months. If any aspiring 144 MHz stations with suitable antennae and power capabilities would like to try for such TEP contacts, why not write to JA1VOK, Hatsuio Yoshida, 1453-5 Kanasugi, Funabashi — City, Chiba 273, Japan, the results might be worthwhile.

From the pages of "Forward Bias" of the A.C.T. Division comes news that Bill VK1BH is now operational on 432 MHz using a 12 element beam. Also it was noted that the editor VK1ZME recently managed to transmit a TV test pattern at good strength across the length of his shack on 428 MHz. Good work Martin, but try opening the door next time and you could go a lot further.

Another note mentions the return to the bands of Tony VK1VE who is now operational on 2 metres using a multi-mode transceiver and has been worked on the FM channels so far. For those of you who don't know, Tony was injured in an explosion which cost him his eyesight and the use of both his arms. His HF operation in the past was done mainly using VOX and a footswitch. Tony operates the controls of his equipment with his toes. And the paragraph concludes . . . "Welcome to VHF Tony, you will find a friendly group of amateurs here". And I might add it is great

to hear how someone like Tony can overcome such serious disabilities, and it speaks much for that true amateur spirit, and I am sure we all commend his fortitude.

## E.M.E. REPORT

As usual, from the pages of "The Propogator" some news to keep you informed on E.M.E. operation of VK2AMW at Dapto. It reads:

"Water leakage into a coaxial fitting of the transmitter RF output cable prevented operation during the U.S.A. window period of the monthly E.M.E. tests on 8/5. Signals were heard from JA1VDV while the cable was being dried out, but none from our scheduled stations in U.S.A.

"The European window test period later in the evening also resulted in no scheduled stations being heard although our echoes were up to 11 dB over noise.

"A special E.M.E. test was arranged by the Stanford Research Institute (WA6LET) Group for 23/5/76. Moonrise at VK2AMW during this test was 0218 EST on 24/6. Charlie VK2ZEN made all the necessary preparations over several days prior to the test and had the equipment operating some minutes prior to moonrise. Signals were not heard until the moon came up but it was subsequently found that the high power test scheduled for this time had not taken place.

"Signals were peaking to 20 dB over noise and averaged 15-16 dB. WA6LET was heard in contact with W3CCX, W7B8T, VK3ATN, JA9BOH and W9WCD during the test period. Some time was required to calibrate our system against the WA6LET signal level in preparation for the anticipated high power tests starting at 1800Z (0400EST) but they did not take place. However, WA6LET carried out the scheduled reduced power test shortly after this time and their signals were copied down to their lowest level even though they were using 3.6 kHz IF passband at the time. Another calibration run was then carried out on our receiving system.

"No attempt was made to transmit to WA6LET or any other station as they had indicated that this test was aimed at them working stations they had not worked before, plus obtaining information from their special high power tests. Charlie's time was fully taken up with calibration checks etc. Club member Ken Grimm helped out by operating the chart recorder, entering information on the chart record, etc. Bruce Proctor also assisted again during this test, which was in the wee small hours of the morning. Bruce has become an excellent second operator at Dapto and is quite an expert at dish pointing, information logging, assisting with signal checks etc. Keith VK2ZYI loaned a good quality stereo tape recorder for this special test to facilitate correlation of comments with signals on the tape".

I am sorry to note also that Lyle VK2ALU, the pioneer of Dapto E.M.E. operation, is still not able to get about for such tests due to a back injury, but I guess he still lends a hand with moral support and advice.

Also of interest is the fact that the operators at VK2AMW can hear their own echoes up to 10 dB above noise. Two way contacts have been made with stations in U.S.A., Canada, England, France, Italy and Japan and stations heard in Holland and Rhodesia. VK2AMW and G3LTF in England have successfully exchanged signals over the longest point to point distance currently obtained on the 70 cm amateur band, being 16955 km or 10535 miles. Good work chaps!

These notes have been prepared in a motel room at Lockhart N.S.W. whilst on a holiday run to visit Lyle VK2ALU and to have a look at the VK2AMW E.M.E. installation. Included on the agenda are a visit to Ray VK3ATN and Ron VK3AKC, who also have E.M.E. equipment. So in an effort not to disappoint all my good readers, the necessary information had to be brought with me in the car and prepared in this room. So if anyone wrote to me towards the end of June it is likely your news would not be included as I left before the end of June. If it is still current news, it will be included next month.

So at this point there isn't much left to report, except to say I noticed a little par in the VK7 QRM which reads: "Definition: Of a half wave. A greeting to someone you don't really like". So on the strength of that I will conclude with the thought for the month which I also brought with me: "People with an axe to grind often fly off the handle".

The Voice in the Hills. ■

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*they're heard when others aren't*

- **HIGH GAIN ANTENNAS IN KIT FORM**
  - (1) All parts except elements and booms.
  - (2) All parts except booms.
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- 52-54 MHz available shortly.
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2-way and 4-way power dividers and couplers:
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  - 420-470 MHz
- Tubing, Lowloss coax., connectors, etc.



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  - 420-450 MHz — 5 Models including 2 linears.
  - 52-54 MHz available shortly.



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# TELEGRAPHY SYSTEMS

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**SK-2** Twin Paddle Squeeze Keyer. Built-in paddle, fully adjustable gaps & tension, CMOS circuit. Solid state output, switches up to  $\pm 300v$  at 0.1A, polarity selectable, reverse polarity protected. Selectable Autospace or non-Autospace (Keyed Clock.) Speed 8-50 WPM. Sidetone. Ultra-low power consumption gives long battery life. In attractive moulded plastic case. 185x120x60mm. Last-pressed mode for ease of operation. **\$50**  
As above with rechargeable batteries and charger **\$65**

**MSK-2** Keyer circuit as in SK-2, but without built-in paddle and with addition of two independent 1024 bit memories (approx 85 characters each) which can be programmed and re-programmed through the keyer at any time and replayed when required. Built-in rechargeable battery gives non-volatile power-down memory holding capability of at least 120 hours, and permits portable operation. Easy to operate. Complete with charger **\$85**  
Twin-lever paddle for above keyer (as used in SK-2, but with base, cover and lead.) **\$15**

## ATT-SERIES

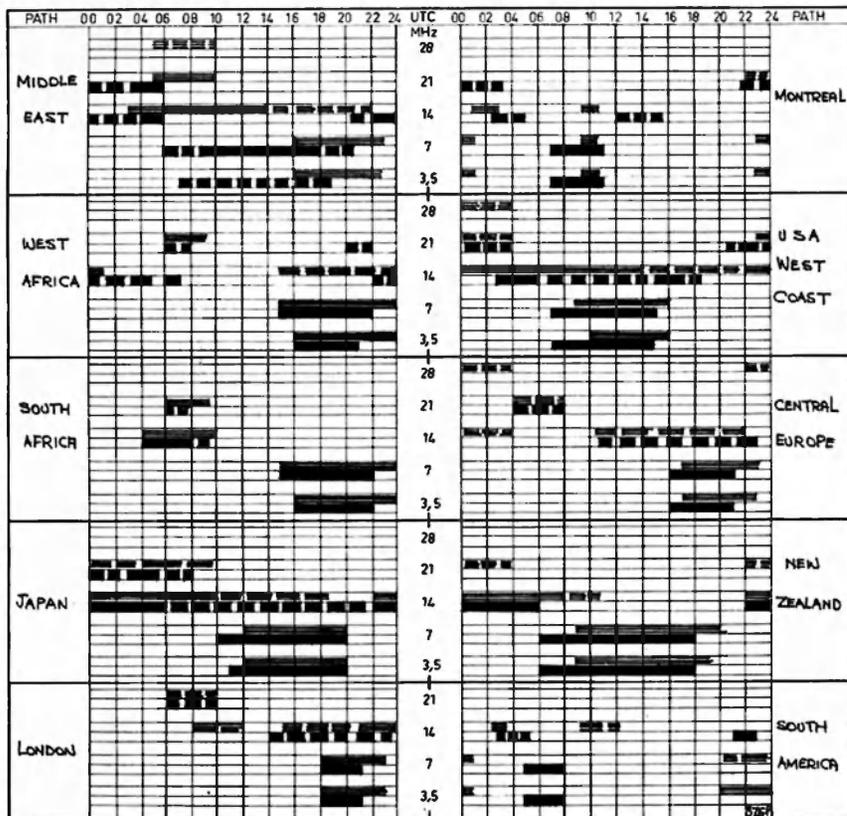
We also manufacture a range of automatic transmitters, standard range from 256 to 4096 bits in case 185x120x60mm, for Morse or Teleprinter operation. Outputs key up to  $\pm 300v$  or Telegraph line as required. Designed for Station Identification, Beacons, Emergency Transmissions, Line Testing etc. Variable speed and repetition rate provided. Details sent on request.

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# IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP



### CHART LEGEND

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SOLID LINES/BARS: BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.

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OTHER DATA: WWV/H DAILY AT HOUR PLUS 14, 18, 45 MINUTES.

# IARU NEWS

Encouraging signs are appearing of the formation of an amateur society in Papua New Guinea. Such a society certainly would be invaluable to the IARU quite apart from any other services it might be enabled to perform on behalf of the members.

PNG is a member of the ITU and therefore possesses one vote at ITU Conferences — especially WARC 79. Readers will be aware of the tremendous efforts being made to establish a favourable attitude to amateur radio in administrations of ITU member countries where amateurs are few or non-existent. This has particular reference to the "Third World" countries where each possesses that one vital vote.

In Region 3 there are 27 countries that are members of the ITU each with one vote; as always, 9 of these countries have amateur radio societies affiliated with the IARU R3 Association. Amateur radio is a banned activity in up to 5 or 6 of the other countries.

Hugh Cassidy, WA6AUD writing in his DX column in CQ April '76 about possible China (BY) activity records that some of the VS6 amateurs feel that the possibilities of some (amateur radio) activity has improved in recent years but that activity probably would come from Chinese nationals within the country (rather than visitors from outside) and operating a station at a technical school or a radio club station.

Reverting again to this important ITU one country one vote rule, it is interesting to observe the representation of the small Region 3 ITU member countries compared with the larger countries.

The five largest area or population countries (China, Japan, India, Indonesia and Australia) cover nearly 23 million square kms with a total population exceeding 1,500,000,000.

Fiji covers 18,000 sq. km, population 535,000. Nauru covers 2 sq. km, pop. 6700. Tongas 700 sq. km, pop. 77,000.

One would be forgiven for believing that perhaps one day other criteria could apply. ■

# HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

### FOR SALE

Collins 62S1 Converter 6 and 2 m spare final tube with external power supply to suit, \$270. American speech processor for Drake TR3 or TR4, as new, \$15. G. C. Ramsay VK5GD, 15 Eliza St., Adelaide, S.A., 5000. Ph. (08) 51 9497.

3 Mono Band Yagi Beams 10, 15, 20, \$100. Purchaser to dismantle off windmill tower. VK3BW, Portarlington. Ph. (052) 59 2322.

Ken KP202 Transceiver with nicads and charger, Chs. 1, 2, 3, 4, 40, 50, \$150. David Farquharson VK1ZDF, P.O. Box E338, Canberra, ACT. Ph. (062) 63 3166 Bus.

FR100B Receiver, FLDX400 Transmitter, interconnecting wiring harness, YD844 microphone, best offer will take, Eddystone EC10 general coverage Rx all transistor, \$140. FT75B Transceiver, FP75B power supply, FV50C VFO, 2 spare 12BYG7 tubes for final, \$320. VK4LK, V. Kerr, Box 237 Charleville, Qld., 4470.

Barlow-Wadley XCR-30, mark 2, as new, all accessories, \$170, also AR7 including 10 metre coil box and circuits, \$25. W. R. Gronow, VK3WG, Ph. (03) 56 7231 daytime.

Frequency Meter 200 MHz, \$150. Petrol driven generator, 12 volt, 30 amp with battery start, ideal for field days, \$90. VK3AFQ, QTHR. Ph. (03) 96 2414.

# 20 YEARS AGO

Ron Fisher, VK3OM

Looking through the August 1956 issue of Amateur Radio, I noticed William Willis advertising the Gorier Coll Turrets. I wonder if a few are still tucked under the bench waiting to go into that receiver to end all receivers. They were quite a massive device, and as far as I can remember one of the very few turrets for all band coverage ever released as a separate unit. Those all band Russian transistor radios available today on the local market are about the nearest approach to the Gorier turrets that I have seen.

The Broadcasting Control Board recommendations for TV receiver IF frequencies were published in full along with the reasons for their choice. The three ranges considered were 20 to 30, 30 to 40 and 40 to 50 MHz, with the final recommendation being of course 30 to 40 MHz.

Technical articles for August included Don Haberecht's massive 20-15-10-5 and 2 metre beam. The 20 to 5 metre section was a WBJK with a 24 element phased array on top for 2 metres. If you

happen to be one of the younger fellows, the WBJK is two element beam with both elements fed in phase. As in this case, they could be fed with tuned feeders to achieve multi band operation. The WBJK was originally developed about 1937 by John Krause. C. W. Mann VK5DF described his phone and CW monitor, and J. G. Oliver VK7JO showed how to set up an index system while Jim Lloyd VK3AST provided a few hints and kinks.

Australia and the International Geophysical Year. Professor H. C. Webster explained the aims behind the event and how amateurs could help with observations of propagation especially in the 50 to 60 MHz region. ■

# QSP

### STATISTICS AGAIN

FCC in the USA received 11458 amateur applications during February of this year and at the end of that month 263,896 amateur operator's licences were extant. Novice licences were 24,154, Technical 51,664, Conditional 25,633, General 80,313, Advanced 67,636 and Extra 14,496. June '76 QST.

## HAMADS—(cont.)—For Sale

52-144 MHz Transverter, see page 5 of March '76 AR. \$50, includes PCB, crystal, diacast box fuses, panel meter, BNC con. and IGL receive conv. unit working OK. N. Cooper VK4ZNC, 5 Cahill St., Strathpine, Qld., 4500 Ph. (07) 205 2121.

Teletype Model 15 with keyboard, \$70. Marconi Mk 4 IO. Television camera with lenses etc., complete and working \$200 o.n.o. VK2ZPM, QTHR. Ph. (02) 476 2304

6m Belcom Liner SSB-AM, \$210; 2m Belcom Liner SSB, CW, 144-146 MHz, \$240; both as new, all access. 4 6KD6 valves, new \$5 each; 2 6883B (12V 6146B) valves, new \$4 each; National NCX3 80-40-20 transceiver complete, V.G. order \$130; 2 BLY90 new \$15 each; 2 BLY88A new \$10 each; 6/40 sockets new \$2 each; TH6DXX antenna with balun, V.G. order \$110; STC 2m 50W FM transistorised PA, brand new \$50. Buyers pay freight. VK7NR, QTHR. Ph. (003) 27 2928.

No. 62 Set Transceiver, 1.6-10 MHz; TR1936 Transceiver, 110-150 MHz; both with circuit diagrams, ideal wrecking or restoration, any offers? P. Hamilton, 10 Highmoor Ave., Bayswater, Vic., 3153. Ph. (03) 729 2504.

Multi 7 2 Mx FM Transceiver with repeaters and anti repeaters 2, 4, 6, 8 (new plan), Simplex 40, 43 (R3 input), 50, 51, 65, mobile mount mic, cable, exc. cond., \$185. Microphone compressor — Katsumi MC22S, compression level meter, Hi/Lo imp. input, 2 tone oscillator, runs on 9V transistor radio battery, fair cond., work well, \$20. Linear Amplifier, 2 x 813, covers 80, 40, 20, 15 Mx with provision for extra band, hefty PSU (v/heavy), RF unit compact table top type, 2 spare tubes, works very well, needs tidying up, buyer to collect, \$175 o.n.o. B Bathols VK3UV, QTHR. Ph. (03) 90 6424 (evenings only).

Ken KP202 hand held chs. 40, 50, repeaters 1, 2, 3, 4 (now called 2, 4, 6, 8) nicad batteries, A and R charger fitted with meter and LED, helical and whip antennas, orig. handbook and pkg., 8 watt O/P diode switched power amp for mobile use, \$160 the lot. Oscilloscope Heathkit 012U 5 inch, 5 MHz AC input only, with handbook and probe, \$60. Ted VK3XT, QTHR. Ph. (03) 560 5051.

RCA AR88D Communications Receiver 0.5-32 MHz continuous, 2 x RF stages, 5 x IF. Xtal filter, variable selectivity. Recently overhauled and aligned to original spec. Plus set of spare tubes, instruction manual and speaker. Still one of the world's best Rx. High stability, suitable RTTY, \$160 o.n.o. VK3ZA, QTHR. Ph. (03) 67 6415 bus., (03) 787 1325 home.

Carphone MR3B, 2m, Ch. 40 (B), solid state PSU, new final, handbook, \$30. VK2YCS, QTHR. Ph. (02) 44 3141.

TCA 1677 Transceiver, complete with mic. and xtl's, good clean condition on 6m FM 52 525 MHz, \$50. 4 switching boxes to suit 1677, \$10 the pair; car cradle for above \$3. VK3ACM, QTHR. Ph. (057) 68 2260 A.H.

My-Gain 2m 5/8 Mobile Whip, magnetic base, excellent performer, \$27 (cost \$41). VK3LJ, QTHR.

Icom IC22A, 3 months old, rep. 2, 4, 7, 8 and simp. 40, 50, 51 and 53, \$170; Yaesu FLDX400 Tx, good cond., etc., \$200 Reg VK3KK, QTHR. Ph. (03) 46 4200 A.H., (03) 652 8489 (bus.).

Yaesu FT101E Transceiver as new, only 6 mths. old, \$590. Also FTDX100 Transceiver, perfect, just expertly overhauled \$350. VK2APP, QTHR. Ph. (063) 83 6206.

432 MHz Base Unit, \$100; FTV650, \$120; RTTY tape punches, \$10 ea. TV typewriter boards, \$20 for set. VK3BOB, QTHR. Ph. (03) 58 7441.

Yaesu FTDX560 incl. 160 m. \$375; Hallicrafters S27 Rx 27-144 MHz, \$50; Geloso G207 Rx 80-11 and 10 m, \$40; RCA BC348-0 Rx 455 kHz IF, prod. det., \$50; TCA 1677 2m Chs. R1, R4, R6, 40, 25W, \$95; AWA MR3A 2m Chs. R6, 40, A, 10W, \$35; H/B Transverter 6m 6/40 PA, \$45. VK2ADY, QTHR. Ph. (067) 65 8664.

Transverter — 8 metres, suits all Yaesu Musen transceivers, 60W PEP out, 40. VK3ATQ, QTHR. Ph. (03) 707 2110.

Yaesu FT101B Transceiver with dummy load, SWR meter, very little used, exc. cond., \$500; Webster Bandspringer with base, \$25 or offers; CRO 5" home brew, wkg. order, \$35. Deceased's effects. Offers to Mrs. Winton, 33 Somerset St., Wantirna Sth., 3152. Ph. (03) 231 2664.

### WANTED

9 MHz Filter and carrier xtl's to suit Plessey transceiver, published in E-Aust. Aug. '74 (FT200 filter xtl's would do). Also the Plessey SL600 series ICs for the circuit. VK3ZR, Ph. (03) 89 4645 A.H.

Galaxy V Transceiver and external VFO, calibrator etc. VK3FI, QTHR. Ph. (058) 21 2705.

Amateur Radio, April 1973 copy — to buy. R. Lenthall, Ridley College, Parkville, 3052. Ph. (03) 380 9801.

Linear Amplifier — FL2100B or Heathkit 220 or similar, compact table top type. Price and details to B. Bathols VK3UV, QTHR. Ph. (03) 90 6424 (evenings only).

Signal Generator 2-500 MHz if possible (lower frequency range considered). T. R. Naughton, Box 80, Birchip, 3483.

Wireless World as listed 1967, 1968 Jan., Feb., 1969 April, 1970 Nov., 1971 April, 1972 August, reasonable price paid single or lot. VK5PI, QTHR. Ph. (08) 264 2061 A.H.; (08) 337 7000 bus.

Yaesu FT200 Transceiver with AC power supply, mike, handbooks, etc., must be in perfect condition, particulars to VK2AJM, 9 Summit Rd., Terrigal, NSW, 2260. Ph. (043) 84 3186.

Swan Sun Band Pass 144 MHz Yagi antenna hardware, mounting insulators (blue) etc. Your antenna building failure is worth top cash for FB parts. Quantity and price to VK2ZNW, Box 1117, Orange, 2800.

## SILENT KEYS

It is with deep regret that we record the passing of —

Mr. L. A. T. POWERS VK2EP  
(formerly VK3APS)  
Mr. R. A. HOLT VK2HW  
Mr. H. I. SHIRLEY VK3AQJ  
(formerly VK3ZOO)  
Mr. W. G. BIGGS VK3ZBZ  
Mr. F. H. BULL VK2AJM  
Mr. C. J. WILKINS VK2ALB  
Mr. E. G. CLARE VK2ALL  
Mr. NORM TYAS VK4TY  
Mr. BILL FABER VK4WF  
Mr. MAXWELL JOHN SWABY VK4DA

Max obtained his Amateur Licence in Victoria at the age of 16 years and was active on the Ham Bands right up to his untimely death on 28th June this year, at his home near Dalby, at the age of 57.

During World War Two Max rose to the rank of Squadron Leader, RAAF, and soon after his discharge moved to Dalby where he ultimately became the largest Radio and Electrical business in the town; but eventually sold out to take over a large grain-growing property on the Condamine River.

However, manual labour was ruled out when Max developed a heart condition, and not being the idle type, founded a two-way radio business which flourished and gave him much pleasure. Max will be sadly missed by his numerous friends who offer their deepest sympathy to his wife, son, daughter-in-law and grandchildren. — VK4RF.

## G3LLL's RF CLIPPER

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FT101 SERIES TRANSCEIVERS  
Also soon available for FT200

The RF Speech Processor that really works! Reports on "transmit" regularly state — "like switching on a linear"! There is, in addition, a bonus gain of 2 "S" points on "receive", with improved selectivity. Particularly effective when used mobile, and when use of a linear amplifier is impracticable. Tested units available ex stock at \$80 including tax, from the Australian Agent.

ERIC COLYER, VK2BEL, P.O. Box 131, Pymble 2073  
Telephone (02) 449 4324

## OBITUARY — JOHN BATTRICK VK3OR

It is hard to know where to start to write about John Battrick — he did so many things. He was first licensed as VK3AKJ later as VK3OR. He became interested in amateur radio in the early 1950s when as a teacher posted to Yarram he met another amateur who was also a teacher — Peter Williams VK3IZ. Six months later he had his licence. By the end of the 1950s both Peter and John were again living in Melbourne and both became interested in Institute affairs. In the following years John became a member of the Council of the Victorian Division and was its President from 1983 to 1985, from 1987 to 1988 he was Federal Secretary and from 1988 to 1989 he was Federal President. He became the WIA Director of the IARU Region 3 Association from its formation in 1968 with Peter Williams as its Secretary. He held that position until the framework of the organisation was formalised at the Tokyo Conference in 1971.

In most of these activities he was working with his friend Peter Williams and always encouraged by his wife Gwyn.

These were only some of the Institute activities with which he was concerned. At different times he was Victorian Division Disposal Secretary, Federal Oscar Co-ordinator and Victorian Division Wicen Co-ordinator — the latter was an activity in which he was always interested and always tried to find time to become involved.

John's tremendous enthusiasm and determination to get the job done characterised everything he did. Despite the impressive list of positions that he held, I think that his most important contribution in the long term was the vision that he shared with Peter Williams of the need for a regional amateur organisation. Both he and Peter were at the time members of the Federal Executive and together they were the catalyst that ultimately led to the inaugural meeting in Sydney that in turn led to the formation and development of the Region 3 organisation as it is today. This is not of course to underestimate his influence and contribution to the Institute in other areas. He was particularly involved in the many years of discussion that ultimately led to the adoption of the present Federal Constitution that has led so rapidly to the new importance of the Federal body. At the Federal Convention in Melbourne in May this year the Federal Council resolved to recognise his contribution to amateur radio by recommending his election as a Life Member.

John passed away on 21st May 1978, aged 47 years.

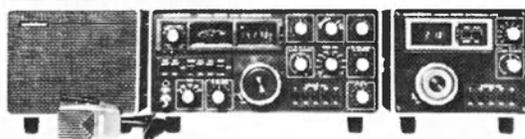
VK3KI



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The fabulous Uniden 2020 phase-locked-loop transceiver offers separate usb/lsw/cw 8-pole crystal filters as standard and 6146B's in the final with screen voltage stabilisation for minimum distortion products. Features plug-in pcb's and even the front panel can be swung out for easy servicing. A full spares catalogue is available together with change-over pcb's. Compare the Uniden 2020 with other HF transceivers and you'll be quickly convinced that it offers the best value! The price \$570 includes mic, cables, plugs, English manual and VICOM 90-day warranty! But don't get caught - VICOM is the only factory-authorised dealer for Australasia.



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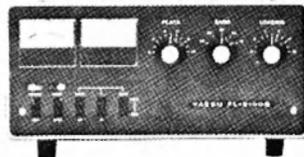
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**AL24DXN** trap dipole 20-40m

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## ANTENNA COUPLERS

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2 METRE 160-10M TRANSCEIVER

- Coverage 141-145MHz, 744.0 - 145.2 145.7 - 145.9 (crystals provided)
- Provision for other crystals (200kHz per crystal)
- VFO operation using 200kHz with excellent stability
- pep output 3 watts
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**IC22A SPECIAL OFFER.** This superb mobile rig with solid-state T/R relay, PA protection, 5 helical resonators and proven trouble-free performance is now available at \$177 including 3 channels or \$198 including 6 channels from the Bandplan. All rigs come complete with mic, brackets, cables, English Manual and 12 months warranty.

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- Desk Mic** IC5M2 \$34

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transceiver.



TS-820  
H.F.  
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VOL. 44, No. 9

SEPTEMBER 1976

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### COVER PHOTO

A ground view of the antennae (circled) at 90 ft. and 232 ft. levels for the new Southern Tasmania Repeater installation VK7RHT, located near Hobart.

(See story on page 10)



# RADIO SUPPLIERS

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Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

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### 27 MHz Transceiver

Suitable for Novice Amateurs

5 W, AM 23 Channel 12V DC operation.

S-meter, squelch, ant. & PA facility.

\$115 P&P \$3

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**YAESU FT101E** 160-10m SSB, AM and CW Transceiver with RF speech processor fitted 240V AC and 12V DC PSU inbuilt. \$670

**KENWOOD TR7200G** 2 metre FM Transceiver, 10 watt and 1 watt operation fitted with crystals for operation on 146.1 and 146.4 repeater channels 12V DC. \$215

**KENWOOD TR2200G** handy 1 watt, 12 channel transceiver for 2 metres FM. Fitted with 4 sets repeater crystals. Inbuilt ni-cad charger. \$180

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**KEN KP202** stubby helical antennas. \$6.50

## 27 MHz (11 METRE) EQUIPMENT

**LAFAYETTE HA310** Walkie Talkies, 1 watt 3 channel fitted with 27.240 crystals. PMG approved. \$135 pair

**LAFAYETTE MICRO 66** 5 watt transceiver, 6 channel operation, fitted with one set crystals. \$139

**LAFAYETTE 27 MHz** fibreglass cowl mount mobile loaded antenna, 36" long, complete with base and coax. \$23.95

**LAFAYETTE 27 MHz** combination AM Radio and 27 MHz loaded antenna complete with splitter harness, cables and plugs. \$28.95

**LAFAYETTE 27 MHz** gutter mount mobile antenna complete with coax cable and PL259 plug. \$22.50

**1/4 WAVE STAINLESS STEEL 27 MHz** mobile antenna with heavy duty spring, base and insulator. \$30

**6 CHANNEL 5 watt AM 27 MHz** mobile transceiver. PMG approved for 27-880 MHz operation with crystals for 27.880. \$101.50

**LAFAYETTE "Range Boost"** 1/2 wave vertical antenna for 27 MHz base station use. \$59

**LAFAYETTE 1/4 wave** ground plane antenna. \$35

**52 OHM COAX CABLE**, 1/4" diameter, 55c metre

**PL259 COAXIAL CABLE PLUGS**, \$1.80 each

**REDUCER** to suit for 1/4" coax. 40c each

**SO239 COAX CHASSIS SOCKETS**, \$1.40 each

## POCKET MULTIMETER SPECIAL



### MODEL C1000M MULTIMETER

Compact, handy and versatile, the C1000M is the ideal low cost pocket meter. Mirror Scale. Specifications: 1,000 Ohm/Volt DC; 1,000 Ohm/Volt AC; DC volts - 10; 50; 250; 1,000; DC amps - 1 mA; 100 mA; Ohms - 150 K $\Omega$ ; Centre scale - 3 K $\Omega$ ; Decibel - 10 dB to 22 dB; Dimensions - 3-1/2" x 2-3/8" x 1-1/8" 90 x 60 x 30 mm.

\$7.95

POST FREE

## MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCEIVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION



### SPECIFICATIONS:

Transistors: 13  
Channel Numbers: 3, 27.24 OMHz  
Transmitter Frequency Tolerance:  $\pm 0.005\%$   
RF Input Power: 1 watt  
Tone Call Frequency: 2000 Hz  
Receiver type: Superheterodyne  
Receiver Sensitivity: 0.7  $\mu$ V at 10 dB S/N  
Selectivity: 45 dB at  $\pm 10$  kHz  
IF Frequency: 455 kHz  
Audio Output: 500 mW to Ext. Speaker Jack  
Power Supply: 8 UM-3 (penlite battery)  
Current Drain: Transmitter 120-122 mA  
Receiver: 20-130 mA.

\$49.50 each or \$95 a pair

Post & Pack \$1.50 per unit

## 11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.155	27.880
27.085	27.165	27.235
27.125	27.225	27.255
27.240	27.910	27.265

\$6.50 A PAIR (Transmit and Receive)

## 2 METRE CRYSTAL SPECIAL

We have purchased a quantity of crystals to suit the KEN KP202 Transceiver and offer them at a special reduced price while they last.

Transmit Crystals	Receiver Crystals
146.10 MHz	146.70 MHz
146.20 MHz	146.80 MHz
146.30 MHz	146.90 MHz
146.40 MHz	147.00 MHz
	146.50 MHz
	146.55 MHz

\$3.50 EACH

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**NEON FLASH TUBES** (ex Repco). Ideal for Ignition timing lights. \$1.50 each - P&P 50c

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**RESISTORS** 100 assorted 1/2 watt carbon resistors, all popular values. \$2 - P&P 50c

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**POLYESTER TUBULAR CAPACITORS** 100 assorted capacitors, all good popular values. \$4 - P&P 50c.

**"PHILIPS" TYPE CONCENTRIC TRIMMER CAPACITORS** 25 pF. 10 for \$2 - P&P 50c.

**XENON FLASH TUBES** suitable for Strobe use. (Sorry, no trigger transformers). \$1.50 ea. P&P 50c.

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**AY6102** Normally \$1.99 ea. 10 for \$5.00 P&P 30c

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**BATTERY HARNESS** to suit 9 volt 216 batteries. 10 for \$1 - P&P 50c.

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# amateur QSP radio

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Copy is required by the third of each month. Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.

The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

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Advertising material should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 25th of the second month preceding publication. Phone: (03) 24 8652.

Hamads should be sent direct to P.O. Box 150, Toorak, Vic., 3142, by the 3rd of the month preceding publication.

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It is impossible for us to ensure that advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly.

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## NZART GOLDEN JUBILEE CONFERENCE

This conference was held in early June at Auckland to celebrate the 50th birthday of the New Zealand Association of Radio Transmitters. The WIA has always had close links with the NZART and I was privileged to be your representative at this event together with representatives of the RSGB and the ARRL and some 700 members, friends and visitors to the conference.

The business of the conference was not any different to that conducted at our conventions, but the highlights were an address by Sir William Pickering from the Space Communications Centre in the U.S.A. who had an early interest in amateur radio in his university days in ZL 66CJ Aerial Circus, the Golden Jubilee Ball and the usual field events such as mobile rallies, aerial measuring contest were all extremely well attended evidenced by the forest of mobile antennae in the large car park. Ladies were well catered for by illustrated talks from June Mulgrew who told of taking women from 16-62 on a Himalayan Trek and VK4HK Harry Kinzbrunner on the Early Days of the Flying Doctor Service. Scenic coach trips were arranged including an expensive one for OMs to a greenstone jewellery factory. This was rounded off by suitable speeches from the PMG and the Director of Radio Services in which details of the Novice Licensing were announced.

The organizers are to be congratulated for an extremely well planned conference which enabled Doug Gorman M.B.E. ZL21Y NZART President to keep the various speakers and events to time. This was assisted by catering arrangements which allowed the large numbers present to obtain refreshment at the various breaks promptly and efficiently in the time allowed. If there was a message to be learned from the various technical speakers, it was that amateur radio of the future would be with digital electronics.

May I, on behalf of myself and XYL, express our thanks to WIA for the opportunity to represent the Institute and to the NZART for their entertainment of us.

Planning for WARC 1979 is going ahead on both sides of the Tasman and we trust that our visit will further strengthen the ties between our two countries in all aspects of Amateur Radio.

73 — KEITH ROGET VK3YQ ■

## EVENTS CALENDAR

(Times are 20.00h local unless otherwise stated)  
(Limited to 3 lines).

### September

- 3 Hunter Branch meeting.
- 8 VK3 General meeting — 412 Brunswick St., Fitzroy.
- 9 Illawarra Branch meeting.
- 10 VK2 VHF Group meeting at WIC.  
VK7 Northern Branch meeting.
- 14 VK7 North-West Branch meeting.
- 15 Sydney fox hunt.
- 17 Blue Mountains Branch meeting.  
VK4 Divisional meeting — QCWA Rooms, Gregory Tce., Spring Hill, 19.30h.  
Central Queensland Branch Meeting, Tech. Coll. (Adult Educ.), Bolsover Lane, Rockhampton, 19.45h.
- 21 VK6 Gen. meeting — Science House, 10 Hooper St., W. Perth.
- 23 Brisbane VHF Group, Oakleigh Scout Den, High St., Dorrington.
- 24 VK2 Divisional meeting — WIC.
- 27 VK1 Divisional meeting — Studio in Griffin Centre.
- 28 VK5 Divisional meeting — WIA HQ, West Thebarton Rd., Thebarton.

### October

- 2/3 24th South West Zone Convention, from 08.00h 2nd Ch. 40 talk-in. Tumut Racecourse, Elm Drive, Tumut. VK2PN, Box 53, Tumut.
- 30/31 VK3 Western Zone Convention, Birchlp.

### November

- 13/14 VK7 Hamfest — Evandale ■

## QSP

### VHF BEACONS

It is noted from RI news of May '76 there were 5 beacons operational in Europe on 28 MHz, 53 on 2m, 23 on 70 cm, 11 in the 1296 MHz band, 3 on 2304 MHz and 2 in the 10 GHz band.

### SATELLITES

According to a table issued with the Telecommunications Journal of April '76 a total of 154 artificial satellites were launched during 1975 by or on behalf of 7 countries from 11 different sites in the world. A significant number carried transmissions around 136-137 MHz.

### VICTORIAN DIVISION DISPOSALS AND COMPONENTS

The Division advises that all correspondence dealing with Disposals and Components (including mail orders) must now go to 412 Brunswick St., Fitzroy, Vic., 3065, instead of the previous Mt. Waverley address.

### ISM AND RFI

May '76 QST advises that the FCC is undertaking a study on the methods most useful or desirable in regulating interference to communications from industrial, scientific and medical devices such as diathermy equipment.

### SCHOLARSHIPS

May '76 QST lists a number of scholarships available to US residents, or restricted areas therein, for further studies in electronics or related sciences (What is available in this field in Australia? — Ed.).

### MORSE CODE EXAM

The Commission (FCC) is planning to begin administration of multiple-choice "message content" telegraphy examinations on a limited, trial basis in the near future at a few FCC examination points. Under this system applicants will listen to a five minute message in the International Morse Code and make whatever notes or copy they wish. Then, they will be given a multiple choice test on the contents of the transmission; 80 per cent will be the passing grade". QST May '76. ■

# WIANEWS

Two Federal Government advertisements in the daily press during July claimed the attention of Executive.

## PENSIONERS

The first invited submissions to the newly appointed Committee on the care of the aged and infirm. The Executive summarised the Institute's case that financial assistance ought to be made available in home, hostels and similar places where a need can be supported for the supply and maintenance of an amateur station, that some reimbursement ought to accrue to the Institute in respect of the lower subscription rates granted to pensioners and the infirm and, finally, that a significant reduction should be made in licence fees for pensioner and disabled amateur radio operators.

Correspondence on the last item has been going on with the Secretary of the Department for some time. In his letter of 31st March the Secretary stated that a submission for reduced licence fees for aged and invalid amateur licensees had been put to the Minister for consideration. A reminder was sent off on this during June.

## GOVERNMENT EFFICIENCY

The next advertisement invited correspondence to suggest greater efficiency in Government expenditure. This was to an expenditure committee of the House of Representatives Standing Committee on Expenditure.

The Institute submitted a lengthy document dealing with the manner in which some of the systems operated by the Radio Frequency Management Division require overhaul and up-dating. Acknowledgement was given that in all our dealings with officers of the Division, we receive the utmost consideration and assistance, but it would appear that staff shortages and economies have created the situation where time cannot be given to considering improvements to systems and procedures.

The area given the most attention was examinations in all its many facets. The Institute has previously suggested ways and means for responsible amateurs to be able to assist with examinations, particularly, as an example, in the invigilation of Novice exams. But it is believed the assistance of the Institute ought to go much further. In addition, the format and frequency of the exams needs examination as well as the exemptions, alternatives, syllabuses, frequency, centres and concessions. All these and more were dealt with in considerable detail as illustrating the greater efficiency which ought to be achievable with modern systems.

But, the question must arise whether the Division is really the best organisation to conduct examinations or whether it would be better if these could be taken over by a properly qualified educational institution.

The Institute had something to say about licensing documentation, especially that which affects the call book, and about the need for some de-regulation of the amateur service.

## OUTSTANDINGS

A further back-up was the preparation and submission to the Division of a consolidated list of outstandings which have accumulated over a considerable period of time. The list repeats all the points made about examinations and then sets out a wide range of other outstandings (including the 1976 Convention arising) on repeaters, interference, frequencies and many others.

Yet another lengthy submission was made to the Division in response to negotiations on repeater conditions which had been discussed with them back in February/March of this year.

## 70 cm REPEATERS

Two other letters went to the Division from the Executive. One was the long awaited finality on 70 cm repeater frequencies, since it had not been possible to include this information at the time when the 70 cm WIA band plan for 430-440 MHz (required by them) was submitted last December.

## WICEN

The second, drafted by the Federal WICEN Co-ordinator, Brig. Rex Roseblade, VK1QJ, sought clarification and flexibility in re-

lation to official WICEN communications relative to the existing paragraph 94 of the Handbook. This derived from discussions in the recent national Seminar at Mt. Macedon attended by VK1QJ and other official emergency services as well as a representative of the Radio Frequency Management Division.

## SUBSCRIPTION NOTICES

The Executive meeting late in July also finalised the reprint now due of the annual subscriptions notice stationery, and in view of Divisional opinions decided to revert to the earlier practice of a subscriptions notice followed at a later date by a Final Notice. Note was taken of the circulars sent out by several Divisions (VK2, 4, 5 and 6) this year to members still unfinancial beyond the automatic cut-off dates for stopping AR address labels to these people. The costs and time involved are not inconsiderable — some of the reasons given for earlier omissions to pay were interesting.

## RADIO CLUBS MEETING

The VK6 Divisional Council had approved VK6DY to be the new Chairman of the AARTG and this was confirmed by the Executive. One of the most interesting documents studied was the Minutes of the VK4 Radio Clubs Workshop held in Brisbane during June. Representatives and observers attended in Brisbane from 14 clubs throughout Queensland and N. NSW (Summerland) as far afield as Cairns and Townsville. The venue was the Windsor YMCA rooms, delegates were billeted and some savings were effected by bringing in "take away" food for the two main meals. Even if the cost came to about \$600 the bulk of which was of country return air fares for the delegates. The meetings were chaired by Divisional Council officers and attended by other members of the Divisional Council including the Federal Councillor, VK4NP, more or less fresh from the 1976 Federal Convention in Melbourne.

The objects of the meeting were set down as the exchange of ideas on the amateur service and club activity, the assessment of the needs of amateurs within the Division, the co-ordination of various matters common to all groups, and the establishment of common aims on which future planning could be based. The Agenda covered a wide range of subjects including Federal Executive finances, costs of AR, Divisional finances, Federal Executive activities, education and training, the "Arnold" Report, licensing and bandplans for repeaters and beacons, the international scene and WARC 79, Intruder Watch, recruitment planning, WICEN, public relations, Divisional services, interest in contests, club activities and relationships with the Division and so on.

Many of the delegates said they had prior reservations about a meeting of this kind, but at the end of it were convinced that it was fully justified and very successful. They hoped that these meetings could henceforward be held each year or biennially, preferably just prior to the annual Federal Convention.

## VK4 VISIT

Also finalised during July were details of the Federal Presidents official visit to various Queensland centres late in August. He is scheduled to address meetings in Brisbane, Rockhampton, Mackay and Townsville and will have with him the Institute's edited videotape of the G6CJ "aerial circus" lecture given to a special VK3 Divisional meeting late in June. Unfortunately the availability of this videotape is severely restricted by reason of various conditions imposed upon it by the lecturer who is, after all, a professional engineer in this particular field. This could have been the first videotaping of his lecture which he has given nearly 150 times throughout the world.

## RECRUITMENT

Finally the Executive considered recruitment planning and approved the form of the advertising and the leaflets prepared for the August "stage one" of the programme which was kept modest in cost mainly to gauge the extent of the interest, and to publicise Institute aims and services more widely.

Members are urged to support this recruiting campaign most strongly and will be aware of the material which went out as inserts into August AR. If an influx of new members is achieved, the second stage is of course to keep them as members by various means and doubtless this aspect will be claiming the attention of Divisions and local clubs and groups. ■

# A SIMPLE PULSE POSITION MODULATION SYSTEM

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52 Pohlman St., Southport, Qld., 4215.  
(Submitted 31st May 1974)

Digital communication techniques have received only a small amount of attention in Amateur literature. This is possibly because the seeming complexity of these systems has frightened off prospective experimenters. However, once some of the theory and the techniques of digital modulation systems have been mastered, they no longer seem mysterious and awe-inspiring.

The basis of all digital modulation systems is the Whittaker-Shannon sampling theorem which stated simply is as follows: When an audio signal of bandwidth  $W$  is sampled (i.e. instantaneous values taken at periodic intervals) with a sampling frequency equal to or greater than  $2W$  then the audio signal which can be reconstructed from this sampled waveform will be an exact copy of the original audio signal.

This is illustrated in figure 1.

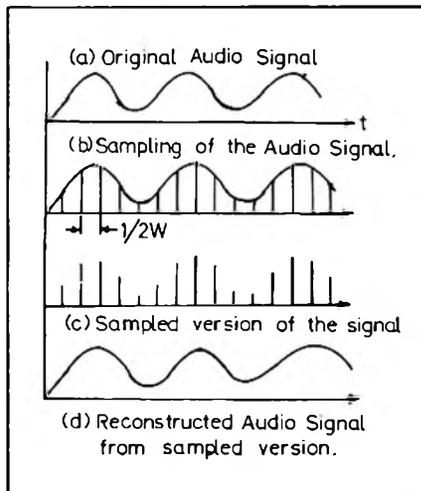


FIGURE 1

The type of signal shown in figure 1C is known as a pulse amplitude modulated signal since the amplitude of each of the pulses represents the value of the audio signal at that particular instant.

If, instead of having the amplitude of the pulses proportional to the instantaneous value of the audio signal, we were to make the width of these pulses proportional to the signal, while keeping the amplitude constant, then pulse width modulation would be produced. This is illustrated in figure 2.

Consider now the pulse width modulated signal in greater detail.

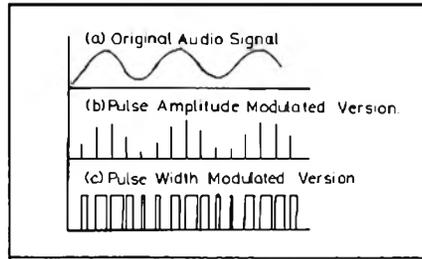


FIGURE 2

The pulses which cause the sample to be taken are generated by some form of oscillator running at frequency  $2W$  or greater as shown in figure 3A. The pulse width modulated waveform produced by figure 3A acting on the audio signal in some suitable circuit is shown in figure 3B. If the waveform shown in figure 3B is differentiated, then the resultant is shown in figure 3C. Note that the upward going pulses all occur at the points where the pulses taking the sample occurred in figure 3, but the positions along the horizontal axis (time axis) of the downward going pulses depend on the width of the pulse in figure 3B and thus on the instantaneous values of the audio signal that is being sampled. The signal shown in figure 3B is of a type known as pulse position modulation.

Let us now consider the pulse position modulated signal in a little more detail as shown in figure 4.

For a simple digital system we require only two possible states for the signals  $+V$ ,  $0$ ,  $-V$ , so we can convert it into two possible states by rectifying it as shown in figure 4b. We now have a problem — how to distinguish the fixed sampling pulses (the time reference pulses) from the position modulated pulses. A very simple approach is to make the reference pulses longer than the modulated pulses, and in a demodulator have a

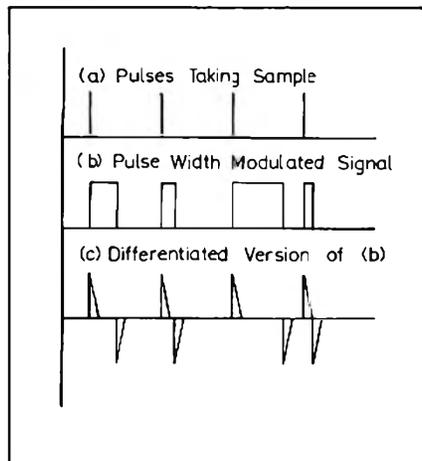


FIGURE 3

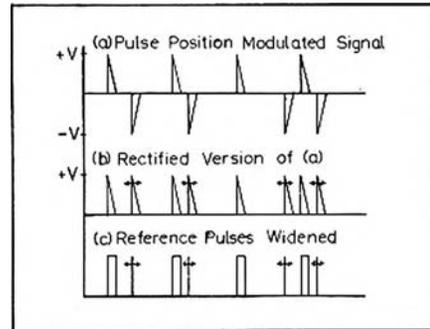


FIGURE 4

pulse length discriminator to sort out the two types of pulses. This approach is shown in figure 4b.

Now let us look at one cycle (one frame in digital terminology) of the above waveform. Refer to figure 5.

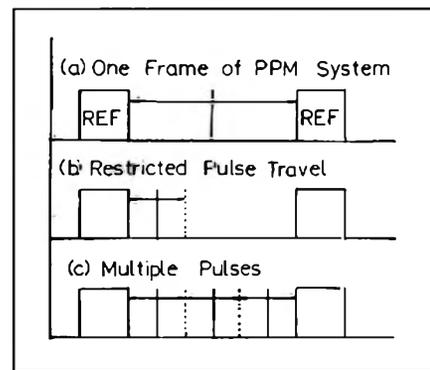


FIGURE 5

As our system stands, the position modulated pulse can take any position between two successive reference pulses. If the position modulated pulse sits half way between the reference pulses for zero input to the modulator and we then apply a sine wave input to the modulator, the pulse will move say to the right of the zero position on positive half cycles and to the left on negative half cycles. The distance it is displaced from the zero position is a function of the amplitude of the input signal.

If we limit the maximum allowable input signal to some pre-determined value, then the region that the position modulated pulse can occupy will be restricted to some fraction of the total distance between the reference pulses.

In an AC coupled system, all we have done is to reduce the amplitude of the AC output signal requiring a little more gain in the amplifier following the demodulator. We can then apply a DC offset to the input signal and place the region that the position modulated pulse can occupy at any position between the reference pulses as in figure 5b. This then leaves a large

vacant region between the reference pulses into which we can place more position modulated pulses.

If these multiple position modulated pulses never get mixed up by a demodulator, then we have a number of independent channels being carried on the one digital signal. The process is known as multiplexing. The penalty to be paid for adding more channels is an increase in the bandwidth required to transmit the signal. This is true of all multiplexed systems.

The practical pulse position modulation system shown in this article is a rather simple version, originally built to demon-

strate pulse position modulation to students. It is, however, a workable communication system and can quite happily carry four 5 kHz bandwidth voice signals through a noisy transmission channel of bandwidth down to 30 kHz.

The circuits used are now described in detail.

Circuit in figure 7 shows the 4 channel pulse position modulator. IC "A" generates a sawtooth waveform. Op. amp — A1 generates a square wave of frequency 10 kHz (period of 100  $\mu$ s). A2 converts this into a pulse train which is used as an input to integrator A3 which generates the sawtooth.

IC "B" is four audio amplifiers. The DC level of the output is set by the 50k pot. Each amplifier has a gain of ten, and the amplitude of its AC output is limited by the zener diode clipper.

IC "C" is four comparators. The sawtooth waveform is fed to the inverting input and the output of one of the audio amplifiers to the non-inverting input. The waveforms around the comparator are as shown in figure 6.

Suppose the instantaneous output voltage of the audio amplifier is as shown in figure 6a. When the voltage of the sawtooth waveform is less than that of the audio input, the comparator output is a high voltage (clamped to +4V by the zener diode). When the sawtooth voltage is greater than the audio input, the com-

parator output is a low voltage. The resultant output waveform is as shown. Note that the positive going edge of this waveform is fixed in relation to the sawtooth waveform, but the negative going edge will vary in position depending on the value of the audio input. The output waveform is differentiated by an R-C circuit on the input of T2, T3, T4 to produce the waveform shown in figure 6c. This is fed to the BC109 pulse amplifier T6. This transistor is normally saturated so its output is low. Positive going pulses therefore do not affect its state, but negative going pulses turn the transistor off causing its output to rise to +8V for the duration of the negative going pulse. The output at the collector is as shown on the circuit. Positive going pulses from the four channels are added together in the following BC109, T7, to produce the output shown.

The sawtooth output of A3 is differentiated and fed into another BC109 pulse amplifier, T1, to produce the reference pulse of 30  $\mu$ s duration. This is then added to the four 3  $\mu$ s pulses to produce the combined output which is available in inverted or non-inverted form.

Figure 8 shows the 4 channel pulse position demodulator. The input waveform is fed into a slicer consisting of 3 BC109 transistors and the output of the slicer is available at the collector of T4. This becomes the input to the clock of the MC 14015CL four bit shift register (a 7495 or

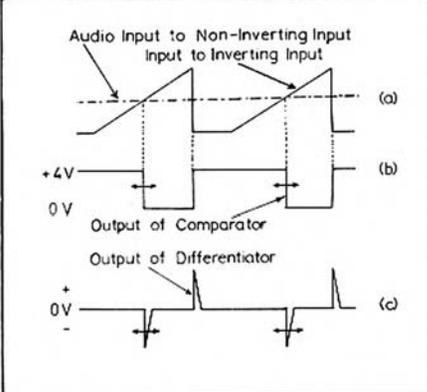
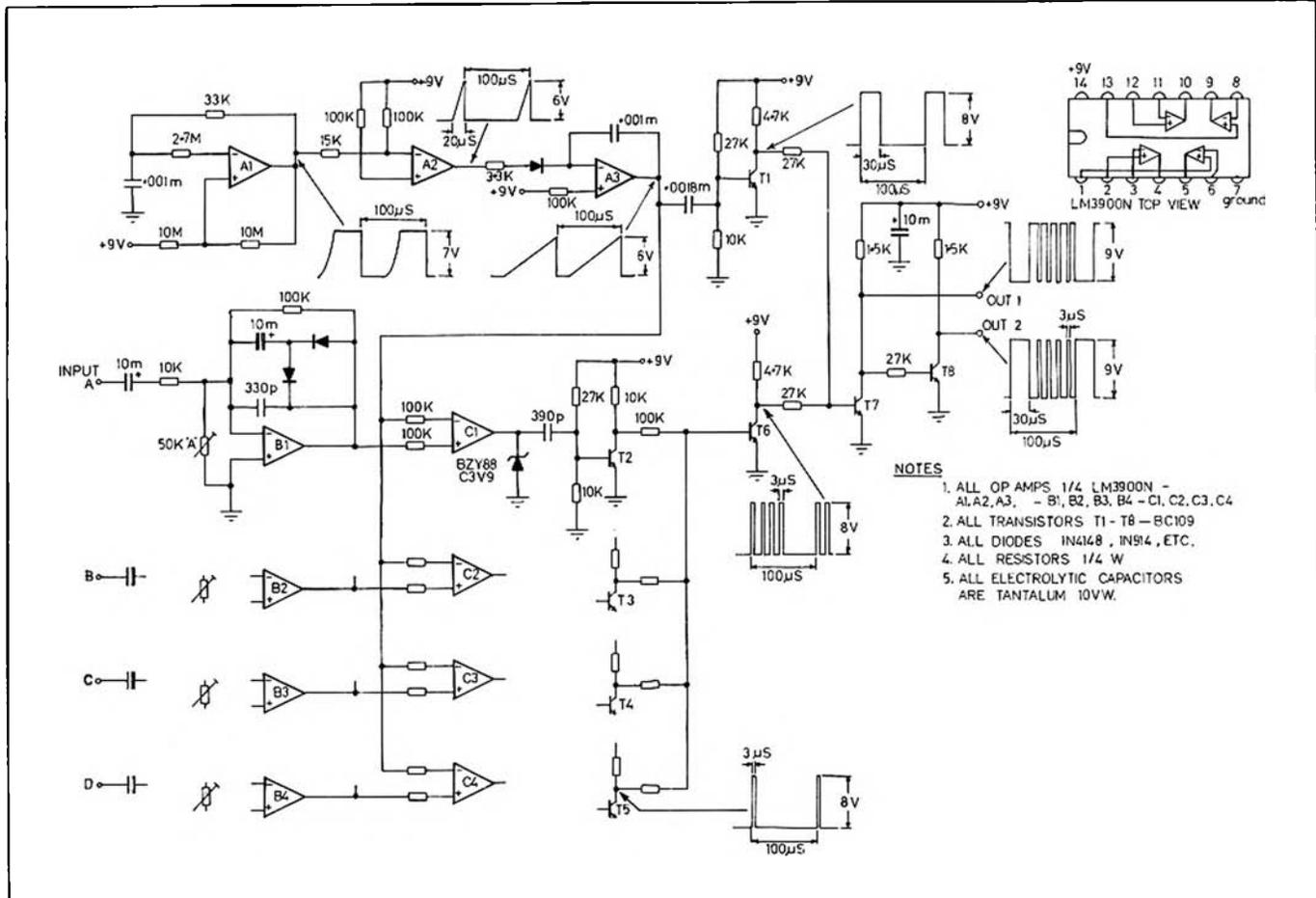


FIGURE 6



- NOTES
1. ALL OP AMPS 1/4 LM3900N - A1, A2, A3, - B1, B2, B3, B4 - C1, C2, C3, C4
  2. ALL TRANSISTORS T1 - T8 - BC109
  3. ALL DIODES IN4148, IN914, ETC.
  4. ALL RESISTORS 1/4 W
  5. ALL ELECTROLYTIC CAPACITORS ARE TANTALUM 10VW.

FIGURE 7. 4 CHANNEL PULSE POSITION MODULATOR

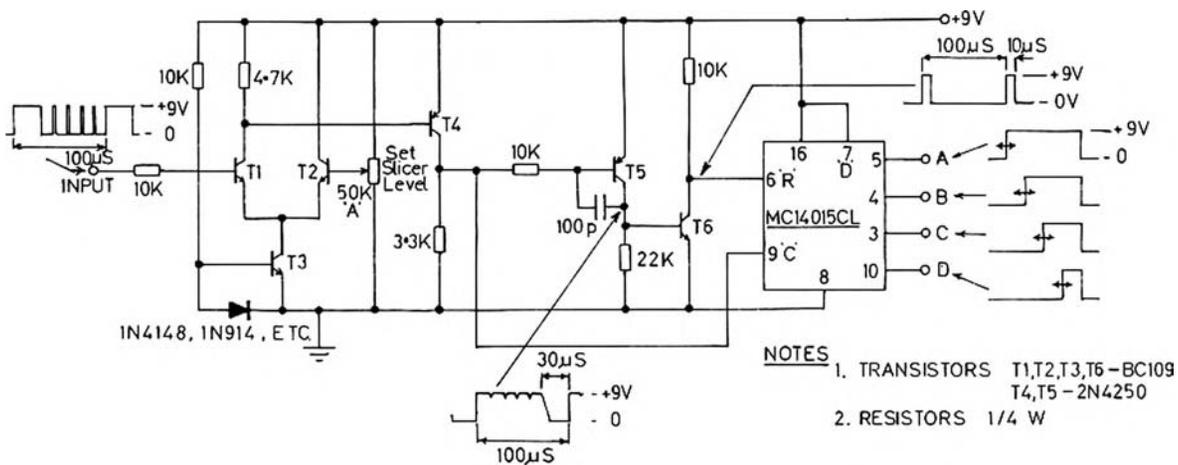


FIGURE 8. 4 CHANNEL PULSE POSITION DEMODULATOR

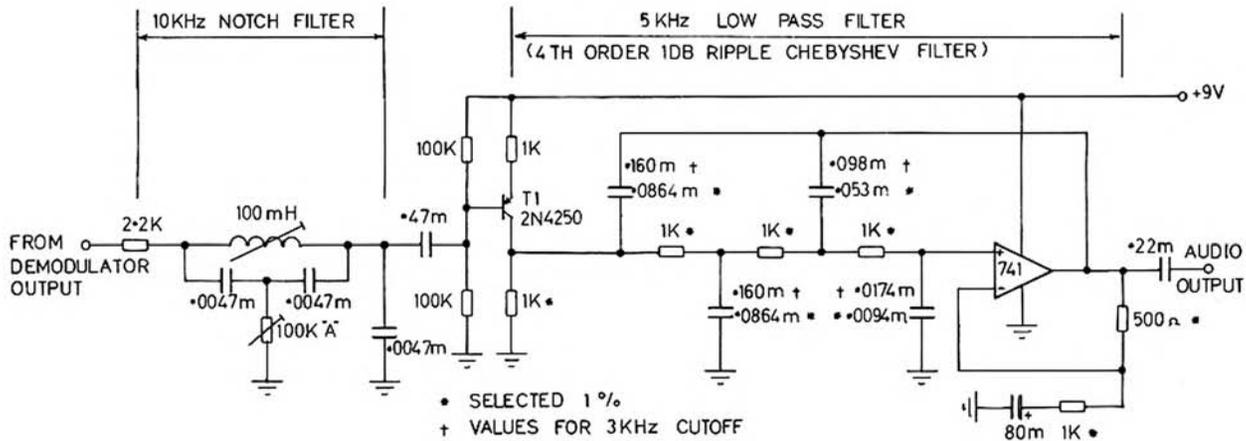


FIGURE 9. PPM SYSTEM FILTER UNIT (ONE CHANNEL)

7496 could be used with suitable interfacing circuitry). The data input of the shift register is hard wired to the + supply.

The output of T4 is also fed to the base of the other 2N4256, T5, which is wired as a Miller integrator. The time constant involved is such that the 3 µs channel pulses produce no output at the collector of T5 but the 30 µs reference pulse does provide an output. The separated reference pulse is inverted by T6 and fed to the reset input of the shift register.

Operation of the shift register is as follows. Once the four outputs have been reset to zero by the reference pulse, the first channel pulse to come along will change the first shift register output from 0V to full supply voltage. The second channel pulse will change the second output from 0 to supply. Similarly for the third and fourth channels. The outputs of the shift register as shown in figure 8 are now four pulse width modulated signals corresponding to the four original inputs to the modulator.

The original signals can now be recovered simply by low pass filtering each of the outputs. Figure 9 shows the filters. Firstly the 10 kHz component in the waveform is removed by a notch filter similar to those used in broadcast band radio tuners. The 2N4250 transistor T2 then buffers the output of the notch filter to drive the active RC low pass filter. This filter is of the chebyshev type and is fourth order with 1 dB passband ripple. The values shown for a 3 kHz cutoff would be preferable for a voice communication system. Output of the low pass filter is around 500 mV p-p for a fully modulated input.

The only piece of test equipment needed to set the system in operation is a reasonable CRO of at least 2 MHz bandwidth.

This is not intended to be a state of art communications system as there are many modifications which could be used to improve the system. Rather it is published to provide a useful starting point for interested experimenters.

**NOTE BY THE TECHNICAL EDITOR**

Some readers may be asking why go to all this trouble to almost destroy the audio signal and then have to recover it with sophisticated circuitry at the receiver. Well, as with FM and RTTY, the Pulse Position Modulation (PPM) signal may vary in strength over wide limits without affecting the recovered audio. If a signal can be established over a path it will sound R5S9 even if it is noisy at the receiver detector.

For amateurs there is another advantage. The PA duty cycle is low. In the system described the transmitter could run three times as much input for PPM as for FM. A gain of almost 5 dB! And you don't have to learn CW or how to type! By reducing the duration of the 30 µs reference pulse, which consumes most of the power, even greater peak power inputs could be run. The transmission bandwidth may be too broad for other than UHF and higher, however it does suggest a use for that old AM receiver. ■

# AX3SIG — EXERCISE “HAM FEST”

## GOLDEN JUBILEE STATION —

### ROYAL AUSTRALIAN CORPS OF SIGNALS

To celebrate the fiftieth anniversary of the formation of the Royal Australian Corps of Signals, an amateur radio station was set up at the Signals Depot, Watsonia Barracks, Melbourne, to operate on a 24-hour basis from November 3 to November 10, 1975.

To mark the occasion, a special call sign, AX3SIG was allocated to the Corps for their Golden Jubilee station.

A large marquee was erected on the cricket oval at Watsonia to house the equipment and the oval provided space for an extensive antenna farm.

The station was probably the most elaborate in the history of amateur radio in Australia.

In the control centre marquee, there were duplex positions to provide for split frequency operation on 80 through 10 metres with each position equipped with 2 x 400 watt SSB/CW transmitters/receivers; a 150 watt transmitter (AM and CW) on 160 metres and a 10 watt 2 metre VHF position. The show-piece of the HF installation was a Collins trailer-mounted fully mobile communications centre, featuring a high-powered 10 kW transmitter (certainly not used on the amateur bands!) and a low powered secondary transmitter which was used by AX3SIG. This equipment is fully air-portable and provides in-



Antenna Farm at AX3SIG during exercise Ham Fest. Visible are 3 TH6DXX beams, 160Mx mast, whip antenna on Collins Mobile Communications Centre.

built facilities for SSB/ISB/CW and RTT together with an automatic telephone exchange and all associated channelling and control equipment.

The antenna farm featured 3 x TH6DXX beams; dipoles for 160, 80 and 40 metres; 2 x 2-30 MHz log-periodics; a 30-foot whip for HF (2-30 MHz) and a Ringo on 2 metres.

The station commenced operation on the morning of November 3, 1975 and operated continuously until close-down on the morning of November 11.

At all times, the station was under the control of a licensed amateur and the operators were drawn from the Operating Troop of 2 Signal Regiment, of the Australian Army Field Force Command.

Propagation during the period was generally poor and activity was low until the last two days, when conditions improved.

Approximately 1000 contacts were made; the greatest number being with VK3 — 350 contacts and Japan on 21 MHz — 280 contacts.

During the period of operation, contact was made with many serving and former members of the Royal Australian Corps of Signals and also with members of sister Corps of other Armed Services including UK, New Zealand, USA and Papua New Guinea.

Some seldom-heard call areas were worked including Poland, Taiwan, Sardinia, Sicily and Malta.

A special QSL card was produced and the QSL Manager (VK3ZA) has now checked all logs and all cards have been despatched.

On Saturday, November 8, call sign AX2SIG commenced operation for the day from 5 Signal Regiment in Sydney and their first contact was with AX3SIG to pass greetings on the Corps' official birthday.

More than a 1000 visitors passed through the station at Watsonia during its operation with a peak on Saturday, November 8, following the official Corps' birthday parade.

The Royal Australian Corps of Signals expresses its thanks to all amateurs who were worked for their keen interest in the station and the wishes which they expressed on the Corps' Golden Jubilee.

Among the other amateurs associated with the Signal Corps who operated the station were John Buxton, VK3YJB; Tony Ballantine, VK2AAA and John Loftus, VK3QK. ■



Warrant Officer John Wilson, left, and Second Lieutenant Rob Elworthy operating one of the Duplex 400W SSB/CW positions during the Ham Fest.

Photos courtesy Army Public Relations.

# TEACHING THE MORSE CODE FOR AMATEUR RADIO PURPOSES

Roger Davis VK4AAR

There have been several articles on learning more code in "AR" in recent years. This short note is to describe a system I have used successfully to teach morse code to numbers of club members in 1975. While it will no doubt interest individuals wishing to learn morse code, I have written this particular article specially for my colleagues who, as RADIO CLUB INSTRUCTORS, face the problem of running classes to teach morse code for the A.O.C.P.

Morse classes in a small club with only 1 or 2 instructors can be a problem. Students who study the theory side for a period of two years may become interested in morse at different stages while others are not interested in morse at all. Morse classes will thus bore a large percentage of members at any one time. In any case weekly classes to teach receiving are quite inefficient and some instructors consider them useless. Weekly classes will suffice to give guidance in sending procedure once students can receive. The solution seemed to be to provide students with a lesson on cassette tape. A survey showed that 47 out of 55 club members owned a cassette player of some description.

The author had long believed in a "SOUND ONLY" method of learning the letters. These days the usual method is to read from an alphabetical list the "di-dah" or worse still the "•—" configurations and "learn it off by heart". Then these visual images have to be translated into sound images or the reverse process during receiving. Such a learning process is often inefficient. Surely it would be better to learn the sound directly as a rhythm pattern.

A cassette tape with a "teach yourself; lesson" was specially designed with a view to having members learn the code by themselves, at home, at their own pace.

The author had previously designed and recorded such a tape to teach morse code to a blind person but it has long since disappeared in a divisional tape library. After trying several new formats and trying them out on several members, a format was perfected on the fifth attempt. (Perfected is a relative term — it takes several hours just to record one side of a C60 so that the criteria was lowered as time went on. A recording studio will be used for the next edition because although the morse is fed direct, the mike was open all the time for voice). The original production of the master required a number of very late nights but perhaps the success in teaching NAOCP students makes it worthwhile.

Why design a new cassette for teaching morse when several commercial products existed? Several commercial lessons were already owned by various club members. Some had three different versions already but none of these was satisfactory and each for a variety of reasons.

The usual pitfalls as described in the standard texts; ARRL HANDBOOK, THE RADIO HANDBOOK had all been fallen into by the commercial products and there is no need to dwell on them here.

The tape "INTRODUCTION TO MORSE CODE" was made to fit onto the two 30 minute sides of a C60 cassette. Side A teaches the 26 letters of the alphabet in 5 groups as follows:

Firstly the letter is demonstrated:

Voice: "di - dah" , "A"

Tone: • — • — • —

At the end of each group of 5 letters a random practice session is given as follows: Tone — • — • 2.5 second pause. Voice: "C" then a 2 second pause Tone • • — • 2.5 sec. pause, Voice: "F" . . . etc.

In this fashion each of the letters in the group is covered several times in random order.

The basic process which was aimed at is "RE-INFORCEMENT OF LEARNING".

You hear the tone oscillator equivalent of di-dah and you have 2 seconds in which to say to yourself . . . um? . . . "A". The voice then says "A". If you do not get it in 2 seconds you will be told A, and this will refresh your fading memory. If you are correct then you will feel pleased at your success. This method sounds simple and best of all it is working. Student club members who were completely new to morse code claimed to have mastered the letters in 4 or 5 repeat playings of each section.

Side B covers the 10 digits and the special characters for the Australian AOC.P. Members reported that having mastered the 26 letters on side A the numbers and special characters are learnt much faster. This is fortunate since these characters are harder and in the case of the numbers many students spend a lot of time trying to decode numbers by counting the incoming dits. Having been trained to listen only to rhythms the student is less likely to fall into this bad habit. The last 10 minutes of side A and the last 15 minutes of side B are completely random practice sessions but still using the format of code/pause/voice/pause. After finishing the cassette lesson the student will "know the code" and can then progress to standard practice tapes or practice sessions as broadcast by various stations of the Amateur Radio service on 3550 kHz in the evenings.

It has always been recognised that one must learn to receive before starting to send. Otherwise one will get to learn ones own mistakes — ones own poor sending will sound normal and good morse will sound wrong. But many students will tell you "I cannot start to learn morse yet because I cannot find a good place to buy a morse key". Once convinced that they can learn the code without owning a key, the process can begin. After a person can receive well, it is time to start sending. If a person knows what good morse sounds like he can correct his own sending to a certain extent. The weekly availability of an experienced operator then provides for corrections of minor individual errors and guidance in holding the key. Such guidance only takes a few minutes per week. Each student brings his own key and oscillator to the classroom at this stage and takes turns sending text to the others. As a further exercise a round table QSO is simulated to teach the additional features of CW operating.

The Windsor YMCA Radio Club decided that rather than the problems of cassette loan library each person would purchase his own copies from the club. Several club members now assist in the copying of cassettes from the masters so that the club can offer copies for sale to individuals or clubs. Other clubs might consider a similar scheme. This article was intended to inject some new ideas and systems into the teaching of morse code to intending Amateurs. Further details from the club VK4AYM C/- QTH VK4AAR.

In conclusion there are now at last some real results — 6 out of 6 club members have passed the Novice morse exam while several non member Z calls who used the cassette system have reported a pass in the morse exam. ■

## QSP

### RFI

"Most consumers do not understand that when they may encounter interference with their home television or radio set after an amateur or citizen band radio operator moves next door, the source is not a defect in the equipment of their neighbour but with their own radio or television". Senator Goldwater's introduction (part) to a Congressional bill on RFI Feb. '78 as reported in QST May '76 with the additional comment by K7UGA, that the consumer doesn't realise that the device for which he paid so much money is missing a few parts which could keep it from trying to be a receiver. The industry has been slow to recognise the rapid growth in the number of radio transmitters, and thus, the great increase in potential RFI, he said.

### RECIPROCITY AND FEES

New Zealand has reciprocal licensing of amateur radio stations with the USA and the French Republic which includes Cook Islands, Niue and Tokelau Islands. NZART 1976 Call Book. From the same source it is noted that the annual fee for an amateur station licence in New Zealand was increased from \$3 to \$6 from 1-3-1976.

# DREAM OR NIGHTMARE: A REPEATER FOR SOUTHERN TASMANIA

B. J. Morgan, LL.B. VK7RR  
12 Avondale Grove, Mount Nelson

Hobart, the capital city of Tasmania, nestles snugly beneath the 4,000-odd foot Mt. Wellington. Since the earliest days of amateur radio, Hobartians have looked fondly at that mighty magnificence and swooned at the thought of a VHF site to end all sites. Thus as equipment became more and more portable, mountain topping DX-peditions became regular events and results invariably justified the trouble.

Then one day a new word came into the language — Repeater. Those eyes which were growing dim from many years of covetous glances at the mountain top, began to dream of a repeater to perpetuate their dreams and ambitions. 1970 came and construction of a repeater was commenced. The initial work was carried out by Ron VK7ZRO and Dave VK7MD. By the middle of 1970 a repeater was in existence except for a bug free keyer, antennae and a site. The equipment was comprised of a 1674 transmitter exciter board into a low power final delivering 25 watts of power; the receiver a modified Ranger 800 2 with 6CW4 front end. As a unit this repeater was used on a manned basis for a short while, but increasing commitments necessitated a change in repeater committee.

The 'Northerners' by this time (to the uninitiated, the northern branch of the Division) had been causing strange splutters to appear "a bit above channel A" and suddenly there was a licensed repeater in Tasmania and the Southerners had been beaten to the punch. However, not to be outdone, the Southern repeater under a new committee, finally managed to ascend the mountain two years later. Antennae were erected on the commercial television tower and initial tests were commenced. However, all was not as it should be. Spies in the north of the State were sent out to give signal reports. Comparisons between the repeater and a mobile some 100' below showed a notable difference — the mobile could be heard the repeater could not!

Faced with this result, the committee carefully stored the repeater in a corner of the building and repaired to warmer climes. It was obvious that a rethink was necessary. Was the lo-loss cable not so lo? Was the transmit power too low? Were the antennae unsuitable? Time passed and the repeater was forgotten until one day came news of a fire on the mountain. The damage was not severe but a decree was issued by the owners of the building that no valve equipment was to henceforth be stored therein. The repeater story that had never started, had just ended.

Another committee was formed to build

a solid state repeater. Enthusiasm was not high and an air of gloom and dismay pervaded the project. The receiver was unstable, the exciter was too broad, the final was temperamental and to make matters worse two members of the committee were newly married! The operation was again at a standstill but this did not deter the old eyes from still casting covetous glances at the mountain top from time to time.

Towards the end of 1975 it was realised that a local amateur who also was an employee of Telecom, was the engineer responsible for antennae and cables etc. on the National TV tower on the mountain. Thus the question was cautiously born, "What about moving the valve repeater". But where was it? After much careful looking, a piece of coaxial cable was found protruding from a dark corner and at the other end was the device, very

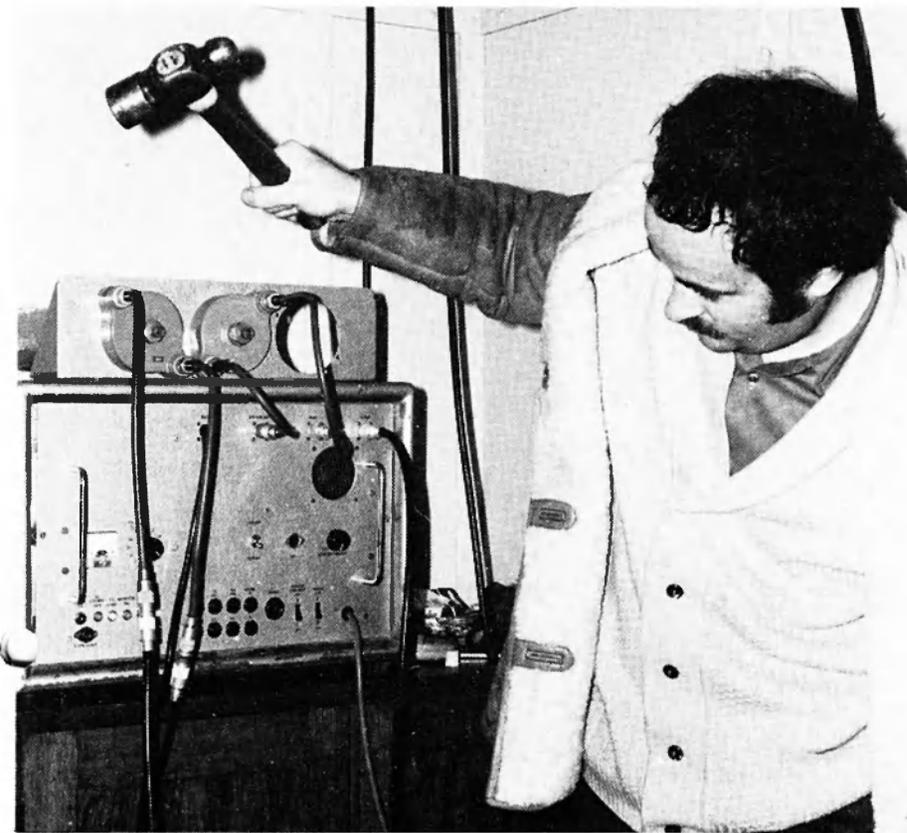
dusty and abandoned but still in one piece.

Some two years after first ascending the mountain, the repeater was brought back to sea level having had less than one hour's use. The first step was to build a reliable keyer. This presented no problem to one of our engineer amateurs VK7AW, who in a short space of time had a very satisfactory little man working away on MCW from inside a small die-cast box. The repeater was plugged in and turned on. Nothing. In case the shock had been too much the process was repeated with the same result. A careful inspection of the innards revealed that the transmitter was OK but the receiver was the perfect attenuator. Not having any need for such a good attenuator, it was pulled out and work commenced on fixing it. Hours and hours later, after countless cups of black coffee it again



Inspecting the aerials of VK7RHT.

Photos: B. J. Morgan and W. T. Moffat VK7TM



Final tweak before going into service.

level for the week whilst we were waiting for the new cable. Some of the lightest moments in the saga came whilst users (not knowing that we were not using the proper antennas) sat in the city, gazed up at the tower and expressed all sorts of theories about why signals were noisy even where they could see the tower. It was fortunate that the inventor of co-axial verticals did not have to endure the criticisms of angle of radiation, etc., whilst the unenlightened discussed the faults of the antenna at length. Returning to the now completed cable run, the truth about the aerials was revealed and the two tower antennae were connected, the power output was increased to its nominal 75 watts and the big switch was turned on. We then sat waiting for reports. We were not long in waiting. In the first few hours, reports came in from over 100 miles away, from a hand held unit some 60 miles away and from mobiles 50-70 miles away. As a start then the repeater was working and very well at that.

After two weeks of air testing the equipment is still being run by virtue of an operating permit to enable interference problems, etc., to be dealt with, if and when they appear. To date there has been nothing untoward occur. We have been advised that channel Two (new band plan) has been confirmed as our operating channel and the call sign VK7RHT will soon be granted.

This story in reading does not adequately relate the problems experienced in setting up a repeater on a "congested" mountain top. Whilst we did not need to purchase or erect towers, etc., we had to counter any possible intermodulation faults caused with commercial services in the vicinity, ensure minimum cable loss (the run to each antenna is a minimum of 350 ft.), engage the voluntary services of qualified and medically suitable riggers to carry out the installation and connection of the antennas and cables and perhaps most of all, to work in sub-zero temperatures amidst ice and snow, gale force winds and driving rain, all taking their turn to hinder the workers.

*Sequel.* The repeater has already shown itself to be the realisation of a life's dream for those intrepid pioneers of the mountain-top gazing. Perhaps not surprisingly it has attracted many old timers to 2 metres. The success of the project already can be gauged when, in a conversation recently, two OTs new aspirants to 2 metres were both trying out their multi-channel mobiles. One suggested they go to 3,590 and the reply was, "Which channel is that on this rig?"

Equipment TX : TCA 1674 + QQE06/40 final, 75 watts out —

Receiver: STC 131 modified front end with MPF 1000 and helical resonators.

Cable: Andrews FHJ114 foam filled, HM9 air pressurised.

Antennae: Home built, stainless steel co-axial verticals, sealed in polyurethane compound and fibreglass.

Timer and Keyer: Home-brew using ICs. ■

emitted noise. But what sensitivity? When cold it was giving 20 dB quieting at 1 microvolt, as it warmed up this decreased to a miserable 5 microvolts.

The repeater was set up for evaluating performance, for a 1 month test period from a 1000' elevation, at an amateur's residence. This gave time for consideration of antennae at the new site and a modern receiver. The month passed and unfortunately we were no further advanced. A rebuild of the transmitter final had been considered desirable and at the same time the power output was raised to 75 watts. An STC 131 receiver was considered a very good basis for a new repeater receiver and at no cost one was obtained and modifications carried out. It was heartening when, after many long and sleepless nights spent huddled over benches and FET's, the receiver was giving 20 dB of quieting at 0.35 microvolts. Maybe the repeater might work well after all. The committee at this stage consisted of four. Phil VK7SS was responsible for antennae. Andrew VK7AW for the keyer and timing circuitry, Tom VK7TM and Brian VK7RR for the transmitter and receiver.

Then came the big test. Towards the end of April antennae were erected under the 90' platform of the National TV tower. There were two existing runs of lo-loss cable that were surplus to requirements and these were obtained on loan. When connected it was obvious that either one cable or one antenna was faulty. By

swapping cables from antenna to antenna the fault was traced to one of the cables. Next job — fix the cable.

Saturday, May 8th was C day. Bright and early at 6.45 a.m. Brian and Tom met and started off for the mountain top, Andrew and Phil followed. The weather was against us and it was impossible to do any work. It was agreed that, subject to the weather improving, the repairs would be started the next day. However, whilst the weather was satisfactory, we had forgotten Mother's Day and so the work was called off again.

During the following week, with the assistance of some amateurs who were also authorised tower climbers, one antenna was raised to the 232 ft. platform and a cable run was taken up from the 90 ft. level to the top antenna. It was realised that time was working against us because of the risk of deteriorating weather. Several weeks were spent in tracing out the faulty cable and trying to repair it. Ultimately it was discovered that the cable was completely full of water and was beyond repair. After much discussion and a meeting of interested parties, it was agreed to purchase new lo-loss cable at a price of approximately \$300.00. On the 29th of May this cable was run in the most appalling and rapidly deteriorating weather conditions. However, everything was completed and then came the big moment.

But to digress for a moment, Brian and Tom had decided to run the repeater transmitter on a temporary aerial at ground

# PACIFIC MARITIME MOBILE NET

E. J. Mulholland P29EM/VK4AEM  
P.O. Box 3082, Port Moresby, Papua, N.G.

The Pacific Maritime Mobile Net has been operated by Robby YJ8AN, at 0530Z on 14.310 MHz for many years. Its purpose is to provide a safety and weather service to the many private yachts cruising in and around the Pacific, who are equipped with amateur radio.

I became interested during the latter half of 1975, when because of ill health I was confined largely to my home, and thus Amateur Radio became a very important therapy. When Robby, YJ8AN, went on holiday for a month to New Zealand from 21 February, 1976 to 29 March, 1976, he paid me the compliment of inviting me to act as net controller during his absence. All dates and times quoted are in Greenwich Mean Time.

An emergency was declared by Maurie HP2BKZ/MM at about 0540Z on 8 February, 1976 to Robby YJ8AN, as net control. In brief, a passenger had fallen down a cliff on the island of Rapa Rapa in French Polynesia, and although there were several medical doctors aboard "Yankee Trader", the patient's condition indicated that an aero-medical evacuation to hospital may be needed.

This was handled by net control YJ8AN from that time until about 0808Z, when Robby lost propagation. Up till now the aim had been to establish contact with the French authorities in Papeete, "Yankee Trader" could not make contact on any marine or commercial frequency.

When Robby YJ8AN lost contact, P29EM offered to act as relay, as I could copy all stations involved. By this time, 0808Z, we had managed to raise a young lady, Pauline, on a yacht, HP9XPC, moored off Papeete, and passed to her a request to get hold of F08AU, Ed, whom we knew

to be connected with the French Administration in both the maritime and communication areas.

It is understood that this young lady rowed and walked some six miles at night, and finally located Ed F08AU, who came straight on frequency.

From 0808Z to 0837Z, the net F08AU, HP2BKZ/MM, HP9XPC/MM, YJ8AN with P29EM as control made the necessary arrangements to have a French doctor on landline to Ed, F08AU, and the ship's doctor in the radio cabin with Maurie, HP2BKZ/MM.

From 0840Z to 0955Z the necessary medical information was passed — ship's doctor to P29EM, P29EM to F08AU, F08AU land line to French Government Doctor, and in reverse — complicated by the American/Australian/French accents involved and the somewhat unusual to me, medical terms being used.

From 1059Z to 1152Z the net was joined by Allen, ZL1AWP as back up. In this period certain plans and counter plans were put forward by the French Authorities for consideration by the Captain of "Yankee Trader". In brief, from "Yankee Trader's" then present position, and in consideration of the weather, the offer made by the French of helicopter evacuation from Mururoa, or conventional aircraft from Touboulawai would result in:

- Yankee Trader to Mururoa — 60 hours
- Yankee Trader to Touboulawai — 48 hours
- Yankee Trader to Papeete — 30 hours

The Captain decided on the shortest course and continued to proceed to Papeete.

At this time we closed the net for that night, and agreed to come up on following morning.

The next sked was 2059Z to 2110Z, F08AU, HP2BKZ/MM, P29EM, as control.

This merely confirmed that the patient had not deteriorated and the previously agreed plans were being followed.

A further sked was held 2205Z to 2207Z, F08AU, HP2BKZ/MM, P29EM, as above.

It was agreed that a listening watch would be maintained on the hour, and check skeds were held, now 9 February, at 0056Z-0100Z, 0354Z-0400Z, and of course on the regular MM net 0530Z with Robby YJ8AN as net control. Although P29EM was not directly involved, the following must be one of the most complicated communications ever attempted. The French Government medical officer now had radio communication but could not talk direct to F08AU, net control or the vessel, so we had:

The French Doctor F08EE in French to F08DR, in French to F08AU, in English to YJ8AN, in English to HP2BKZ/MM, and reverse, discussing the clinical symptoms exhibited by the patient. A tribute to the patience and attention of all involved is the fact that the traffic was successfully passed.

The next sked was on 10 February, at 0613Z-0639Z, F08AU, HP2BKZ/MM, P29EM, the results of which were passed to Robby YJ8AN 0641Z-0643Z, and arrangements made for listening watch 2200Z, on 11 February, 0200Z, 0600Z, 0700Z. Skeds were kept BP2BKZ/MM, P29EM at 2158-2205Z, on 11 February, 0204Z-0220Z, by which time "Yankee Trader" had arrived in Papeete, and the patient was safely in hospital.

I have written this event at some length, because I had the good fortune to be involved as relay and control, which taught me a very great deal, and because it does illustrate the co-operation of the Amateur fraternity, regardless of race ■

## TRY THIS

Ron Cook, VK3AFN  
Bill Rice, VK3ABP

FROM THE DESIGNERS NOTEBOOK  
John Day VK3ZJF and G. N. Long VK3YDB

### TEMPERATURE METER

For some of the work we have been doing lately, we needed to be able to measure variations in the case temperature of some power transistors. Not being able to measure the case temperature, led to the needless destruction of some devices due to over-dissipation.

Obviously, we needed some form of surface temperature meter. The following circuit uses a silicon power diode as the sensing element in a bridge configuration, feeding a differential amplifier to drive a meter.

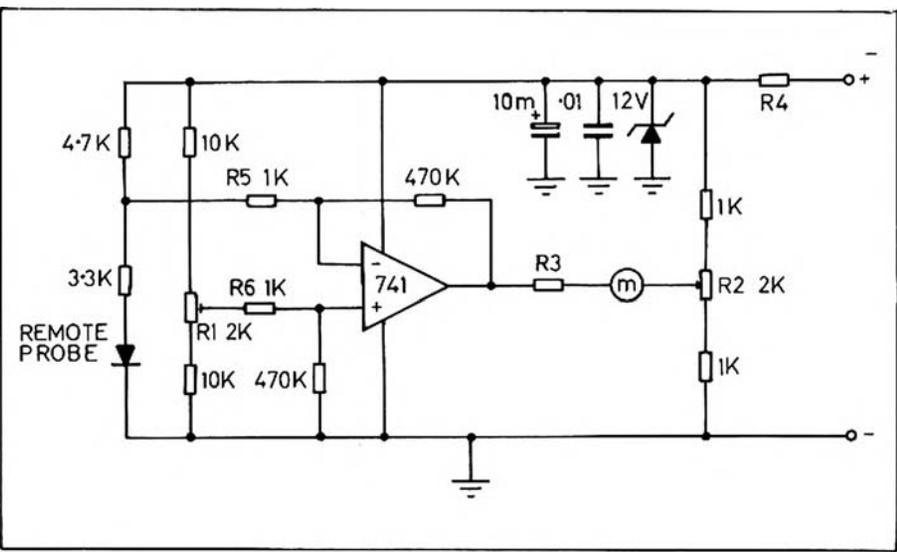


FIGURE 1

Potentiometers R1 and R2 are used to set lower and upper limits respectively. Resistor R3 depends on the sensitivity of the meter you use. If the system has too much gain for your application, the values of R5 and R6 may be increased but must be the same value as each other.

The probe diode may be mounted in any convenient holder and should be fed with co-axial cable. ■

**PRACTICE WITH A MATE**  
Ron Cook, VK3AFW

If your CW is a little rusty, one of the best ways of getting back to speed is to enlist the assistance of a reliable friend. AR magazine and the daily paper make excellent sources of plain language copy. To increase one's acquaintance with numerals, the classified advertisements could be used, however, one can predict the numbers with some accuracy. A better method is to have groups of five characters made up of letters and numerals arranged in random order. Each group of five represents one average word and this helps in keeping the speed steady.

How then does one obtain these groups?

Well, I had reason to become familiar with the operation of a small computer and set about the production of blocks of nearly perfectly randomly selected 5 character groups as an exercise. The only difficulty encountered occurred in teaching the machine (or the operator?) to get the "words" out of the machine onto paper. The result is reproduced on this page. There is no particular reason for only printing out 25 by 25 word blocks, as the machine could create thousands of words in a second most likely without repeating any particular combination. Any character (letter or numeral) has an equal chance of being selected. Thus about 1/3 of the characters are numerals.

Having acquired your friend and practice oscillator, he can proceed to send the first row of the first block followed by the first row of the second block etc. Next time, the columns could be sent in sequence. Other combinations of "words" could be made up, however, once they start to become familiar it is time to get another printout (from a friend with a computer). ■

**QSP**

**NEW CALL SIGN PREFIXES**  
According to Radio Communications July '76 the prefix series D7A to D9Z has been allocated to the Republic of Korea.

**UK LICENCES**  
According to Radio Communication July '76 and resulting from continuing discussions between the RSGB and their licensing authority, a new form of licence will be devised for issue in 1977 for new licensees, as well as being available to those holding existing licences. The new licence is stated as designed to cover all forms of image transmission (ATV, SSTV, Fax) as well as doing away with separate letters of authority for hand-held equipment. The new licence covering all modes and mobile will of course cost more. 3 or 5 year licences were considered, they say, but for several reasons this was rejected. Yet another example of the liberalising influence overseas.

0 0 J 2 8	F W W E 8	S Y M 0 Y	B U C D T	3 4 B T 4
M 0 U C D	R 7 H 3 3	4 N R 6 L	C S I L Z	L Z J 3 3
3 5 B U V	I J M 0 I	Z L C S U	C S Y N E	9 0 G 9 S
U C S I K	V 0 J 3 3	2 6 X F 0	0 J 2 8 F	Q Y B Y I
9 P A 0 H	4 N E 8 D	T 4 2 8 F	0 U C S I	Z J M 0 U

X G 8 F 0	U Z J 2 7	J I 9 S I	K V P D R	6 X H 4 N
W E 0 0 J	2 7 K N R	6 Z K V 0	J I 9 P S	U C S Y B
Y N W Q Y	N W 0 U V	0 J 3 5 V	I L X D E	0 0 H 4 N
E 9 A O G	9 S I Z K	B R 5 V I	L Z K N W	9 E 0 U X
H 6 Z K B	Y B R 5 B	Y M 0 I K	B U C A I	K B Y M 0

I Z J M Q	T 4 2 8 F	Q T 2 8 G	9 A A A P	D W Q T 3
2 5 X F Q	T 1 9 S U	C A A P A	0 J 2 6 X	G 9 S Y B
T 3 3 5 C	A 0 J 1 8	D T 4 1 8	D T 3 4 M	Q T 3 3 3
5 B Y 1 9	P S U X G	7 J 2 7 H	6 L Z J M	0 U C S U
X F 0 U X	F W W Q T	3 5 V I L	C S U X H	5 V P F Q

R 7 K B T	3 5 C S I	K V I Z L	X D E 9 P	D R 7 J 2
8 F Q R 7	J I 9 A O	G 7 J 2 7	K N E 9 P	A 0 H 5 C
S T 2 7 H	6 Z L Z H	3 3 4 N E	0 0 G 8 G	8 G 7 G 6
L C S I L	X F 9 0 F	0 I L X F	Q T 2 8 G	7 G 7 K B
U C S U X	G 9 S U X	H 6 X H 5	C A A 0 G	7 K N E 9

A P F W W	Q Y N E 0	I K V P F	Q R 7 H 4	1 0 0 H 6
L X H 5 V	0 G 8 D R	7 J 2 7 J	2 7 K B R	4 N R 5 C
A A P D T	4 N E 0 0	H 4 B T 4	N W Q T 2	7 K N W Q
R S V 0 H	5 X F W E	0 0 J 3 5	C A A P D	E 9 A P D
W Q T 2 7	H 3 3 4 N	W Q T 4 M	Q R 5 C D	R 6 L X G

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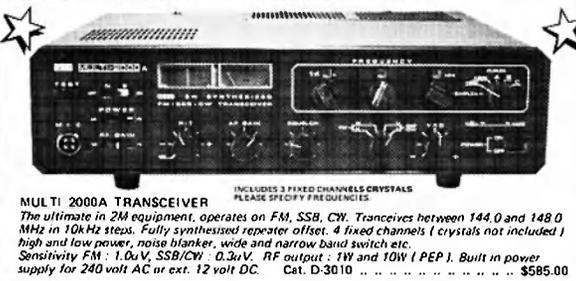
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# COMMERCIAL KINKS

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## THE HY GAIN TH6-DXX

In the four and a half years that Commercial Kinks has been running, this month is the first time that a commercially made antenna has been the subject of some modifications. Perhaps modification is not quite the word, as these are really setting right some design deficiencies. The antenna in question is the popular TH6-DXX. An article from Geoff Wilson VK3AMK for this column prompted a closer look and I contacted Henry Alcorn VK3AYG who was assembling his TH6 to get his comments. While there is some duplication of thoughts I think it is worth stating them all to get both points of view.

Henry makes five points:

1. The swaged ends of element aluminium tubing is sometimes not concentric and not along the axis of the larger part of the tubing.

Straighten the short swaged end back into line with the main part of the element tubing and tolerate the out of concentricity.

2. The flat washers under the heads of the long 5/16" bolts that hold the extruded clamping section of the boom to the mast bracket will not fit into the channel. Cut off a piece on one side of the 5/16" washer but protect the bare metal exposed against rust.

3. Turnbuckles on the boom support cable are not strong enough and are not provided with locknuts.

Replace these with 5/16" or 3/8" steel turnbuckles with locknuts, do not use the diecast type turnbuckles.

4. Clamps on the driven element near the insulating bush which clamp the connecting cable from the beta match and the feeder are not very strong and the lugs bend if over tightened.

Cut and fit 1/4" inside diameter bush between the lugs of the clamps so as they do not collapse when tightened.

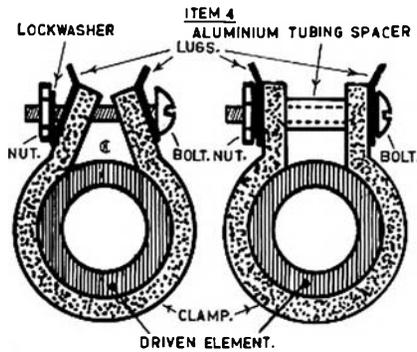
5. Tubing clamps supplied are not entirely satisfactory and although it is pointed out in the assembly instructions not to tighten the clamps to a point where the screws push into the tubing, it is not always possible to get enough clamping action until this is done.

Replace the tubing clamps with stainless steel worm drive type clamps. Henry now has his TH6 up at nearly 20 metres high, and reports that while it is not particularly simple to assemble or erect, when in place appears to be quite substantial.

Now over to Geoff for his thoughts on the TH6-DXX.

## TH6-DXX ASSEMBLY

The following points may be of interest to those assembling these beams. Due to similarity with other Hy-Gain models some of this information may be applicable to beams such as the TH3 Mk. 3 etc. also.



TH6DXX Assembly Detail, Cross Sectional View.

Although these antennas are supplied in kit form it doesn't always follow that everything goes together exactly as planned. Recently while assembling a TH6-DXX the following items were modified.

1. Turnbuckles on boom support cables. These were replaced with heavier types as the size supplied had been used for some years on a large 2M yagi (28 foot boom) and these bent due to wind load. It is advisable to run a wire through the turnbuckle to prevent it turning with vibration.

2. 1/2" compression clamps. These are used to hold the smallest diameter tubing on the 10M reflector and 15M director. Due to their small size and the way they are shaped the metal appears to be under stress. During assembly one snapped and subsequent examination showed that the bolt hole was a fraction too small causing the bolt to self tap the metal and thus increase the strain on the clamp. A new clamp was obtained and this too had a similar size hole. By VERY slightly enlarging the hole with a taper reamer a good clearance fit resulted and no further troubles were encountered.

3. Placement of boom support clamps. These simply don't go where the instructions say and will have to be shifted slightly. I moved each clamp 2 1/4" further out along the boom. Using the dimensions supplied one clamp would be in the middle of an element to boom clamping plate!

4. Tubing clamps on driven element. These are used to secure the pigtailed from the beta match and the balun to the driven element. As the bolt is tightened the top ends of the clamp move inwards until they are at an angle of about 45°. This then makes it impossible to have the solder lugs on the pigtailed fully in contact with the metal on the clamp. At best they will barely touch the clamp. This is a vital point in the electrical connections of the beam. A piece of aluminium tube 1/16" wall thickness, 1/4" I.D., 3/8" O.D. x 15/32" long was placed over the 1/4" bolt where it passes through the clamp and this prevents the shape of the clamp changing as the bolt is tightened but still allows the clamp to tighten firmly on the element. At the same time a flat surface

remains beneath the solder lugs providing a broad even area of metal to metal contact.

5. Securing caps protecting ends of traps. By smearing a trace of epoxy resin over the end of each trap then slowly pushing the cap over it and turning it around several times the caps are firmly locked on.

6. Fitting element to boom brackets for driven element and 10M director. When I attempted to fit these two elements I found that the 1/4" bolts in the centre of the clamping plates would not screw right down. The reason for this is the double walled tubing used in the inner boom sections. If you attempt to screw these bolts hard down the heads will probably shear. As the elements are of equal length either side of the boom they should normally remain in a state of equilibrium, and the bolts at the top and bottom of the clamping plates are there to prevent the element moving out of the horizontal plane. If it is desired to screw the bolts hard down, a pilot hole should be drilled beneath each one through the two concentric sections in boom and the hole then tapped 1/4" to take the bolts. These steps aren't necessary with the clamping plates for the other elements as only a single thickness of tube is involved and this is soft enough to accept the bolts when fully screwed down.

## NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

### BUILDING A WOODEN MAST

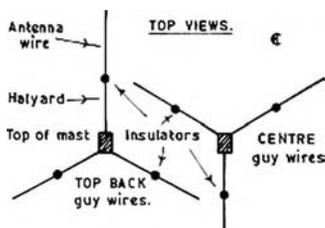
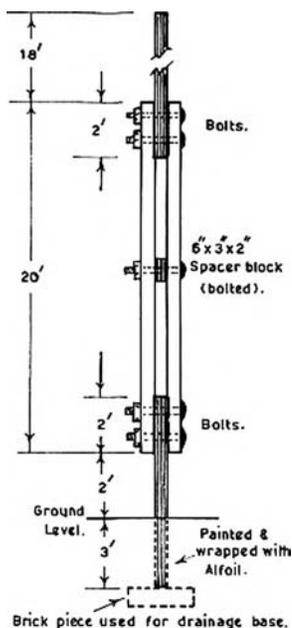
The newcomer to amateur radio and shortwave listening soon learns a lot about antennas, and it is not long before he starts to think of possibilities apart from the wire he has strung from Dad's shed to Mum's favourite tree.

He soon learns that antenna length, height and clearance from surrounding objects become important.

Knowing your formulae and reference to Newcomers' Notebook in July 75 will assist with the antenna length, and this article is designed to assist with the height and clearance factors — building and erecting a simple wooden mast.

The main requirements are permission from your parents, Council and DCA if appropriate, together with three twenty foot lengths of straight grained, knot free exterior timber, one seven foot piece of the same, all being about three by two inches. Five, six inch by half inch galvanised bolts and some nuts, washers and paint completes the immediate essentials. For the ground post, it is advisable to procure some thick Alfoil, as will be seen later.

Before building commences, give all the timber sections two coats of primer, undercoat and good quality exterior house paint,



Once the mast is hoisted vertical, you can slide home the second base mounting bolt and tighten both base bolts. The guy wires can then be secured at 120 degree intervals around the mast. The centre guys should be about 20 feet from the ground and the top guys, near the top, obviously. Use large turnbuckles at the ground end of the guy wires, so that adjustment can be made to compensate for stretching. Make sure that turnbuckles and pulleys for raising and lowering your antenna are greased several times per year.

With respect to the halyards, do not tie them to cleats on the mast, but use a counterweight which compensates for movement in the antenna.

Full details of guy anchoring, halyards, pulleys and turnbuckles appear in the ARRL Handbook, ARRL Antenna Handbook and RSGB Handbook, and it is beyond the scope of this article to cover those points. Hoping you meet with increased success from raising your antenna up on your home brew wooden mast. ■

## VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP  
Forrester, 5233

### AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	142.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbray	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RMT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHF, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

No doubt the boys in Tasmania will be satisfied with their efforts in constructing the VK7RMT beacon on 52.400, since it alerted VK4ZRF, VK4ZNC, VK4ZJC, VK4ZIT, VK4ZRF, VK5ZQQ and VK5ZSA on 12.6.76 that the 6 metre band was open, with signals to 5 x 9. Additional openings were noted on 27.5, 5.6, 15.6, 19.6 according to Joe VK7ZGJ. "QRM" openings were also noted into VK2. So it seems the mid-winter DX is still to be had providing you remember to be around and do some listening and calling.

The Gold Coast (VK4) monthly newsletter has arrived, and it is interesting to note their UHF repeater is now operational. By the time you read this the input and output frequencies will have been changed to conform to the WIA 70 cm band plan, and will be input 433.225 MHz and output 438.225 MHz. While on repeaters it is hoped by now you are all familiar with the new numbering arrangements for all your repeaters, which should simplify matters considerably.

There isn't much to report on 2 metre activity at present, many operators have gone into hibernation. Graham VK1ED now operates with a long yagi on the band and is working into Sydney from Canberra regularly, using an IC202 to drive a home built linear using a 6/40 on SSB and CW. Graham also reports working VK2ZEZ in Ryde at good strength on both 6 and 2 metres.

I am hopeful that with improvements to my own (VK5LP) 2 metre equipment currently being undertaken (more power, better antennae) that Canberra may ultimately be worked from here. It is not an impossible distance (about 1000 km) and ought to be possible with CW anyway. Details of the improvements later when completed.

The Gold Coast newsletter also makes mention of 2 metre SSB contacts being made from that area on the low end of 144 MHz. Those within range are advised to look around 144.100 following the VK4WI Sunday morning broadcast, with VK4FE, VK4VK, VK4ABR, VK4TX and VK4ZAO normally being available. In addition VK2PU can also be heard from Kingcliff.

It has quite impressed me lately to find 2 metre SSB activity so much on the increase in VK4, perhaps my stirring while up there did help a little. However, Nev VK4ZNC writes to advise of a 380 mile contact on 27.6 at 0000Z between his station located at Mt. Archer 2000 feet a.s.l. near Rockhampton, and Allen VK4ZRF at Springbrook near the NSW border. Signals at both ends were weak but readable. Nev was using a ten element beam and an IC202 with a 50 watt PA, Allen used an FT220 transceiver (10 watts) and a ten element beam. Frequency 144.150. The mode used was SSB and no help gained from Es or ducting propagation. It proves once again it can be done, and I recall being told some years ago you couldn't work out of Rockhampton on 2 metres! Thanks, Nev., for your letter, and hope you can extend the distance further with better conditions.

Steve VK3CGZ writes to report a few odd 6 metre openings during June, with up to 20 stations being worked on occasions. He reports word from Graham P29DJ that he is building two 146 MHz carphones to introduce FM to his country. Graham is holding skeds with Mario VK4MS at Ingham nightly on 6 metres around 0800Z. They fire up on 7105 kHz at 0700Z, QSY to 52.050 MHz, then return to 3605 kHz to round off the contact. Most times Mario is audible, running 100 watts. Graham has an FTV650 and has less success on the return path. Currently he is thinking of building up the VK3ZAZ power amplifier, which should help a bit!

ATV is the big scene in Melbourne at present. Steve mentions over 20 stations receiving and transmitting video. Many stations have inter-carrier sound on 431.750, video on 426.25, with the FM talk-back on 147.630 MHz.

QSP from ZL3LN/C Chatham Islands suggests there is a possibility of 6 metre activity on this island from November — maybe another new country for all! Chatham Island is 400 miles east of New Zealand with a population of 600 people, 50 chickens, 4 dogs and 2 amateurs. ZL3LN has finished his tour of duty there and is OAT, but had more than 3500 contacts in six months on HF. Thanks for all the news, Steve.

### EME REPORT

Lyle VK2ALU reports the scheduled EME tests for 5.6 were carried out by Charlie VK2ZEN with the assistance of Ian Proctor. A one hour test was made with W1JAA, formerly W6FZJ. This was the first contact at his new QTH in Massachusetts. Signals were 2 to 3 dB above noise.

Chart recordings were made from the tape of EME signals received from WA6LET on 24.5, to obtain data on fading characteristics of the EME path. Indications of scintillation fading were present in addition to the very marked libration fading pattern.

As the signal was above noise level at all times, even at the deepest part of the fade, these chart records are the most useful information obtained to date for determining what type of emission and processing of received signals could be used to obtain the greatest advantage from the characteristics of the EME propagation path.

Now we have heard of everything department: W3CCX and crew plan to operate portable EME in Columbia, South America in July-August on 432 MHz. Their antenna will be an array of 16 large yagis, with a measured gain of 1 dB more

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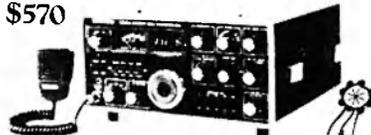
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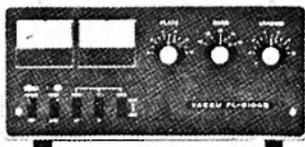
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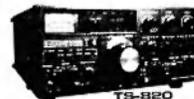
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than their 20 foot dish at home. This DXpedition promises to be quite an operation! A schedule has been circulated for EME tests with various stations, including VK2AMW, over the period 31.7 to 2.8. Thanks for all that news Lyle via "The Propagator".

VK5LP had the pleasure of meeting up with Lyle during July and being shown over the VK2AMW EME installation, of which I was duly impressed. Fortunately for me, the Saturday night of my stay, 4/7, actually coincided with an EME schedule on 432 MHz with stations in Canada, Holland and Sweden. I was able to observe at first hand what is involved in EME communication, and to see how Lyle with the help of Charlie VK2ZEN actually carried out these tests, which were successful, and will no doubt be reported in Lyle's notes next month.

Just a few words on EME for those of you not conversant with what goes on. Lyle took me out to the station around 0500Z and with his calculations already made as to the position of the moon, he set up the 30 foot dish according to his calculations to be looking at the moon, pressed the transmitting key, and back came his echoes! That was before any visual sighting was made of the moon. Subsequently, the dish was left to track the moon on its orbit for some 4 hours before we returned to the site for the actual tests. Lyle pressed the key again and back came the echoes once more. A polar mount is used at the Dapto dish to make this form of tracking possible. Everything went well with the equipment, and I enjoyed every minute of it.

My subsequent travels while on this short holiday run took me to view the installations at Ron VK3AKC in Geelong, who successfully works EME on 1296 MHz via a 20 foot dish, a visit to Ron VK3AGK at Kellor, Melbourne, who has a 12 foot stressed type dish in his backyard, and then to Ray VK3ATN at Birchip who has had successful EME contacts on 144 MHz using stacked rhombs, and is currently making good use of a 16 foot dish on 432 MHz, about 43 feet in the air, with regular contacts to Melbourne etc. A lot of information was gleaned from all these gentlemen, who were outstanding with their hospitality in every case. So much for the true amateur spirit, something I will always remember.

As other news is somewhat scarce during the winter doldrums, I feel I would like to bring a few excerpts from a Guest Editorial by Steve Grimley VK1VK in "Forward Bias" of June 1976. Steve speaks of the few pertinent remarks made in October 1975 by the Superintendent of the Regulatory and Licensing Branch of the then PMG Dept., Mr. Bob Crowe, when he addressed the Moorabbin Radio Club in Victoria. He is quoted as saying "From reports and observations over the past couple of years, it is apparent that the technical part of the amateur service has now disappeared. Satisfaction is now being obtained from the acquisition of commercial equipment, which leads to a social contact type of transmission". The paragraph concluded that this was a "sign of 3 times".

Steve's editorial comment reads "Many of us recall the days when our licence was to operate an 'experimental' station — later this was changed to amateur service, and new licensees were required to stay on CW for six months and submit a log for approval before being allowed to use telephony at all. It was a rare station that used any commercial transmitting equipment, and commercial receivers were mostly of the rebuilt war disposals variety. Antennae, even complex beams, were almost always home-brew. I can't help feeling that these were the best years in amateur radio. It is indeed pleasing to see the trend to simple homebrew gear once again, with the current novice operator constructional articles appearing in AR and elsewhere.

"The radio amateur has in the past 30 years been responsible for developing many of the advanced communications methods. A notable example of this is the single sideband suppressed carrier system. When I first heard US amateurs using SSB around 1949 my reaction was the same as most others — an amused reference to 'duck talk'. By the early 1950s the system had proved itself, and by the middle of the decade the home-brew construction articles began to appear in this country. The thrill of my first SSB contact (with W2TP) is one I'll take to my grave, a thrill doubly exciting because I was using a transmitter I'd

built myself. That was nearly 20 years ago. It is testimony to the skill, ingenuity, and enterprise of the radio amateur, that 30 years after they first used the SSB system, it has been given tacit approval by governments all over the world, and in many places its use is arbitrary.

"And I see two very good reasons to encourage the radio amateur to go back to experimenting and home construction. Firstly, the more we experiment the more likely we are to come up with another monumental breakthrough in the communications art. Secondly, there is a great deal of personal satisfaction to be gained by constructing one's own equipment."

I would like to make the following few comments on Steve's guest editorial. There is nothing in the editorial with which I would disagree, it's commonsense. Mr. Crowe's comments are probably quite valid for most HF operation, and the appliance operation of some amateurs on the FM channels. Despite the gradual development and distribution of commercial SSB equipment for VHF, much homebrew construction is still being done. No one can blame a person for purchasing a basic SSB source, with its inherent frequency stability and readout, most amateurs are still building their own linears to increase the power levels of these small commercial units. With solid state power amplifiers now being possible at reasonable levels of power with the provision of better and safer transistors, many such units are actually being built. Valve linears are tending to disappear for at least two reasons, many like to be up with the state of the art, and secondly, there aren't too many good QOE06/40 valves available these days.

One main point I would like to make however, is the very poor acceptance by amateurs of anything made by amateurs. For a number of years now I have awarded a prize at the Mt. Gambier Convention for the best piece of home constructed equipment, and some very good gear appears each year, good design, well and neatly constructed, with a good appearance. Should circumstances change, and you want to do something of a different nature, and the equipment you have so carefully and laboriously constructed be no longer of any use to you, you try and sell it for even a most reasonable figure of value — you just can't.

I have been through this situation a number of times. I suppose over the years I have built as many as most amateurs who go in for home building on a reasonable scale, but practically nothing has ever been sold at even a reasonable price, it's almost always a give-away. But recently, I sold a couple of items of commercial equipment several years old, still in good condition, and no trouble to get a reasonable price, I was happy and so were the guys who bought the gear. And that's one point of contention with a lot of people — you build something good and it's worthless almost in the eyes of fellow amateurs, but buy something from XYZ Company in Japan or elsewhere, and it will always have a fair market price if you look after it. Hence, some of the incentive to home-brew is taken away in these circumstances.

Nevertheless, I believe all amateurs should go through a stage of home construction if only to learn something, and this applies most particularly to VHF and UHF operation — there is no known way to learn the techniques associated with those areas of operation other than to roll your own, and experience will teach you much — you soon learn just how much inductance is represented by half an inch of wire left when you solder a bypass capacitor with a long lead etc.

Summing up, there is a place for both home-brew and commercial equipment in all shacks, everyone should try their hand at making some gear, particularly at VHF if possible. Maybe more important however, is the need for all amateurs to spread themselves out over our bands as much as possible. If the VHF and UHF population could be increased 100 times there would be a lot more incentive for people to keep actively operating on those bands. The die-hard VHF/UHF type will always be there, but I think it is necessary for the thousands of HF operators who never operate on any other bands to take a serious look at the possibilities that exist for something fresh to be done or thought about above 52 MHz.

That will have to do for now, before I get carried away on this very interesting subject — but I do make a plea for more operation on VHF/UHF by the HF gang — and you don't even

have to build anything these days if you want to stay commercial — equipment is now on the market covering 52, 144, 432 and 1296 MHz, take your pick.

Closing with the thought for the month: "To have lost your reputation is to be dead among the living".

The Voice in the Hills

# PROJECT AUSTRALIS

David Hull, VK3ZDH

## OCTOBER 76

OSCAR 6				OSCAR 7			
Date	Orbit No.	Time Z	Long °W	Date	Orbit No.	Time	Long °W
1	8586	00.57	64.19	1	18112	01.30	79.90
2	8599	01.51	77.81	2	18124	00.30	64.90
3	8611	00.51	62.69	3	18137	01.25	78.65
4	8624	01.45	76.31	4	18149	00.25	63.65
5	8636	00.44	61.19	5	18162	01.20	77.40
6	8649	01.38	74.81	6	18174	00.20	62.40
7	8661	00.38	59.69	7	18187	01.15	76.15
8	8674	01.32	73.31	8	18199	00.14	61.15
9	8686	00.31	58.19	9	18212	01.09	74.90
10	8699	01.26	71.81	10	18224	00.09	59.90
11	8711	00.25	56.69	11	18237	01.04	73.65
12	8724	01.19	70.31	12	18249	00.04	58.65
13	8736	00.19	55.19	13	18262	00.59	72.40
14	8749	01.13	68.81	14	18275	01.54	86.15
15	8761	00.12	53.69	15	18287	00.54	71.15
16	8774	01.06	67.31	16	18300	01.49	84.90
17	8786	00.06	52.19	17	18312	00.49	69.90
18	8799	01.00	65.81	18	18325	01.44	83.65
19	8812	01.54	79.43	19	18337	00.44	68.65
20	8824	00.54	64.31	20	18350	01.39	82.40
21	8837	01.48	77.93	21	18362	00.38	67.40
22	8849	00.47	62.81	22	18375	01.33	81.15
23	8862	01.41	76.43	23	18387	00.33	66.15
24	8874	00.41	61.31	24	18400	01.28	79.90
25	8887	01.35	74.93	25	18412	00.28	64.90
26	8899	00.34	59.81	26	18425	01.23	78.65
27	8912	01.29	73.43	27	18437	00.23	63.65
28	8924	00.28	58.31	28	18450	01.18	77.40
29	8937	01.22	71.93	29	18462	00.18	62.40
30	8949	00.22	56.81	30	18475	01.13	76.15
31	8962	01.16	70.43	31	18487	00.13	61.15

MODE B NOTES — Courtesy by Bob Arnold  
Since the last report the following newcomers to Oscar 7 Mode B have been heard:—  
VK3AOC VK3AKC VK6BE

The following DX contacts have been reported:—  
ZL3AR to VK6KJ and VK6WG  
V5GHI to VK6KJ and VK3ZBB

The Melbourne-Hong Kong path is at the extreme limit of Mode B, the window being open for a maximum of 2 minutes on the most suitable orbits — circa ascending mode 200.

How can we improve Oscar contacts? The most desirable antenna set-up consists of circuitry polarised antennae for 432 and 145 adjustable for both elevation and azimuth.

Communication using horizontally polarised antennae is generally satisfactory, rotation in azimuth is virtually essential but elevation can be fixed at about 20 deg. — this gives far better results than horizontal except for horizon contacts.

Remember, the higher the antenna gain the smaller the aperture and therefore the need for more accurate tracking systems.

## YRCS

Bob Guthberlet  
31 Bandon Terrace,  
Marino, 5049

I am indebted to Sam Voron who supplied the following information showing YRCS activity in N.S.W.

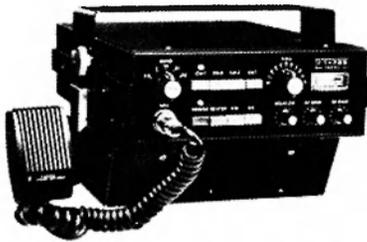
Some 30 persons attended the Committee meeting of the YRCS on Sunday 20th June, 1976, at Gosford High School. Reports presented for the first half of 1976 by Ken Hargraves VK2AKH, YRCS State Education Officer, included an announcement that the new N.S.W. YRCS elementary stages 1 & 2 notes are being widely used by



# Mini-Mobile/Base Station

COMPACT 120 WATT  
80 thru 10m TRANSCEIVER

FT-75B High power, for General use. FT-75BS Low power, for Novice use



Even the compact and sports car enthusiast can enjoy all band, SSB mobile operation, with the FT-75B "Mini-Mobile" transceiver. Features include a 120 Watt transmitter with provision for three, variable crystal controlled frequencies on each band; as well as provision for external VFO operation. The FT-75B is all solid state except for the final and driver stages and includes a built-in noise blanker and squelch circuit.

The FT-75BS has one final tube removed and PS transformer tapped to reduce power to approx. 30W PEP output. When full call is obtained the set can be re-modified back to original condition.

## TECHNICAL DATA — FT-75B

### GENERAL

Frequency Range: 80 M 75 KHz segment, 40 M 100 KHz segment, 20 M 150 KHz segment, 15 M 240 KHz segment and 10 M 400 KHz segment.

Mode: Upper Sideband for 20, 15 and 10 meter bands. Lower Sideband for 80 and 40 meter bands. CW for all bands.

Frequency Control: Crystal control VXO with 3 channels per band.

VXO Coverage:  $\pm 3$  KHz for 80 M,  $\pm 3$  KHz for 40 M,  $\pm 5$  KHz for 20 M,  $\pm 5$  KHz for 15 M and  $\pm 6$  KHz for 10 M.

Antenna Impedance: 50 Ohm unbalanced.

Size: 210(W) x 80(H) x 300(D) m/m.

Weight: 3.8 Kg.

### RECEIVER

Sensitivity: 0.5  $\mu$ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW.

Selectivity: 2.3 KHz nominal bandwidth at 6 dB down, 4.5 KHz at 60 dB down on SSB and CW.

Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1  $\mu$ V equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1  $\mu$ V. Attack time 5 millisecond and release time 1.5 seconds.

Audio Output: 2 Watts at 4 Ohm impedance.

FT-75B, inc. one crystal for each band 3565, 7085, 14,200, 21400, 28550 kHz, mic. & inst. book \$295

FT-75BS, inc. crystals 21175, 27125 kHz, mic. Inst. book \$276

### TRANSMITTER

Input Power: 120 Watts PEP on SSB and 100 Watts on CW at 50% duty cycle. (Slightly lower on 10 meter.)

Microphone: 50 K Ohm dynamic type.

Carrier Suppression: -40 dB.

Sideband Suppression: -40dB.

Spurious Radiation: -40 dB.

Distortion: -30 dB.

Final Tube: 12GB7 x 2.

JAS7576-23

FP-75B or BS, AC PSU \$74  
DC-75B or BS DC PS, inc. mobile mounting bracket \$80

All prices include S.T., Freight extra. Prices and specifications subject to change.

90 DAY WARRANTY



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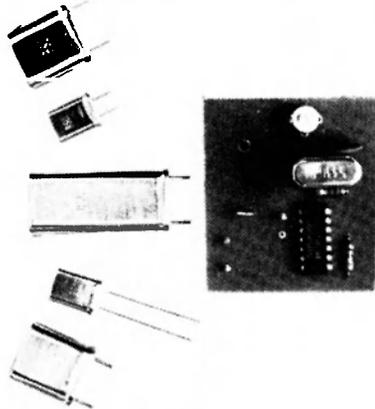
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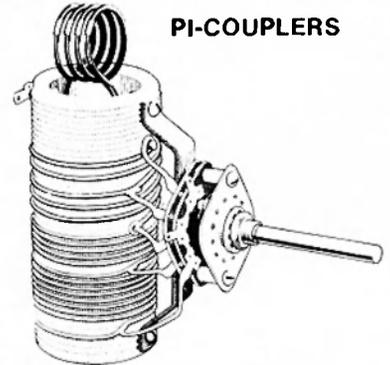


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Perth: COMMUNICATION SYSTEMS — Phone 76 2566  
Hobart: DILMOND INSTRUMENTS — Phone 47 9077

## PI-COUPLERS



### WILLIS MEDIUM POWER TYPE

For use up to 600 watts p.e.p. Match plate loads of 2,000 to 3,500 ohms (Z) and higher into co-axial cable. Operating O increases on higher frequencies to increase harmonic suppression, enabling practical values of tuning capacity to be used on 10 and 15 metres and allowing for wiring inductance (L). Incorporating extra switch section for shunting additional capacity (C) if required, or switching other circuits. Switch rated for 10 amps. at 2,000 volts with contact resistant (R) of 0.8 milli-ohms.

Suggested for use in "A LINEAR POWER AMPLIFIER FOR AUSTRALIAN CONDITIONS" (Refer "Amateur Radio", April, May & June issues, 1976).

PRICE: \$23.95

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many of the 26 school, regional and group radio clubs who are currently members of the YRCS (N.S.W.).

Noel Ericsson VK2MF, YRCS State Treasurer, presented a healthy financial position as a result of a variety of money raising activities. Brother Cyril Quinlan VK2ACQ, YRCS Private Studies Supervisor, described the successful Easter vacation camp at Wisemans Ferry for the many students around N.S.W. who are studying through correspondence. Activities included radio transmitting, theory classes, Morse classes, YRCS certificate examination etc. These types of activities allow the isolated YRCS student as well as students from other radio clubs to meet each other and gain new forms of incentive and assistance in their studies. Sam Voron VK2BVS, State YRCS Publicity Officer, outlined some of the problems faced by YRCS in this field, and advised the persons interested in new positions of public relations officer, magazine editor for beginner orientated activities, publicity officer and activities organiser for creating YRCS activities, such as radio camping holidays during school and public holidays would be welcome. Rex Black VK2YA, State YRCS supervisor, presented a report from Tim Mills VK2ZTM, President of the NSW Division of the WIA, outlining YRCS participation at the WIA Federal Convention. Several of the items in relation to YRCS and the Novice Licence were unanimously supported by N.S.W. YRCS and a special thanks was moved to Tim for his interest and support to YRCS activities. Present at the meetings were the WIA based DX group President, Roger Brown VK2BEQ and Vice-President, Paul Anslow SWL2PMA. It was decided that their comprehensive short and medium wave listeners' awards would be recognised in the N.S.W. YRCS awards system.

Country enquiries on the Novice Licence Course should be directed to Mr. Rex Black, 10 David St., Springwood, 2777, or to Westlakes Radio Club, Novice Training Manual, P.O. Box 1, Teralba, 2284.

#### NOVICE RADIO ON SYDNEY TELEVISION (Channel 9 news)

On July 4th some 60 persons from the Novice Amateur Radio group and the general public attended the WIA based DX group field stations set up on the Southern and Northern heads of Sydney Harbour. Television Stations ABC channel 2 and channel 10 filmed highlights of the activities which included a full quarter wave vertical on 160 metres being suspended by a kite up 125 feet and a full quarter wave earth hanging down a 500 foot cliff. Using 10 watts of AM on 1825 kHz. Reports of S9 into the Blue Mountains and around Sydney, as well as 30 dB over 9 in the Newcastle and Westlakes area were received. Operation from 160 to 120 metres provided several overseas contacts with continuous operation on 27.125 MHz providing a link between the northern and southern head groups. From these sites the regular WIA Sunday morning broadcast for radio amateurs and listeners was relayed on to 1825 kHz AM, 27.125 MHz AM and 28.5 MHz SSB, with those attending being given the opportunity to try their voice at relay identification and call-back operation.

Many thanks, Sam, for an interesting report. Will other States please take note. ■

## LARA

### Ladies Amateur Radio Association

Last month, we announced that LARA's first birthday had arrived and that celebrations and festivities had been indulged in accordingly. Only now have the details of the resulting orgy come to light, unearthed by our roving reporter. LARA in VK3 held a dinner party on Tuesday 27 July at the Salzburg Lodge for members and selected guests. The evening was a great success and the birthday well and truly (and energetically) celebrated. The bottle of champagne kindly donated by the Management was saved for the next monthly meeting with a view to livening up the proceedings of same!

The LARA birthday was also celebrated on the Monday night sked with members all over Australia coming up on air for the occasion — We remind members and all interested YLs that it is allowable for unlicensed YLs (and others) to speak on air

provided that all transmission is supervised according to the regulations, by the licensee of the station concerned. Regular Monday night skeds are held at (or around) 8.00 p.m. EAST on 3650 kHz.

At this time the August exam will be over but belated good wishes to YLs braving the exams, and we hope to hear you on air with brand new, squeaky clean licences (in a few months) when the results come out. Some YLs under pressure of other commitments prefer February exams go on with the study in the meantime.

Plans for LARA activity in the next year or so are still in the idea stage (until meetings and things have been held) so await the next exciting episode in October AR.

33's from Kate Duncan. ■

## QSP

### WARC 79 AND INTRUDERS

"Included among the aims of the amateur service at WARC 1979 will be the acquisition of amateur exclusive allocations in the 1.8-2.0 MHz and 3.5-3.8 MHz bands, and to clear the whole of 14 MHz. The Soviet authorities have already indicated their willingness to co-operate over the last item". Month on the Air column in Radio Communications July '76.

## IARU NEWS

Looking through the list of countries which are members of the ITU there are now 148 altogether. Of these there are 68 countries with no amateur radio societies affiliated with the IARU. Half of these are in Africa, over half of the remainder are in Asia and 5 are in the Pacific area.

Amateurs are active or are known to be able to get licences in about 50 of these countries. In the remaining countries (i.e. 18) amateur radio is either banned altogether (Afghanistan, China, etc.) or it is well-nigh impossible to get a licence (Albania, Iraq, etc.).

As all readers will know, each of these countries has one vote at ITU Conferences. USA, Japan, USSR, UK, Canada, Germany and the larger European countries are large, developed and active in amateur radio affairs.

The number of small independent nations which are members of the ITU is growing. Nauru Fiji, Tonga, Vatican, Liechtenstein, Oman, Qatar, Maldives, Kuwait, Bahrain, Swaziland, Lesotho, Comoros are a few of these.

Perhaps further comments are unnecessary in the light of IARU talks in Geneva this month about the situation.

The IARU R1 news of May '76 carries the news that the State of the Comoros and the Republic of Guinea-Bissau have become members of the ITU. The Comoros call sign series is D6A-D6Z.

From the same source it was most encouraging to note that the almost defunct Ghana Amateur Radio Society organised an amateur station at the Ghana Trade Fair in Accra earlier in the year, and gave a demonstration to the Head of State. Two officers of the Liberian Radio Amateur Association travelled to the Ivory Coast during March on a successful mission to promote multinational co-operation in Amateur Radio. It was also noted with interest that the licensing of amateurs in Zambia continued throughout the period when there was a declared state of emergency in the country. During June EL2BA, the IARU committee member of Liberia addressed a conference in Botswana of amateurs from all the surrounding countries to emphasize the need for the formation of a society in countries not having one.

On the WARC 79 front there is nothing fresh to report. The Institute now possesses copies of the voluminous submissions made by the ARRL, Canadian amateurs and RSGB to their respective governments. During September there is to be a meeting of various IARU experts in Geneva to prepare suitable WARC 79 amateur radio packages for use by societies or amateurs in the "less developed" countries.

August QST carries an IARU page devoted to the development of the flourishing Cyprus Amateur Radio Society where a 2m repeater 8000 ft. up on Mt. Troodos is only one item of their activities. This repeater was one of the important unifying

factors for the Island's amateurs and contacts through it reach to almost every part of the island as well as to Haifa in Israel. Another interesting item, apart from their 10m and 2m beacons, was the fact that mobile operations are prohibited except by members of their Cyprus Amateur Emergency Net. ■

## REPEATERS

Ken Jewell, VK3ZNJ  
Peter Mill, VK3ZPP

At the outset of this month's column I should apologise for the non-appearance of the column in last month's AR, but due to the pressure of work encroaching on amateur radio time, it was not possible to prepare a column by the deadline, also there was no news to hand. In a recent QSO with John VK5CU on 40 mx I was able to obtain some information for the column which also brought to mind a thought which I have had for some time, if a regular net could be established on 80 mx one night a month for repeater groups, they could help each other with any problems, and be brought up to date with developments in the federal sphere and all could benefit with an exchange of ideas, comments on this idea would be welcome.

### FEDERAL NEWS

In the near future a meeting will be held with the Post and Telecommunications Department to discuss some of the decisions that came out of the Federal Convention and to formulate the licensing conditions for repeaters that have been under review for some time. It is hoped that this meeting will enable the licensing of repeaters to be easier, and the conditions to be more realistic as well as uniform throughout Australia without the individual rules incorporated by certain parties in the various States.

### SOUTH AUSTRALIAN NEWS

There is a team led by John VK5JD who are apparently working on a repeater for the mid north area of South Australia at Port Pirie.

It is believed that this repeater will be on channel R42, running about 15 watts to a Ringo Ranger antenna and the call sign could be VK5RMM. There has been some problems with the site due to its remoteness, tests have been carried out and it is expected to be on the air by the end of August. A group in Adelaide led by project manager John VK5CU is working on the second repeater for that city, and due to financial assistance by both members and non-members of the WIA, the project is well on the way. The project has been on the go since March and the equipment has been obtained as a kit from VHF Engineering of the United States. The field tests at the site 1350 ft. ASL show that it will favour the north east toward the Barossa Valley. The repeater will run 15 watts through a diplexer on possibly channel R46 and the call sign is hoped to be VK5RRR.

### TASMANIAN NEWS

Not too much from down that way at this time but the Launceston repeater is still functioning as well as ever, the newest operational repeater in that State in Hobart is providing quite good coverage, but at the present time the receiver is lacking in sensitivity as it can be heard in the north of the State but cannot be triggered. The Loona repeater is not on the air as yet, but we hope to have more news of this next month, however the 432 MHz beacon operating from the site is getting out well.

### NEW SOUTH WALES NEWS

Advice has been received that from the 1st August 1976 N.S.W. will adopt the new numbering system for repeaters, and use the single digit identification for repeaters that was shown in the July issue of AR in this column under Victorian News. However N.S.W. has made a good suggestion for the changeover period that is to adopt the following in calling for a few weeks — "I will see you on Geelong channel 8" or "this is VK2XXX calling CQ through channel 5 Wollongong", after a few weeks the normal reference to the channel number only will be quite sufficient.

There is a proposed repeater for the Blue Mountains in the planning stage at the moment which will be on channel R47, also the VK1 Division is proposing a service on Mt. Ginini



# VHF FM FROM ONE OF THE WORLD'S LEADERS **YAESU**

## ● 24 Channel FM Transceiver

# FT-224

The FT-224 is an advanced, solid state transceiver, that features 10 watts and 23 channel flexibility plus one priority channel, all in one compact package. Dial is marked in channel frequencies for direct read-out, and three popular channels are installed. Additional plus features include automatic high VSWR protection of the final output transistor, and reverse power line polarity protection. A monitor switch is provided which enables checking of your own transmitter/receiver frequencies. Panel meter functions as "S" meter, transmitter RF output, and centre reading discriminator meter which enables received frequency to be checked. FET RF with five section helical resonator. Three IF filters. The FT-224 comes complete with a built-in speaker, mobile mounting bracket, and dynamic microphone.



**GENERAL**  
**Frequency Range:** 146 to 148 MHz.  
**Number of Channels:** 23 plus 1 priority channel.  
**Mode:** FM.  
**Frequency Stability:** ±0.001%.  
**Circuitry:** 30 Transistors, 23 Diodes, 4 IC, 5 FET.  
**Power Source:** 13.5V DC.

**Antenna Impedance:** 52 ohm unbalanced.  
**Power requirement:** 0.4A receive, 2.2A transmit (DC).  
**Size:** 180(w) x 70(h) x 220(d) mm.  
**Weight:** 2.5 kg.  
**RECEIVER**  
**Sensitivity:** 0.3µV for 20 dB quieting.  
**Selectivity:** 15 kHz at 6 dB, 25 kHz at 60 dB.

**Audio Output:** 2.5 Watts at 4 ohm  
**TRANSMITTER**  
**RF Output Power:** 1 & 10 watts.  
**Spurious Radiation:** -60 dB or better.  
**Deviation:** ± 5 kHz nominal.

FT-224 (inc. 4 chns.) **\$199.00**  
 Extra standard channels **\$9.00**  
 FP-2 Matching AC PS **\$69.00**

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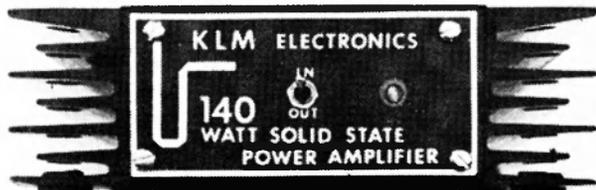
FRED BAIL VK3YS  
 JIM BAIL VK3ABA

JAS7576-20

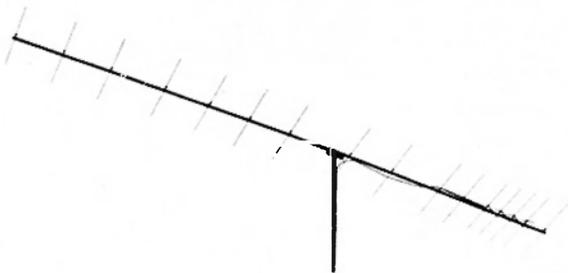
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  - (1) All parts except elements and booms.
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  - (3) Antennas complete.
- 144-148 MHz — 8 Models including 2 for circ. polarization.
- 420-470 MHz — 5 Models including 16 el. 12 ft. boom 15 dB gain.
- 52-54 MHz available shortly.
- **HIGH GAIN HF ANTENNAS** — Complete range available shortly.
- **QUARTER WAVE SLEEVE BALUNS**  
 2-way and 4-way power dividers and couplers:  
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 420-470 MHz
- Tubing, Lowloss coax., connectors, etc.



- **SOLID STATE AMPLIFIERS (13.5V DC Nominal)**  
 To suit your FM/CW/SSB rig (no tuning micro-strip line circuitry).
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  - 420-450 MHz — 5 Models including 2 linears.
  - 52-54 MHz available shortly.
- **KLM TRANSCEIVERS** 144-148 and 432-436 MHz.



USB, LSB and CW ideal for Oscar 7

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17A Ashton St., Labrador, Q. 4215 (075) 37 3926 (Mike)

which will provide a wide service area to southern N.S.W., the channels for these repeaters are yet to be confirmed.

### VICTORIAN NEWS

The repeater for Mt. Macedon is now a step closer with the erection of the transmit antenna on the mast and the coax has been run to the shack. The receive antenna has yet to be raised and the various parts of the unit to be put together as a working rig, however the end is coming closer after three years of stagnation.

Also hastening slowly is the north east repeater, VK3RNE with the signing of the lease for the site and now the construction of the building can get under way shortly. At Geelong VK3RGL has had its fair share of problems of late with a power supply that went QRT, transformers and all, and a time that was about as consistent as a roulette wheel, however these problems have been solved and the repeater is working better

### QUEENSLAND REPEATERS

#### OPERATIONAL

CALLSIGN	Ch	LOCATION OR SERVICE AREA	TYPE OF IDENT	RANGE	PROJECT OFF.
VK4RBN	R48	Brisbane/Mt. Glorious	Audible	80 km	VK4DT
VK4RGC	R42	Gold Coast/Mt. Tamborine	Audible	80 km	VK4ZDA
VK4RAR	R42	Rockhampton/The Range	Audible	100 km	VK4MM

#### TESTING STAGE

VK4RAT	R42	Townsville/Mt. Stuart	Audible	90 km	VK4XZ
VK4RA1	R46	Ipswich/Denmark Hill	Verbal	50 km	?
VK4RDD	R44	Toowoomba	Verbal	50 km	?

than ever. It is hoped that by the time that this is being read, the newly acquired keyer will be beeping out VK3RGL at the appropriate intervals and new lo loss coax will be offering less resistance to the RF on the way to the antenna.

On the UHF scene I have been accused of stirring, so for those interested, the Victorian

Division lodged an application with the P. & T. Dept. on 26th July, 1976, for a service repeater on UHF with the proposed call sign VK3RMU to serve Melbourne, the antenna and coax is ready on the site on Mt. Dandenong. The equipment has been obtained and only the keyer has to be built, good news Ron.

## IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

Another period of very quiet conditions has been with us again. Since early June there has been little or no solar activity noted. Daytime conditions have been fair on the higher bands when the A index has been low. Even the periods of relatively high A have been less numerous than has been the custom of late.

From July 1 WWV and WWVH 18 and 45 minutes past the hour Solar Flux and A index announcements were curtailed. This somewhat reduced the do-it-yourself information and the 14 minutes past the hour "radio quality report" will cease at the end of September. So our real time solar activity data will be lost.

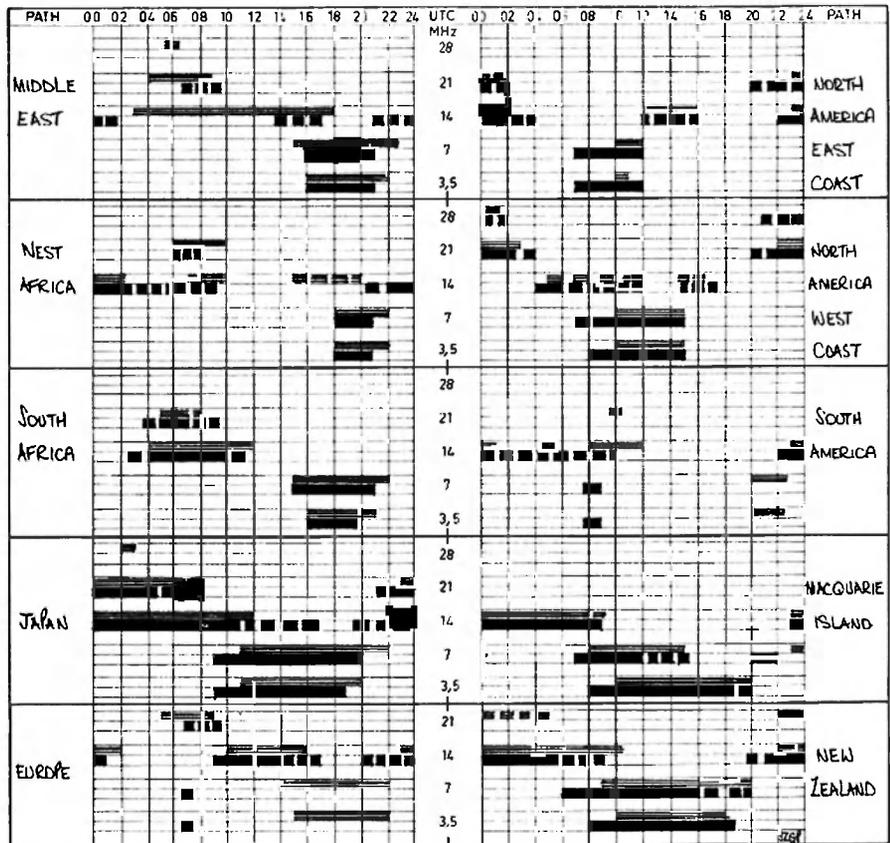
Frank Hine VK2QL has arranged with IPS Sydney to continue their supply of Solar Flux and A index data for inclusion in the VK2WIA Sunday morning broadcast. It is hoped that arrangements will be made to have this information over VK2WIA at a fixed time each broadcast. This will enable those who rely on this valuable data to maintain their records at least on a weekly basis — Thanks, Frank.

Recent articles from the US suggest that we are in for a period of very low sunspot activity. It was noted in the late 1600s that there was a period of around 75 years when there was no visible sunspot activity. Other scientific data confirmed this phenomena. The writer had some quite convincing data to accompany his theories. There is much conjecture that the lack of sunspots in reasonable quantity is causing the decline in rainfall noted over the past few years. The latest Solar Flux predictions still make interesting reading.

Month—	1	2	3	4	5	6	7	8	9	10	11	12
1975—	78	74	72	71	70	70	77	90	80	76	81	75
1976—	74	70	77	74	76	77	79	116	117	117	117	117
1977—	117	117	117	117								

FIGURES 74 72 ACTUAL  
FIGURES 116 117 PREDICTED

These figures are at March 76 and are from CCIR Zurich and published in the ITU Telecommunication Journal. The predicted figures for June



FROM WEST AUSTRALIA (solid lines/bars)  
FROM EAST AUSTRALIA (broken lines/bars)  
FULL LINES & BARS BETTER THAN 50% OF MONTH, BUT NOT EVERY DAY  
BROKEN LINES & BARS LESS THAN 50% OF MONTH. USEFUL AT PERIODS OF HIGH SOLAR ACTIVITY  
PREDICTIONS COURTESY I.P.S. SYDNEY.

July appear high — July looks like remaining around 70 at the time of writing. Quite a few "experts" still consider late 76 as the beginning

of the rise in the smoothed sunspot numbers. The forecasts for June 5, July 5, Aug. 4, Sept. 4, can we go much lower?

## 20 YEARS AGO

Ron Fisher, VK3OM

### SEPTEMBER 1956

The September 1956 issue of Amateur Radio marked the debut of the G4ZU Three Band Minibeam. This was possibly the first beam designed to cover the 10, 15 and 20 metre bands without switching and at the same time be of compact dimensions. G4ZU was of course G. A. Bird who

was later to design the controversial Bird Cage antenna. The G4ZU article was reprinted from the February 1956 issue of the RSGB Bulletin.

Part one of a three part series on Pulse Theory by Ian Berwick VK3ALZ appeared along with New Bottles for Old by Alan Head VK3AKZ. Alan replaced some of the original tubes in his Marconi CR100 receiver with miniature types for improved performance.

Phyl Moncur's YL Corner included a most interesting biography on Austine Henry VK3YL. At that time (1956) she had held her amateur licence for twenty six years.

The Federal Notes consisted of a report on the Region 1 conference held in Stresa, Italy. Forty

official delegates from fourteen countries attended and discussed a wide variety of subjects.

It seems that quite a scare went through the amateur ranks during the early part of 1956. Rumour had it that television receivers might have an IF frequency of around 21 MHz. Federal Executive immediately requested information from the ARRL and also from American TVI expert Phil Rand which was in turn passed on to the authorities. All of this apparently achieved results as the Post-Master-General announced on July 19th that manufacturers should adhere to the Broadcast Control Board recommendations and that the public should be aware of the problems associated with non-standard receivers.

**Some words of doubtful wisdom from ARIE BLES VK2AVA of SIDEBAND ELECTRONICS IMPORTS Springwood, N.S.W.**

Last month I mentioned my involvement in the YAESU MUSEN FRG-7 receiver development.

In the 1950's, some 20 odd years ago, RACAL in England started to apply the drift-free WADLEY LOOP principle in an all-band receiver, which already then aroused my interest. Shielding in high-impedance valve circuit design was then a major undertaking, RACAL used die-cast boxes for the various circuit stages, and home-brewing of a similar receiver was not done at that time.

Ten years later, Ian Pogson of RADIO TV & HOBBIES, now ELECTRONICS AUSTRALIA, undertook the courageous project of the DELTA-HET receiver and again only very experienced constructors managed to make a go of it, with their knowledge of and access to TV alignment equipment.

Four years ago, when the first news arrived about the BARLOW WADLEY receiver, again I became more than interested, procured a sample and found it adequate and started to import the sets from South Africa, to date having distributed over 500 of them. Two years ago, while in DURBAN, South Africa, at the BARLOW factory, I made a plug for the production of a more sophisticated Barlow Wadley receiver, a "cosmetic improved design" with the appearance of a standard communications receiver, but I could not find support for my idea. Some top-level Barlow manager had already decided that the set should remain as it was. That made me decide to go elsewhere with my ideas, and JAPAN was the most likely place to arouse interest. However, even there it was not easy to convince manufacturers of the potentials of an all-band stable receiver design, but I persevered, and supplied them Barlow Wadley samples. Eventually Sako Hasegawa, the progressive manager of YAESU MUSEN saw something in it, although I have a suspicion that the Selwa people, who make the SSR-1 for DRAKE also benefited from one of my Barlow samples.

A year ago Mr. Hasegawa told me during one of my six monthly visits to TOKYO, that he was making progress with his Wadley-loop receiver project, and voluntarily promised me as a reward for my efforts in the matter, to supply me direct supplies of the finished product as soon as it would come off the assembly line. Last November he showed me a completed FRG-7 sample, but had production problems, and mentioned objections against direct supplies to me!

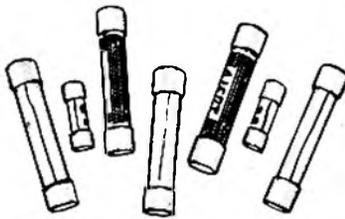
Well, there we are, samples of the FRG-7 receivers are now at a number of places in Australia, I have one myself and must say, it is good, looks good in its type FT-101-E cabinet and performs well. It will soon be the most popular all-band communications type receiver, easy to tune AM, CW and SSB signals, does not overload on strong signals but needs an external antenna, co-ax fed at the higher frequencies. Good luck to YAESU MUSEN with future new designs, their FRG-7 outperforms the XCR-30 and SSR-1 by a large margin.

ARIE BLES, VK2AVA

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Pty. Ltd.

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cartridge fuses



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- TDC 13:** 20mm x 5 mm Quick acting 63 ma to 3 amp
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- TDC 123:** 20mm x 5mm Slow blow 100 ma to 2.5 amp.

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Telex: Melbourne, 31447  
Sydney, 21707 Brisbane, 41500 Perth 93244

**AWARDS COLUMN**

Brian Austin, VK5CA

These two awards should be of interest to Novice Licensees who wish to start chasing certificates—**TEN AMERICAN DISTRICTS AWARD**

General—

The Lockheed Amateur Radio Club (W6LS) is pleased to offer the TAD award as an operating incentive to those who have not yet obtained their Worked All States award. The TAD award has already gained a satisfactory degree of popularity with American Novices and DX hams. All correspondence should be sent to the Lockheed Amateur Radio Club, 2814 Empire Avenue, Burbank, California 91504, U.S.A. W6LS will do all it can to be on the air to keep any requested QSO schedule. We particularly appreciate opportunities to QSO DX stations which have received the TAD award.

Rules—

1. The TAD award is available to all licensed hams and ham clubs.
2. American hams must submit postmarked QSL cards as proof of two-way contacts with hams in all ten (1 thru 0) USA call districts.
3. DX hams can meet the requirement stipulated in (2), or they can have their cards and/or logs verified by a local club officer. The signed verified list is acceptable in lieu of postmarked cards.
4. Cards from W6LS and/or W8LS members (who use club cards) do not have to be postmarked.
5. The postmarked original envelope can be sent with a card which does not directly show a postmark.
6. QSL cards (if provided) are returned promptly at no extra cost.
7. No minimum report is required, but each QSL must show a report.
8. All ten contacts must have been made from the same call sign area, such as W2, G3, or VU2. However, these contacts do not have to be made from one location within that call-sign area.
9. Contacts can be to or from fixed, mobile, portable, or fixed-portable ham stations; there is no restriction. Contacts count for the call-sign area in which they are made.
10. If your call sign changes, previous contacts still count, as long as they were made from the same call sign area in which you now operate.
11. Crossband and/or cross-mode contacts are acceptable.
12. Contacts do not have to be made after any specific beginning date, nor before any closing date.
13. Hand-printed endorsements will be added (per request) for operating distinctions such as QRP, SSTV, Oscar, RTTY, Code, SSB, One-Band, YL etc.
14. Remember that Hawaii (KH6/WH6) is in the 6th USA call district and Alaska (KL7/WL7) is in the 7th USA call district.
15. Application must be accompanied by one dollar (cash, USA stamps, or IRC's) to pay award costs and postage.

San Rafael High School Radio Club is sponsoring a "NOVICE ALL-AMERICAN" AWARD.

This award is designed for two purposes. The first is to provide an award that is well within the reach of any novice. All a novice need do is to work one station in each of the ten call areas and submit a list of contacts with the date and time of the contacts to the Awards Manager, along with \$1 or 4 IRCs for handling.

The second purpose of this award is to encourage the more advanced licence holders to work a few novices. To this end, this award is also available to licence holders above the level of novice. However, to encourage the above, the more advanced licence holder must work a novice in each of the ten call areas. Submit for the award in the same fashion as the novices.

As a wild card for incentive purposes, any

territorial possession of the USA outside the continental limits (Including Hawaii and Alaska) listed by the ARRL as a country may be substituted for one of the ten call areas.

The awards manager is—  
William A. Pearson WB6QBJ,  
25 Rudnick Avenue,  
Novato, California 94947.

# MAGAZINE INDEX

Syd Clark, VK3ASC

## BREAK-IN May 1976

From Spark to Space; Profile of a Radio Pioneer — Syd Strong; Ashburton in the Mid-Twenties; Tuvalu.

## NZART GOLDEN JUBILEE CALLBOOK

A copy of the latest issue of the NZART has just reached the writer for a mention in this month's notes. New Zealand Amateur Radio Stations are listed alphabetically within each of the four ZL call sign areas. In addition there is a complete list of NZART Non-transmitting members and a great deal of information which will be useful to DX'ers and SWL's, not to mention the full gamut of advertising.

## CQ MAGAZINE March 1978

The DXCC and Countries List Criteria; Kenwood TS-520 Transceiver Additions; Chicago FMers direct-Dial Police via 911 Emergency Number; A receiver Pre-Amp for Heath SB and HW Series Transceivers; Hampeak; Review; Kenwood TS-700A; A Backspace Modification for the WOLMD Keyboard; Improved Performance from the Drake R-4B and T-4XB; Longwave Simplified; Improving the Heathkit HW-101 Transceiver; Antennas.

## CQ MAGAZINE May 1976

A Single Element Delta Loop Antenna for 15 & 20 Metres; An Audio Powered Noise Clipper; W5DFU, Fast Scan/Slow Scan Innovator; Restoring old Transmitter for Novice Use; An Inexpensive Memory Keyer for Contests; From Novice to Extra at Age 13, A Quick and Easy 160 Metre Vertical Antenna.

## HAM RADIO May 1976

A Pin Diode Transmit/Receive Switch; Cylindrical Feed Horns; Six Element Collinear Array; Low Profile Three Band Quad; Selective Antenna System; Loop Yagi Antennas; Towers and Rotators; ZL Special Antenna; 5/8 Wavelength Vertical Antenna for 2M; Low Cost Antenna Rotator; Aural SWR Indicator; VHF/UHF Antenna Techniques.

## QST May 1976

A Boondoggle in the Boondocks; Learning to Work with Integrated Circuits; A PROM for the Accu-keyer; Power Amplifier Development with your Transistors; One KW — Solid State Style; The 40-M Triangle; Build A Tune-Tin; Home for Sweepstakes; Frequency Measuring Test; Results 42nd ARRL November Sweepstakes.

# LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

Dear Sir,

Further to my article dealing with rechargeable nicad and alkaline batteries, published in March 1976 AR, I have come across two separate cases where a nicad cell seemed completely dead. Not only was there no voltage across it but when checked both ways on an ohmmeter the cell showed a dead short.

On the assumption that one could hardly make matters worse and that there must actually be a short in the cell, I got a couple of leads and connected them to a twelve volt ten ampere power source (a car battery would do) and jabbed the leads momentarily across the cell. (Don't hold the leads on even for a second or the cell might explode). As I had hoped the short circuit cleared and the cell immediately showed a slight voltage. After two or three slow charges the cell came

back into what appeared to be normal working order.

I can only conclude that there was a small whisker of metal somewhere inside the cell which was causing an internal short circuit and the surge of high current was sufficient to fuse it and clear the short. Anyway it is a tip worth trying with nicad cells which show this condition.

Roy Hartkopf VK3AOH.

The Editor,  
Dear Sir,

I am writing this letter regarding a confidence trick played on me by a person involving parts for my amateur radio set. I hope that you publish this in the next AR so it does not happen to some other amateur.

At approximately 4.40 p.m. on Wednesday, 7-7-76 I was called on the telephone by a friend of mine whom I know very well and who had something for me. I proceeded to my car which was garaged and went to his place. I stayed with him for no more than twenty-five minutes and returned home. On my return, I was informed by my mother and father that a "Brian Perry" from AWA had called with some parts for my radio set.

These were three used tubes a 6BQ7A, ECF8Q, 6V8 wrapped in brown paper. This "Mr. Brian Perry" told my parents that he was doing me a favour by dropping them off as he knew that I was anxious to obtain the parts and also that he could not stay long as his boss was in the car waiting for him.

He said to my parents that he had telephoned me earlier? and that he was surprised I was not at home? also that he knew where I was going? and that he would find me there. My father being a trusting and good hearted chap, said that he would pay this "Brian Perry" then and save him the bother.

My father was told the parts were \$19.50 and this was written on the brown paper with a message — "Phone Don tomorrow — If satisfactory 747 8148. My father gave him a \$20 note and was given fifty cents change. On returning I rang the 747 8148 number to find that it was a non-existent number.

This "Mr. Brian Perry" is about 45, has brown wavy hair which is receding at the forehead, is about 5'7" tall, medium to fair complexion and weight approximately 12-13 stone, he was dressed in brown suit with white shirt. He is glib and fast talking and had alcohol on his breath at the time. This trick occurred in the eastern suburbs of Sydney, but could happen anywhere, I guess.

I warn fellow amateurs and their families to be careful of this trick and for them to watch out for this chap, who seems to have done it many times before. I would be interested in any information any AR readers have regarding this person.

Yours faithfully,

James Goodger, VK2JO.

(We hope that members will be alert to this confidence trick and report any similar occurrences to local authorities — Ed.)

# INTRUDER WATCH

All Chandler, VK3LC  
1358 High Street, Glen Iris, 3146

I wish to enlarge on two statements made in "AR" of July 1976. Firstly, concerning Radio Pakistan, on page 28 "IARU News" quoting the then PMG's Department as saying: "while the Administration cannot of course, condone the use of Amateur channels for broadcasting purposes, in view of all the circumstances, it is considered that the assurance given by Pakistan that it will vacate the channel and until doing so, will limit operation to times unlikely to affect seriously the activities of Australian amateurs . . ."

Twenty years later, Radio Pakistan is still as active and virile as ever, broadcasting in the 7 MHz band at times around 1200z because of a resolution taken at the 1959 ITU Conference. The resolution is as follows — "PAKISTAN — Recognising (a) that the frequency management procedure outlined in Article 10 of the Regulations has not been accepted by all frequency users; (b) that this procedure does not solve the prob-

lem of a large number of out of band stations which are already in operation; (c) that this procedure does adequately cover the needs of the countries not having sufficient listings in the Master Frequency Record; (d) the Delegation of Pakistan accepts this procedure only on a trial basis.

The Delegation of Pakistan is not satisfied with the allocation in the band 7-7.3 MHz particularly, and therefore further reserves the position of its country on Resolution No. 10 annexed to these Regulations, relative to out of band broadcasting".

Resolution No. 10 states — "The Administrative Radio Conference, Geneva, 1959 — considering (a) that the sharing of frequency bands by amateur, fixed and broadcasting services is undesirable and should be avoided; (b) that it is desirable to have world-wide exclusive allocations for these services in Band 7; (c) that the band 7000 to 7100 kHz is allocated on a world-wide basis exclusively to the amateur service; (d) that the band 7100 to 7300 kHz is allocated in Regions 1 and 3 to the broadcasting service and in Region 2 to the amateur service; resolves — that the broadcasting service should be prohibited from the band 7000 to 7100 kHz and that broadcasting stations operating on frequencies in this band should cease such operation; and noting — the provisions of No. 117 of the Radio Regulations".

No. 117 reads — "Where, in adjacent Regions or sub-Regions, a band of frequencies is allocated to different services of the same category, the basic principle is the equality of right to operate. Accordingly, the stations of each service in one Region or sub-Region must operate so as not to cause harmful interference to services in the other Regions or sub-Regions".

It will be very interesting to note what is going to be "resolved" at the WARC Conference in 1979 and whether it can be implemented!

Secondly, page 30 — "Guidelines etc." section 8 and 9 refers to "pirates in the 11 metre band", and says in substance — "these operators are intruders and should be treated as such".

While being substantially correct, I would like to qualify that statement. The Intruder Watch is mainly concerned with Commercially oriented intruders, and deals with our Central Administration whereas, these "pirates" are the concern of the Divisional Administrations. In the case of apprehending them, quickness is the essence of the operation and, therefore, instead of alerting Divisional Intruder Watch Co-ordinators it would be much quicker to telephone the Divisional Telecom office where procedures could be implemented immediately to apprehend the "pirate". They have ways and means of detecting "pirates" if alerted at the appropriate moment. After that a formal report could be forwarded to the Intruder Watch Divisional Co-ordinator concerned.

# CONTESTS

Kevin Phillips, VK3AUQ  
Box 67, East Melbourne, 3002

## CONTEST CALENDAR

September  
11/12 European Phone Contest  
16/18 YLRL "Howdy Days"  
18/19 Scandinavian CW  
25/26 Scandinavian Phone

October  
2/3 VK/ZL/OCEANIA PHONE  
9/10 VK/ZL/OCEANIA CW  
16/17 Scouts Jamboree  
16/17 RSGB 7 MHz Phone  
30/31 CQ WW DX CW

November  
6/7 RSGB 7 MHz Phone  
27/28 CQ WW DX CW

## YLRL "Howdy Days"

Starts 1800 GMT 16 September and finishes 1800 GMT on 18 September. This activity is for YLs, and scoring is based on contacts between YLs only. All bands and modes may be used, but cross band or net contacts do not count. Scoring is 2 points for each YLRL member worked and 1 point for non-members. Only 1 contact with the same station is allowed regardless of the band. For the final score, add the OSO points, there are no

multipliers. Logs to be sent to Beth Newlin, WA7FFG, 826 W. Prince Road, 06, Tucson, AZ85705, by 18 October.

### SCANDINAVIAN ACTIVITY CONTEST

CW — starts 1500 GMT on 18 Sept. and finishes 1800 GMT on 19 Sept.

Phone — starts 1500 GMT on 25 Sept. and finishes 1800 GMT on 26 Sept. All bands 3.5 to 28 MHz may be used. The following prefixes will be considered as countries for the contest. LA/LJ/LG, JW, JX, OH, OHO, OJO, OX, OY, OZ, SM/SK/SL. Classes are Single operator, Multi operator, single and multi transmitter. Multi transmitter stations must use separate series of serial numbers for each band.

Exchange RS(T) and a progressive QSO number starting with 001. Scoring is 1 point per completed QSO, and the multiplier is the sum of SAC countries worked on each band as listed above. Final score is the sum of QSO points from all bands multiplied by the sum of the multiplier from each band (max of 10 per band). Scoring is on an all-band basis only.

Include a summary sheet showing scoring and other information, your name and address, and a signed declaration that all rules and regulations have been observed. Mailing deadline is 15 October and logs go to: SSA Contest Manager, SM0DJZ, PO Box 3036, S-195 03, Maersta, Sweden. ■

## HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

### FOR SALE

FT75 Transceiver with DC power supply, many xtls, inbuilt VFO, 80 and 20m (VFO removable leaving no marks), \$250 ONO (going Atlas). Sansei SWR meter model SE-405P, works ok on HF, \$12. Desk Mic model DM-112 with extra long goose neck (50k imp), \$12. EA240 type Rx .5 to 30 MHz, pass any test of appearance and performance at \$160 ONO VK4XT, Box 496, Dalby, 4405.

2 Mx FM — 2 AWA MR6As, good cond., six chan., 15 watts out, good Rx, six chan. A(37), B(40), C(43), 50, R2, R8 to be shared between both rigs — \$110 the lot ONO. Contact Ken Jewell VK3AKK, Ph. (03) 604 8219 BH or (052) 82 2160 AH.

Acitron Transceiver, all bands, 400W PEP, digital dial, \$425, will trade. Ph. (03) 58 7441.

Heathkit SB401/SB301, 80-10m Transceiver, plus SB610 Monitorscope and SB600 matching ext. speaker. USB, LSB, CW and RTTY modes, all bands. All units in good condition, no mods., to be sold as one unit complete with manuals, \$475 ONO, or would discuss a swap with a Yaesu. Trio or Uniden AC/DC Transceiver. VK2BIP, QTHR. Ph. (060) 76 9331.

FT75 Transceiver with AC supply, DC supply, FV 50C VFO, under dash mobile cradle and front cover, home station teak veneer console to house above gear, 9 ft. centre-loaded multi-band whip, \$270 ONO. Alan Bradley VK3LW, 70 James St., Belmont, 3216. Ph. (052) 43 7550.

HF Transceiver, AM 160m-80m, tunable Rx, 3 xtl controlled ch on Tx, 12V DC or 240V AC, ex Castlemaine Fire Brigade Base Stn., \$50. Joe Dorman VK3YH2, Ph. (054) 23 2367.

FT220 Yaesu 2m Transceiver FM/SSB, with repeater function property of VS6BE, \$295. Contact VK1BH, QTHR. Ph. Bus. (062) 65 5347, AH (062) 88 6062.

FT101B Transceiver, excellent condition, no mods, complete with CW filter, \$520. VK3UM, 30 Rollaway Rise, Chirnside Park, 3140. Ph. (03) 735 0783 AH.

Collins KWM2A Transceiver, 3253A Transmitter, both as brand new and with matching 240V AC power supply. Ph. (03) 24 1231, AH (03) 20 6135.

Pye MTR MK1 Tx Rx xtl locked about 25W to final and manual, \$90. Pye 62 5W transceiver, contains DC-DC Inverter and manual, \$40. VK3EB, QTHR. Ph. (03) 82 1769.

FT200 Transceiver and power supply, no mic., \$320. Tac TO-2 2 in. Oscilloscope, \$50. VK2BVR, QTHR. Ph. (02) 620 1444.

Service Manual for R5223 Communication Rx, consisting of complete detail of voltage and alignment data, each unit, mechanical repair with full description components and parts with two large circuits containing int. and ext. wiring diagrams, layouts of adjustment points of each unit etc., all these for \$22, incl. postage. J. C. van Ooijen, Box 141, St. Kilda West, 3182, Vic. Ph. (03) 699 2400.

Vertical Hy-Gain 18V antenna, base loaded 10 thru 80m, unused, \$29. Quad ant. components, 2 crossarms, boom, 8 al. and fibreglass spreaders (no ant. wire), \$40. VK3UJ, QTHR. Ph. 874 5632.

Trio 9R 59DS Rx 0.5-30 MHz AM/SSB, ext. calib., handbook, \$120 ONO. P. Hamilton, 10 Highmore Ave., Bayswater, 3153. Ph. (03) 729 2504.

FT200 Transceiver with FP200/250 power supply and English manual, few hours use in as new cond., can demonstrate any band, \$375. VK2BTY, Ph. (02) 498 3926.

11m Carphone, 10W AM, good cond., PS included, front panel, ant. tuning indicator, Offers. 6m beam, 5 el. folded dipole, DE, Offers. Dictaphones, good cond., PS and speaker units inc. and mics., \$20, some tapes. Bruce R. Kendall, 10 Carter Cres., Werribee, 3030. Ph. (03) 741 2382, 741 2350, 741 1127 any time.

Kenwood TR2200G 2m FM 1W ch. 8 (4), A. Brand new, hardly used, \$160 complete. FTV650 6m Transverter, brand new, used once only, complete inc. patching leads, manual, carton, etc., \$130, must sell the lot very soon. Bruce Kendall, 10 Carter Cr., Werribee, 3030. Ph. (03) 741 2382 any time.

Heathkit HW101 Transceiver, complete with mic. and AC PSU, Heath HN-31 dummy load. AR2 2m vert. antenna plus 4 Heath vert. for 40, 15 and 20m. Owner returning to USA, must sell, \$340 the lot. VK1DS, QTHR. Ph. (062) 88 5001.

FT200 Transceiver with FP200 power supply, in original carton, \$300. Also 240V/100 875VA Transformer, by Don Electric, what offers? L. T. Swain VK2CS, QTHR. Ph. (049) 59 1629.

Tri-Band Quad Kit, VK3ASC type, brand new, unused, \$135 freight forward. VK4FQ, 153 Mill Drive, Mt. View, Townsville, 4814.

Oscillograph, Cossor Model 1065, mint condition, complete with Hi-Z probe Y amp DC to 11 MHz 4 in. screen, enquiries in writing to James, C/- State Crown Law Dept., 33 Franklin Street, Adelaide. Price: \$100 firm.

Bird wattmeter module type 500C, \$40. Also Woden UM2 modulation transformer, two of three inch selyens. Hills five section fifty feet tubular mast with guy rings and foot plate. Offers. VK2BQJ, QTHR. Ph. (02) 642 0122 Bus.

FT2FB as new. Ch. 40, 50, R2, R8, \$150. Ken KP202 hand-held transceiver with leather case and charger, ch. 40, R2, R8 with spare whip, \$145. AS2HRF 5/8 cowl mount 2m whip, untrimmed, \$25. All units perfect cond., no mods., with relevant manuals and accessories. All offers considered. VK3ASI, QTHR. Ph. (052) 21 6244 bus or (052) 43 1283 AH.

### WANTED

Automatic Kayser with paddle, 240 mains operation. VK2ABC, QTHR. Ph. (02) 451 1313.

455 kHz/2.1 kHz mechanical filter PP109/GRC, CX1211/U cable. MT297/GR, AM65/GRC, C375/VRC RT70/GRC, G8/GRC, AN/PR C-25, AN-GRR5, AN/VRC46, 47, 29, any US army technical manuals. Top prices paid. D. L. Leupold, 9 Hyland Ave., Darlington, SA, 5047. Ph. (08) 296 4250.

Transmitter FLDX400, must be good, VK2BDT, QTHR.

Goodmans Axiom 300 speaker. P & P to VK3PR, 6 View Ct., Leongatha, 3953. Ph. (056) 62 2711.

### WANTED KNOWN

VK7 Division Hamfest, 13th-14th November — Evandale. Usual activities starting at 1300 hrs., smorgasbord dinner Saturday night and Barbecue Sunday lunch. More details WIA, Tas. Div., PO Box 1010, Launceston, 7250. Alt. Mr. L. Dowl VK7ZLD, or phone (003) 32 1213.

## SILENT KEYS

It is with deep regret that we record the passing of —

Mr. J. H. WINTON	VK3XR
Mr. D. R. MILLEN	VK2LQ
Mr. J. B. DEERING	VK2ND
Mr. A. F. JACOBSEN	ex VK6WB
	ex VK4GM
Mr. M. O. BESTED	VK2AEB
Mr. W. J. LEWIS	VK2YB
Mr. R. C. GODSALL	VK2ARG
Mr. A. H. CLYNE	VK3ACC
Mr. M. W. T. CHERRY	VK3ZBA

W. J. T. (BILL) FABER VK4WF  
Bill was born in London in 1907 and emigrated to Australia in 1911.

He obtained operators licence No. 3318 in February 1924. Bill served as a Squadron Leader in New Guinea during the last war.

He retired from the PMG in 1972, and passed away at his daughter's residence, Roma.

Bill leaves a son and daughter to whom the Queensland division expresses sympathy.

VK4PJ

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	Tape Punch	\$150
<b>TELETYPE</b>	Reperforator	\$80

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Hamak — At Geelong Common Reserve, October 16 and 17 (Sat. & Sun). No fixed bookings, no competitions — for the first time, other clubs have been asked to participate and display their hobbies. Meet radio clubs, model railway, astronomers, Belmont Steam Preservation Society, Fencing demo, aircraft jollylights, RC model aircraft, gems display, colour TV, AR advertisers. Meals and refreshments available at reasonable cost. Bring usable equipment for sale (no junk please). Talk-in facilities on Ch. 40 FM. Bring the family, no reg. fees, but a donation appreciated. Further details from VK3AKC (052) 21 1499, VK3AFI (052) 21 3658, VK3ZSD (052) 78 9502.



# DRAKE

## AMATEUR C LINE

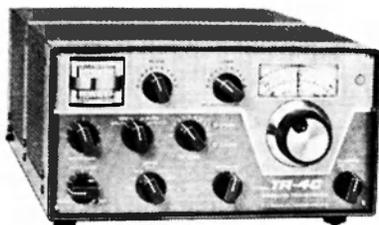


### R-4C RECEIVER

**\$695**

**Versatility ...  
Accuracy ...  
Dependability ..**

- Linear permeability tuned VFO with 1 kHz dial divisions. VFO and crystal frequencies pre-mixed for all-band stability
- Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 MHz of 10 meters with crystals furnished
- Any fifteen 500 kHz ranges between 1.5 and 30 MHz can be covered with accessory crystals for 160 meters, MARS, etc. (5.0-6.0 MHz not recommended)
- Electronic Passband tuning gives sideband selection, without retuning
- Accessory Noise blanker operates on CW, SSB, and AM
- Notch filter and 25 kHz crystal calibrator are built-in
- Product detector for SSB/CW, diode detector for AM
- Crystal Lattice Filter gives superior shape factor and ultimate selectivity for better adjacent channel rejection
- Solid State Permeability Tuned VFO
- Three AGC Release Times, two for SSB and AM plus fast release for break-in CW. Also AGC off.
- Excellent Overload and Cross Modulation characteristics
- Dimensions: 5½"H, 10¾"W, 12¼"D (14.0 x 27.3 x 31.1 cm). **WL:** 16 lbs. (7.3 kg).



### TR-4C SIDE BAND TRANSCEIVER

**\$630**

**GENERAL:** • All amateur bands 10 thru 80 meters in seven 600 kHz ranges • Solid State VFO with 1 kHz dial divisions • Modes SSB Upper and Lower, CW and AM • Built-in Sidetone and automatic T/R switching on CW • 30 tubes and semi-conductors • Dimensions: 5½"H, 10¾"W, 14¾"D (14.0 x 27.3 x 36.5 cm). **WL:** 16 lbs. (7.3 kg).

**TRANSMIT:** • VOX or PTT on SSB or AM • Input Power: SSB, 300 watts P.E.P.; AM, 260 watts P.E.P. controlled carrier compatible with SSB linears: CW, 260 watts • Adjustable pi-network.

**RECEIVE:** • Sensitivity better than ½ µV for 10 dB S/N • I.F. Selectivity 2.1 kHz @ 6 dB, 3.6 kHz @ 60 dB. • AGC full on receive modes, variable with RF gain control, fast attack and slow release with noise pulse suppression • Diode Detector for AM reception.

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### T-4XC TRANSMITTER

**\$625**

Use VFO of either R-4C or T-4XC for transceiving or separately.

- Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 MHz of 10 meters with crystals furnished; MARS and other frequencies with accessory crystals, except 2.3-3, 5-6, 10.5-12 MHz.
- Upper and Lower Sideband on all frequencies
- Automatic Transmit Receive Switching on CW (semi break-in)
- Controlled Carrier Modulation for AM is completely compatible with SSB linear amplifiers
- VOX or PTT on SSB and AM built-in
- Separate VOX Delay Controls for SSB/AM and CW.
- Adjustable PI-Network Output
- Two 8-pole Crystal-Lattice Filters for sideband selection, 2.4 kHz bandwidth
- Transmitting AGC prevents flat topping
- Shaped Grid Block Keying with side tone output
- 200 Watts PEP Input on SSB — 200 watts input CW
- Meter indicates plate current and relative output
- Compact size; rugged construction
- Solid State Permeability Tuned VFO with 1 kHz dial divisions
- Solid State HF Crystal Oscillator
- Dimensions: 5½"H, 10¾"W, 12¼"D (14.0 x 27.3 x 31.1 cm). **WL:** 14 lbs. (6.4 kg).



### SSR-1 COMMUNICATIONS RECEIVER

**\$290**

- Synthesized • General Coverage
- Low Cost • All Solid State • Built-in AC Power Supply • Selectable Sidebands
- Excellent Performance

**PRELIMINARY SPECIFICATIONS:** • Coverage: 500 kHz to 30 MHz • Frequency can be read accurately to better than 5 kHz • Sensitivity typically 0.5 microvolts for 10 dB S+N/N SSB and better than 2 microvolts for 10 dB S+N/N AM • Selectable sidebands • Built-in power supply: 117/234 VAC ± 20% • If the AC power source fails the unit switches automatically to an internal battery pack which uses eight D-cells (not supplied) • For reduced current drain on DC operation the dials do not light up unless a red pushbutton on the front panel is depressed.

The performance, versatility, size and low cost of the SSR-1 make it ideal for use as a stand-by amateur or novice-amateur receiver, short wave receiver, CB monitor receiver, or general purpose laboratory receiver.

Send for details of the new HAMVISION Model OM-7 SSTV/NATV System

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Melbourne: 233-4044; Adelaide: 42-6666;  
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# Sideband Electronics Sales

## HF TRANSCEIVERS

**ATLAS** models 210-x 80 to 10 M transceiver inclusive factory installed noise blanker **Only \$600**

**YAESU MUSEN** model FT-101-E AC-DC transceivers 10 to 160 M with speech processor **\$650**

**TRIO KENWOOD** model TS-520 AC-DC transceivers 10 to 80 M **Still only \$530**

**TRIO KENWOOD** model TS-820—expected shortly.

**TRIO KENWOOD** model QR-666 receiver 170 KHz to 30 MHz AC-DC **\$225**

## VHF TRANSCEIVERS

**ICOM** model IC-202 2 M SSB portable transceiver 144-144.4 MHz **\$180**

**ICOM** model IC-502 6 M SSB portable transceivers 52-53 MHz **\$175**

**TRIO KENWOOD** model TS-700-A FM-AM-CW-SSB transceivers. Full 144-148 MHz coverage, 10-Watt output, VFO controlled, self-contained, AC-DC operation **\$575**

**KYOKUTO** 2 M FM 15 W output transceivers with digital read-out and crystal synthesized PLL circuitry now with 800 transmit and 1000 receive channels 5 KHz apart, covers all of 144-148 MHz, receive to 149 MHz. No more crystals to buy. Includes simplex, repeater and anti-repeater operation **\$300**

## NOVICE TRANSCEIVERS

**SIDEBAND** model SE-501 15-Watt PEP 23 channels AM-SSB **\$198**

**SIDEBAND** model NC-310 1-Watt AM 3 channels 27.240 crystals **\$50**

**SIDEBAND** model 2 5-Watt AM 6 channels **\$75**  
New models expected shortly.

## HY-GAIN ANTENNAS

14-AVQ 10-40 M verticals 19' tall **\$65**

18-AVT-WB 10-80 M verticals 23' tall **\$90**

TH3JR 10-15-20 M 3-element Yagi 12' boom **\$135**

TH3MK3 10-15-20 M 3-element Yagi 14' boom **\$180**

TH6DXX 10-15-20 M 6-element Yagi 24' boom **\$225**

HY-QUAD 10-15-20 M cubical quad 8' boom **\$200**

TIGER ARRAY 204 BA 20 M 4-element 26' boom **\$190**

BN-86 balun **\$18**

FERRITE-CORE BALUN. Japanese product **\$12**

## MARK MOBILE ANTENNAS

Helical 6' long HW-40 for 40 M **\$18**

High-power KW-40 for 40 M **\$25**

HW-20 for 20 M **\$16**

Swivel mounts and chrome-plated spring for all **\$12**

## ASAHI MOBILE ANTENNAS

AS-2-DW-E  $\frac{1}{4}$  wave 2 M mobile whip **\$8**

AS-WW  $\frac{3}{8}$  wave 2 M mobile whip **\$18**

AS-GM gutter clip mount with cable and connectors **\$10**

M-Ring body mount and cap **\$5**

## CUSH CRAFT ANTENNAS

Model DGPA 27-52 MHz adjustable ground plane **\$25**

AR-2X Ringo Ranger double  $\frac{3}{8}$  vertical for 2 M **\$37**

A147-11 11-element 2 M Yagi **\$37**

A147-20 combination horizontal vertical 2 M **\$65**

A144-20 combination Yagi with matching harness for circular polarization **\$65**

CR-1 27-29 MHz  $\frac{3}{8}$  vertical Ringo **\$37**

## ANTENNA ROTATORS

Model CDR Ham-II for all hf beams except 40 M **\$165**

Model CDR AR-22 L junior rotator for small beams **\$55**

KEN model KR-400 for all medium-size hf beams with internal disc brake **\$100**

KEN model KR-500 for vertical elevation control of satellite tracking **\$100**

All models rotators come complete with 230-volt AC indicator-control units.

6-conductor cable for KR-400-500 **65 cents per metre**

6-conductor cable, smaller size **40 cents per metre**

10-conductor heavy cable for Ham-II **\$1 per metre**

## COAX CABLE CONNECTORS

RG-8-U coax cable **\$1 per metre**

RG-58-U coax cable **40 cents per metre**

RG-58 coax cable **35 cents per metre**

Coax connectors, RG-8 and RG-58 type. Male to male and female joiners **All for \$1**

Angle and T connectors **\$1.50**

RCA to PI-259 adaptors **\$1**

Please add cutting and handling cost—\$1.

DRAKE W-4 SWR Watt-meter, 0-200 and 0-2000 Watt scales **\$60**

DRAKE TV-1000 TVI low pass filter **\$25**

DRAKE TV-3300 TVI low pass filter **\$28**

DRAKE TV-42 TVI low pass filter, low power **\$15**

## SWR METERS

SINGLE METER **\$12**

SINGLE METER with power scale 10-100 W **\$17**

TWIN METER, SWR up to 200 MHz **\$22**

CRYSTAL FILTER, 9 MHz, similar to FT-200 ones. With carrier crystals **\$35**

PTT DYNAMIC MICROPHONES, 50 K or 600 ohms. With 4-pin plug fitted **\$10**

All prices quoted are net SYDNEY, N.S.W., on cash-with-order basis, sales tax included in all cases, but subject to changes without prior notice. ALL-RISK INSURANCE from now on free with all orders over \$100; small orders add 50c for insurance. Allow for freight, postage or carriage; excess remitted will be refunded. For prompt and economical despatch we use ANSETT air freight and COMET road service.

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**PETER SCHULZ, VK2ZXL.**



VOL. 44, No. 10

OCTOBER 1976

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### COVER PHOTO

*Cubs of the Winston "A" Pack take their turn at the radio at Mount Isa, Queensland, during Jamboree-on-the-air (JOTA), October, 1975. The operator in charge of the set is Owen Arnleldt (VK4OV).*

# HAM

# RADIO SUPPLIERS

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## LINER E549S

### 27 MHz Transceiver

Suitable for Novice Amateurs

5 W, AM 23 Channel 12V DC operation.

S-meter, squelch, ant. & PA facility.

\$115 P&P \$3

## AMATEUR TRANSCEIVERS

**KENWOOD TR7200G** 2 metre FM Transceiver, 10 watt and 1 watt operation, fitted with crystals for operation on 146.1 and 146.4 repeater channels 12V DC. **\$215**

**KENWOOD TR2200G** handy 1 watt, 12 channel transceiver for 2 metres FM. Fitted with 4 sets repeater crystals. Inbuilt nicad charger. **\$180**

**ICOM IC202** 2 metre SSB Transceiver, 3W PEP, SSB operation. Provision for external antenna, DC input etc. **\$195**

**KEN KP202** slubby helical antennas. **\$6.50**

**23 CHANNEL SSB/AM Transceivers**, 5 watts AM, 15 watts PEP SSB, Squelch, RF gain, public address, S meter, 12V DC operation. **\$210**

**23 CHANNEL AM 5 watt Transceivers**, 12V DC operation, S meter, squelch, public address facility. **\$115**

## 27 MHz (11 METRE) EQUIPMENT

**LAFAYETTE HA310** Walkie Talkies, 1 watt, 3 channel, fitted with 27.240 crystals, PMG approved. **\$135 pair**

**LAFAYETTE MICRO 66** 5 watt transceiver, 6 channel operation, fitted with one set crystals. **\$139**

**LAFAYETTE 27 MHz** fibreglass cowl mount mobile loaded antenna, 36" long, complete with base and coax. **\$28.45**

**LAFAYETTE 27 MHz** combination AM Radio and 27 MHz loaded antenna, complete with splitter harness, cables and plugs. **\$28.95**

**LAFAYETTE 27 MHz** gutter mount mobile antenna complete with coax cable and PL259 plug. **\$22.50**

**6 CHANNEL 5 watt AM 27 MHz** mobile transceiver, PMG approved for 27-880 MHz operation with crystals for 27.880. **\$101.50**

**LAFAYETTE "Range Boost"** 1/2 wave vertical antenna for 27 MHz base station use. **\$59**

**LAFAYETTE 1/4 wave** ground plane antenna. **\$35**

**52 OHM COAX CABLE**, 1/4" diameter. **55c metre**

**PL259 COAXIAL CABLE PLUGS**. **\$1.60 each**

**REDUCER** to suit for 1/4" coax. **40c each**

**SO239 COAX CHASSIS SOCKETS**. **\$1.40 each**

## YAESU FRG-7

THE RADIO FOR WORLD-WIDE LISTENING AT ITS BEST — 0.5-29.9 MHz COVERAGE SYNTHESIZED COMMUNICATION RECEIVER



The model FRG-7 is a precision built high performance communication receiver designed to cover the band from 0.5-29.9 MHz. Its state of the art technology offers an unprecedented level of versatility. The Wadley Loop System (drift cancellation circuit) coupled with a triple conversion super heterodyne system guarantees an extremely high sensitivity and excellent stability. It provides complete satisfaction to amateurs as well as BCLs with superb performance and many features such as RF attenuator, selectable tone, and automatic noise suppression circuit.

### ANTENNA ROTATORS

**AR22L Antenna Rotator**. Diecast construction to take lightweight VHF and HF beams. Complete with attractive control box which requires only 4 wire connection, 240V AC. **\$65 each**

**CDE HAM II Rotator** for the heavier duty beam. Suitable all HF frequencies except 40m. Requires 8 wire connection, 240V AC. **\$165**

### SWR BRIDGES

**SWR Bridge and Field Strength Meter Combination**, 50 ohms impedance. **\$19.50**

**Midland SWR Bridge and Power Meter Combination**, 50 ohms impedance. **\$24.50**

**Foster HF204, Headphones and Boom Microphone Combination**, mic. 200 ohm, phones 80 ohm. **\$16.90 P&P \$125**

## 11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.155	27.880
27.085	27.165	27.235
27.125	27.225	27.255
27.240	27.910	27.265

**\$6.50 A PAIR (Transmit and Receive)**

## 2 METRE CRYSTAL SPECIAL

We have purchased a quantity of crystals to suit the KEN KP202 Transceiver and offer them at a special reduced price while they last.

Transmit Crystals	Receiver Crystals
146.10 MHz	146.70 MHz
146.20 MHz	146.80 MHz
146.30 MHz	146.90 MHz
146.40 MHz	147.00 MHz
	146.50 MHz
	146.55 MHz

**\$3.50 EACH**

LOOKING FOR BARGAINS?



## BRIDGE ROAD, RICHMOND STORE SPECIALS

### TRANSFORMERS

**Type 6426 44VCT** at 1 1/2 amp, 6.3V at 1/2 amp. **\$4.50 each P&P \$1**

**Type PF3152 50VCT** at 1 amp, 6.3V at 1/2 amp. **\$4 each P&P \$1**

**Type 6625 240V PRI** — 24V SEC. at 1/2 amp. **\$3 each P&P 75c**

**Type X320 240V PRI** — 24V SEC. at 200 mA. **\$2 each P&P 50c**

**Type PF130 285-285V** at 100mA, 6.3VCT at 2 amp, 6.3V at 2 amp, 6.3V TAP 5V at 2 amp. **\$8 each P&P \$2**

**Diodes 1 amp, 1 kV mini diodes**, type A14P, 10 for **\$1.50 P&P 30c**

**Magnetic Earphone** to suit most transistor Radios, fitted with 2.5 mm plug. **10 for \$2 P&P 50c**

**Carbon Potentiometers**, 10 assorted, new carbon pots. Popular values 1/4" shaft. **\$4 P&P \$1**

**Neon Flashtubes (ex Repco)**, ideal for ignition timing lights. **\$1.50 ea. or 10 for \$12**

**Electrolytic Capacitors**, 50 assorted popular values. **\$5 P&P 50c**

**Wire Wound Resistors**, 100 assorted, 5 and 10 watt, wire wound, all new and popular values. **\$8 P&P \$1**

**Polyester Tubular Capacitors**, 100 assorted capacitors, all good popular values. **\$4 P&P 50c**

**Philips Type Concentric Trimmer Capacitors**, 25 pF. **10 for \$2 P&P 50c**

**Xenon Flash Tubes**, suitable for Strobe use (sorry no trigger transformers) reduced to **75c each or 10 for \$7 P&P 50c**

**Egg Insulators**, Quality porcelain egg insulators. **35c each or 10 for \$3 P&P \$1**

### METERS

**Edge Meter 0-1 mA** calibrated 0-5 1/2" face x 2 1/2" W x 3" D. **\$3 P&P 50c**

**Blank Face 50-0-50 uA** 3" square. **\$3 P&P 50c**

**200 uA Meter**, calibrated 0-100, 2 1/2" W x 2 1/4" H, ex Repco Headlight Aimer. **\$3 P&P 50c**

**Twin Level Meter**, 1 7/8" x 1 3/8" 250 uA. **\$4.50 P&P 50c**

**Signal Level Meter** 1 3/4" x 7/8" 250 uA. **\$3.50 P&P 50c**

### TRANSISTOR SPECIALS

**AY6102** Normally \$1.99 ea. **10 for \$5.00 P&P 30c**

**2N3564** Normally 38c ea. **10 for \$2.50 P&P 30c**

**BC107B** Normally 32c ea. **10 for \$2.00 P&P 30c**

**MJE340** Normally \$1.50 ea. **10 for \$4.50 P&P 30c**

### INTEGRATED CIRCUIT BARGAIN

**TBA641 BX1** with heat sink, normally \$3.26 **\$2 each P&P 30c**

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B. Due to circumstances beyond our control, prices quoted in this advertisement are subject to alteration without notice. New equipment available at our Bridge Road Store.

# amateur radio

## QSP 19th JAMBOREE ON THE AIR

During the weekend of 16th/17th October 1976, the 19th International Scout Jamboree on the Air will again be enjoyed by over 200,000 Scouts and Guides throughout the Scouting Nations of the World, and hopefully by an equally impressive number of Australian amateur operators, which is believed to be well in excess of 5,000. Australia will contribute as its share, over 500 amateur radio operators and over 15,000 Scouts and Guides.

Jamboree on the Air was the brainchild of an English Scouter and amateur radio operator, Les Mitchell, who, incidentally, saw service in Australia as a member of the English Armed Forces during the Second World War. The idea came to Les during the Scouting World Jamboree at Sutton Coldfield in England in 1957, when over a modest cup of coffee one morning he suggested that he, and fellow Scouter/Amateurs at the Jamboree should meet together each year over the air, at that same time, to recall their happy acquaintance during that Jamboree.

However, the idea developed to include the Scouts in the respective groups, and of many other Scouts who were not fortunate enough to enjoy the excitement of personally attending a World Jamboree, but who could however, enjoy the spirit and excitement of such an International Scout gathering by means of Amateur Radio. So the theme of the first Jamboree on the Air was developed.

It is history now how the idea caught on like wildfire. The first Jamboree on the Air exceeded all expectations, and Les realised it would have to be taken over by the World Scouting Bureau, and so another amateur operator, Len Jarrett in the World Bureau, has since co-ordinated the activities of national organisers in all Scouting countries to build the activity up to the degree under which it operates today, thanks to the generosity of friendly amateurs throughout the world. Since that first Jamboree, it is estimated that over 2½ million Scouts and Guides have taken part in Jamboree on the Air.

Some remarkable "spin-offs" have resulted from these contacts. Scouts have exchanged visits with other Scouts throughout their own countries and even overseas as a result of initial contacts with each other during JOTA. Scouts and Scouters have developed an interest in amateur radio, through their association with this fine leisure activity and became amateur operators themselves. The writer is now one also.

Scouting has gained too by attracting many amateurs to Scouting as Warranted Scouters and non-uniformed supporters of Scouting at group and committee level. No doubt, this fine interchange will go on to the benefit of both organisations. The remarkable feature of JOTA has been the extension throughout the world of the best of the ideas of both organisations.

So hopefully, Jamboree on the Air will continue to prosper and if the idea has sufficiently caught your imagination to help you realise that you too can contribute greatly to the extension of that spirit, then please don't hesitate to offer your services.

If you do not know a Troop, and you can help, then write to the branch organiser, Jamboree on the Air, at the Branch Headquarters of the Scout Association of Australia in your capital city. I am sure you will be made most welcome.

Alternatively, a line to me at my QTH in the Call Book will ensure that your offer is directed to the right quarter. I can assure you that your good deed will be amply repaid by the satisfaction you will have given to Scouts or Guides who take part in what may well be their only International Scouting activity.

NOEL I. LYNCH VK4ZNI, National Organiser, 19th JOTA

## QSP

### TRAINING AND EXAM CONCEPT

"FCC approved ARRL's training concept in mid May, to be tried as an experimental one-year program. The League has proposed a carefully monitored training course of 10 to 12 lessons to be conducted by qualified, certified instructors. Upon satisfactory completion of the course, the student would be certified 'qualified for Novice licence' to the FCC, which would then issue him a licence without further exam. By the time you read this, approximately 40 clubs and organisations will be teaching courses under this program on a trial basis." Ham Radio July '76.

### REVIEWS

Many readers would be pleased to learn that "Amateur Radio" is now included in the "Review of Reviews" column in the prestigious ITU Telecommunication Journal. In the June issue 74 different publications in 11 different languages were reviewed.

### 2 METRES "ON THE AIR"

Dick Smith, of Dick Smith Electronics will be flying his Piper Twin engine Commanche Aircraft — REG VH-DIC, in the Australian Air Race from Perth to Adelaide, Melbourne and Sydney from October 20th to 24th.

He will be operating continuously on all 2 Metre Amateur Channels using an FDK Multi 7 feeding a ½ wave whip (call sign VK2ZIP).

He will make an award for the contact with the longest communication distance (we hear one Amateur is setting up on Ayers Rock!).

Co-Pilot for the race will be famous Australian Aviatix, Nancy Bird-Walton.

Route segments are as follows — if you are planning to travel to a remote mountain top write to Dick first and he will listen especially for you.

Oct. 20th — Start Perth — Norseman — Forest.  
21st — Forest — Ceduna — Port Augusta — Adelaide.  
22nd — Adelaide — Camerai — Warrnambool — Melbourne.  
24th — Melbourne — Narrandera — Parks — Bathurst — Sydney.

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# WIANEWS

In WIANEWS August AR, brief mention was made about correspondence sent by the Executive to the Radio Frequency Management Division.

One of the more important submissions related to a consolidated list of outstandings, and additional material concerning our amateur service.

No less than 47 different items were included in the list under several broad headings. In the covering letter, concern was expressed that the administration of the amateur service appears to follow too closely on practices adopted for commercial services, and conversely that any de-restrictions which could be applied in favour of the amateur service could not in fact be carried through for fear of creating precedents for the commercial services.

The hope was expressed that with a modest amount of initial effort, a considerable improvement could be achieved which could result in savings on both manpower and finances without significantly affecting standards. The WIA was concerned that the amateur service is being administered today in terms of procedures recognised in many other large countries as outmoded and unnecessarily restrictive. It is recognised that the officers of the Department are doing everything they can to keep the present system operational. The Institutes' case however, is that a review of the systems in use should be undertaken otherwise longer and longer delays and increasing frustration will create further and further problems.

Revisionary work, it is believed, should be begun soon, before the administration has to devote more and more of its time to WARC 79 affairs.

Mention was made about the growing strength of the CB movement and the baleful influence of pirate activities mushrooming out of the ready availability of equipment. It had been hoped that Novice Licensing would have countered some of these pirate activities but delays and other problems in fact operated in reverse.

These are some of the broad principles which were further elaborated in discussions with "Central Office" late in August.

## EXAMINATIONS

As might be expected this current problem merited the full treatment. Detailed syllabuses (especially Novice Theory) are considered essential. WIA assistance ought to be sought for the invigilation of some examinations by responsible licensed amateurs, and some of the elementary examinations and Morse code tests should actually be conducted by responsible amateurs under controlled conditions. "Multi-choice" papers should be expedited for all exams. Four AOCPE exams per year instead of two. Exams should be held in more places than at present.

The results of exams should be announced within 3, or at the most 4, weeks and that lists of successful candidates ought to be supplied together with a general appraisal of the examinations — what reasons caused the most failures and so on.

Definite lists of exemptions and alternative qualifications were desired and "conceded passes" should be examined. In the Morse exams, it is felt that stickers or endorsements should be available for passing at different speeds and that the method of sending the novice Morse should be reviewed.

Incidentally this latter request received sympathetic consideration and it was agreed at the interview that an Executive Group would hold discussions with the P. & T. Examinations section.

Other submissions covered repeater conditions and the need for sensible liberalisation having regard to sensitive frequency spots on shared bands. A later submission was made to obtain approval in principle for cross-band attended and unattended ATV repeaters affecting the 70 cm, 23 cm and 576 MHz bands.

Identification should be extended to 10 minutes instead of the present 5 minutes was another request. Reviews should be

made on paragraphs 80(a) and 94 of the Handbook, beacons should be licensed in any part of any amateur band subject to compliance with an agreed band plan.

Interference problems were enumerated including radio alarms and other devices operating in amateur bands, the old problems of TV channels O and 5A and the need to improve standards designed to reduce RFI susceptibility of consumer electronic products.

Some provision should be made for limited licensees to qualify and use CW, RTTY restrictions should be revised to permit other codes including ASCII and official Divisional broadcasts should be subject to some liberalisation.

Additional frequencies were listed, including 28.1 to 28.3 MHz for Novices, re-allocation of 50 to 52 MHz and various others which will obviously form part of the WARC 79 brief.

And finally an array of general matters including call book inaccuracies, review of the amateur advisory committee service, reduced licence fees for pensioners and the disabled, vigorous apprehension of illegal operators, etc.

Altogether a formidable list.

## CITIZENS BAND

At their August meeting the Executive continued their review of the "CB" situation. The existing WIA policy is still as published in AR for October 1974 page 8, and embraces opposition to law-breakers and any radio communication service for or on behalf of unqualified persons under uncontrolled conditions.

## YRCS

During August, a Postal Vote was circulated to Divisions — "That having regard to practical considerations and the necessity for the re-organisation of WIA educational arrangements it is resolved that Motion 72.201 be rescinded and that no other similar constitutions be recognised, but that the Institute agrees to render every possible help and assistance for the training of youth as heretofore with the object of preparing them for the amateur examinations, including the continuing provision of certificate forms, publications and the like".

If this postal motion (No. 1/1976) is passed, it will mean that Federal YRCS will no longer exist and Divisions would be responsible for this activity within their respective States. This was a motion laid on the table for 3 months as discussed in depth at the 1976 Federal Convention.

## FINANCES

An Examination of Executive costs incurred so far this year so as to review the 1977 budget was another area discussed in detail. The conclusion was reached that there should not be any increase in Federal dues for the year 1977.

## ARNOLD REPORT

At their August meeting the Executive members also reviewed developments relating to the Investigators' Report by Bob Arnold. Some difficulty arises because of the apparent lack of feed-back from members and therefore an appraisal of the present situation was completed for the benefit of Federal Councilors, since it seems apparent that further work on this Report may now rest with the Divisions themselves.

## PUBLIC RELATIONS

It was most heartening to the Executive that advice and assistance now seems to be at hand for public relations activities. Mr. Doug Anderson, VK3ZW, kindly attended the August meeting and spoke in depth about the media and allied subjects. Doug is the Director of the Victoria Promotions Committee and is therefore well placed and well qualified to help in the public relations field, in particular, when he has had time to absorb and evaluate current developments.

## RECRUITING

At the time of writing, some 200 enquiries have come forward and every day sees more being processed. It is still too early to evaluate the drive but already new members are coming into the system on a firm basis and an expansion can therefore be predicted. The target figure is 8000 and hopefully existing members will wield their influence towards achieving this target. ■

# A RARE EVENT

On Saturday October 23rd 1976 at 4.40 p.m. EAST a rare event will take place. Melbourne will experience a total Solar eclipse. Observers from all over the world will gather at vantage points in South Australia, Victoria and New South Wales to study and record the eclipse and its effects. Radio Amateurs will have an opportunity to add to the relatively scarce information on the effects of total eclipses.

Melbourne is one of only 20 cities with a population exceeding 2 million that will experience a total eclipse during the years 1900 to 2050. Sydney will experience a total eclipse in 2028.

According to past records, the sky over Melbourne at 3 p.m. on 23rd October is by average more than half covered by cloud. On only three occasions since 1957 has the Melbourne sky been cloudless at that time and date. (Sydneyers should check their own meteorological records before sniggering too loudly). There is in fact only one chance in three that the total eclipse will not be obscured by cloud. A number of aircraft ranging up to a Boeing 707 have been chartered to enable selected observers to rise above such possible restrictions. As shown on the map the total eclipse may be seen along a strip passing over Mt. Gambier, Ballarat, Melbourne and Merimbula.

Key times are listed in the table.

The short period of totality arises from the Moon's apparent diameter being only 5 per cent greater than the Sun's. This also accounts for the rarity of total eclipses and the limited number of vantage points from which they can be viewed.

On this occasion a partial eclipse will be visible in South East Africa, the

Location	Eclipse starts	Totality starts	Totality ends	Eclipse ends
Mt. Gambier	5h28m29s	6h36m11s	6h39m19s	7h40m26s
Melbourne	5h33m40s	6h39m26s	6h42m11s	7h41m39s
Merimbula	5h39m27s	6h42m51s	6h45m39s	7h43m03s

Table of Key Times. Times in UTC.

southern tip of India, Indonesia, parts of New Guinea and all of Australia and New Zealand.

## WHAT TO LOOK FOR:

Before reading further, please read the warning.

In the area of the total eclipse day will briefly turn to night. Bright stars such as those in the Southern Cross and the Pointers will be clearly visible. Venus and Mars will be visible above the obscured sun's disc and Mercury a little below. Animals, insects, plants and perhaps people are expected to become confused. The air temperature will drop. Perhaps this will cause a temperature inversion or ducting may develop enabling VHF contacts to be made over extended distances along the path of totality. Two metre stations in Melbourne and Mt. Gambier should be able to test this out. The ionisation in the D and F layers will drop, perhaps producing evening type DX on the broadcast, 160, 80 and 40 metre bands for stations in the eclipse area. Amateurs have a rare chance to provide valuable scientific data.

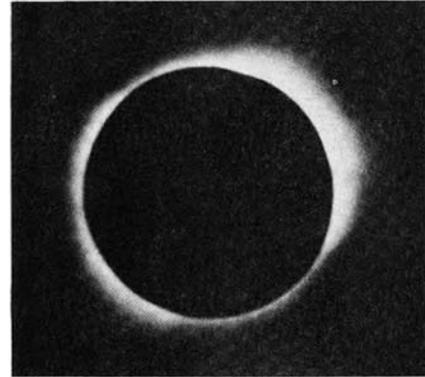
## A SAFE VIEWING METHOD

There is **NO** safe way to look at the Sun directly.

A modified pinhole camera may be used for safe INDIRECT viewing. One can be easily constructed as follows.

Take two large stout pieces of card about 300 mm (1 ft.) square. Make a small round hole about 3 mm (1/8") in diameter in the centre of one card. Walk outside with the two cards and face North.

Hold the pierced card in the left hand (assuming afternoon viewing) and the other card in the right hand. Move the cards



Total solar eclipse. 20 June, 1974, Cape Leeuwin, W.A. T. B. Tregaskis.

until the centre of the shadow of the pierced card falls on the other card. A spot of light will be seen. This is a projected image of the sun. Focus the image by adjusting the card's spacing. A white card will give the brightest image. The eclipse will be clearly visible with this simple instrument.

Readers seeking more information particularly those requiring safe photography techniques should write for an information booklet which is available for —

The Secretary,  
Astronomical Society of Victoria,  
Box 1059J GPO,  
Melbourne,  
Vic. 3001.

Price is \$1.00 plus 54c postage.

Much of the information reproduced in this article was obtained from this booklet.

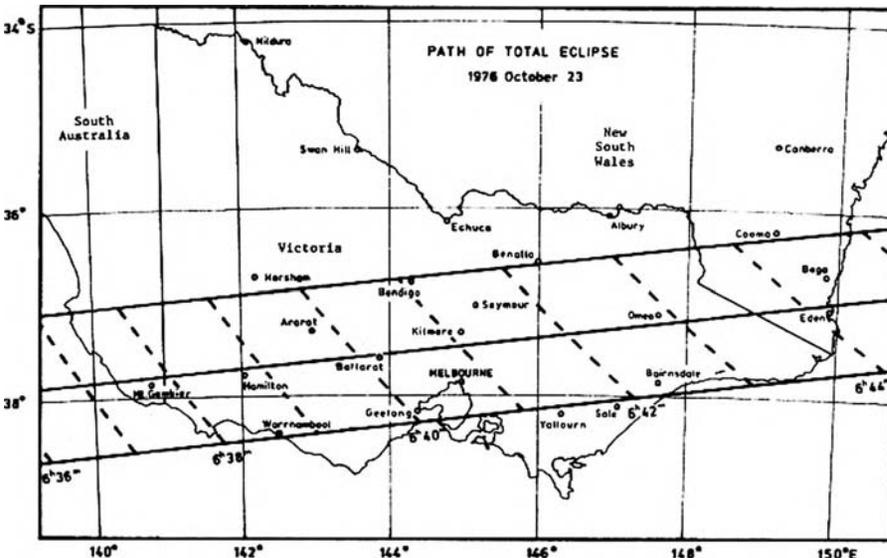
## WARNING

*It cannot be over-stressed that observing the Sun can permanently damage the eyes. During the partial phases of an eclipse, even though the area of the Sun which is not blacked-out by the Moon is relatively smaller than the full Solar disc, the light intensity is as high, and the risk of eye damage is just the same.*

*Do not under any circumstances look at the Sun through the camera view-finder, a telescope or its finder, binoculars or through any optical aid; the solar filters supplied with some telescopes are also not suitable.*

*Even with the unaided eye, the Sun is too intense to be observed directly without eye damage for more than a fleeting glimpse, this holds true during all partial phases of the eclipse.*

*Crossed polarizing filters are NOT a safe observing aid at any period during the eclipse.*





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**IC502**

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# A QUAD FOR 20 AND 40 METRES

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David S. Down VK5HP

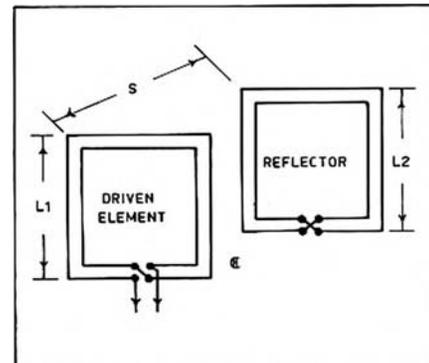
17 Brodie Cres., Christies Beach, S.A. 5165

This antenna is primarily designed for the low power operator, who uses every antenna advantage he can get, and not for the lid who substitutes over-the-limit power for poor operating ability.

Some of the stations worked on 40 at the time, were inaudible on either my G5RV or double extended Zepp via the main station receiver also used for the QRP tests. I manhandled the quad around about 180 degrees, and one CW CQ call resulted in a ZS6 and a FB8.

The next stage was to dispense with a boom, reducing weight and wind resistance. A spider quad evolved, using Rangoon cane spreaders, TV ribbon elements and feeder.

A closed loop of TV ribbon has a feed-point impedance of about 600 ohms. By placing a second similar loop as a reflector, this figure drops to 300 ohms — very convenient for 300 ohm feeder through a Z-match, which is what I used.



**STUBLESS 40-20 m QUAD**  
300 ohm TV ribbon elements and feeder.  
GAIN: 7.3 dB over dipole.  
F/B: 25 dB approx.

Band	L1	L2	S
40	17'7"	18'2"	17'
20	8'10"	9'1"	8'5"
15	5'10"	6'1½"	5'7"
11	4'4¾"	4'9"	4'4"
10	4'4"	4'6½"	4'2"

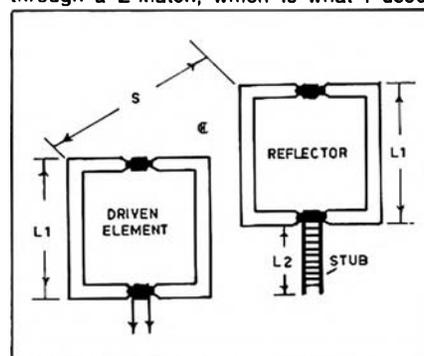
similar in appearance, except the sides of the loop are half or full wave (depending on space available), and the upper horizontal section of each element is divided in half at the point of minimum current.

A single loop X-Q antenna gives 5 dB gain, and the 2 element version gives 9.5 dB gain, both over a dipole, with a front-to-back ratio in the order of 22 dB. This is comparable to the standard quad (except the X-Q gain is greater), but the X-Q has a sharper forward radiating lobe.

The so-called "difficulty" in handling quads was easily overcome, by use of a 14 foot piece of 2½ inch waterpipe roped to a suitable support in the yard.

The assembly of one side of the quad is done on the ground, following which the mounting pipe for the rotator is mounted to the spider, and both are inserted in the vertical piece of waterpipe. The second element is then assembled on the ground, then taken via a ladder, up to the spider and bolted to it. Tuning can then be done whilst the antenna is still atop the water pipe.

When assembly and tuning was completed, the pipe and quad were walked to the tower base, a shoulder (courtesy Arnie VK5VS) put beneath the spider boom, and a monkey up the pole trick completed the procedure. The mast insert is then fitted to the rotator, and the necessary clamping arrangements finalised. Since Arnie's first trip up the tower, the quad has been back to ground 4 times for modifications to an X-Q array, and the total rigging-derigging time is down to 90 seconds. Very handy not having a guyed tower!



**X-Q ANTENNA — STUB TUNED**  
300 ohm TV ribbon elements and feeder.  
GAIN: 9.5 dB over dipole.  
F/B: 22 dB approx.

Insulators (top and bottom) are strips of tag-board.

Band	L1	L2	S
40	33'3"	18'9"	17'
20	16'8½"	9'4½"	8'6"
15	11'1½"	6'3"	5'8"
11	8'8½"	4'10½"	4'6"
10	8'3"	4'7½"	4'3"

The spider "boom", mounting pipe to rotator and hardware, was given 8 coats of marine paint, whilst the spreaders had 2 coats of marine sealer followed by 6 coats of marine paint. As for the 300 ohm ribbon, it received a liberal dose of melted black shoe-polish to improve its weather-handling ability.

All up weight is less than 25 pounds, and the total cost of all materials including the paints, less than \$50. Elements for 15, 11, and 10 metres may be added if desired. The type of boom is also optional as is the type of reflector (either continuous tuned loop, or stub tuned loop). The antenna may also be fed with coax and balun.

Further variations have since been used at this QTH, both of which are known as X-Q (expanded quad) Antennas. These are

For QRP DX operation, the better the operator and his antenna, the better the DX results. I will not attempt an article to improve the operator, but I can suggest trying this antenna.

The basic considerations for this design, were that the antenna had to be effective, simple, cheap and as compact as possible without using traps. Traps, of course are ineffective radiating portions of radiating elements — bad news for QRP operations.

To make the quad universally appealing, certain standards were set, which, at MINIMUM, I felt, covered the average QRP op's domestic requirements, but which allowed for individual variations for further improved performance:

1. Low mounting height of 30 feet, un-guyed.
2. Small turning circle.
3. Weight restricted to 25 lbs. to suit smaller rotators.
4. Cheap.
5. Materials available at least in each capital city.
6. Minimum equipment for construction and tuning.
7. Effective in performance.

"A quad on 40?", "Too unsightly", "Never turn it with your Stolle", "Have to jack it up 100 feet so it looks in proportion", were some of the comments I had on making initial enquiries about such an antenna. Everyone condemned size and weight, but not efficiency, so I thought that if I could reduce the size and weight but retain efficiency, then I would have achieved something worthwhile.

Figuring that by using 300 ohm TV ribbon, I could effectively halve the element size, the spacing then became the critical size factor, so a compromise was made regarding efficiency versus size, and some spacing was sacrificed.

The prototype was built and roped to the tower; using my standard 3 watt output CW rig and a beam heading of roughly NE, I worked VK2/3/4, JA, JD1, HM and HL, 9V0, FK8, W & K, KH6 and VE lands. Being easily pleased, and quite satisfied with that result on 40 metres, I returned to 20m CW, 3 watts output and same beam heading, logging I, DL, F, HA, HB, UA and UK for my trouble. I didn't get any 599s from the DX QSOs, but reports varied from 339 to 579. That is an advantage of CW — if you can hear them, you can work them.

On air, the sceptics raise a smile from me — not too many believe that 3 watts is behind the signal heard, but then it is natural to be apprehensive of something one has not seen for himself, especially when the QRP station is receiving DX RST reports equal to, or an S-point lower than, the full power station. The rig is inconsequential. The antenna and its feed system is not. Only when you go QRP per-

manently, and sacrifice everything that the "knowledgeable"(?) amateurs seem to need like life's blood itself (over the limit power and commercial antennas), do you realise the efficiency of an antenna system pruned to a millimetre, the feeder pruned to a small fraction of a wavelength, properly soldered and sealed connections and connectors, the insertion loss of meters and filters, the use of propagation charts, operating skill and patience. And

when you drag the DX in, you know you built it all, and you are OPERATING!

QRP (3 watts) WAC, WAS and 64 countries to date, will keep me on QRP for a while, and probably still experimenting with antennas and their feeders.

If you want to test yourself as an operator, and your present antenna for efficiency, see you on 40 and 20 metres QRP soon? ■

# QRP OPERATION AND THE ARGONAUT 509

Les Smith VK2BCU

8 Dora Creek Rd., Cooranbong, N.S.W., 2265

**Some months ago I became interested in buying an Argonaut by the American Ten Tec company, but apart from a copy of the specs, a photograph in an advert and a few non committal answers by the agent on the phone, I was unable to find out anything about this low power 5 band transceiver. So if you are interested in the 509 or QRP operation (calling all novices) then this article is for you.**

The unit was ordered from an agent in Springwood as the result of an advert in Amateur Radio. The unit arrived in due course, still obviously in the same packing material that it was shipped from the States in. On opening, the 509 gave the first impression of a neat unit with a pleasing appearance. Its HWD dimensions are 4 by 13 by 7 inches approximately. Front panel controls are as shown in Table 1. The most important controls of any transceiver, the tuning mechanism and dial movement have been well thought out. Tuning rate, an easy 15 kHz per revolution is obtained from a planetary drive, with no evidence of backlash. The main dial, a pointer and string arrangement is divided into 5 sections of 100 kHz each on the 4 lower bands. The skirt of the tuning knob is marked off in 1 kHz divisions, each 5 being numbered. One rotation of this skirt represents 100 kHz. The frequency is then calculated by adding the main pointer to the reading on the knob skirt. Many transceivers use this arrangement. For example in the 80 metre band, if the skirt reading is 47 and the main pointer is between 1 and 2 then the frequency is 3647 kHz or thereabouts.

The resonate control peaks the receiver RF section in the desired portion of the band. On 80 metres about 50 kHz can be covered without having to readjust this control; there is greater coverage on higher bands. The 10 metre band is covered in one switch position, with each revolution of the main tuning knob skirt representing 500 kHz. Dial accuracy is quoted at  $\pm 5$  kHz. This is substantially correct; see Table 2.

Stability, checked over a 15 minute

period, after 1 minute warm up turned out to be less than 10 Hz. In operation no drift is apparent. In fact if the set is picked up and moved about SSB signals stay readable.

Power requirements are 120 mA at 12 volts for receive (dial light off, volume at minimum setting) and 800 mA at rated CW output. Selectivity is satisfactory at 2.5 kHz bandwidth (shape factor 1.7 at 6/50 dB) and the sensitivity seems such that it would be capable of working anything within reason, even with a linear added. I have not had the opportunity of actually comparing it with another receiver. Since writing this I have been told that RX can outclass some of the more common transceivers on the market.

I found some facets of the set disappointing. These were the feel of the bandswitch, an off-centre hole in the main tuning knob, and the need to juggle the bandswitch on some bands to get the transmitter sections to work. The set proved to be microphonic when unpacked. As good as his word, the agent offered to have it repaired, but not wishing to send the set away, and after an excuse to look inside myself I became owner-serviceman. The trouble was a poor solder connection.

Internally the set is compact in construction, and cunning in design. The local oscillator used a permeability tuning system, with a concept that could prove popular with homebrewers. Rather than heterodyne a fixed 5-5.5 MHz local oscillator to another frequency on bands like 40 or 15 metres before final mixing, the oscillator is multiplied to give the correct frequency relationships. On 15 metres for example, the oscillator is run on 6 MHz, doubled to

12 MHz, and subtracted from the received signal to give the required 9 MHz IF. The oscillator is run on approximately the same frequency give or take a megahertz or so, to give linear frequency readout. Despite this there are no obvious birdies.

A comprehensive service manual is included with the set.

The S meter is calibrated for signal strength S4-S9. For use without a linear amplifier this is normally adequate because most stations worked use at least 2½ S points more power than the 509 so that if they receive a signal at say S2, then they will get a report of S4-S5. The S meter also acts as the meter for the SWR bridge, the function desired being chosen by a front panel switch. Less than a mile from my QTH another station operates with a power of 250 watts. Despite this no cross modulation has ever been observed.

The broad band final amplifier seems to handle all sorts of mismatches without destruction, from dead shorts to open circuits or mistuned antennas. CW input is 5 watts.

Well so much for theory. How does low power operation in Australia go? I think that Ten Tec have summarised the case very well in the operators manual. "QRP is not push button communication. Because it does take skill and technique, it is an exciting and challenging facet of Amateur Radio". Low power operation is a good thing to start off in amateur radio with. It teaches many things. Because radiated power is low, good technique is essential. Without it, no contacts. So it teaches technique. An efficient antenna is a must. Therefore low power operation helps to

teach antenna fundamentals. And to understand propagation factors. These are all vital pieces of information to the new amateur.

The degree of satisfaction obtained from QRP operation depends on the interests and temperament of the operator. If you are interested in working DX on 20 metres, and don't like to have the second best signal on the band, or hate other guys tuning up on top of you right when you are in the middle of a rare DX QSO then QRP operation may not be for you. If you are patient, enjoy experimenting, and are prepared to forgo operating when conditions are poor, then QRP operation might appeal to you. When running low power, the adage that if you can hear 'em you can work 'em is no longer true. An S3 signal in the clear is quite readable, and while you can hear *him* without difficulty he will *never* hear you. This means that the QRP operator can never make as many contacts as the station running 100 watts. Nevertheless it is possible to make many enjoyable contacts. From my QTH near Newcastle it is possible to work the east coast and across to ZL on 80 metres when the static is quiet. If the static is noisy then forget about operating, you will get less frustrated reading a book or something. For local work 80 metres is the best. Typical reports range from S5-S7. On 20 metres distances covered are

greater, but power is lacking, as shown by typical reports which range from S2-S7.

It is possible to work long distances — even across to the States on very rare occasions, as my log shows. More often a QSO goes something like this — S7 station calls CQ. QRP station answers. S7 station comes back — ur sig R5 S3-5 with QSB. QRP station makes grand revelation that it is running 5 watts. S7 station seems more tolerant of weaker signal, sometimes even impressed (you are really doing well with 5 watts) but this does not help when signals drop out because of fading, or just as often when some criminal type starts tuning up on top of you.

So there it is. What the big American glossies say about working the world with low power is true; you can, but there are problems. You will need a beam, which I do not have, and a lot of patience. In wars of interference you lose. Every time.

Nevertheless I enjoy QRP operation and I enjoy using the little 509. It is educational; the PTT is almost as good as VOX, the CW break in is a delight to use, and more importantly this set will encourage buyers to become builders. It is very hard to assemble a whole station these days. But if you buy a little 509 then you will probably end up brewing too. Things like a linear, 50 watts would be nice. That is unless you buy a linear. Shame.

**TABLE 1**

Front panel controls of the Argonaut 509. Bracketed comments show switch positions as rotated in the clockwise position. Resonate or receiver RF tuning.

Bandswitch (80, 40, 20, 15 and 10 metres). Main transceiver tuning (both RX and TX). RF gain control — maximum attenuation 25 dB approx.

AF gain control + power on off — push on.

Mode (Sideband reverse, CW, sideband normal, "lock" or tune up).

Drive (ganged RF drive and mike gain controls).

Meter switch (S meter, forward power, reflected power).

Clarifier (pull off push on on the potentiometer).

**TABLE 2**

Dial setting and actual frequency for the Argonaut 509. Measured on a Marconi TF2416 frequency counter. This band is typical of the others.

Dial Setting	Actual Frequency
14000 kHz	14000 kHz
14050	14052
14100	14102
14150	14151
14200	14198
14250	14246
14300	14293

# A METHOD OF REDUCING HV POWER LINE NOISE

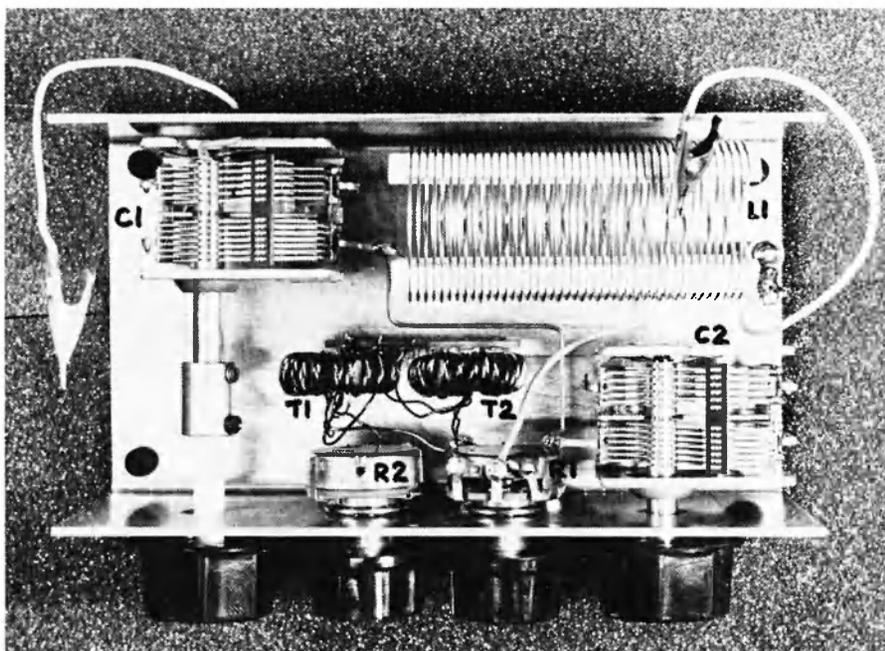
Drew Diamond VK3XU

55 Winbirra Pde., Ashwood, Vic., 3147

Many amateurs have HV power lines running near their location. These lines have a habit of developing leaky insulators, resulting in a particularly objectionable noise level. At this location it can reach levels in excess of "S9".

The problem is therefore, how can this noise be eliminated or reduced? Consider that this particular source of noise has three salient features; it is coherent, has a fixed location, and a fairly constant level in the short term.

Though I do not think it is a new idea, this little circuit appears to offer a solution. Two antennas are used. One is a "noise" antenna and the other is the main antenna for the particular band in use. The noise antenna must be located in a position where it will receive the maximum amount of noise and minimum of wanted signal. The main antenna is of course just the opposite. The noise antenna could consist of about 10 metres of hook-up wire run along a wooden fence or under the eaves of the house in such a position that it will receive a large noise voltage.



**Method of Construction and Layout.**

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At this location it runs under the eave down one side of the house towards the HV line in the street.

Consider the circuit. The heart of it is T1, a transmission line transformer. The noise sample is propagated along b,a, and signal plus noise along c,d in the opposite direction. The net field from these two in-

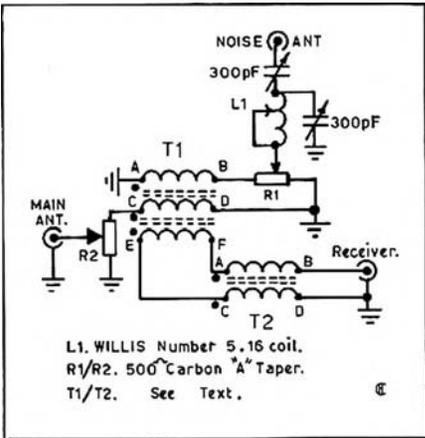


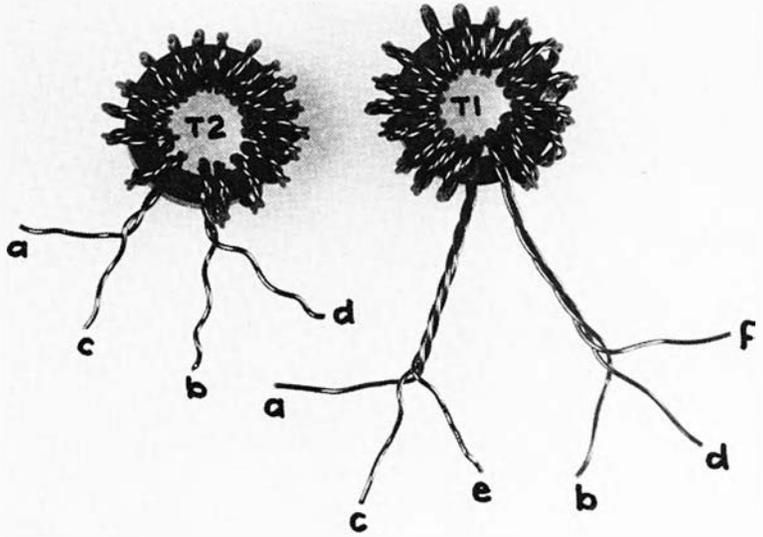
FIGURE 1

fluence e,f. Now ideally, if the noise field along b,a was equal in amplitude and phase to the noise component in c,d, it would leave only signal component in e,f, which is coupled via balun T2 to the receiver.

It would be unlikely, of course for the above situation to occur, so I have included some adjustments. R1 and R2 are used to adjust the amplitude of noise components from each antenna to equal each other exactly. C1, C2 and L1 form a matching network so that the impedance of the noise antenna can be matched to R1/T1 on any HF band.

All the components are mounted in a simple U shaped box 8 x 5 x 15 cm. C1 is supported upon insulating posts and has an insulated shaft to the knob. Number 3 knitting needles are a good source of material for insulated posts and shafts. is soldered to the tag of C1 at one end and to a little insulated post at the other. A small clip lead is used to connect the noise antenna and another lead for tapping L1.

T1 and T2 are wound on Q2 toroidal formers about 2 cm in diameter (just



Transformer Windings

about any core will do) and are critical in only one respect, the connections must be right. Number 22 B & S enamelled wire is used. For T1, cut off three lengths each about 50 cm long and for T2, two lengths about 60 cm long. T1 is trifilar wound. Twist the three wires together at one end and clamp about 2 cm in a vice. Twist the other ends together and fix them firmly in the chuck of a hand drill. Give the drill a few tugs to take out the wrinkles, then twist them up to about two twists per cm, at the same time keeping the wire taut. The two wires of T2 are twisted up in the same manner. The number of turns for T1 and T2 is not critical, just fill the formers neatly as shown in the photo. Remove the insulation from the ends, and using an ohmmeter, locate the respective wires ab, cd and ef. Join a to d. Pair off e and f which leaves b and c.

Adjustment is fairly simple. A good level of noise voltage must first be established. Turn R1 to max. and R2 to min. Then adjust C1, L1 and C2 for maximum received noise. Now R2 is advanced to max. and R1 to min. Rotate R1 from min.

and a point will be reached where the noise will drop. Alternately adjust R1 and R2 for best noise null but try to achieve this with R2 near its max. setting. If a null is achieved too far down R1 and R2, receiver noise begins to become apparent. Some final adjustment of C1 and C2 may be necessary. A piece of plain cardboard could be placed behind the knobs upon which the settings for each band are marked.

I see no reason why this circuit could not be used at VHF for radio or TV reception. The noise antenna could be a small, low beam pointed at the source of noise. The Z matching becomes unnecessary of course. R1 and R2 should be step attenuators with 10 and 1 dB steps.

The device seems to be particularly useful when the noise has reached S6 or more. During periods when the level has reached S9 it is possible to restore an otherwise unusable band. Sometimes, unfortunately, it appears to be impossible to obtain a deep null on the noise, due possibly to there being more than one leaky insulator in the area.

# LIVING WITH LOGIC

Are you baffled by what goes on inside those mysterious black caterpillars which seem to be everywhere these days? Like so many of us, the author admitted he was confused, so he began to "learn by doing".

It has become obvious to me over the past few years that unless one is familiar

with logic techniques it is increasingly difficult to keep up with new developments. I had read numerous texts, and built a Digital Frequency Meter. This was a "Meccano" type project; solder ICs into ready-made circuit boards, do some interconnecting, and it works! As to understanding how, I was not progressing. Something had to be done about it. Reading the books seemed useless; I had to build something so I could see it working!

Harry Moores VK4IJ

6 Thomas St., Wilston, Qld. 4051

## LOW SPEED

My answer to the problem was to build some simple logic devices and operate them at a speed low enough to see the results on input and output indicators. So I purchased a 7400 Series Data Book, a handful of assorted ICs, some LEDs, and some 0.1 inch Matrix board to mount the whole thing on. The total outlay was about \$18.

The 7400 Data Book is a mine of information, not as a study text, but as a refer-

ence book while work proceeds. Don't regard the ICs just as black boxes, but try to get at least a sketchy idea of what happens inside the individual units. Forget about the detailed circuit diagrams of the internal components shown in the book. Concentrate on the block diagrams showing interconnections between the gates and flip-flops within the chip.

Before we can look at the pulses going through the ICs, we must have something to generate them. A 555 is ideal here, cheap and easy to get going. Use values in the timing network to give about 30 pulses per minute at about a 50 per cent duty cycle. Use a potentiometer for the timing resistor (R1 in the data book circuit) so that the rate can be varied.

#### DECADE COUNTER

Now let us look at the 7490, a decade counter. The data book tells us that as well as dividing by 10, the 7490 has another interesting function; it can give a Binary Coded Decimal output as well. Referring to the data book, connect up the IC to divide by 10. Connect a LED to show the input pulses, and other LEDs on each of the four BCD outputs, arranged on the board in the correct sequence ABCD (or 1248). Copy out the BCD code up to 10 on a piece of paper if you are not familiar with it, and then apply the necessary 5 volt supply to the system.

Looking at the four output LEDs, we find we can follow the BCD count up to 9; but the divider is supposed to count to 10. The data book shows the 7490 is triggered by the trailing edge of the pulse. Is this the answer? (No, Harry. 0000, zero, is state 1. 1001, nine, is state 10. — Tech. Ed.).

Although we can read the BCD count, it is not a very convenient display. Let us use a 7 segment LED display to show the decimal equivalent of the count. Listed in the data book are several ICs which can take a BCD count and convert it into suit-

able pulses to operate various types of display, for example a 7448 BCD to 7 segment decoder-driver. Avoid the mistake I made of choosing a 7448 and then a common-anode display. The outputs of a 7448 are positive pulses to drive a common-cathode display, so I had to use seven inverting transistors. (Or else use a 7447. — Tech. Ed.).

Now we find we can follow both the BCD and the decimal count of our pulse source. While this is interesting, it is not much use. Let us see if we can count rate, i.e. frequency. To do this we must stop the count after a set period of time. If we remove the input to the 7490 while the count is progressing, we find both displays retain the last number counted. The 7490 has a memory. At this stage see what you can find out about JK flip-flops (the works of the 7490).

#### RESETS

In the data book we find that the two resets on the 7490 have to be at 0 (or ground) for it to operate, so while still holding the count we may put a 1 (or plus 5V) on one of the reset lines: the count returns to zero.

At this stage let us put a timebase into the system. As we are counting only 30 pulses per minute we need a gate open time of at least 20 seconds to count up to 10. Using a conventional oscillator we would need a very long chain of dividers, so we will use a simpler method which would not be accurate enough for practical purposes, but is sufficient for demonstration. Note that with this system it is not only the timebase frequency but also its mark to space ratio which controls the counting time. This timebase will be another 555 with timing constants to give about 3 pulses per minute.

Now to look at the operation of a gate. Use one gate of a 7400. Connect the pulse generator (clock) to one input, and the new 555 timebase to the other. Connect the output to the 7490. As the 7400

is a quad NAND gate (i.e. four gates in the package), a zero will only appear at the output when there is a 1 on both inputs. The gate can only open during the "on" time of our timebase, when the pulse generator output will then appear inverted at the output of the 7400.

We now find that our count goes up to a certain number, holds there for a while, and then continues. Obviously we must reset it before the count commences again. So use another gate of the 7400, this time with one input at 1 (5V), and the other connected to the timebase. While the timebase is at 1 a 0 appears at the output, which we connect to the reset line, and the count continues. But as soon as the timebase goes to 0 a 1 appears on the reset line and the count is returned to zero.

#### DISPLAY TIME

Now we see that our counter counts to a number, immediately resets to zero, and holds there until the count recommences. To improve the presentation I put a U<sub>v</sub> with a time constant slightly less than the timebase off time in the reset line. Now we have a real counter, which can count up to a number, display it for a period, reset to zero and restart counting.

You may well ask "What use is this device?" For a practical application the answer is "None". But I learned more about the operation of logic devices with this than with all the previous reading I had done! I am now going to pull it apart and use the bits as part of a digital dial readout for a VK4ZEL exciter. This will entail more sophisticated clock gating and resetting, and the use of latches. It is all in the data book!

I have deliberately not included any circuits or component values in this description, as working from the data book is part of the exercise. One final word of warning; do not forget limiting resistors in series with the LEDs. ■

# FIXED WIRE BEAMS CHEAP BUT EFFECTIVE

When one hears of/refers to, beam antennas, it is natural, in these times of commercialised "amateur" radio, to assume that it is the rotatable, aluminium, trap-loaded variety under discussion — this need not be so.

For simplicity of construction and price, the fixed wire beam takes a lot of beating for the performance it can give.

Commercial and military fixed services (point-to-point) often rely on just this type of antenna to establish and maintain efficient and effective communications. Why not the amateur then?

If you are one of those ops who has a pet frequency and direction for working, then read on — this could be a high gain, direction antenna of use to you.

On the matter of directivity too, remember that most HF uni-directional arrays when correctly tuned, have a forward lobe

spanning an arc in the order of 50 degrees. Look at that arc on your great circle map — it covers a lot more territory than one initially thinks when speaking in terms of "directional" antennas.

If we compare the aluminium tubing and wire beams physically, we notice a difference in element diameter to length ratios of course. In addition, we find a slight capacitive effect on the wire beam, not present on the tubing type, due to the influence of the insulators supporting the ends.

David S. Down VK5HP

17 Brodie Cres., Christies Beach, S.A., 5165

Because of these differences, certain modifications are required when wire is used for the elements in lieu of aluminium tubing.

When constructing a 4 element fixed wire beam for the 1975 CQ WW CW contest, these factors became apparent and it is the intention here, to pass on some of the relevant information gleaned from both references, and practical experience.

For the uninitiated, the most common forms of wire beams in use are the quad and ZL special, but it is not the intention of this article to go into detail on either — so much has been written for so long on these regulars.

Two and 3 element fixed wire beams can be built for a few dollars, without giving away any performance to the more costly rotatable arrays. Construction time is about an hour and a half, and that elusive hi-gain 40 metre array is a real possibility (no traps either!)

For matching convenience to 75 ohm coax or tuned feeder, the driven element in each case is folded. Your choice of matching transformer or alternative methods of feeding is, of course, available.

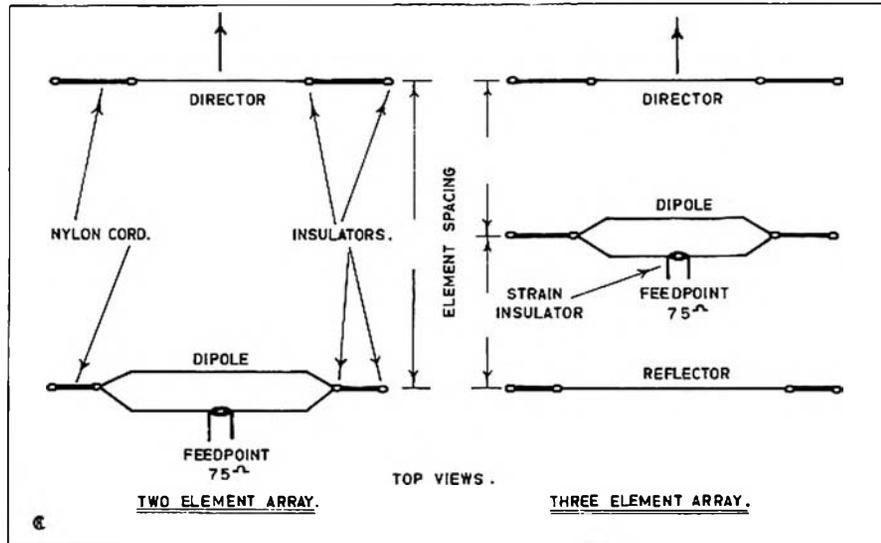
I used 12-gauge hard-drawn, copper wire (pre-stretched between car and carport!) for the elements and erected separate supports for each element on the 4 element version due to the non-availability of 25 foot lengths of spreaders in my junkbox — again, this arrangement lends itself to individual requirements.

The antenna is arranged in a horizontal

plane as shown and is of the uni-directional type. As with all beams, the array should be elevated as high as possible, with 10 metres being the bare minimum. It is also important for the feedline to drop vertically from the driven element

for as far as possible (ideally, at least 20 feet).

Dimensions are given for 2 and 3 element arrays for the 40, 20, 15 and 10 metre bands, and these should be followed very closely.



BAND	DIRECTOR	DIPOLE	REFLECTOR	SPACING
40 m	62'6"	66'2"	70'4"	16'
20 m	31'3"	33'1"	35'2"	8'
15 m	20'10"	22'1"	23'6"	6'6"
10 m	14'10"	16'	17'4"	4'

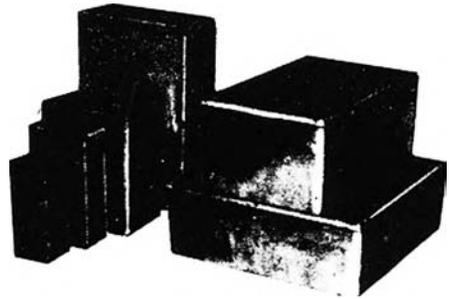
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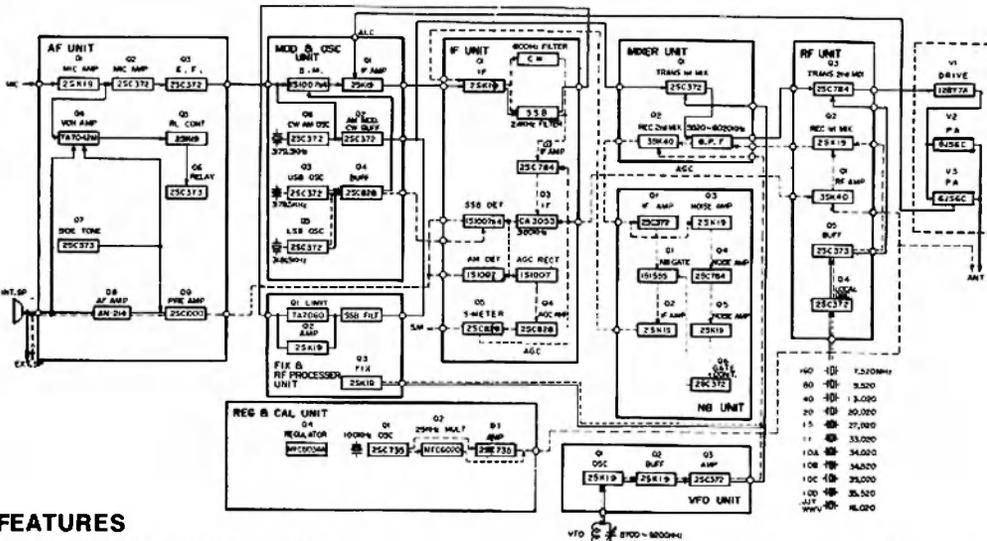
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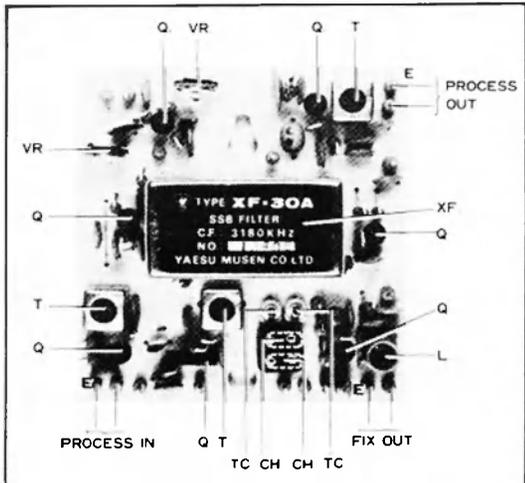
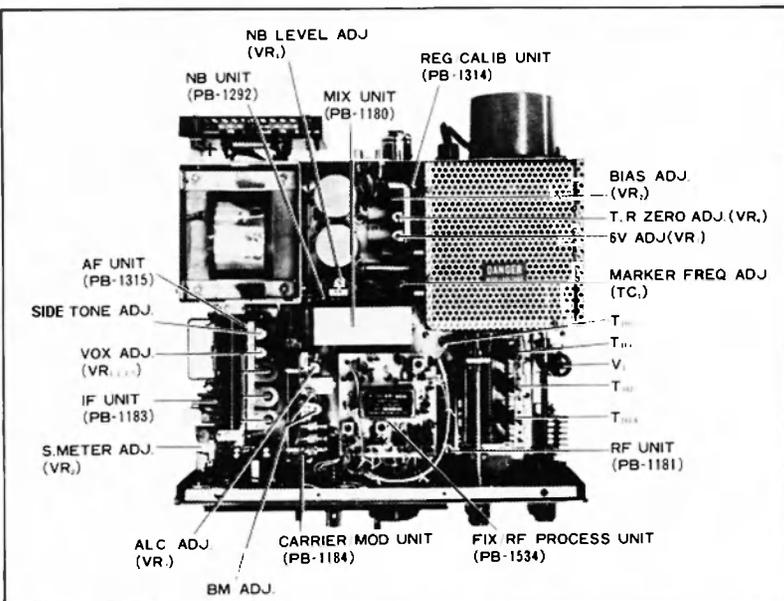
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- ★ English language factory instruction manual with full circuitry, AC and DC power cables, all connectors.

# Station FT-101E/EE

— With latest model RF speech processor including front panel adjustment.



All new built in R.F. Speech Processor with front panel level control.

## TECHNICAL DATA

### GENERAL

**Frequency Range:** 1.8-2.0 MHz, 3.5-4.0 MHz, 7.0-7.5 MHz, 14.0-14.5 MHz, 21.0-21.5 MHz, 27.0-27.5 MHz, 28.0-30.0 MHz all full transmit and receive. WWV 10.0-10.5 MHz (receive only). One auxiliary 500 kHz segment is available except for IF and VFO frequency range. Heterodyne crystal for 1.8-2.0 MHz is available optionally. (NOTE: All our sets include this crystal).

**Mode:** Selectable USB, LSB, CW or AM

**Frequency Stability:** Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.

**Calibration Accuracy:** 2 kHz maximum after 100 kHz calibration.

**Backlash:** Not more than 50 Hz

**Antenna Impedance:** 50 to 75 ohm unbalanced nominal.

**Circuitry:** 40 Transistors, 3 Integrated Circuits, 38 Diodes and 3 Tubes.

**Power Requirement:** 100/110/117/200/220/234 V AC, 50-60 Hz, 350 Watts maximum, or 13.5 V DC nominal, 5 A for standby, 0.5 A for receive (Heater OFF) and 20 A for transmit.

**Size:** 340(W) x 153(H) x 285(D) mm

**Weight:** 15.9 kg (Shpg wt.: 20 kg)

### RECEIVER

**Sensitivity:** 3.0  $\mu$ V for 10 dB Noise plus Signal to Noise Ratio on 14 MHz

**Selectivity:** 2.4 kHz nominal band-width at 6 dB down, 4.0 kHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth on 6 dB down, 1.2 kHz at 60 dB down with optional CW filter.

**Harmonic & Other Spurious Response:** Image Rejection better than 50 dB. Internal Spurious Signal below 1  $\mu$ V equivalent to antenna input.

**Automatic Gain Control:** AGC threshold nominal 3 $\mu$ V. Attack time 8 milli-Second and release time 1800 milli-second.

**Audio Noise Level:** Not less than 40 dB below 1 watt

**Audio Output:** 3 Watts to internal or external speaker at 4 ohm impedance

**Audio Distortion:** Less than 10% at 3 watts output.

### TRANSMITTER

**Input Power:** 260 Watts PEP on SSB, 180 Watts on CW at 50% duty cycle and 80 Watts on AM except for 160 metre. (Slightly lower on 10 metre)

**Microphone:** 50 K ohm dynamic type

**Carrier Suppression:** -50 dB

**Sideband Suppression:** -50 dB

**Spurious Radiation:** -40 dB

**Distortion Products:** -30 dB

**Frequency Response:** 350 to 2700 Hz  $\pm$  3 dB

**Final Tube:** 6JS6C x 2.

All prices include S.T. Freight extra. Prices and specifications subject to change. **90 DAY WARRANTY**

## ELECTRONIC SERVICES

FRED BAIL VK3YS  
JIM BAIL VK3ABA

60 Shannon St., Box Hill North, Vic., 3129.  
Ph. 89 2213

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TAS	G.T. ELECTRONICS, 131 Westbury Rd., South Lancelton, 7200	Ph 44 4773
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot, 2020	Ph 667 1650 A.H. 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalry Street, Seven Hills, 2147	Ph 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West, 3202	Ph 69 2040
QLD	H. C. BARLOW, 92 Charles St., Artkenvale, Townsville, 4814	Ph 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion, 4010	Ph 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Aitree Crl., Phillip, 2606	Ph 81 2824 82 2864

# NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

## AN AERIAL TUNING UNIT FOR AERIALS SHORTER THAN $\frac{1}{4}$ WAVE LENGTH OR JUST SHORTER THAN $\frac{1}{2}$ WAVELENGTH

This aerial tuning unit has been used on 160 metres with considerable success and could be used on other bands such as 80 metres with no modification. Having tried a few aerial tuning units which did the job of matching the transmitter to the aerial in a mediocre way, I had the good fortune to have first hand experience of using a system similar to that now described.

The output tank circuit of the average amateur transmitter is designed to transfer maximum power into a load of approximately 50 ohms impedance. When an attempt is made to load such a transmitter into a load which is significantly different in characteristics to that for which it was designed, you have quite a few problems trying to get it to load, as I did.

T1 is the impedance matching autotransformer. It consists of a toroid of about 3 inches in diameter wound with 58 turns of enamelled copper wire. The wire is wound twice around the circumference of the toroid spacing the turns so that this occurs. The wire at the low impedance end is wound with 14 gauge B & S wire for about a third of the winding, and then the rest is wound with 18 gauge B & S wire. The toroid is first wrapped with plastic insulation tape and then the wire is wound on starting at the earth end of the winding. The 5 ohm tap occurs at the 13th turn and progressing further up the taps occur at the 15th, 17th, 20th, 23rd, 26th, 30th, 35th, 40th (50 ohms) and 48th turn. The winding continues to the 58th turn which is the 105 ohm tap. Each of the required taps is made by raising the wire a fraction of a centimetre off the toroid, scraping the insulation off it at that point and soldering a length of wire to it

long enough to go to the switch, S1. The tapping points might appear a bit odd, but they are arranged going down from 50 ohms to be approximately 75 per cent of the previous value, 38 ohms is approximately 75 per cent of 50 ohms and 28 ohms is approximately 75 per cent of 38 ohms. This makes for an autotransformer with a much smoother transition of impedances which means it is easier to select the correct aerial impedance.

Some years back Phil Williams VK5NN built a tuning unit something similar to this one. He used a TV horizontal output transformer core as the former for T1. I have no doubt that it will work as well as mine and may be more easily obtainable.

T1 matches the resistive impedance of the aerial system but the reactive element has still to be balanced out. L1 is used to balance out the reactance of the aerial. I use a rotary inductor with a coil diameter of about 5 centimetres within a total of about 60 turns on it over a length of 12 centimetres.

Rotary inductors are not all that easy to come by so a coil of up to 60 turns can replace L1 used with an 11 position switch to select tapings on the coil. The exact tapping used on the coil for any particular part of 160 or 80 metres depends on the aerial in use, as does the impedance tap on T1 that is used.

A thermo-couple ammeter can be wired into the circuit either between S1 and L1 or after L1 and before the aerial. These ammeters will register the amount of RF current going into the aerial, and by squaring this current and multiplying by the impedance tapping used on T1 the amount of power out of the ATU can be reasonably accurately calculated. Thermo-couple ammeters are hard to come by so I decided to try the current transformer idea that I had seen in a copy of "Electron", the Dutch amateur radio magazine. T2 has a toroid ring of 14 mm diameter. Through the centre of the toroid is passed the wire from S1 to L1. Four turns of insulated wire are wound on the toroid and then taken off the RF detector and metering circuit. With the 5k ohm trim pot at half travel the 1 mA FSD meter registered 3.3 amps of aerial current. The scale is fairly linear down to a third scale and then becomes progressively non-linear such that

a current which should read a fifth of FSD only reads a sixth and so on.

More turns can be wound on the secondary of T2, although I would think that 5 to 6 turns would be enough even with a very low powered transmitter. The value of the two resistors can also be altered to give almost any range that the builder desires. The toroid is one available from Elcoma but I think that any orders for parts from them carry a certain minimum quantity and total transaction price requirement. Some builders may like to wire a small pilot lamp across the secondary winding of T2. Depending on the voltage of the lamp, the number of turns on T2 and the power of the transmitter will determine the brightness of the lamp. The brilliance of the lamp will increase with modulation on an AM transmitter, the meter will, however, stay stationary if there is no carrier shift.

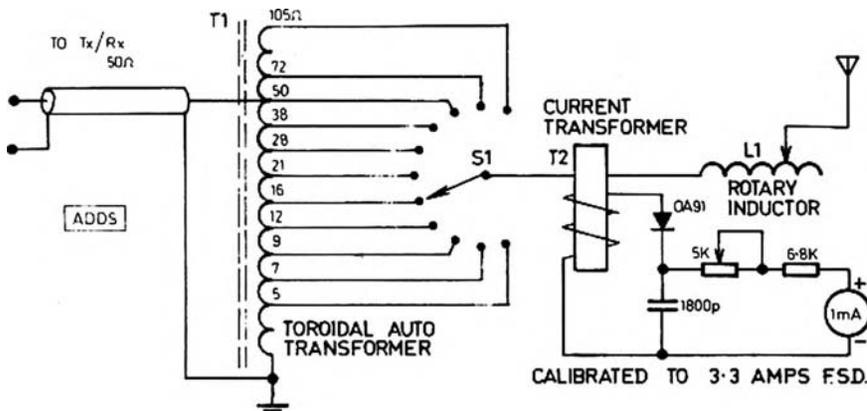
Normally, the transmitter is tuned into a 50 ohm dummy load, then transferred to the aerial via the aerial tuning unit. Without touching the transmitter controls starting with S1 set to a low impedance run L1 through its range noting the maximum reading on the meter. Try the next impedance tap and take L1 through its range again stopping at the point where maximum current is indicated by the meter. Continue this progression through the taps on T1 and adjusting L1 for maximum indicated current until you come to the point where you find that one particular tap on T1 and one setting on L1 gives the maximum meter reading. The aerial tuning unit is now tuned for maximum transfer of power from the transmitter to the aerial. The aerial system is also matched to the receiver and I obtained 1 S point gain through the use of the ATU. During the process of tuning the ATU give the transmitter a bit of a rest every few seconds as it could be drawing excessive plate or collector current at times.

This simple aerial tuning unit works extremely well and should do so for you too. It appears to have no vices that I can detect and all controls work the way they should. Hope to hear you with a better signal on 160 metres soon. If you intend to use it on higher bands than 80 metres, a low loss toroid should be used. A smaller toroid could be used too.

## AFTERTHOUGHTS

People who are members of The Eastern and Mountain District Radio Club will have read this article in "The Radio Bulletin" for May 1976. Lin Brown VK3ARL read the article and came up with an amendment to the RF metering circuit which was featured in June 1976 issue of "The Radio Bulletin".

The toroid T2 not being readily available, Lin tried out a balun core as used in TV tuners. These are the 2 holed ferrite cores measuring about 10 mm x 10 mm x 5 mm. The aerial wire is passed straight through one hole and 4 to 6 turns of fine wire is wound through the second hole and over the outside of the core to form the secondary winding. The rest of the circuit is as original. Thanks Lin. ■



# COMMERCIAL KINKS

Ron Fisher, VK3OM  
3 Fairview Ave.,  
Glen Waverley, 3150

After our discussion on the TH6DX antenna last month, a logical extension of this is a useful hint on the HAM-M and HAM-11 rotators. Geoff Wilson VK3AMK is again the author.

To follow this is a simple hint to improve the quality of the internal speaker on the Yaesu FT101B, again by Geoff; and to finish up this month a simple modification for the KEN KP202 hand-held transceiver. Firstly though over to Geoff for his two hints.

## HAM-M AND HAM-II ROTATORS

If you don't wish to depend upon the motor unit to provide a low impedance ear path between the upper and lower mast a very quick and simple modification can be made. The materials required are readily available in most shacks: 2½-3 ft. of RG-8U coax (old if on-hand is perfectly suitable) and two ¼" hole solder lugs.

Firstly strip the outer PVC covering from the coax but *don't* damage it. This is a tricky operation but gently heating it with a hair drier will soften it and, with one end of the braid and inner cable held in a vice, the outer covering can be eased off. Next push the braid off the inner insulation and flatten one end and solder or crimp to one lug. Attach this lug to the ¼" bolt in the centre of the upper mast clamping plate, screwing it tight.

Ensure there is enough braid to reach from the upper clamping plate centre bolt to the same bolt on the lower mast clamping plate (allowing for the full rotation of the unit of course). Attach the other lug and pass a couple of feet of wire through the hole and twist the end of the wire to hold it. Push the wire through the PVC tubing and pull the braid through until the tubing reaches the upper lug. Attach the lower lug to the bolt in the centre of the lower clamping plate and it is complete. The tubing over the braid will prevent the braid scratching the rotator paint and protect the fine braid from abrasion.

## FT-101B INTERNAL SPEAKER

The cover plate on the underside of my FT101B was so close to the plate holding the internal speaker that at certain audio

frequencies the cover plate produced a very annoying rattle. This was cured by cutting a piece of thin foam rubber (approx. 1/8" thickness) to fit around the edge of the speaker plate and holding it in place with a few drops of contact adhesive. The rubber then acted as a buffer between the speaker plate and the cover plate and the problem was solved.

## IMPROVING THE TRANSMITTED AUDIO OF THE KEN KP202

The transmitted audio from the KEN 2FM transceivers seems to vary from quite good to very poor. The latter state usually shows up as an excess of high frequency response plus some harshness or distortion.

Having just acquired a KEN that came into the above class, I decided that a solution was required. The cause appears to be quite wide variation in the microphone inserts supplied in the KEN. The cure is simple. Just connect a .2 mFd disc ceramic capacitor across the output connections of the microphone. The capacitor should be of the 25 volt type about the size of a five cent piece. It is connected with short leads and folded flat against the back of the microphone insert, there will be no trouble getting it to fit. ■

# VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP  
Forreston, 5233

## AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lolly	53.000
	VK5VF, Mt. Lolly	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RMT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea*	50.110
KG6	KG6JDX, Guam*	50.110
KH6	KH6EQI, Hawaii*	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

\*Denotes addition.

It appears the beacons in South Korea and Hawaii are still running continuously, so they have been re-included for your information. News from overseas via VK6ZDY mentions quite a lot of beacons operating in the U.S.A., Canada and Alaska as well as some Pacific areas. It seems there could be more chances of very long haul DX when the sunspot cycle becomes more suitable, but it will

require VK stations to monitor the 50 MHz end of the band. I guess that none of us do this as often as we should, and really never know how many lost opportunities may have been around — one of the disadvantages of our 2 MHz separation from other call areas, fortunately however, our beams will work better down to 50 MHz than theirs will at 52 MHz, so that may be some compensation.

Peter, VK6ZDY has sent me copies of the July issue of SMIRK, from Texas U.S.A., which has much information on 50 to 54 MHz as it affects the northern hemisphere in particular. Probably of interest to many will be some extracts by Ray K5ZMS and I quote "My guessimate that this would be a great year for DX on 6 has exceeded my wildest expectations. (Remember, northern hemisphere has just been through their summer DX season . . . SLP) KL7's IBG and HLE have been worked, VE1ASJ and W1's worked YV5ZZ. JA8s worked KH6J; JH1WTO being heard in Pacific NW; C6A, ZF1XW, most of the VEs, VO1MO, KP4's, CO2KK, XE1GE and FE, KH6's worked W6's, NM and NW7's, PJ2DW and VP2LAW. All these countries have been worked this year. VE1ASJ became the first to work the YV5ZZ station, doing it during the Field Day.

"We have had one of the best Es summers in years, the foreign DX has been great, and we have finally interested many people to get back on 6 metres. I was the first to hear the WA6MHZ beacon on 50.195, 10 watts out. If you hear it, call on 50.110. It runs 24 hours a day. I also hear that K7IHZ's beacon on 50.103 is on again. If you hear it call on 50.140".

It certainly appears the northern hemisphere had a ball this year, with so many openings to everywhere. If this is an indication of the situation during the low of the sunspot cycle, it must surely mean there are many more stations now with 6 metre capability, and as the DX seasons improve then surely VK must participate to some degree in these extreme distance openings.

Thanks for that letter Peter, VK6ZDY, and it is noted you will be at a new QTH from November at a height of 1100 feet a.s.l. I wonder why you chose that situation? Peter also points out that the 14 JA's which made it to KH6 on 7/8th July were covering approx 3500 miles, and to W6 about 6000 miles; W6 to KH6 about 2500 miles. There are some good hauls here and it ought to be possible to obtain similar distances from VK. It looks as though you guys on the east coast of Australia should be doing more during the warmer

weather to extend your distances into the Pacific areas, using HF to set up skeds where possible.

A letter from Selwyn ZL2BJO advises dates of their VHF contests as follows: 7/11/76 six metres only, four one hour periods 1000 to 1400 NZ daylight time. As these times have not been given to me in GMT I can only suggest NZDT will probably be 3 hours ahead of EST, instead of the normal 2 hours, making the corrected times as 2100 to 0300Z, 4/12/76 0400 to 1000Z; 5/12/76 1800 to 2400Z. All bands used. 14/15 Feb. 1977, DX Field Day, times not yet finalised.

Could I ask everyone submitting times for contests and field days to please make the times in GMT. This effectively takes care of different daylight savings time, and simplifies my work. Thanks. Therefore, I do hope the above mentioned times will be correct.

As an indication that the 6 metre band is open a lot more than you think during the winter months, take a note of these contacts made by Barry VK2ZAY at Gunnedah, most signals being 5 x 9; 23/5 VK7ZLH; 30/5 VK4MS, VK4TL; 27/6 VK5ZBU, VK5ZVQ, VK5ZSA, VK5MT; 17/1 VK4TL, VK4RO; 22/7 VK7ZGJ, VK5ZZZ, VK5ZTX and VK5MM.

Kerry VK5SU/2 now residing at Moree has written to say all his gear has arrived from Ceduna, and he looks like being fully operational by the time the real DX starts coming through. Currently he has 11 elements on 2 metres FM, 11 elements on 2 metres SSB and a 4 el. on 6 metres. First VHF contact from Moree was to Joe VK7ZGJ on 6/7/76 using the FTV650 to a 40 metre dipole!

Kerry is able to work Barry VK2ZAY (110 miles) every day on 144.1 SSB, and was able to make an initial contact with him using his 2 element portable beam nailed under the eaves of the house. FM signals both ways to Barry are noise free, and SSB are 5 x 9— subject to QSB. Others he has worked on 144 SSB are Chick VK2DK at Narrabri (60 miles), Reg VK2ATS at Inverell (85 m) and Allan VK2ASI at Tamworth (135 m).

Kerry reports SSB is the favoured mode in northern N.S.W. and he is particularly keen to contact the Queensland boys, as the VK4RTT beacon at Mt. Mowbullan is frequently audible at up to 9+ with low QSB. The beacon is approximately 210 miles NE from Moree. Kerry will keep an ear open for travellers on Channel 40 FM when home.

Phil VK2YDY is now active also from Moree using an FT200 and Europa B to 11 elements hori-

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TH3MK3, 10-15-20m 3el 14' boom \$190  
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FD30M low pass filter,  
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4kW, sealed . . . . . \$22

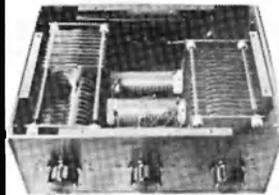
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2 tones . . . . . \$65  
MC22, as above - but no  
compression meter . . . . . \$54

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| 2. Transmitting tubes in final (6146B)                         | Yes         | No      | Yes     |
| 3. CW filter as standard                                       | Yes         | No      | No      |
| 4. Regulated screen voltages for stable operation of final     | Yes         | No      | No      |
| 5. Independent of circuits for Tx and Rx                       | Yes         | No      | No      |
| 6. Dual RIT control 5kHz                                       | Yes         | No      | No      |
| 7. 1kHz VFO  | Yes         | No      | No      |
| 8. Shortfall AGC switch  | Yes         | No      | Yes     |
| 9. PLL VFO for excellent stability and tracking                | Yes         | No      | No      |
| 10. Noise Blanker for pulse type noise                         | Yes         | Yes     | Yes     |
| 11. Hybrid dial with digital analog read out                   | Yes         | No      | No      |
| 12. RF amp and fan switchable when receiving only - as desired | Yes         | No      | No      |

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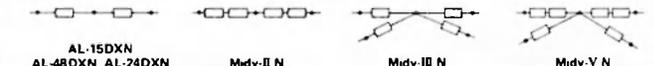
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AL 24DXN	do	52 ohm	7 - 14MHz	do	do	14m	900g
AL 15DXN	do	52 ohm	21 - 28MHz	do	do	6m	870g
Midy II N	do	52 ohm	3.5 - 7, 14MHz	1.5KW PEP 750W CW	Less than 1.3:1 @ 50Hz	23m	1.4kg
Midy III N	New Deluxe type, Multi-band Loaded Dipole	52 ohm	7 - 28MHz	2KW PEP 1KW CW	do	14m	1.4kg
Midy V N	do	52 ohm	3.5 - 28MHz	1.5KW PEP 750W CW	do	23m	2.2kg

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zontal at 40 feet. Phil also has 2 m FM. Phil comes from Toowoomba, and Kerry mentions when next he returns there he will be trying to stir up some interest in the southern directions. Pat VK2ZXB is due in Moree on transfer from Ceduna and has an IC22A. Gerry VK2BGK is also due on transfer and is keen on FM operation. Dave VK2CAD is at Moree and uses 2 metres FM. And there are others in this town of 10,000 people who look like having their interests stirred again by Kerry. My thanks to Kerry for once again writing, and I have given his letter some prominence as this is the first real report we have had of 2 metre SSB operation from northern N.S.W. They are situated at a nice distance to VK5 for Es contacts when the band is right, so once again all you guys with 2 metre equipment, watch the band closely from October onwards especially, what with Moree and associated towns, plus the increased interest in the more northern areas of VK4, it seems we could yet have some long haul DX on 144 again.

Steve VK3BIZ writes to report a contact between HL9WI and JDI1AFM on Ogasawara Island, south of Japan. Hiro JA1LZK was operating as JDI1AFM on this his second DX-pedition to Ogasawara Is. from 1st to 9th August. KG6JDX has a beacon running on 50.110 during the evenings. P29DJ and VK4MS are running nightly skeds on 52.050 at 0730Z. P29BH and P29DJ will both be active on 6 metres this summer. Steve predicts that September, October and November will be the months to watch for serious DXworking. He also mentions that the mailing address of Bill Boykin, HL9WI, is HQ, 8th Army Engineers, Korea, A.P.O., San Francisco, 96301.

Thanks Steve for your letter, let us hope you will not be too disappointed with 6 metres from your new QTH, which appears to be prime Channel O area!

#### 432 MHz ACTIVITY

John VK7JV is now active on the band, with approx. 200 mW to a 16 el. yagi. Joe VK7ZGJ of course is also there. Tests between Keith VK5SV and myself VK5LP have been carried out over the 35 mile path of hilly country with good results. There seems to be no difference between 432 and 144 MHz as far as we can see for our path. I am running about 40 watts output from a 2C39A to a 13 el. yagi at 67 feet, Keith in the next day or two will be lifting his 10 watts also to 40 watts and the same type of antenna.

#### E.M.E. ACTIVITY

Lyle VK2ALU sends his monthly notes via "The Propagator". He writes: "A scheduled EME test was made on 3/7/76. Those present were VK2ALU, VK2ZEN, VK5LP and Ken Grimm. The first EME test was with SM5LE and a contact was made: he

gave us an M report but we could only give him a T report due to interference experienced from auto ignition. The next test was with PA0SSB, who was worked with M reports both ways. His signal peaked to 8 dB above noise at the start of the test, but faded during the half hour. The final test was with LX1DB, who was not heard. Our echoes peaked at 7 dB above noise.

SM5LE requested EME tests on 30 and 31/7 and 1/8. We had the first VK-SM 70 cm contact with SM5LE on 30/7, signals were M copy both ways. We did not hear any signals from HK1TL during the test on 1/8. Another station was heard near the frequency but the call sign could not be fully identified. As a matter of interest HK1TL in Columbia, South America, was a portable operation, with all the moonbounce equipment, antenna and personnel coming from W3CCX in U.S.A. Their portable gear weighs 1368 lbs. and all had to be airfreighted.

A QSL card was received from W1JAA for our first EME contact with him, made in June. He is our second longest distance contact, with a point-to-point distance of 10,110 miles (16,270 km)."

Lyle also mentions they are always happy to have visitors come along to the moonbounce tests at Dapto, but would like any visitors to make sure they arrive before the tests commence, or do the last 200-300 yards on foot, as their receiving system is VERY sensitive to auto ignition noise! (With that I can agree — SLP).

#### GENERAL INFORMATION

I note with interest the last issue of "Forward Bias" from Canberra, was printed by the "Photo-offset" process. The chief advantage of this is that the resolution of the printing is much greater than the previously used duplicator system.

Arie VK3AMZ is looking for long haul tropospheric scatter contacts on a regular basis, either CW or SSB. Each week night from 0930Z onwards. Arie is looking towards the N.E., N, and N.E.E. from Melbourne. Frequencies used are 144.030 for CW (this mode preferred) and 144.100 for SSB. Any takers?

The Geelong Amateur Radio & TV Club Newsletter contained the above item. It also has an interesting comment in the President's report which reads: "It has been the concern of the Club for some time that although the population of Geelong has expanded in recent years the amateur population has remained dormant. This situation should not be tolerated by Geelong amateurs, we must have the numbers if we are to survive and enjoy our hobby. To do this we as amateurs must support schools, clubs and organisations who promote amateur radio.

"This year the Club is about to take a bold step in promoting amateur radio by conducting

classes for the novice licence. These classes will be open to the public and will be conducted by qualified teachers".

It is commendable to see concern is being voiced in Geelong, as it has in some other areas, and it is to be hoped that their efforts will be rewarded in the long term.

David VK5KK is currently constructing SSTV equipment for use on both HF and VHF bands, so that will be another mode of operation to come out of that shack.

The VK5 mid-north repeater is now in operation from The Bluff near Port Pirie, and is operating on new Channel 2. Reports welcome. Call sign VK5RMN.

Stan ZL4MB writes with some news of activity from across the Tasman. He mentions "Six metres last summer was very poor, with only one contact outside Dunedin, to a VK7 and that was poor. This coming summer he will be home operating from hilltops.

"On 20th and 21st November there will be activity on 52, 144, 432 and 1296 MHz from Dunedin to Christchurch with Russell ZL4TGP, Ronald ZL4TGR, Brian ZL4TGO and Stan ZL4MB at the Dunedin end, and Vern ZL3AQ will be joining them for the weekend. From Christchurch Max ZL3AAN and Ray ZL3TBS will be operating. Included in the activities will be operation through Oscar 6 and 7, and a special invitation is extended to VK operators to participate in any of the activity where practicable. Operating times look like being 2100 to 2300Z and 0000 to 0400Z each day, from the top of one of Dunedin's hills.

"4/5 December they will be supporting the usual VHF/UHF National Field Day. Les ZL3TCW at Timaru, as well as operating in the Field Day also should have his 150 foot tower in operation before Christmas and looking for trans-Tasman 144 MHz DX. Keep an ear open for him. Overall, it seems there will be quite a bit of 6 metre activity from New Zealand this year".

There doesn't seem to be much else to report now, so will start closing. However, as this appears in October we will be nearing the increased DX activity on both 6 and 2 metres, so if all those stations in all those States really do become keen as they indicated, we could expect some good contacts. Southern States will certainly be looking towards northern N.S.W. and Queensland this year for 144 MHz SSB, so remember 144.100 is the calling frequency. On 6 metres it is 52.050. But keep an ear on the area 50 to 52 MHz especially during October and November.

With those few words I close with the thought for the month: "It has never been determined whether the early bird enjoys the worm as much as the late bird enjoys the extra sleep". 73.

The Voice in the Hills. ■

## IARU NEWS

The Deputy Secretary-General of the ITU, Australian, Richard E. Butler, recently addressed the Rotary Club of Sydney about the changing telecommunication environment in Asia and the Western Pacific. Since he kindly sent a copy of this address to the Editor it is assured no objections will be raised in quoting from it.

"A clearer recognition of the need for widespread international co-operation comes at a time when the world at large is also becoming more conscious of the importance of telecommunications of all kinds.

We recognise that telecommunications are part of the nervous system of society. As such they have a role to play in the furtherance of social, economic and other policy aspirations of direct concern to all.

The wide multilateral interest is now reflected in the participation entities and scientific and industrial organisations in the work of the ITU. For example, at the policy level there are now 146 Member Governments, each with their independent rights and aspirations to be accommodated in the collective international will and processes of the Union.

An indication of the awareness of governments in Asia and the Western Pacific of the importance

of telecommunications can be obtained by examining the growth in the membership of the ITU.

Including only a few members from the region a hundred years ago (India, Iran, New Zealand and some Australian States) the number of members from Asia and the Western Pacific was still just 15 countries in 1950. But today, it is approaching 40.

In the last 25 years new nations started emerging as independent States acting for the first time sovereignly to meet their own requirements.

In many instances, these countries, some wealthy, some less so and some very poor, were unable to provide a communication infrastructure commensurate with even the most immediate economic and social requirements. It was consequently logical therefore that the ITU . . . should set out to assist in meeting the needs of these countries, by providing field assistance as an Executing Agency for the United Nations Development Programme . . .

We are, in reality, developing master plans for the closer integration of Asia and the Western Pacific in the global telecommunications system, using a mixture of land and satellite systems. Land systems will provide connections from Asian countries to the Middle East and through the Middle East to Europe and Africa . . .

The ITU is an impressive and long-standing example of world-wide international co-operation in the development of telecommunication policies. It is the oldest of the inter-governmental organisa-

tions which form the specialised agencies of the United Nations and traditionally its work has been of a standard setting and regulatory nature.

It provides the forum at various hierarchical levels for the telecommunication interests to decide on the long-term policy applications, to arrive at standards, eliminating inconsistencies in the arrangement and conduct of their services so that advances that have been achieved in telecommunications will be employed to the full.

Policies with regard to telecommunications, resulting in the adoption of regulations and recommendations to the realisation of development are, by and large, elaborated in the Union by persuasion and by consensus. The acceptance of such policies is strongly assisted by the fact that the people to whom they are directed have themselves contributed to their formulation. The opportunity that the Union provides for joint and voluntary consultation, in the widest sense, is the corner stone in its continued success . . .

The present state and future development of all telecommunications depend upon understanding and greater exchanges between governments, their authorities, specialists, etc., with the active participation of a well informed public assisting in the formulation of future policy measures, needs and investments inherent in their application. Future development is no longer only a question of providing a telegram or telephone service, or organising broadcasting and some fixed and mobile services using the radio frequency spectrum . . .

Some potential telecommunication applications create sensitive policy issues. These can only be satisfactorily resolved by multilateral considerations, understanding and mutual co-operation at the world, regional or inter-country levels — not merely between governments and their authorities but at all levels, including you and your individual counterparts — irrespective of your vocation".

The word "telecommunications" has a very wide meaning — see AR Jan. '76 p. 21.

On the WARC 79 front the Australian amateur service brief has taken shape and it is understood that the administration has now received the agenda for the Conference thus enabling the postponed meeting of the APG to take place early in October.

The Federal President was invited to attend the

50th anniversary celebrations of JARL in Tokyo later in September but unfortunately could not accept. Mr. Michael Owen, VK3KI however will be attending in his role as a Director of the IARU R3 organisation as well as representing the WIA. He will take with him from the WIA a suitably prepared token in the shape of a slab of Australian raw opal cut to the outline of Australia with a silver plate to mark the gift. ■

# A.O.C.P. EXAM PAPERS AUGUST 1976

## POSTAL AND TELECOMMUNICATIONS DEPARTMENT AMATEUR OPERATOR'S CERTIFICATE OF PROFICIENCY

### SECTION K (Regulations) August 1976 POSTAL AND TELECOMMUNICATIONS DEPARTMENT

Time allowed — 30 minutes.

*NOTE: Three questions only to be attempted. Credit will not be given more than three answers. All questions carry equal marks.*

1. (a) In your own words, state the method of determining the power output of a single sideband suppressed-carrier emission.
- (b) What type of transmission is a:
  - (i) A3H emission.
  - (ii) A1 emission.
2. (a) List the type of messages not permitted in the amateur service.
- (b) Under what conditions may an unlicensed person be permitted to use the microphone of an amateur station transmitter?
3. (a) Discuss briefly the regulatory requirements regarding portable and mobile operation.
- (b) Give an example of a radiotelegraphy call and reply when VK2AA is calling VK3AB.
4. Give the meaning of the following abbreviations:  
QSV QSY QRZ? QSB? AA

## AMATEUR OPERATOR'S CERTIFICATE OF PROFICIENCY SECTION M (Theory) August 1976

Time Allowed — 2½ hours.

*NOTE: Seven questions only to be attempted. Credit will not be given for more than seven answers. All questions carry equal marks.*

1. (a) Assisted by a block diagram, describe briefly the function of each stage of a single-sideband suppressed-carrier (A3J) transmitter.
- (b) List three advantages to be gained by using the A3J mode of transmission in preference to double-sideband full-carrier (A3) transmission.
2. (a) Assisted by a sketch, describe the construction and theory of operation of a crystal microphone.
- (b) Listing component values, show by means of a circuit diagram how this type of microphone is connected to an amplifier.
3. (a) Describe the manner by which high-frequency radio waves may be propagated over long distances. Explain why communication between countries such as America and Australia is restricted to certain times in the HF bands.
- (b) Explain why communication over long distances as described in (a) is not possible using the VHF and UHF amateur bands.
4. (a) A double conversion type superheterodyne receiver is tuned to a signal on 14.1 MHz which is amplitude modulated by a 1000 Hertz tone. Draw a block schematic diagram of such a receiver and show typical frequencies present at the input and output of each stage.
- (b) Discuss the theory of operation of this type of receiver and list any advantages and disadvantages it may have in comparison with the single conversion type.
5. (a) Explain the fundamental difference between frequency modulation and amplitude modulation.
- (b) With the aid of a circuit diagram, explain the theory of operation of the discriminator stage of a receiver suitable for reception of frequency modulated signals.
6. Assisted by a circuit diagram, describe the operation of a mains operated power supply which uses silicon diodes. The power supply is required to provide a regulated output of 6 volts to supply a crystal oscillator and an unregulated output of 9 volts for the buffer stage of a transistor type transmitter.
7. (a) With the assistance of plate current-grid voltage curves explain bias conditions for valves operating in Class A, Class B, and Class C amplifiers.
- (b) Give an example of the use of each class of amplifier and indicate approximate efficiency percentage in each case.
8. (a) What is meant by the following terms when used in reference to an iron cored transformer:—
  - (i) turns ratio; and
  - (ii) impedance ratio?
- (b) List the losses associated with the operation of a power transformer and state how these may be minimised.
9. Two resistors, R1 and R2, of 20,000 and 10,000 ohms respectively are connected in series across a 20 volt DC supply of negligible impedance. Calculate:
  - (i) the potential difference across each resistor;
  - (ii) the power dissipated by R2;
  - (iii) the voltage reading which will be obtained if a voltmeter having an internal resistance of 10,000 ohms is connected across R1.

## BOOK REVIEW

### VHF-UHF MANUAL

An RSGB Publication

Well the British have done it again! This time they have produced not only an up-to-date manual on the practicalities of VHF and UHF operation, but also a reference book which is likely to stay in one piece for more than twelve months!

The third edition of the RSGB's VHF-UHF Manual is at hand and its 400 odd pages cover most of the main subjects that you would expect to find in this type of reference plus some bonuses. It is a hard-cover reference book and weighs a fraction over 1 kg.

The main chapters are Propagation, Tuned Circuits, Receivers, Transmitters, Filters, Aerials, Microwaves, Space Communication and Test Equipment — not very inspiring titles but the information contained within the chapters is vast.

The chapters on Receivers and Transmitters cover the field admirably with detail on the everyday modes of operation together with sufficient information on the more exotic modes (such as ATV) to whet the appetite of newcomer or old-timer alike.

A new section on Microwaves is by far the best I have seen in any amateur publication. Information on Waveguides, aerials — design and construction Gunn oscillators etc. is such that surely an upsurge in microwave communication must result.

A chapter on Space communication covers the satellite and EME field well.

One or two little things which I like about this edition (bonuses) include the expanded information on design and the large number of "building block" circuits. For example the book contains numerous graphs, nomograms and design charts which are all relevant to this part of the spectrum, including a resonant frequency chart for 20 to 6000 MHz, a design chart for quarter wave helical resonators 1 to 10,000 MHz, coil design information 0.01 to 1 microhenry etc., etc.

On the "building block" side, there are many useful circuits, transistor RF amplifiers for 1296 MHz, linear amplifiers, high power amplifiers for 70 cm, wide band IF amplifiers for microwave work and so the list goes on.

Perhaps the notes on the fly leaf cover, fairly well sum up my thoughts on this publication.

"This manual deals with techniques and equipment applicable to frequencies above 30 MHz. It is in this part of the spectrum that much work is now concentrated with particular emphasis on microwaves. While the contents are primarily for the amateur technician there is much information of value to the professional engineer".

Oh!, and by the way, if you think you know all about the ins and outs of VHF propagation — What is a Skeleton tephigram? (it's got nothing to do with aerials).

## BOOK REVIEW

### BIG EAR

A new very readable book just out is by the famous John Kraus, W8JK who first conceived the 'flat-top' beam named after his call-sign 40 years ago.

The book is somewhat, and interestingly, autobiographical leading from and up to discoveries by the Ohio State University radio telescope in some attempt to answer the question whether or not we are alone in the Universe. On the way he describes many meetings, amusing anecdotes and much about amateur radio and astronomy.

Published by Cygnus-Quasar Books of P.O. Box 85, Powell, Ohio, USA 43065 at US \$2.95 cover price post paid.

## INTRUDER WATCH

All Chandler, VK3LC

1536 High Street, Glen Iris, 3146

Intruder Watch Memo No. 2 1976 from the ARRL is worth quoting —

"Our new and intensified Intruder Watch program went into effect June 10, and already things are rolling. To this date, we have received confirmations from the FCC monitoring branch for five of the Broadcasting stations on our forty metre exclusive amateur segment, and more are coming soon. Once the FCC treaty branch receives copies of the reports we have on file, diplomatic action will begin, taking the form of telegrams to the offending administrations. We have also sent the FCC all our documentation concerning the FAA weather link spur on 14195 kHz. The FAA technicians are aware of the radiation but have not been successful in finding its cause. We will keep you informed of all IW developments".

And further — "So far this year, we have received practically no reports of any intruders in the 160, 15 and 10 metre bands. We assume that the lack of intruders on these bands is due to the poor band conditions. But is this really the case? Cou'd it be that the poor conditions have simply discouraged IWers from listening on these frequencies? In 1979, the World Administrative Radio Conference (WARC) will determine frequency allocations for the remainder of this century. Currently, 15 metres is being eyed on an international scale by shortwave broadcast services and 10 metres is becoming interesting to fixed service ionospheric scatter links (again on an international scope). Even domestic broadcasters are looking to expand their services up to 1805 kHz.

Without a source of objection to the presence of intruders on our shared bands (not simply the exclusive segments) we have no muscle with which to defend our rights to this spectrum space. Don't ignore 160, 15 and 10 — conditions will improve long before 1979.

I would like to stress some points that were made about reporting methods. It would be of extreme help if any patterns of operation were reported. Does the station transmit only on weekdays? Only at certain times of the day? Every day? Does the station announce that it is beaming its transmissions to a particular region of the globe? (This is especially important if the station announces that it is beaming to our region). If its mode is F1, what frequency shift is it using? Bandwidth? Most important of all: If you aren't sure of something, leave it blank rather than guessing at it or assuming it. Our IW reports are

written evidence, and it does absolutely no good to our cause for them to be inaccurate".

The sentiments expressed in that memo apply equally effectively to us in Region 3, and I would like to see more enthusiasm shown by members in reporting intruders.

We have had reports from time to time of Japanese fishing boats operating in Australian waters and I have been in touch with our Administration regarding these boats. When they operate between 3500 and 3700 kHz in Australian territorial waters they are intruders, but it has to be established that they are operating in our territorial waters less than 12 miles offshore. If it can be established that they are operating within these boundaries then they will send a complaint to the Japanese authorities. Thus, in reporting it will be necessary to get a fix on the boats, and also take a read out of their traffic. It must be known that they are Japanese, and not Taiwanese. ■

## 20 YEARS AGO

Ron Fisher, VK3OM

### OCTOBER 1956

It is apparent from AR Editorials written around the late 1956 period that the Federal Executive were formulating plans for representation at the 1959 ITU Conference. October 1956 put the question 'To Represent or not to Represent' with several suggestions on just how we could be represented. Of course we were represented expertly by the late John Moyle. With WARC 1979 coming up, I hope present day amateurs are thinking along the same lines.

Hans Albrecht VK3AHH was a prolific contributor to Amateur Radio during the fifties concentrating on antennas and propagation. His 'Analysis of World-wide Ionospheric Propagation to and from Australia, 1953-1954' presented in the October 1956 issue was indeed a monumental effort.

Part two of Ian Berwick's Pulse Theory discussed multivibrators of various types.

Technical articles were rounded out with 'Understanding Television Interference' by Lewis McCoy W1ICP, a reprint from QST of April 1956 and 'Low-Pass Filter Home Building Simplified' by that other prolific author Hans Ruckert, VK2AOU.

A note of interest was that Frank VK3FN picked up a distress signal from Danny Weil when his yacht developed engine trouble in wild seas south of New Guinea. Frank arranged for a launch to be sent to Danny's aid. ■

## CONTESTS

Kevin Phillips, VK3AUQ

Box 67, East Melbourne, 3002

### CONTEST CALENDAR

**October**  
2/3 VK/ZL/Oceania Phone  
9/10 VK/ZL/Oceania CW  
16/17 Scouts Jamboree  
16/17 RSGB 7 MHz CW  
30/31 CQ WW DX Phone

**November**  
6/7 RSGB 7 MHz Phone  
27/28 CQ WW DX CW

**December**  
Dec. 11/Jan. 16 Ross Hull VHF Memorial  
CQ WORLD WIDE DX CONTEST

Phone October 30-31 and CW on November 27-28 Starts 0000 GMT Sat. and ends 2400 GMT Sun.

All bands 1.8 to 28 MHz may be used, w/h Single Operator Single band and Multi band, Multi Operator (all band only) single transmitter and multi transmitter.

Exchange RS/RST report and zone, i.e. 5E30, 58930. Each zone and country worked on each band counts as a multiplier. Contacts between stations on different continents count 3 points, and between stations in different countries, but the same continent are 1 point. Contacts between stations in the same country count only for zones and multiplier.

Final score is total QSO points by the sum of zones and countries worked.

Logs must have all times in GMT. Indicate zone and country, multiplier only first time it is worked on each band. Use a separate sheet for each band, with a summary sheet for each band.

Send logs postmarked no later than Dec. 1 for phone, and Jan. 15 for CW, to:—

CQ WW Contest Committee  
14 Vanderventer Avenue,  
Port Washington, L.I., N.Y., U.S.A. 11050.

I have received from Frank Anzalone W1WY a list of VK entrants in last year's CQ WW DX Contest.

### PHONE

VK4UR	A	242,951	672	40	87
VK4FH	A	183,300	630	37	63
VK5MF	A	159,063	489	39	72
VK3ARY	A	123,541	355	43	78
VK3SM	A	42,016	141	35	66
VK2CW	A	24,024	106	33	55
VK4PJ	A	18,522	101	24	39
VK3YO	A	11,346	65	25	37
VK4UU	A	7,943	57	16	31
VK6CT	2F	468,309	1,427	29	82
VK4DO	14	18,428	104	24	44
VK5BS	14	3,900	38	13	26
VK5WO	14	2,352	30	11	17
VK4LX	7	22,412	153	20	32
VK3XB	3.5	8,379	145	10	11

### CW

VK3MR	A	507,870	857	78	120
VK2GW	A	333,336	838	56	80
VK4FH	A	95,284	400	36	46
VK4UR	A	49,700	254	33	38
VK3XB	A	23,511	162	27	24
VK5LU	A	15,255	113	13	32
VK4RU	A	7,774	102	13	13
VK4XA	28	2,448	58	8	8
VK3RJ	21	7,107	107	13	10
VK6HD	14	469,320	1,325	32	88
VK5HP	14	24,376	188	19	25
VK3APN	7	48,804	334	18	31
Multi op. single TX					
VK6DS		566,010	1,003	64	126

### CONTEST CHAMPIONS TROPHY

It is too early yet to see who will get points for the trophy from the RD Contest, as logs are still coming in at the time of writing. I will take this opportunity to correct a mistake I made about the Trophy in July AR. The winner's name will not be engraved on the Trophy as it would be only a few years before there would be no room for further engraving. A list will be published each year of past winners of the trophy.

The next contest to count towards the trophy is the VK/ZL/Oceania Phone and CW. Best of luck to all participants. ■

## AWARDS

## COLUMN

Brian Austin, VK5CA

### SSB AWARD — CZECHOSLOVAKIA

General:

- The award is available to licensed amateurs.
- Contacts on and after 1st January 1969 are valid.
- Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
- The award is issued for 2 x SSB contacts only.
- The fee for the award is 5 IRC.
- The address for applications is—  
Central Radio Club  
Awards Manager  
Post Box 69  
Prague 1, Czechoslovakia.

Requirements:

A total of 25 points is required from confirmed contacts with different stations in Czechoslovakia. Contacts on 3.5 and 7 MHz count 2 points each and those on 14, 21 and 28 MHz one point each.

### CROSS COUNTRY AWARD — DENMARK

General:

- The award is available to licensed amateurs.
- Contacts on and after 1st April, 1970 are valid.
- Amateurs should submit a list certified by the Awards Manager of a National Society.

4. The award is issued for either ALL CW or ALL PHONE.
5. The fee for the award is 5 IRC.
6. The address for applications is—  
EDR Traffic Manager  
Post Box 335  
DK 9100 Aalborg, Denmark,

Rules: The call sign is the basis of the award. Each call area OZ1 to OZ9 and OX3 must be contacted. 3 contacts with each call area are permitted on each band with the exception of OX3 where 9 contacts are permitted on each band. Only OX3 cards are valid for Greenland, OX5 cards do not count.

Requirements — 40 points.

Communities List:

1. Copenhagen Amt
2. Frederiksborg Amt
3. Roskilde Amt
4. West Zealand Amt
5. Storstrom Amt
6. Bornholm Amt
7. Fyn Amt
8. South Jutland Amt
9. Ribe Amt
10. Vejle Amt
11. Ringkobing Amt
12. Arhus Amt
13. Viborg Amt
14. North Jutland Amt

## QSP

### SEANET CONVENTION 1976

A note from YB0ACH advises that the 6th Seanet Convention will be held at the Kartika Plaza Hotel, Jalan Thamrin in the middle of Jakarta, Indonesia from 12th to 14th November. He advises that there will be a 50 per cent room rate discount for convention delegates and special discounts will be available from certain offices of Garuda Airlines for parties travelling by that method to the Convention. For further details contact him at Jalan Tebet Utara Dalam No. 6, Jakarta, Indonesia. This Convention is being organised by a committee of ORARI, the Indonesian Amateur Radio Organisation.

## LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

POSTAL AND TELECOMMUNICATIONS DEPARTMENT  
P.O. Box 5412CC, G.P.O., Melbourne, Vic. 3001.

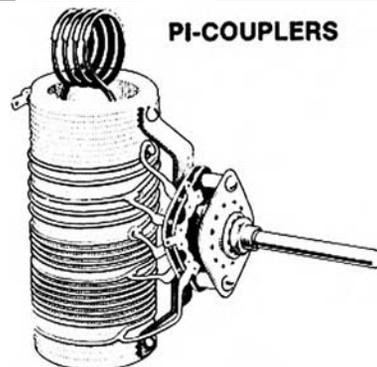
The Secretary,  
Wireless Institute of Australia,  
Post Office Box 150,  
TOORAK, VIC. 3142

26th August, 1976

Dear Sir,  
For your information and in the interest of your members, I wish to advise that Electronic Calculators are now permitted to be used at Novice Limited/Amateur Examinations under the following conditions:

1. Calculators must be portable, silent, self-powered and able to be accommodated on a standard examination table. Programmed calculators are not permitted.
2. Calculators must be switched off on entering the examination room.
3. Candidates will be responsible for ensuring the proper functioning of their calculators prior to commencement of the examination. Power failure or other faults in a calculator provided by a candidate will not be accepted as a basis for special consideration in any examination.
4. A candidate may not borrow a calculator from another candidate after entering the examination room.
5. Examiners and supervisors have the right to inspect any calculators being used in an examination.

Yours faithfully,  
J. W. Clayton, for Secretary.



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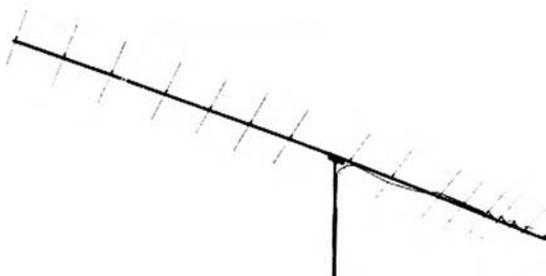
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LETTERS TO EDITOR (continued)

The Editor — Dear Sir,

**A CO-ORDINATED AND UNIFORM APPROACH TO AMATEUR SLOW MORSE TRANSMISSIONS**

It seems to me that the slow morse sessions are not co-ordinating properly hence duplication of effort occurs.

Having established a group to do the slow morse it seems that no recognised standard of morse is transmitted consistently.

I propose now to outline a method whereby the organisations involved do not duplicate the work of others and also that the standard of morse sent to prospective amateurs is uniform throughout and of a consistently high standard similar to that sent by the Postal and Telecommunications Department at exams. No doubt many will disagree with my proposed method. Perhaps you have a better method? If so, why not put it forward — there is always more than one way of doing a job.

**CO-ORDINATION OF EFFORT**

It seems to me to be a waste of effort to have stations in VK2, VK3 and VK5 sending slow morse at a variety of times independently of each other on a variety of frequencies. During the Autumn, Winter and Spring it would not seem unreasonable for the slow morse to originate from only one of these three States on any particular night — not all three as does happen. Static in Summer may mean that each State is required to transmit its own slow morse sessions during this season. I am unable to comment on the likely reception of these broadcasts in VK4, VK6, VK7 or VK8, although VK7 should receive these signals on 3550 kHz fairly well.

Transmissions emanating from any one of the following States — Victoria, New South Wales, Tasmania or South Australia — will be heard in the remaining States of this group. Therefore, slow morse transmissions could be shared e.g. VK2 conduct Monday and Tuesday night sessions, VK3 Wednesday and Thursday nights, VK5 Friday and Saturday nights and VK7 Sunday nights. Probably each night's morse would be of an hour's duration with two runs of morse going between 5 wpm and 12 to 16 wpm. With two runs it would mean that those who could not listen in at the end or beginning and can only spare about half an hour, will get a complete run at all speeds.

It can easily be seen that each individual running a slow morse session would have less work to do. If 4 amateurs are available for each night each amateur would only be required to send slow morse once every 4 weeks or about 13 times a year. A total of 28 amateurs would be required.

**A UNIFORM STANDARD OF MORSE CODE**

The standard of morse sent at the moment varies. It should be the aim of the slow morse operators to have a uniformly good standard of sending. To me, it seems that some of the operators arms must ache badly after sending a batch of morse at slow speed, particularly if it is all hand sent.

There are much easier ways of doing slow morse.

One method involves having several pre-recorded tapes of slow morse sessions. By having 3 one hour tapes it would mean that every 3 months the slow morse transmissions would be repeated. Some may say that this would mean that people would become familiar with the texts used. However, this is not so, as people are not likely to remember a text sent infrequently. After a period of 6 months to a year a morse student should have passed the 10 wpm morse code exam.

On the HF bands it is not permissible to send MCW so the morse tape is fed into a device which opens and closes a relay in response to the audio tones on the morse code tape. The relay would key the transmitter. The morse tape would have call signs placed on it at the appropriate intervals so that once the tape was started and the transmitter keyed by the audio keyer the equipment is being observed the operator could do some reading, work on some project, etc.

The remaining problem is in the making of the tapes. The morse for the tapes could be provided by an electronic keyer or a keyboard type electronic keyer, perhaps used by a typist who has no knowledge of morse. The call signs on the tapes would need to be changed if the operators changed.

**MISCELLANEOUS REQUIREMENTS**

The most suitable band to send slow morse appears to be 80 metres. The static in Summer does make this band a bit of a doubtful quantity but overall it gives the best coverage in the evening hours over a range of probably 500 to 1500 kilometres. Some seem to think that slow morse transmissions should be on 11 metres. Much of this equipment used on this band is purely AM. Any would-be Amateur would be much better advised to get a receiver capable of tuning to 80 metres.

**SUMMARY**

1. There is duplication of effort by several groups to run the slow morse sessions.
2. By co-ordination between groups it is possible to co-ordinate the slow morse transmissions so that each person has less work to do.
3. The standard of the morse is quite variable due to individual persons interpreting what is good morse code in different ways. The morse sent by some is not good, others excellent.
4. It is difficult for an operator to send uniform speed morse, with good formation and few mistakes with a hand key. It is suggested that at the very least an electronic key be used. However, it should be noted that no operator should use an electronic key until quite proficient with a hand key.
5. It is suggested that a bank of morse tapes be made up and distributed to all operators, and that these be used via an audio keyer (subject of a separate article) to key the transmitter and send out the slow morse.
6. Approximately 3 hours of tapes would be needed by each operator and these would repeat after every 3 months. Once made up the tapes should not need to be re-made for several years, hence saving a considerable amount of operator time and the strain of sending morse by hand.
7. The slow morse transmissions should run for about 1 hour per night on 80 metres. Other bands are not really suited for this purpose.
8. This system as proposed in principle may also suit VK6, VK4 and VK8, although time differences and physical distances would cause the system to be altered in some details.
9. More publicity needs to be given to the existing slow morse broadcasts so that people do know when and where to tune to receive them. Amateurs not involved in the slow morse would know to keep at least 5 kHz away from the slow morse transmission frequency. Not all would-be amateurs have super-selective receivers.
10. I am willing to be involved in co-ordinated and uniform high standard slow morse broadcasts.
11. Does anyone else have ideas on how the slow morse should be run? Why not write to the editor with your ideas.

Please do not think that I am not appreciative of the work put into these broadcasts, but I can see ways of making these transmissions more effective, less time consuming and less work for each person involved.

R. Champness VK3UG,  
44 Rathmullen Road, Boronia, 3155.

(This letter has been condensed to allow publication — Ed.)

The Editor,  
Dear Sir,

I have just received the results of my February AOLCP exam and learned of a pass.

I would like to thank the following stations and the owners for the invaluable service they performed in my years of study.

"VK3ANL", 3AZM, 3WS, 3WL, 3TK, 3VZ, 3BGN, 3ZPG, and an old, old friend, YJ8KM (3YCK).  
Bruce, L-30578 VK3-???

**QSP**

**MORSE CODE EXAMS**

"Written CW tests are likely to be with us for some time to come despite the recent relaxation of the rules to permit code "comprehension" exams. The new procedures still haven't been framed up, and even after they are it will take a while before new tapes and matching examinations can be produced and distributed. The change should take place some time this year, though — late — all seems likely". Ham Radio, June '76.

**PROJECT AUSTRALIS**

David Hull, VK3ZDH

**NOVEMBER 76**

**OSCAR 6**

Date	Orbit No.	Time Z	Long °W
1	18500	01.08	74.75
2	18512	00.08	59.75
3	18525	01.03	73.50
4	18537	00.03	58.50
5	18550	00.57	72.25
6	18563	01.52	86.00
7	18575	00.52	71.00
8	18588	01.47	84.75
9	18600	00.47	69.75
10	18613	01.42	83.50
11	18625	00.42	68.50
12	18638	01.37	82.25
13	18650	00.37	67.25
14	18663	01.32	81.00
15	18675	00.32	66.00
16	18688	01.27	79.75
17	18700	00.27	64.75
18	18713	01.22	78.50
19	18725	00.21	63.50
20	18738	01.16	77.25
21	18750	00.16	62.25
22	18763	01.11	76.00
23	18775	00.11	61.00
24	18788	01.06	74.75
25	18800	00.06	59.75
26	18813	01.01	73.50
27	18825	00.01	58.50
28	18838	00.56	72.25
29	18851	01.51	86.00
30	18863	00.51	71.00

**OSCAR 7**

Date	Orbit No.	Time	Long °W
1	8974	00.16	53.89
2	8987	01.10	67.51
3	8999	00.09	52.39
4	9012	01.03	66.01
5	9024	00.03	50.89
6	9037	00.57	64.51
7	9050	01.51	78.13
8	9062	00.51	63.01
9	9075	01.45	76.63
10	9087	00.44	61.51
11	9100	01.38	75.13
12	9112	00.38	60.01
13	9125	01.32	73.63
14	9137	00.31	58.51
15	9150	01.26	72.13
16	9162	00.25	57.01
17	9175	01.19	70.63
18	9187	00.19	55.51
19	9200	01.13	69.13
20	9212	00.12	54.01
21	9225	01.06	67.63
22	9237	00.06	52.51
23	9250	01.00	66.13
24	9263	01.54	79.75
25	9275	00.54	64.63
26	9288	01.48	78.25
27	9300	00.47	63.13
28	9313	01.42	76.75
29	9325	00.41	61.63
30	9338	01.35	75.25

**LARA**

Ladies Amateur Radio Association



Standing (l. to r.): Gladys YF/VK3YS, Mavis YF/VK3BER, Norma VK3AYL, Austine VK3YL, Mavis VK3KS; seated (l. to r.): Kate, Heather YF/VK3ZEB, Irene YF/VK3YER.

Last month, LARA's Great Event was duly celebrated but the pictorial evidence didn't quite make the publication date. However, this omission has been rectified and we present a view of celebrating LARA members in their natural habitats. Thanks go to Mavis VK3KS for her hospitality at the VK3 August meeting.

We now present the topic of the month:—  
"His 'n Hers shacks"  
or "How to Dry the Washing Indoors Without It Dripping All Over the House".

These are the views of an impartial observer of the joys and difficulties of running a YL/OM station. A short quiz of persons in this situation reveals that solutions to this problem vary. One group favour the "separate shacks at the opposite ends of the garden" theory, while another group favour the single (crowded) shack with his and hers mess. Members of this group do in fact concede that the M/F/S ratio (i.e. the ratio of mess to cleared floor space) is proportional to the square of the number of people using the shack, multiplied by complication factors such as O (number of 240V outlets square metres (sewing machine interference) and LM — (who left the lawn mower there for me to trip over?).

LARA proudly announces the result of extensive research as M/F/S . . .

# MAGPUBS

Members interested in overseas publications should please note constant changes in prices which are of course also affected by exchange rates. Overseas magazines are always posted direct to you from suppliers, so please allow about 3 months for transit delays.

The latest subscription list is —

SA	1 year	2 years	3 years
QST (ARRL)	8.50	17.00	25.50
Radio Communications (RSGB)*	11.75	—	—
Break-In (NZART)	5.20	—	—
Ham Radio	7.75	—	17.00
CQ	6.50	11.00	—
CQ-TV (UK)*	4.50	—	—
73	8.00	—	16.50
VHF Communications (quarterly)	5.00 sea mail	7.00 air mail	—

- \*Please ask for membership form beforehand.
- **BACK ISSUES** of VHF Communications are normally available from stock except 1969 issues which are out of print. Single copies are \$1.10 each to 1974 and \$1.40 each from 1975 (average weight of each is 90g); VHF Communications binders to take 12 issues are \$2.25 each and weigh 250g.
- **BACK ISSUES** of other magazines are not available but sometimes can be obtained against special order.
- **BACK ISSUES** of Amateur Radio are available to members. Some issues are out of print however. Issues March to May 1972 at 30c each, June '73 to Dec '74 at 40c each, Jan-Oct '74 at 50c each, Nov 74-Aug '75 at 70c each, Sept '75 onwards at 90c each. Calculate average weight as 120g per issue.
- **AMATEUR RADIO** is available on overseas subscription at \$10.80 for 1977. It is also available at this rate for libraries and organisations such as Government Departments, Schools, etc. All these are post paid by surface mail. For overseas subscriptions, please enquire about extra cost for air mail. As an indication of rates — extra for Air Mail to PNG is \$10.00 for a full year.
- **YRCS NOTES** are also available on request.
- Recruiting leaflets "8000" are supplied free of charge.
- **OTHER ITEMS** are also normally available from stock. These include —
  - Membership Badges (specify full or associate, lapel or stick-pin) \$1.50\*
  - Terylene ties, blue or maroon \$2.90\*
  - WIA Project Australia Great Circle Maps (on Melbourne) \$1.00\*
  - Overseas DX & USA Call Books, NZART Call Books, and many, many other interesting items — please send for lists.

- \*Post Paid.
- Except for magazine subscriptions all other items are normally available from **YOUR DIVISION**. To save on postages and packing, it is better to enquire there first if you live in capital cities.
- WHAT BETTER PRESENT COULD THERE BE FOR CHRISTMAS AND NEW YEAR THAN A MAGAZINE SUBSCRIPTION OR GOOD BOOK.**
- Always please add extra for postage and packing except on current magazine subscriptions or where prices are stated as including postage.

# MAGPUBS

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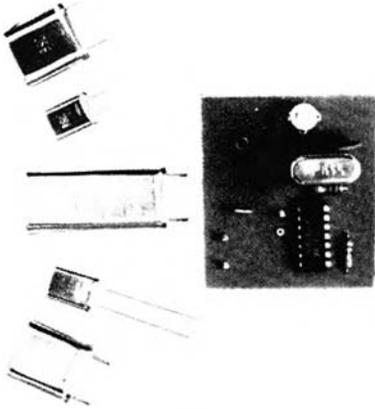
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Application	NBFM	NBFM	WBFM	WBFM	WBFM	NBFM	NBFM
Number of Filter Crystals	8	8	8	8	8	4	2
Bandwidth	12.0 kHz	15.0 kHz	30.0 kHz	36.0 kHz	40.0 kHz	14.0 kHz	14.0 kHz
Pass Band Ripple	← 2 dB			← 2 dB		← 1 dB	← 2 dB
Insertion Loss	< 3.5 dB	< 3.5 dB	< 4.5 dB	< 4.5 dB	< 4.5 dB	< 3 dB	< 1.5 dB
Input Output	Z <sub>t</sub> 820 Ω	910 Ω	2000 Ω	2700 Ω	3000 Ω	910 Ω	2500 Ω
Termination	C <sub>t</sub> 25 pF	25 pF	25 pF	25 pF	25 pF	35 pF	—
Shape Factor	(70 dB) 2.4	(70 dB) 2.3	(70 dB) 2.2	(70 dB) 1.9	(70 dB) 2.0	(40 dB) 3.0	(20 dB) 7.6
	(90 dB) 2.8	(90 dB) 2.9	(90 dB) 2.7	(90 dB) 2.5	(90 dB) 2.5	—	(30 dB) 5.7
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 Shipping weights: Filters 2 oz. ea., Crystals 1/2 oz. ea.  
 All Prices in U.S. Dollars.

# IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

My references to the Solar Flux predictions in last month's AR were premature to say the least. The latest issue from CCIR along with suitable warnings about use of the figures in the transition period between Cycle 20 and 21, has reduced the Solar Flux predictions by some 30 over the following 12 months.

Latest monthly sunspot means have shown just how quiet the sun has been. The following monthly means and the last figure in brackets gives the number of days without visible spots. 1/76 = 8.5 (15), 2/76 = 4.6 (17), 3/76 = 23 (5), 4/76 = 19 (2), 5/76 = 12.7 (6), 6/76 = 12.4 (7), 7/76 = 2.1 (24). I think most will agree July was quiet.

However, early in August a sizeable spot from Cycle 21 was in evidence for around 14 days before it disappeared around the western rim. Bert VK3GS has a photograph to show it amongst some weak Cycle 20 spots.

The smoothed number has been varying again 7/75 = 15, 8/75 = 14.3, 9/75 = 14.5, 10/75 = 15.6, 11/75 = 16.4, 12/75 = 16.6, 1/76 = 15.5 with predicted smoothed numbers for the remainder of the year as 10/76 = 5, 11/76 = 4, 12/76 = 3, 1/77 = 3.

One interesting factor of late is the decline of geomagnetic storms. The last noted on June 11, lasted only 21 hours. The worst disturbances now only reaching the unsettled area and not lasting long. This appears to be customary for the time of the cycle.

My own charts of geomagnetic activity show a general "quietening down", with the A Index reaching 33 on June 11, but being predominantly below 20, with lows around 2-10 for long periods. If only there was some good solar activity to brighten up the scene.

From predictions, the experts would have us believe that the coming cycle is not likely to top 50 in the running smoothed numbers. This would resemble the 72-73 period. Not too bad for 80, 40, 20 not so good for 15 and just an occasional stirring from 10 m. Guess we will have to wait and see.

## LARA (continued)

$$\frac{(Nyl + Nom)^2}{\circ 240} \div (SM - LM)^2 \times \frac{1^*}{OM}$$

\*This factor optional depending on whether or not you can put one over the OM.

Exponents of the two-shack theory tend to emphasise the bliss and peace of mind of being able to find anything just where you put it down last time (even if it was dropped down behind the base station at least you know where it is!). Those who go to the extreme of having two towers in the back and/or front gardens, discover an extra clothesline for the asking. And on wet, rainy days you have two indoor refuges to dry the sheets suspended neatly from the coax. (N.B.: Some OM's disagree violently with this last simple household hint, so be warned!)

In conclusion we point out that as in most amateur shacks — anything goes (except of course the particular rig one wishes to operate at that particular time).

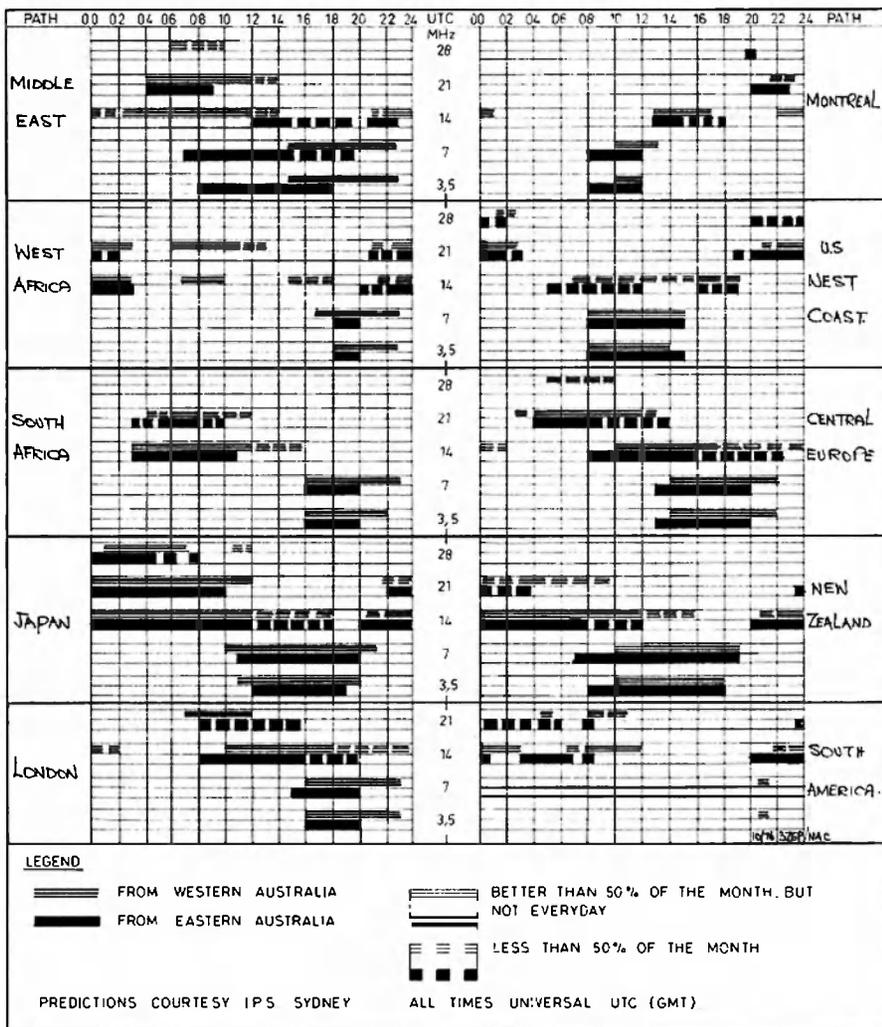
## QSP

### MOONBOUNCE

"We are always happy to have visitors come along to Moonbounce tests at Dapto, but it is a big help if they make sure that they arrive before tests start — or do the last couple of hundred yards on foot, as our receiving system is very sensitive to auto ignition noise". Aug. '76 Moonbounce Report by VK2ALU in "The Propagator".

### PROVOCATION OF THE MONTH

Please advise the discount for licensed amateur's subscriptions to the WIA.



## 19th JOTA

A reminder about the Jamboree on the Air. Noel Lynch, VK4ZNI, the National organiser advises that the official opening address will be broadcast live at 10.00 h EAST on Saturday, 16th October by H.E. the Governor-General and Chief Scout of Australia, Sir John Kerr. Frequencies will be 7070 and 14170 kHz ± QRM.

## SHREWDIE ON SUBS

News from Newcastle is that several members each pay a small monthly instalment into a local Building Society so that at the end of the year a covering cheque is sent off to the Executive Office along with the subscription notices. The interest goes towards the local Branch. They will be doing the same thing for their licence fees at \$1 per month.

## INTERFERENCE ON SHARED VHF/UHF BANDS

It is possible, states the chairman of the VHF/UHF Advisory Committee, for secondary services to cause interference to primary services particularly in the 23 cm band. Such interference is likely only if wide band transmissions are employed, such as A5 (video). It is unlikely that narrow band (phone) emissions would cause interference. Clarification is being sought on this matter with the Department.

## RTTY VDU

Norm Wilson VK4NP writes that he has prepared an information package on the construction of a RTTY VDU, and limited quantities are available from him for anyone wishing to construct such a device. The cost is \$5.00 inclusive of surface mail postage. His address is QTHR.

## DYNAMIC MICROPHONES

"Not too well known among amateurs is the fact that dynamic microphones exhibit a proximity effect which increases the bass output as the distance between the source of sound and the microphone is decreased . . . for best results speak directly into the front of the microphone, but keep it at least 4 inches (10 cm) away from your mouth". Ham Radio June '76.

## HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

3 Mono Band Yagi Beams 10, 15, 20, \$100. Now dismantled and on ground. VK3BW Portarlington. Ph. (052) 59 2322.

Linear Amplifier, 2 x 813 80, 40, 20, 15, with extra switch position for desired band of your choice. 2 spare tubes, heavy PSU. Table top RF unit, needs a little tidying up, excellent performer, buyer to collect, \$140. B. Bathols VK3UV, QTHR. Ph. (03) 90 6424 A.H.

## HAMADS (continued)

"Ham-Cat" base whip with 80 metre, 40 metre and 20 metre coils and whips, \$50 set. Harry Michael VK3ASI, QTHR. Ph. (052) 216244 Bus. or (052) 431283 A.H.

Xtals for Europe and G.B. 2 m FM channels, to suit Icom IC22A transceiver, 9 repeater and 3 simple channels, \$75. VK2SM, QTHR. Ph. (02) 523 1232.

Kenwood TS520, as new \$475. Multi-7 VHF transceiver complete with all xtals \$220. Swan 350 transceiver \$250. TH6DXX Antenna, as new \$160. CDR-Ham II Rotator, as new \$120. Tower 35 ft., wind-up, in good condition \$50. Antenna, Rotator and Tower as package deal for \$300. Must sell, deceased estate. All offers to VK2AGS, QTHR

Heath HW101 CW&SSB receiver 2 x 6146 3.5-30 MHz, similar to that used by VK2QL, complete with hand mic., unused Mullin fan, speaker in case, new Archer headset, 240V P/S, handbooks, fitted 400 kHz CW filter. PEP 180 W. Only defect is erratic S meter circuit. \$375 plus freight. Hansen TV spec. ckt. tester \$15 Hand and 2 bug keys, best offers. Hansen FS meter type FS1, best offer. National HRO RX. 9 coils LF and HF band spread and general coverage, P/S and speaker, best offer. Pa.ec VCT with adaptor panel, best offer. Deceased estate. VK2QL, QTHR. Ph. (02) 76 8661.

AT21 Tx with P/S, best offer and purchaser to arrange collection due to weight. AT2RB with P/S. Operates 3.5 and 7 MHz, best offer. Palac all wave osc. signal generator, best offer. 14 AVQ vertical, needs some repairs, installation sheet with antenna, \$20. Deceased estate VK2YB. Mrs. Lewis, 13 Junction Ave., Ryde, N.S.W., 2140. Ph. (02) 80 1367 weekends only.

Osker SWR and power meter, as new \$45. Ph. (02) 476 5096 after October 2. VK2BEK, new QTH 8/66-68 Florence St., Hornsby, N.S.W., 2077. Ph. (02) 476 5096 after 2nd October.

Trio Twins, TX599-JR599 in perfect condition, \$600 o.n.o., two 8-pole SSB filters, 1.4 MHz \$45 or \$25 each. VK2WR. Ph. (02) 869 8863.

Vinten BTR10 base with VK3 pre-amp, coax switch, PTT mic., spare tubes, xtals for 2 Rx, 4 Rx, 40 Rx. Handbook, excellent condition. Discone Antenna (A.R. April '73) 30 foot mast with nylon guys. T/buckles, approx. 50' UR67 coax, ARRL UHF Manual, \$160 o.n.o., will separate. Philips HF OSC GM2883, \$35. Amateur Band Rx 80 m-10 m, \$100 o.n.o. Tony Hambling L30377, 88 Bayview St., Williamstown, 3016. Ph. (03) 397 6773.

High-Gain aluminium commercial Quad, 42 lbs. plus heavy duty rotator, 145 lbs., 100 ft. of coax and 7 strand control cable, 25 ft. tilt-over tower, low SWR 10, 15 and 20 metres, see working. Genuine snap \$200 or will sell separately. VK2AXZ Newcastle. Ph. (049) 54 0893.

Swan 350 with psu/speaker, handbook, \$225. VK2SI. 12 Ruswell Ave., Warners Bay, 2282.

Robot SSV Monitor, model 70A, new, \$300. VK3VF, QTHR. Ph. (03) 723 3554.

Hy-Gain Th-4 tri-band beam, full size, four element antenna for 10, 15 and 20 m. Dismantled, with instructions. \$100 o.n.o. VK2AKR, QTHR. Ph. (02) 81 4659.

Uniden 2020 and external VFO in mint condition with handbook, microphone and cables in original boxes, \$610 o.n.o. VK3AYK, 1 Elster Ave., Gardenvale, 3185 Ph. (03) 96 2412.

KVG EX-9A crystal filter (transmit) with carrier extls, new, unused. \$30 o.n.o. P. Birrell, VK5ZTT, Box 261, Mt Gambier, 5290.

Heathkit SB401/301 80-10 Mx Transceiver, plus SB610 Monitorscope and SB600 matching ext. speaker. USB, LSB, CW and RTTY modes available all bands. All units in good condition, no mods, to be sold as one unit complete with manuals. \$475 o.n.o., or would be prepared to discuss a swap with a solid state AC/DC Transceiver. VK2BIP, 3 Whitehead St., Khancoban. Ph. (060) 76 9338.

FT501 and FP501, \$650; FT401B, \$460; SP401 speaker and phone patch, \$90; FL2000B lin. amp., \$360; YO100 monitor scope, \$150; FFDX LP filters, 2 only, each \$20; RF550A Hy Gain wall meter and 6 pos. coax SW, \$50; 204 BA 4EL 20 m beam, \$190; 10/15 DB 3EL 10/15 m beam, \$100; Baluns, 2 only, each \$15, or above as complete station, \$1800. All under 6 months old. VK1CO, QTHR. Ph. (062) 88 5049.

FLDX 2000 linear, new 6KD6's, G.C., \$225 o.n.o. FROX400, fully equipped 160-2 m CW, SSB, AM wide, AM narrow, FM, 11 metres. FM discrim. 6 and 2 m S/S converters, very clean, \$300 o.n.o. FR50B, very recent 80-10 metre ham band receiver, AM, SSB, CW, very clean, very sensitive. Hokusai mechanical filter, matching speaker, \$200 o.n.o. FTV650B, brand new in box, \$150. Marconi UHF wavemeter 30-300 MHz, accurate and sensitive, \$50. Dummy Load, 75 ohm 1000 watt continuous, air cooled, good to 52 MHz \$25. Lots more stuff! VK3BIZ. Ph. (03) 88 1110 A.H.

Yaesu FT101 transceiver, recently overhauled, mint condition, \$350. VK2AQW, QTHR. Ph. (02) 449 3538.

2 — McLeod ME58/11A 10 W AM Transceivers, suit 80 m novice operator, complete with circuits and some tentative conversion information, \$15 each, no PSU. VK3UG, QTHR. Ph. (03) 231 2028.

Clegg FM27B 146-148 MHz transceiver, with additional xtl for 145-146 MHz segment and 6A regulated power supply, mint condition, \$245. VK2WD, QTHR. Ph. (02) 42 6080.

3 El 6 m Yagi, 6 m Transverter, HB and all valve, 6/40 final, 21 MHz SSB input, works OK, adaptable to most transceivers, \$50 o.n.o. The above requires personal collection. Vinten base mic., \$3. VK3ACM. Ph. (057) 68 2260 A.H.

Acifron SSB 400 Transceiver, 400 W PEP output 160 m-10 m, very little used, as new, complete station comprising ext. VFO, AC power supply and speaker mike, transmitter test set (comprising 5 position ant switch, SWR bridge, 2 tone test), handbook and circuits. Cost \$1300 new, sell for \$650 o.n.o. VK7MS, QTHR. Ph. (004) 27 2117.

Yaesu FT200 and FP200 PSU, complete with mic., manuals etc., approx. 4 years old and in original condition, no mods, no marks, \$325 o.n.o. VK3BEA, 4 Ailsa St., Dandenong Nth, or Bob Pallett, Ph. (03) 560 8222 Bus.

FT101 incl. 160 m, cooling fan, mobile mount, mic., all cables and manual, very little use, \$370; IC22 fitted with R1-7, reverse 1-7 simplex 37, 40, 43, 49, 50, 51, with mount, cables, mic. and manual, \$200; IC60 6 m FM mobile similar to IC22, fitted with 52.525 and 52.656, with mount, cables, mic. and manual, \$80; IC202 fitted with Oscar crystal and with Icom 10 watt PA, very little use, supplied with manual, cables, etc., \$190; QM 70 PA 2 m FM or SSB 10 W in, 70 W out, solid state, \$50; Set HF Mobile Whips, commercial manufacture to fit Scalar or Philips VHF mount, 160 m, 80 m, 40 m, 20 m, 11 m, 10 m, 6 m, 2 m, \$50 the set. Ray Roche, VK3ZRG/1, C/o Officers Mess, RAAF Base, Fairbairn, ACT.

Philips HF oscillator type GM2883 400 kHz-30 MHz, \$35; SWL amateur band Rx (homebrew) xtal controlled converter, 3.5 MHz tunable IF, AM, SSB "S" meter 80 m-10 m, housed in very neat cabinet, \$110 o.n.o.; 60 copies past AR (to '75), \$10; 24 copies past EA (to '75), \$5; 36 copies past CO's (69-71), \$5, all in exc. cond. T. Hambling, 88 Bayview St., Williamstown, 3016. Ph. (03) 397 6773.

FT200 Transceiver, as new CW, HB AC power supply, Heathkit DC supply, Webster bandspanner ant., the lot \$420. VK3ZX, QTHR. Ph. (051) 74 1144.

Digital Frequency Counter, 6 digit LED display, new, professional appearance, 400 kHz-250 MHz in two ranges, \$175. VK3ZX, QTHR. Ph. (051) 74 1144.

Yaesu FTDX560 transceiver 160 m-10, \$375; Geioso G207 Rx 80 m-10 m, \$30; TCA 1677 transceiver, 2 m, chs. R2, R5, R8, 40, 50, 25 w, \$75; 6 m transverters H/B, Rx 2XMPF121, PA 6/40, \$40. VK2ADY, QTHR. Ph. (067) 65 8664.

5" CRO home brew, \$60; "Simple Sixer" 6 m Tx 100 W IP, CW, PS, \$55; Surplus BC624 VHF Rx chassis, CW, full instructions for conversion to 2 m, \$15. VK3ZFQ, QTHR. Ph. (03) 718 2364.

Hy-Gain 204BA 4 el. 14 MHz monoband Yagi antennas, brand new in unopened factory cartons, two only \$160 each; Ham II brand new heavy duty antenna rotator with 100 foot Belden rotator cable in factory carton, \$150; Swan power supply, heavy duty, for Swan SS-200A broadband transceiver or Atlas requiring 12 volt at high current level, communications speaker built in. Model PS-20 240 V AC, new, \$150; Hy-Gain 18 AVT trapped vertical antennas with radials, two only, used 3 months, \$45 each. All prices firm. VK2JO James. Ph. (02) 36 2981.

## SILENT KEYS

It is with deep regret that we record the passing of —

**JOHN WILLIAM MARTIN** VK3JW  
John spent his early years as an engineer in the Commonwealth Aircraft Corporation.

After war was declared he served with the 8th Div. in Malaya. He was one of 25 men who survived from the 4th reserve MT Unit. Unfortunately he suffered a permanent disability which necessitated a long convalescence in the RGH at Heidelberg. When discharged in 1943 he took up the position of Chief Production Engineer at the aircraft factory in Highett.

His health forced him into semi-retirement and he moved to Payneville where he operated the telephone exchange and the Post Office. It was during this time he became interested in amateur radio. He retired to Bairnsdale and took out his amateur licence.

DX was his main interest and he became the control station of the Pacific DX net. He was a member of the Willis Island DX peddler in 1971.

He felt he had something more to give to amateur radio and in 1972, with the support of the Brisbane DX Club, he led the first Australian DXpedition to Mellish Reef. The call sign VK9JW became quickly known world-wide as it added a new country to the ARRL DX listings.

In 1974 whilst visiting the USA he was named as DXer of the Year at the annual convention of the Northern and Southern California DX clubs.

John passed away on 22nd August, 1976 and will be sadly missed by his many amateur friends throughout the world.

VK4XY

**T. W. A. HALLEY** VK4TI (ex-VK3BX)  
All will be remembered mostly by his many Victorian friends when he operated as VK3BX, Bentleigh, from 1932 to 1952. During World War Two All was a Senior Inspector for the Army and it was his responsibility to accept Radio and Radar equipment on their behalf.

After the war, All resumed his business as Master Builder and in 1967 retired to the Gold Coast of Queensland, where he operated from Chevron Island, Surfers Paradise, as VK4TI. All was a proficient CW operator and enjoyed this mode very much.

We offer our sincere sympathy to his wife, Emily, and his sons, Marshall and Neville.

VK4RF

## WANTED

Valve Tester, complete with manuals covering modern USA valves, in excellent condition. Prefer transconductance meter, otherwise simple emission tester acceptable, price and details to H. T. Mulder, VK6MK, QTHR. Ph. (098) 44 1169.

Schematic and xtal da a on EX-AIF, RAAF portable XCV used on 50 MHz band. Manufactured by Rogers Majestic in Canada, last used by military circa 1965. Will duplicate and return originals VK2VE, QTHR. Ph. (02) 665 9206.

Webster Bandspanner and base, particulars to VK6DC, QTHR

Self supporting tower, 30 to 40 ft. Contact J. Cordingley, 41 Jillico Ave., Tallangatta, 3700. Ph. Tallangatta 295.

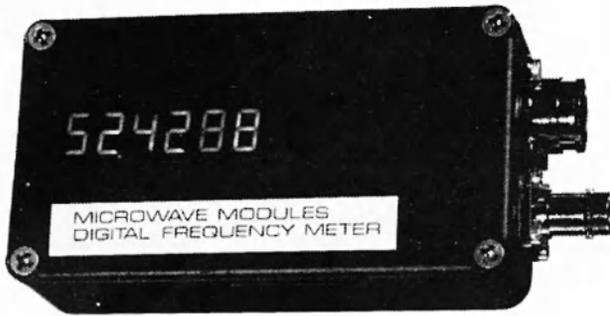
Yaesu FT101B, complete in good condition, with handbook. VK7EM, QTHR. Ph. (004) 37 2582 Bus. (004) 31 4908.

## EXCHANGE

Radio Communication April 1976, plus Jan./Feb./March 1976 QST for copy of Feb. 1966, April and May 1972 QST or sell. D. McConnell, 322 Ligar St., Ballarat, 3350.

## 50 MHz DIGITAL FREQUENCY METER and 500 MHz PRESCALER

from Microwave Modules, U.K.



MULTIPLEXED 6 DIGIT LED DISPLAY, CONSTANTLY UPDATED FOR CONTINUOUS FLICKER FREE DISPLAY FOR A CONSTANT FREQUENCY READING.

\*Digit height 10 mm \*Display width 45 mm \*Case size 111 x 60 x 27 mm \*Frequency range 0.45 to 50 MHz \*Sensitivity, better than 50 mV RMS over above range \*Input connector 50 ohm BNC \*Input Impedance 200 ohm approx. \*Power Connector 5 pin 270° locking DIN socket (plug supplied) \*Power requirements 11-15 volts DC at 200 mA approx.

**MODEL MMD050. Price \$115 add pack and post \$1**

### 500 MHz PRESCALER

THIS PRESCALER USES HIGH SPEED ECL TECHNOLOGY TO ACHIEVE 10 OPERATION TO A FREQUENCY OF 500 MHz.

\*Case size 111 x 60 x 27 mm \*Frequency range 50-500 MHz \*Sensitivity, better than 200 mV RMS over above range \*Input Impedance 50 ohm, BNC connector \*Power requirements 11-15 volt DC at 100 mA approx.

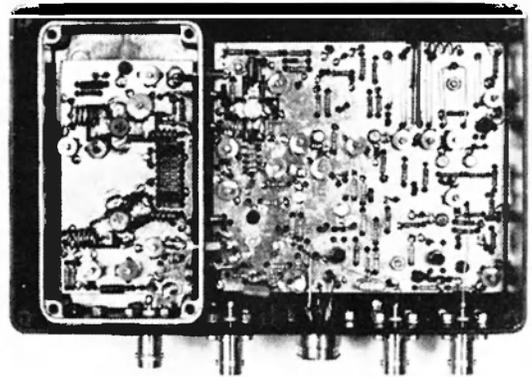
**MODEL MMD500P. Price \$48.50 add pack and post \$1**

### 432 TRANSVERTER Model MMT432

FEATURING COMBINATION OF A LOW-NOISE RECEIVE CONVERTER AND A LOW-DISTORTION TRANSMIT CONVERTER PRODUCING A SPURIOUS-FREE LINEAR SSB SIGNAL, PARTICULARLY WHERE HIGH STABILITY AND SENSITIVITY ARE OF IMPORTANCE.

Power Output 10 watts minimum \*28 MHz IF \*Drive 1 mW to 500 mW \*Aerial Changeover by PIN diode switch \*Modern Microstrip Techniques \*Power requirements 12 volt nominal at 150 mA 1.5 amp. peak \*Case size 187 x 120 x 53 cm \*Spare 432 input socket.

**MODEL MMT432. Price \$195 add pack and post \$2.**



**MMT432 Transverter**

**NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS**

#### 1296 MHz CONVERTER

Microstripline, Schottky diode mixer.  
IF: 28-30 MHz or 144-146 MHz.  
Noise figure: typ. 8.5 dB.  
Overall gain 20 dB. Price: \$58.

#### 432 MHz CONVERTER

2 silicon pre-amplifier stages. MOS-FET mixer. All UHF circuits in microstrip technology.  
Noise figure: typ. 3.8 dB.  
Overall gain: typ. 30 dB.  
IF: 28-30 MHz or 144-146 MHz 9-15 V 30 mA. Price: \$45.

#### 144 MHz MOSFET CONVERTER

Noise figure: typ. 2.8 dB.  
Overall gain: typ. 30 dB.  
IF: 28-30 MHz, 9-15 V 20 mA.  
Price: \$39.

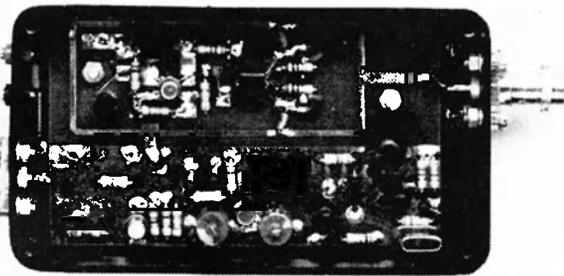
**VARACTOR TRIPLER 144/432 MHz**  
Max. input at 144 MHz: 20 W (FM, CW) - 10 W (AM).

Max. output at 432 MHz: 14 W.  
Price: \$45.

**VARACTOR TRIPLER 432/1296 MHz**  
Max. input at 432 MHz: 24 W (FM, CW) - 12 W (AM).

Max. output at 1296 MHz: 14 W.  
Price: \$65.

Pack and Post \$1



**1296 MHz Converter**

All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

**NEW RELEASE — 144 MHz TRANSCEIVER MODEL MMT144/28** — This 144 MHz Solid State Linear Transceiver is intended for use with 28 MHz transceiver to produce a highly reliable transceive capability for satellite or terrestrial communication. — Power output 10W min. — 28 MHz drive — IF at 500 mW or 5 mW — Receiver gain and noise, typical 30 dB and 2.5 dB — Internal Antenna changeover — Case size 187 x 120 x 53 cm — Power requirements 11 to 13V at 300 mA to 2.2 amp. peak — Spare 144 MHz input socket.

**Model MMT144/28 — Price \$165. Pack and Post \$2.**

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**FANTASTIC CLEARANCE**  
MULTI-2000-A  
SSB/FM/CW  
**WAS \$585; NOW \$499**



**MULTI 2000A TRANSCIEVER**  
The ultimate in 2M equipment, operates on FM, SSB, CW. Transceives between 144.0 and 148.0 MHz in 10kHz steps. Fully synthesised repeater offset, 4 fixed channels (crystals not included) high and low power, noise blanker, wide and narrow band switch etc.  
Sensitivity FM: 1 µV, SSB/CW: 0.3 µV. RF output: 1W and 10W (PEP). Built in power supply for 240 volt AC or ext. 12 volt DC. Cat. D-3010 ..... \$499.00

**COMMUNICATOR AM/VHF RADIO**  
**SLASHED: \$44.90**



Here's value: Dick has dropped the price again on these fabulous multi-band radios. He's overstocked and needs the space. So you benefit. Just look at these features:  
• AM band • FM band • Continuous VHF 54-220MHz  
• LED signal indicator • Military look • Telescopic whip  
Cat. D-2833 ..... \$44.90

**5W 52 ohms**

Sell contained within standard UHF-type coaxial plug. Ideal for low power rigs. Perfect 52 ohm match.  
50 & 100W, 50 ohms: Non-inductive resistors ideal for constructing dummy loads for higher power transmitters. High tolerance, high power and large life have to be to get rid of the heat! Nominal ratings are for continuous use; intermittent ratings are far higher.  
50W: Cat. D-7022 ..... \$2.50  
50W: Cat. D-7015 ..... \$10.50  
100W: Cat. D-7010 ..... \$19.75

**VALVES (ALSO KNOWN AS PETS WITH PILOT LIGHTS)**

These very popular amateur transmitting valves are now down in price (Dick's answer to inflation). They can last long at these prices, so get in for your spares now.  
6K06 Cat. D-7200 ..... \$8.55  
6S16 Cat. D-7201 ..... \$8.25  
6146A Cat. D-7202 ..... \$9.00  
...Then there was the bloke who filled his valves with water and found he had a grid leak...

**PET ROCKS**  
FANTASTIC CRYSTAL SALT \$6.50

Speaking of rocks, you know who must have them in his head. He's selling these most popular 11 metre rocks (channels 9 & 11) for \$1 under his normal price. He mightn't go broke, but he'll be trying at this rate!  
Cat. D-6005 127.065MHz ..... \$6.50 pr  
Cat. D-6008 127.085MHz ..... \$6.50 pr

O 5108  
**\$8.50**

**11m MOBILE: AM SSB 5W**

**MIDLAND 11 METRE 23 CHANNEL SSB/AM**  
One of the most popular 11 metre transceivers in the world. And why not with the features this one has. Like SSB for a start - puts you way out in front when an AM set is still struggling down in the mud.  
**NOVICES:** You can use this transceiver with the Dick Smith converter for 80 metre operation. (Besides, you have got the 7MHz band as well!) No crystals to buy, the full 23 channels are synthesised for you. (Note: channel 23 is outside the Australian Amateur Band).  
Cat. D-1700 ..... \$239.50



**KEENWOOD 520**

FOR THE HAM WHO WANTS MORE THAN THE BONE.  
Most amateurs know the value in the Keenwood 520 series: what more can be said? It's simply a damn good rig.  
Cat. D-2520 ..... \$570  
£11.50, \$26; Ext VFO \$99

SP-520 \$260, TS-520 \$570, VFO-520 \$99

**Europa B: 200w**

11 METRE - 2 METRE TRANSMITTER  
The Europa B is a linear transmit & receive transmitter, 28-30MHz to 144-146MHz. It is suitable for use with either a transceiver or a separate receiver/transmitter. It is ideal for Oscar operation as well as normal tropo. work. Although its primary use is for SSB, it will receive and transmit any mode of which the HF equipment is capable: SSB, AM, CW, FSK, FM. Once attached to your HF equipment you operated it exactly the same as on the HF bands: the Europa B does the rest!  
Cat. D-3500 ..... \$239.00

**look: no holes**

**BUMPER MOUNT ASSEMBLY**  
Allows you to mount antennas directly to most bumpers without drilling holes. Features Zinc plated metal and stainless steel straps. Fully insulated design.  
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**HY-GAIN AERIALS**

HY-GAIN AMATEUR H.F. TRANSMITTING AND RECEIVING AERIALS.  
14 AVQ  
40, 20, 15 & 10 metres, vertical 19 foot high. Ideal for restricted areas and minimal cost.  
Cat. D-4300 ..... \$78.00  
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Cat. D-4301 ..... \$93.00  
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20, 15 & 10 metres, 3 element beam with 14 foot boom. Average gain 8.5dB, handles up to 1KW RF power.  
Cat. D-4306 ..... \$195.00  
TH6DX  
20, 15 & 10 metres, 6 element beam - the BIG ONE. Top performance, maximum gain. Fantastic front to back ratio. Handles up to 1KW RF power, best quality materials.  
Cat. D-4308 ..... \$238.00

**CLASSIC FM & CW**

This quality transceiver covers the five HF amateur bands 180, 40, 20, 15 & 10 metres with either SSB or CW operation. A full 200W input, top. Plug in PC boards make servicing fast and simple. Solid state circuitry and superior selectivity. This quality unit is designed and manufactured in the USA, and normally sells for \$695.00.  
Dick's price to you is just \$599. Now that's a discount!  
Cat. D-2530 ..... \$599.00

**CHECK YOUR ANTENNA**

Accurate: Calibration resistor supplied (50 ohm)  
Portable: Useful for aerial and transmission lines  
Impedance: D-1K with accurate markings at 50, 75 & 300 ohms  
Range: 1.8MHz to 150MHz  
Cat. D-1500 ..... \$72.50

**ICOM 6&2m**

Here are two transceivers for the 2 call (and others!) who share the elusive battery - also known as VHF DX...  
These ICOM transceivers are ideal for portable tropospheric DX operation, SSB or CW. The IC502 is a 6 metre rig, covering 52.53 MHz. A vector driven calibrated dial makes life easy, as does the Lamb type noise blanker and an S meter with RF output level.  
ICOM 502 (6m) Cat. D-3044 ..... \$180  
ONLY \$180  
ICOM 202 (2m) Cat. D-3040 ..... \$184  
The IC202 is very similar to the IC502, but covers the 2 metre band between 144 and 145.5MHz. It is just \$4.00 dearer.

**was \$18.50 now \$6.75**

**ANTENNA QUICK RELEASE**  
Quick release arm! Just for pirates who want to look innocent in a hurry.  
For the serious amateur, they allow you to take the antenna off to avoid damage, or when parked to avoid vandalism or theft. (Just remember to BATT!)  
Cat. D-4508 ..... \$6.75

**just \$4.95**  
**QUICK RELEASE MOBILE MOUNT**  
When you leave the car, take your mobile with you or at least lock it in the boot. This mount allows instant connection of power, speaker, and the rig slides into position under the dash. Cat. D-7210 ..... \$4.95

**\$72.50**

**GRID DIP METER**  
We don't have to tell amateurs how handy dippers are, do we. Do we? Maybe you're a novice who hasn't heard of these yet... A dipper is one of the handiest pieces of test gear to have around: you'll use it to tune the rig, trim the antenna, cure parasitics, measure resonance, etc, etc. You'll use one almost as much as you use a multimeter. The one is reliable and accurate.  
Cat. D-1322 ..... \$87.50

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FOR C.O.D. SEND \$2.40 EXTRA PLUS \$3.00 DEPOSIT. MINIMUM MAIL ORDER AMOUNT IS \$5.

**MULTI 23 CHANNEL TRANSCIEVER**

**7**  
**\$189.00**  
Check the features: 23 channel FM transceiver for full 144-148MHz band. RF power output 10W or 1W (switchable), comes with mic, mobile mount, manual, DC leads & channel 40 (146.00MHz) crystal.  
SPECIAL: If ordered with set, additional channels \$6.00 each. Crystals normally available are 40, 50, 852; rep. 8 and rep. 1, 2, 3, 4, 5, 6.  
Cat. D-3007 ..... \$189.00





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NOVEMBER 1976

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### COVER PHOTO

*Bill Rice VK3ABP, leader of the recent DXpedition to Lake Eyre (his second), plays "Sinbad" on the shores of the lake, with the star of the expedition, the "Red Baron" in the background.*



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Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

### CT-500 — \$24.90 — Postage \$1.30

Popular, medium-size, mirror scale. Overload-protected.

AC/V: 10V, 50V, 250V,

500V, 1000V, (10,000 ohm/V).

DC/V: 2.5V, 10V, 50V, 250V,

500V, 5000V (20,000 ohm/V).

DC/A: 50 uA, 5 mA, 50 mA,

500 mA.

OHM: 12k ohm, 120 k ohm,

1.2M ohm, 12M ohm.

dB: 20 dB to +62 dB.

Approx Size: 5 1/2" x 3 5/8" x 1 1/2". P&P 50c



### 27 MHz (11 METRE) EQUIPMENT

**LAFAYETTE MICRO 66** 5 watt transistor, 6 channel operation, fitted with one set crystals. **\$139**

**LAFAYETTE 27 MHz** fibreglass cowl mount mobile loaded antenna. 36" long, complete with base and coax. **\$28.45**

**LAFAYETTE 27 MHz** combination AM Radio and 27 MHz loaded antenna, complete with splitter harness, cables and plugs. **\$28.95**

**LAFAYETTE 27 MHz** gutter mount mobile antenna complete with coax cable and PL259 plug. **\$22.50**

**1/4 WAVE STAINLESS STEEL 27 MHz** mobile antenna with heavy duty spring, base and insulator. **\$30**

**LAFAYETTE "Range Boost"** 1/2 wave vertical antenna for 27 MHz base station use. **\$59**

**LAFAYETTE 1/4 wave** ground plane antenna. **\$35**

**52 OHM COAX CABLE**, 1/4" diameter. **55c metre**

**PL259 COAXIAL CABLE PLUGS**. **\$1.60 each**

**REDUCER** to suit for 1/4" coax. **40c each**

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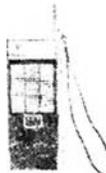
### MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCIEVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION

#### SPECIFICATIONS:

Transistors: 13  
 Channel Numbers: 3, 27.24 OMHz  
 Transmitter Frequency Tolerance:  $\pm 0.005\%$   
 RF Input Power: 1 watt  
 Tone Call Frequency: 2000 Hz  
 Receiver type: Superheterodyne  
 Receiver Sensitivity: 0.7 uV at 10 dB S/N  
 Selectivity: 45 dB at  $\pm 10$  kHz  
 IF Frequency: 455 kHz  
 Audio Output: 500 mW to Ext. Speaker Jack  
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 Current Drain: Transmitter 120-122 mA  
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**\$49.50 each or \$95 a pair**  
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27.085	27.165	27.235
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27.240	27.910	27.265

**\$6.50 A PAIR (Transmit and Receive)**

### XTALS FOR MODEL AIRCRAFT HOBBY MEN

Tx				
29.730	29.75	29.77	29.79	29.81
29.83	29.85	29.87	29.89	29.91
29.92	29.95	29.97	29.99	

Rx			
30.185	30.205	30.222	30.245
30.265	30.285	30.305	30.345
30.365	30.385	30.405	30.425
30.445			

**\$7.50 each — made to order**  
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1-way loudspeaker system 1" x 5" speaker, 8 ohms, frequency response 90-12000 Hz, 4 watt rating. Suitable for transistor radios, portable cassette players, etc. Cabinet size: 12" x 8 3/4" x 4 3/4".

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8. FUNCTION SWITCH
9. BRIGHTNESS CONTROL
10. TONE CONTROL
11. VOLUME CONTROL
12. TUNING KNOB
13. FM AFC SWITCH
14. SELECT SWITCH

Frequency Range: AM 536-1605 kHz; FM 88-108 MHz. Output Power 800 m Watts. Speaker: 8 ohm. Circuit 1C, 11 transistors, 11 diodes, 1 display (12 hours only).

**Price \$47.00 — Post and Pack \$2.80**

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# amateur radio

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## QSP CB - BE PREPARED

As you are all well aware, numerous items concerning "CB" have been appearing with increasing frequency in the daily press, the popular monthly magazines, and also on television.

Let's take a look at the situation.

There are already in Australia a large number of people who have (and can use) transmitting equipment of their own. This equipment has been, and still is, freely available to anyone wishing to buy it. It is reasonably cheap and works well.

Some estimates put the number in Australia as up to 200,000.

We are faced with ordinary people who wish to use an instrument, about which they have no technical knowledge, as a means of personal communications enabling them to talk freely to other people miles away.

We know that many people would use "CB" innocently, wisely and with decorum.

However, it is human nature that there will be some people who will unhesitatingly use "CB" for their own legal and illegal purposes. Yet others will embrace "CB" for the thrills of longer and greater DX contacts, whether permitted or not.

Others again will use "CB" because they are "frustrated amateurs", or have no time or inclination to study for examinations.

The introduction of a legal, short range, personal communications facility (CB) is a concept entirely new to Australia, requiring approval at a government level. The major consideration affecting the introduction of any new facility is the ability of the administration to exercise complete and effective control. The WIA has no direct policy on the principle of a short range personal communications facility (CB). However, there are very definite policies with regard to the use of Amateur bands by people who have taken the law into their own hands, and are operating their own personal communications facility.

I would like to emphasise that it is the function of the WIA to look after the interests of the licensed Amateur transmitter and those who aspire to obtain a licence. To this end, we must closely follow all developments that may affect our privileges now, and in the future.

DAVID WARDLAW VK3ADW  
Federal President, WIA

## QSP

### DIVISIONAL BROADCASTS

For the benefit of short wave listeners in particular, here are brief details of Divisional broadcasts. All are on Sundays, unless otherwise stated, and times are local times; other frequencies are used in addition to those listed (especially VHF).

Division	Local time	Frequencies kHz ±
VK1	19.30	3595
		27125
VK2	11.00	1825
		3580
VK2: Hunter Branch:	19.30	7146
		27125
VK3	10.30	3595
		1825
VK3	also on 3CR Mondays about	3600
		7135
VK4	09.00	22.00h
		1825
VK4		3580
		7146
VK5	0.900	14342
		27125
VK5		1815
		3625
VK5		7125
		14170
VK6	09.30	3600
		7080
VK6		14100
		3570
VK7	09.30	7130
		(27125)

### INTERFERENCE

An interference survey was conducted recently in the UK and a brief report was given in the July '76 issue of Radio Communication which could

have much relevance to Australian conditions. Some 1221 members completed and returned the questionnaire and the report sums up the results. From the returns it is possible to formulate a picture of "Mr. Average Amateur". If he experiences any interference problems at all, he suffers about three cases of TVI (his own TV and two others?), a case of BCI and two of AFI (AFI is unlikely to be the result of defects in his own station). He is not entirely convinced (as he should be) that interference can be cured, and he is too prone to fears (often unfounded) that limit his operation. Many of his cases are not reported . . . so the (official) statistics underestimate the problem to a considerable degree. This is fortunate for the complacency of the manufacturers, who continue to deny that any problem exists. With the growth of private radio services (including amateur) the problem can be expected to increase, and Mr. Average Amateur can expect the situation to get worse before it gets better, unless he faces up to it squarely by (a) using his equipment; (b) facing up to interference problems, technical and social; (c) keeping in touch with the Society and seeking its help in difficult cases".

### VHF CHANNELS

"An outsider who has operated for decades on the HF and LF bands is really puzzled by the present VHF set-up. The habit of referring to "channels" instead of frequencies is confusing to the newcomer to VHF. When one takes the trouble to find out what the channel numbers mean, one is staggered to find 25 kHz separation. Are the VHF signals really so broad that they really require 25 kHz? If it arises from the use of FM by the repeaters, then surely FM must be a most extravagant method of using our frequencies. Where would we be on 20 m if QSOs had to be 25 kHz apart? Surely, such a method must invite severe criticism and loss of frequencies at the 1979 WARC?" G3BID writing in June '76 Mobile News.

# WIANEWS

CB

The following joint statement is published for general information: "An exploratory meeting was held on 27th September 1976 in Melbourne between members of the Executive of the Wireless Institute of Australia and the Australian Citizens Radio Movement, a group representative of those interested in the legislation of a citizens band. The Federal President explained the I.T.U., Radio Regulations and the Amateur Service which was international.

A wide-ranging discussion was then held in relation to the concepts involved, the aims of the service and the realities which must be faced. Stress was laid upon the need for a frequency band suitable to accommodate the equipment already in the country, but no specific frequencies were requested. Equal stress was laid upon the safety and emergency uses of such a service for private individuals. The problems experienced were aired and it was believed that a CB service nevertheless would eventuate in due course.

The Federal President thanked all those who attended."

## POSTAL VOTE

Postal Motion 76.20.01 (No. 1/1976) was circulated to Federal Councillors in August and was passed. The Motion was detailed in WIANEWS in Oct. AR.

In simple terms this means there is now no Federal Y.R.C.S. organisation in existence other than via the Executive Office. Youth Radio Schemes will in future exist as units in each State and in many cases will remain under the control of the respective Divisional Council. Federal Y.R.C.S. Notes in AR will cease and presumably each Division will henceforward include Y.R.C.S. Notes of their own State in their own bulletin. A report will be made at the next Federal Convention on how the new system functions.

The Federal Education Officer is Mr. Graeme Scott, VK3ZR acting in accordance with Federal Convention Motion 76.093 to investigate and make recommendations on general radio instruction to candidates of all ages and to take into account the nature and levels of examinations and exemptions therefrom. This portfolio covers a big field of activity — much greater than may appear on first sight — and naturally includes Y.R.C.S.

An interesting development was a request received from Central Office for the assistance promised some years ago by the Institute relating to multi-choice examination questions for AOCIP and Regulations. As the result, a considerable number of questions and answers were duly prepared and submitted. It is understood that a similar request went out to other groups.

How far this indicates a switch to multi-choice for all amateur examinations remains to be seen. However it may indicate that the Institute's submissions relating to systems improvements in the R.F.M.D. have not fallen on stony ground — see WIANEWS in Sept. AR — but nevertheless it seems that replies to our many submissions, other than acknowledgements from the Division, are still as difficult to obtain as ever. Perhaps the blame really lies fairly and squarely on shortages of staff, coupled with the low priority believed to have been conferred upon amateur affairs.

Executive held two meetings during September, an ordinary one and a special one as already reported above.

## SUBSCRIPTIONS

The Finance Sub-Committee 'met' during the month and agreed to recommend Executive to accept the 1976 Federal Convention Motion that the 1977 Federal due should be \$15.00 for full and associate members. This was accepted. This is only 50 cents above the 1976 level despite the ravages of inflation. The extra 50 cents is to be allocated against the Federal dues element; the AR and IARU elements remain unchanged. It was noted with approbation that some Divisions are already calling for an extra levy to help the I.T.U. Fund for WARC 79.

## WARC 79

And on this subject the Agenda for WARC 79 has finally arrived and clause 1 in it advises the duration of the Conference as 10

weeks from 24.9.1979. 10 weeks is a very long time and will seem a lifetime when all the late night sessions are taken into account. 10 weeks in a place such as Geneva also promises to be a most expensive affair, quite apart from the loss of pay or earning capacity for anyone not attending on a 'holiday'. It would be no holiday.

A meeting of the Australian Preparatory Group (APG) was scheduled for 6th October having been postponed from June whilst awaiting the Agenda. Meanwhile work has been going forward preparing the W.I.A. submissions on the amateur service for Committee No. 2, but progress was slower than anticipated because of other pressing commitments says Dr. Wardlaw.

## CALL BOOK 1977

At last sufficient information came through during September to justify work commencing on processing non-members into the Institute's EDP file in preparation for the next call book. Slight modifications to the programme will be required, but these can not be done for us before February next year. Since the non-member input work may take that length of time to complete anyway, and a month will have to be allowed to iron out any bugs in the system, it does not seem likely that the 1977 Call Book could appear much before June. This assumes a satisfactory conclusion to contractual negotiations with the R.F.M.D.

If all goes according to Hoyle, the WIA non-members will be identified with an asterisk against their names in the print-out for the call book. Furthermore, as we know from past experience their details are liable to contain considerable error, whereas the addresses, etc., of members will be much more accurate.

## UHF AND UP

The VHF/UHF Advisory Committee (VHFAC, as it is called) spent some time considering EME and ATV repeater frequencies. Correspondence on EME was initiated with Lyle Patison VK2ALU, from whom the original submissions derived. The RFMD was asked to approve cross-band ATV repeaters, and correspondence was initiated with the New South Wales Division relating to their requirement for in-band 70cm ATV repeaters, since this raises a number of issues important to future operations on this band.

## REPEATERS

No comments have come through from the RFMD about the 70cm band plan for 430-40 MHz and the 70 cm proposed repeater frequencies. In the same way there is no news about Institute submissions relating to repeater conditions one of which was the very reasonable request that the WIA should be consulted before the grant of any 70cm repeater licences. If this is not done band plans are rendered useless and chaos could occur. This point was taken in discussions with the RFMD on 23rd August but may take time to implement.

Great pressures exist in the heaviest population area of Australia — namely New South Wales — for additional 2 metre repeater frequencies, and Executive noted the crystallisation thought in that State Division which would enable further work to begin when details come forward.

## CUSTOMS

Further to the report on pages 3 and 4 of AR for Nov. '75 a press release during September advised the acceptance by Government (subject to international commitments — which are unlikely to affect amateur gear) of the IAC report of 9.4.1976 on Telecommunications Equipment. Paragraph 2.8 in that Report noted that some items of amateur radio equipment already enter under by-law. Remaining requests for duty free entry of specific items would be more appropriately dealt with through the by-law system, it said. The press release advised in relation to these that normal by-law criteria will continue to apply.

A disturbing report was recently received that general by-law concessions for 70cm amateur transceivers had been withdrawn as the result of objections by a local manufacturer. Nothing further has transpired on this.

## WICEN FREQUENCIES

An objection was received to the proposal that 14100 kHz be specified as a WICEN net frequency because this is at the borderline between the CW and phone segments of the band.

## CONTESTS

Executive considered a proposal that the VK/ZL/O Contest, in so

far as the WIA is concerned, should be terminated because of the limited interest in it, the work and the costs involved. It was agreed that no changes should be made.

### CALCULATORS IN AMATEUR EXAMS

A letter from the Department advised that electronic calculators will be permitted in exams subject to certain conditions.

### G6CJ AERIAL CIRCUS

Certain conditions were imposed when G6CJ agreed to the WIA making a videotape of his splendid lecture on aeri-als. As a result of this a set of conditions to be observed has now been drawn up for the loan of the edited videotape.

## 1976 REMEMBRANCE DAY CONTEST, OPENING ADDRESS BY THE RT. HON. MALCOLM FRASER, M.P., PRIME MINISTER OF AUSTRALIA

I am very pleased to be given this opportunity to open the Remembrance Day Contest for 1976 and in a small way assist with your tribute to those amateur radio operators who laid down their lives for Australia.

Since the Remembrance Day Contest is a friendly contest those who take part will be carrying on the tradition of amateur radio itself, making friends over the air and helping to develop international understanding through this remarkable leisure activity. A most fitting way of serving the memory of those whose names are inscribed on the Roll of Honour.

I am a little disappointed that amateur radio is not allowed in some countries, but I understand that most of you listening will be in regular contact over the air with amateurs in most countries of the world; your contacts provide a valuable addition to the goodwill and international understanding so badly needed in today's world.

Your administrators in amateur radio should continue to be on the alert to meet new challenges.

The achievements of amateur radio operators are considerable. They include technical advancements, instructional assistance to aspiring amateurs and to those starting their careers in electronics; demonstrations of using and commanding amateur satellites are just a few.

The communications originated by amateurs during the Guatemalan earthquakes and other disasters bear witness to their intrinsic value. Nearer home, the value of amateur communications during Cyclone Tracey, the Brisbane floods, bushfires and other emergencies are clearly recognised by emergency organisations and official bodies.

I commend this kind of community effort to all amateurs and hope every advantage will be taken of practice exercises, training sessions and other ways to maintain high standards.

With these few thoughts I am delighted to declare open the 1976 Remembrance Day Contest. ■

## QSP

### CONDEMNATION

"Amateur radio operators in Chicago's largest Amateur Radio club are taking a firm stand against Citizens Band radio operators and their use of "smoke reports" and "convoys" to avoid highway radar installations. At a recent meeting the 350-member Chicago FM Club passed a resolution condemning the use of radio to "circumvent the traffic laws of our communities" and pledged not to use Amateur Radio for such purposes". Report in Worldradio News, July 1976.

### GOING MICROWAVE?

The editorial in June '76 QST carries the following interesting information — "It seems to us that we amateurs need to make a good deal more use of the UHF and above. We have large chunks of spectrum up there that are being used by only a small number of hardy experimenters. What is needed is a more vigorous expansion into the higher reaches of the spectrum.

The upward move is inevitable. Two metres will soon be overloaded from one end of the band to the other, an overloading that has been enhanced by the massive growth of FM the past few years. The 220-MHz band is fast becoming overcrowded, particularly in the larger metropolitan areas. The same for 420. There is, literally, no space left in those three bands in many areas of North America.

This same situation exists in other radio services. It is obvious from what we learn during preparations for WARC-79 that other services would like spectrum space in or around 140-150 MHz. But the space just isn't available. There are a number of us who believe that the only real and long-term solution lies in a move to 900 MHz for a number of the mobile services. There's just no use in postponing the inevitable.

The same goes for the amateur service. Now is the time to head for 1215 and above. There's no sense in postponing the inevitable. The quicker we make the move, the quicker we'll take some of the pressure off our bands at 144 and 220 and 420, and the better we'll be able to justify our retention of our bands at 1215 and above".

### INTERFERENCE

Here is a quote from the column of Dr. Theodore Cohen, W4UMF, in Worldradio News June '76—

"Discussions with Mr. Richard Smith, Federal Communications Commission, Washington, DC, indicate that the commission received 25,282 RFI complaints during the third quarter of fiscal 1976. This brings the total number of complaints for the fiscal year to date to 57,014, 2000 more than all of the complaints received in fiscal 1975.

Roughly 46,000 of the 57,014 complaints received by the commission involve electronic home-entertainment equipment, with 80 per cent of these complaints related to the operation of stations in the Citizens Radio Service. Amateur operations are involved in about 7 per cent of the complaints. The FCC is still projecting that it will receive about 77,000 complaints during fiscal 1976, which, if true, would represent a 40 per cent increase in complaints over those reported last year".

### SLOW SCAN TV SPACE SHOTS

The NASA laboratory's amateur radio station has recently been transmitting exciting pictures to the amateur fraternity

### CB

Needless to say, a considerable amount of time was taken up by the Executive in discussing the concept of a Citizens Band in Australia. These culminated in the meeting with ACRM at their request. A letter was earlier despatched to the Minister highlighting amateur interest in the 11 metre band and pointing out that if this band is withdrawn the Novice licensees would lose 68 per cent of the frequencies allocated to them. One last thought this month on CB. USA CB-ers are not legally permitted to contact stations outside the USA and the majority opinion seems to indicate the same ought to apply here. This view appears to coincide with that of the more enlightened proponents of CB. ■

around the world. Bruce VK3VF has forwarded two of N6V's slow scan TV pictures received at his QTH.

Photograph 1 shows a crater on the surface of Mars as seen from the VIKING 1 Lander. The triangular peaks on the right of the picture are reference data related to computer enhancement of the picture. A graduated contrast scale is visible at the bottom.

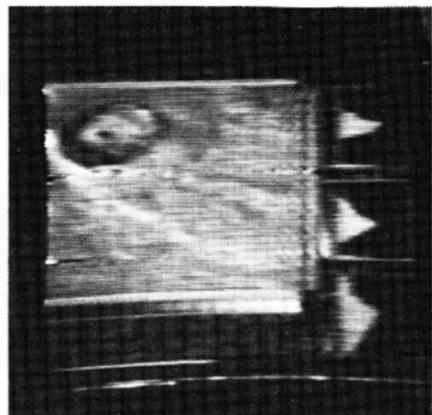


PHOTO No. 1



PHOTO No. 2

Photograph 2 is a view of Phobos, one of the moons of Mars. Phobos is only 17 miles in diameter. The photograph was taken by the Orbiter and has not been computer enhanced. It was transmitted via 20 metres only minutes after being received on Earth. Note the large lump that has been cleaved off the lower right side of Phobos. ■

# MORE ON THE CW NET THE NCS

Frank Miller VK4II

The NCS (Net Control Station) is the heart of the CW Net. His task must seem to most net stations as superhuman. After all, the NCS must know at all times exactly where every station is, who the other station he is talking to is, who he has had QSOs with before, if he is temporarily or permanently out of the session, what frequencies are still available, etc., and all this for possibly 20 to 30 stations at a time.

The key to it all is the logging system. Without a very efficient and effective logging system, control of a large number of stations simultaneously is close to impossible. The system described in this article was suggested by the late VK2AV, Art Thurston, in the early days of the CW net. It proved to be excellent then and has not needed much modification since.

Essentially the system is simply the assignment of a separate line in the log to each station in the net. For 20 stations, there are 20 lines in the log. Each line is a diary item for that station. As each new station reports in, his call is entered on the next line and his call thus forms the title of that diary item. As each station has QSOs, his line starts to fill up with frequency, call, frequency, call, etc., forming an immediate record of the stations he works, and where he was, up to and including the current QSO. As each QSO is completed, a line is drawn through the station and frequency just completed.

The trick to the system is to realise that each station's record must be kept up to date at every moment. Once two stations are assigned a frequency, that information must be entered against both the stations. This takes a second or two and is the only delay in the procedure, though it is doubtful whether the net stations detect it. In practice, the log is so succinct and neat that the NCS can relax and can be quite sure of himself. Nothing is entered in the log which is not absolutely vital.

Experience has shown that a spacing of 3 kHz between stations is best, and 4 kHz above and below the NCS frequency should be left clear. To tell at a glance which frequencies are not in use cannot be immediately seen by scanning the log itself and so I write all the possible frequencies across the top of the page and put a mark under each one in use, crossing the mark off when the frequency becomes free. Other NCSs have arranged a set of cards, horizontally along a rod, each card corresponding to a frequency. As each frequency is assigned, the card is flipped over so that only the available frequencies are visible. Between 7003 and 7035 kHz are ten useable frequencies.

This serves adequately for most nets but can obviously be extended as required.

In scanning the log in the course of a session, the NCS needs only to scan the right hand end of the diary lines for crossed-out last QSOs, since QSOs still in progress are not yet crossed-out. Each line is the personal history of that station so it is essential that it be kept accurate. After a QSO, only one station might report back while the second station is tardy. In such a case, although the QSO is logged against both stations, only the station which has reported back should have his current QSO crossed-out. In this way, the fact that the other station is still out is obvious.

The rule is simple: *keep each station's record absolutely accurate at all times.*

Once the logging system is fully understood, it is an easy job to simulate it on the air by listening in to a CW Net session and pretending to be NCS. It takes only a few minutes to get the feel of it and to understand its subtleties. I leave a column free to the left of the log to register which stations are temporarily out of the net. If a station is out for the remainder of the session, I put a line through his call.

An example of part of a real net log is shown below. It represents a moment in time and can be followed through if it is remembered that each station is recorded in the order of reporting in and that adjacent stations are not necessarily paired together.

## TYPICAL NCS LOG

	3	6	9	12	15	18	21	7025	29	32	35	38
	.	.	.	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	.	.	.	.
CALL	1st QSO		2nd QSO		3rd QSO		4th QSO					
× 2SM	<del>06 2YK</del>											
3AJY	<del>08 2AFG</del>		<del>04 2AW</del>		15 2LM							
× 2AW	<del>15 2H</del>		<del>04 2AJY</del>		<del>08 2BF</del>							
2AFG	<del>08 2AJY</del>		29 2BWC									
2YK	<del>08 2CM</del>		<del>18 2BH</del>		<del>08 2BF</del>		18 3XU					
2RY	<del>12 5KQ</del>		<del>08 2BWB</del>									
× 3JI	<del>15 2AW</del>											
5KQ	<del>12 3RY</del>		<del>12 3IV</del>									
2AHR	<del>29 BWG</del>		<del>09 2AMG</del>									
2BWC	<del>29 2AHR</del>		<del>29 2AFG</del>		38 2RY		38 2ADB					

## LOG SUMMARY

- 2SM completed a QSO and has temporarily left the session.
- 3AJY is in a QSO, his third.
- 2AW completed 3 QSOs and is out temporarily.
- 2AFG in a QSO.
- 2YK in his 4th QSO.
- 2RY waiting on frequency to be assigned another QSO.

Let us hope that this explanation may prove helpful to any operator who finds himself in control of a large group of stations, whether on 'phone or CW. It is nice to think that one could cope with a civil emergency traffic situation if called upon to do so, or just be able to take command of the CW Net sometime.

## SOME TIPS FOR AN NCS

- Remember that you are in charge. Be firm when necessary to maintain control. This is in everyone's interest.
- Identify yourself as NCS (call CQ Net) at least twice every minute during quiet times. This preserves the frequency.
- Check your frequency from time to time and correct it.
- Keep your speed well within your high accuracy range. Mistakes are confusing to interpret, especially frequency information and call signs.
- Keep your transmissions short. Avoid wordy chatting with stations since this confuses stations who are returning to the net at that time.
- Send a complete list of net stations at the completion of each net. This gives everyone the chance to see what the day's activity was like (QNS).
- Use your clarifier. This is vital since stations call in both above and below net frequency.
- Always be courteous. The net must be fun for all comers and mistakes do occur. The activity, while serious, must not be taken too seriously. ■

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- TH6DXX 20, 15 & 10 metres, 6 element beam - THE BIG ONE Top performance, maximum gain. Fantastic front to back ratio. Handles up to 1KW RF power, heat quality materials. Cat. D-4308 ..... \$238.00

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Dick is overstocked with these most popular 11 metre crystals - 27,085 & 27,095MHz (channels 8 & 11). So he's selling them off at \$1.50 off his normal price. Add that extra channel while they're cheap!  
**650 PR** Ch 9 Cat D-6006 Ch 11 Cat D-6008

**MORSE KEY**  
ONE OF THE BEST KEYS ON THE MARKET  
Cat D-7104  
**1975**  
Double ball pivot rollers & adjusting springs suit all types.

**MOBILE ANTENNAS AT MADMAN PRICES!**  
6 metre 1/2 wave whip, base included, comes with for easy fitting. VSWR better than 1.5:1. Strong, rustproof design. What a bargain at only \$9.50. WDW!  
Cat D-4614  
**950**

**DUAL BAND VHF WHIP**  
This 48" base loaded stainless steel antenna is 1/4 wave length on 50MHz and 5/8 wave length on 144MHz. Very interchangeable, use with suitable base magnetic, gutter, jig, hole, bumper, etc. Type GA-0026, Cat D-4609.  
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Cat D-4608  
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# A MORE VERSATILE STATION FREQUENCY COUNTER

If you have ever wanted to connect a digital frequency meter to your receiver to give received frequency readout, it becomes immediately obvious that with modern super-heterodyne types that this is not possible. There are at least three ways of overcoming this problem:—

(1) If the receiver has a VFO range that starts at an exact multiple of 1 MHz (i.e. 5.0-5.5 MHz) then the frequency meter may be connected to the VFO and the true received frequency calculated in one's head.

(2) The three generated frequencies of the receiver (HFO, VFO and BFO) may be heterodyned in a series of mixers and the actual received frequency selected by tuned circuits and amplified before reading with the frequency meter. This method requires switchable tuned circuits and peaking capacitors for each band and also the generated frequency may be leaked to the receiver if the mixing unit is not perfectly shielded.

(3) The use of "up-down counters" provides a far better solution to the problems encountered in the second method. This involves the use of decade counters that will add or subtract frequencies digitally rather than by heterodyning and selecting with tuned circuits. The counter to be described uses this principle in that it "counts up" the HFO frequency then subtracts both the VFO and BFO frequencies, and displays the result which is of course the

D. J. McWilliam VK2ZDJ  
The Winery, Yenda, N.S.W. 2681

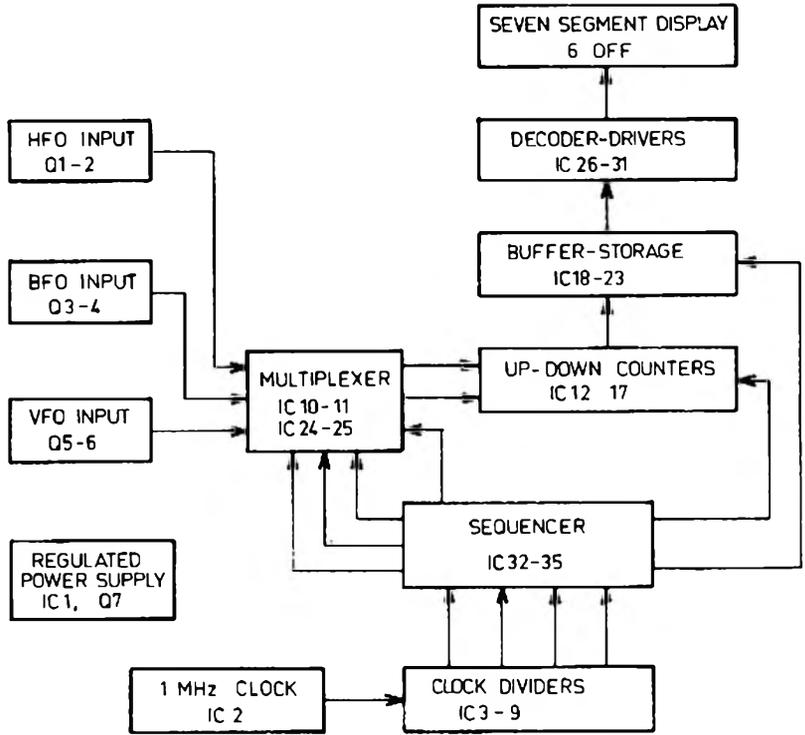
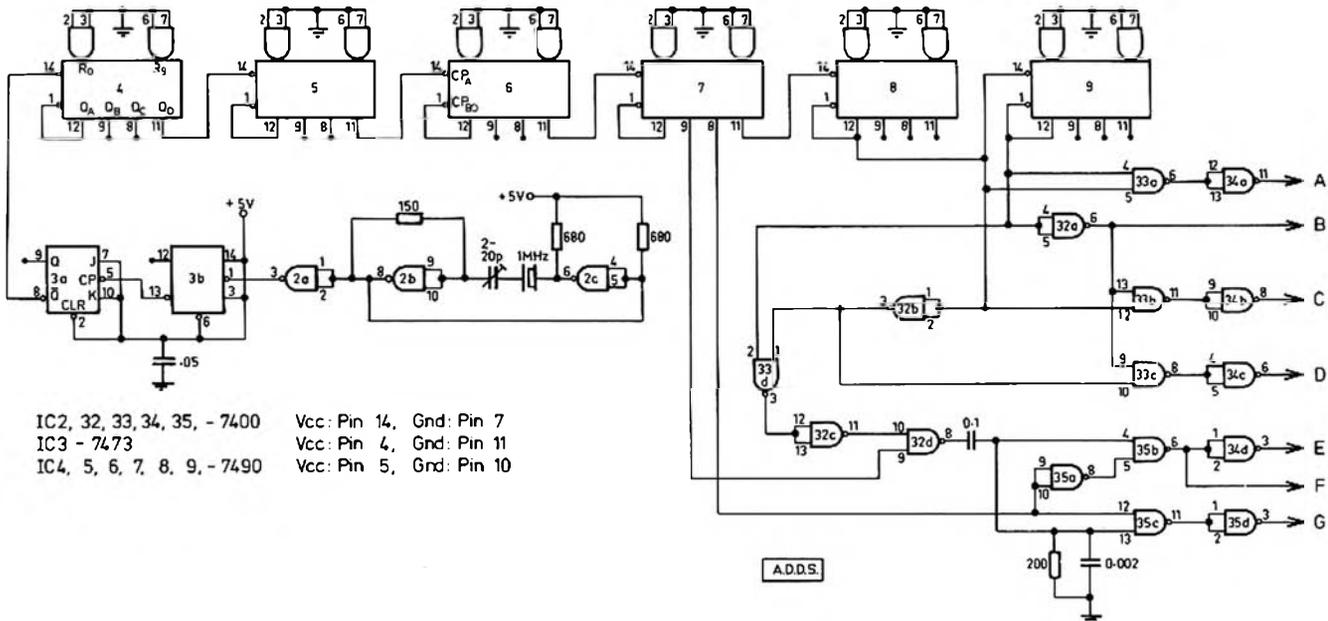
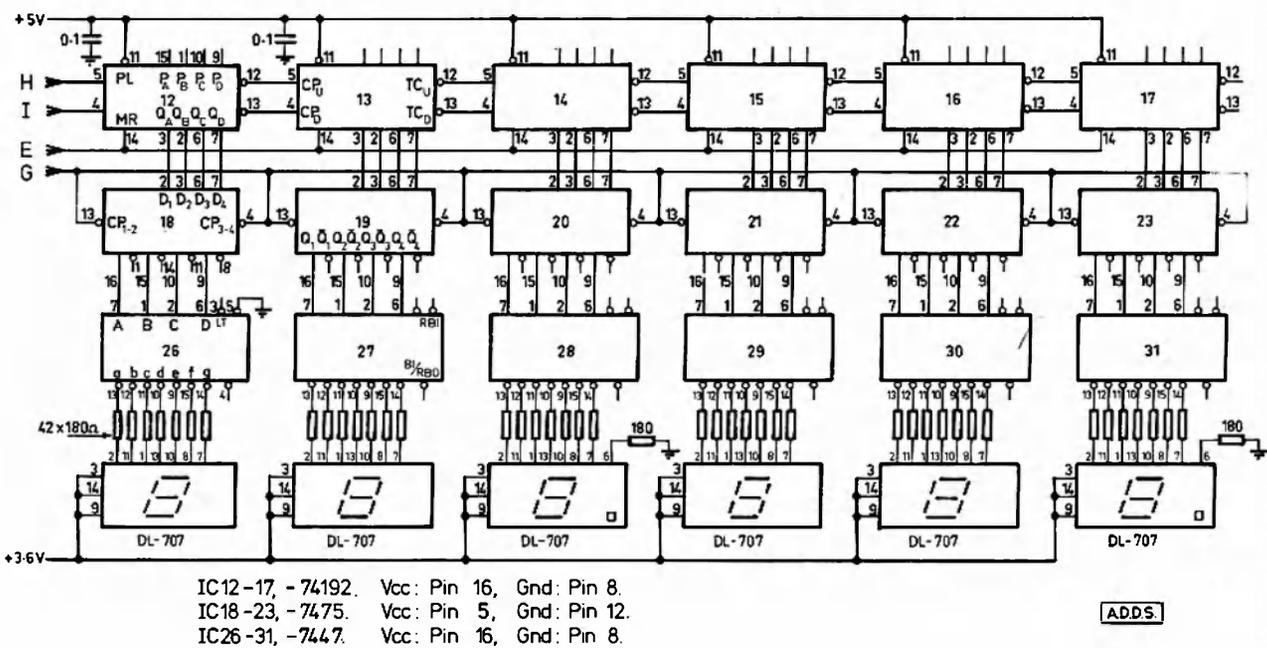


FIG. 1. BLOCK SCHEMATIC OF COUNTER

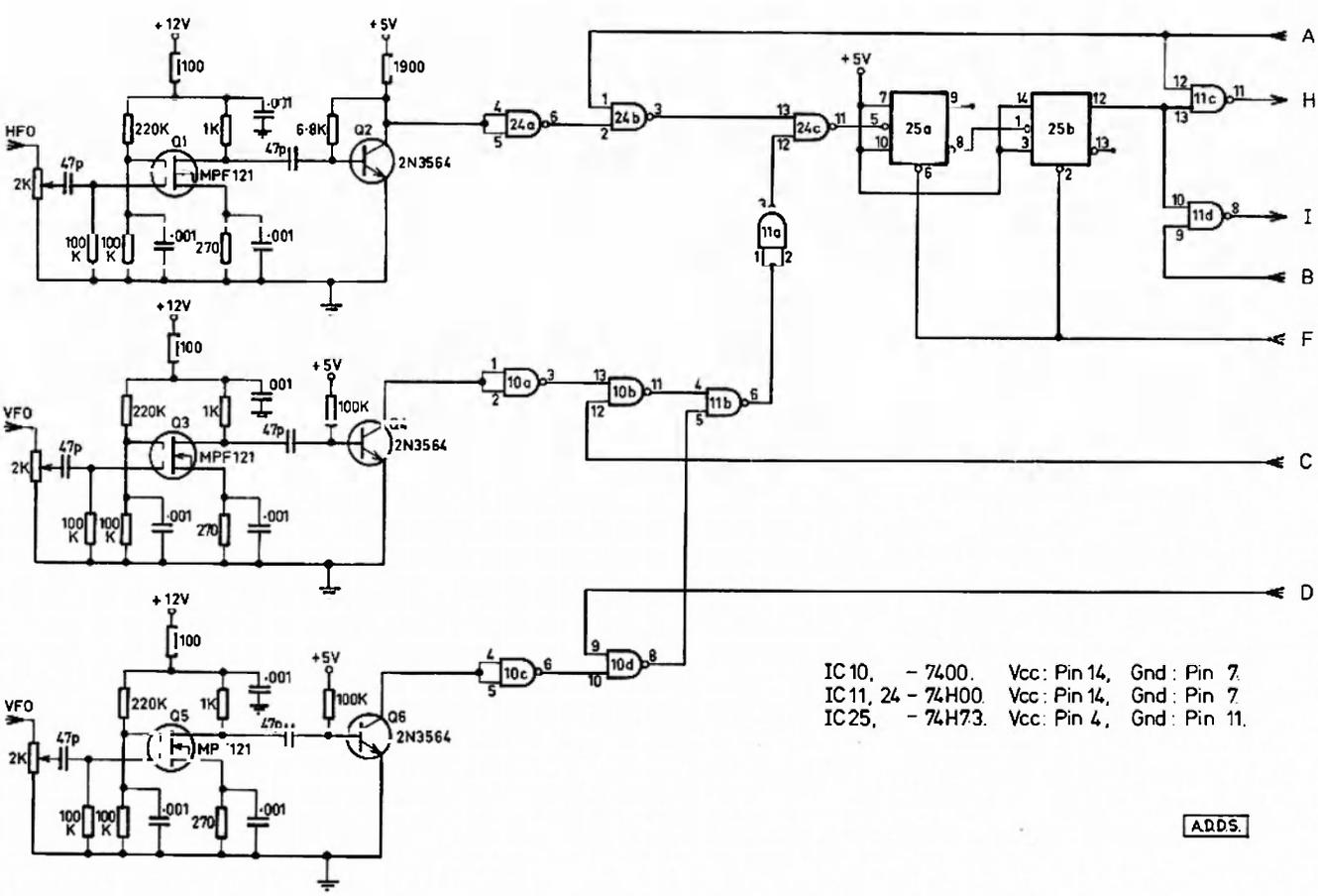


IC2, 32, 33, 34, 35, - 7400 Vcc: Pin 14, Gnd: Pin 7  
 IC3 - 7473 Vcc: Pin 4, Gnd: Pin 11  
 IC4, 5, 6, 7, 8, 9, - 7490 Vcc: Pin 5, Gnd: Pin 10

FIG. 2A. 1 MHz CLOCK DIVIDER CIRCUITRY AND SEQUENCER CIRCUITRY



**FIG. 2B. COUNTER AND DISPLAY CIRCUITRY**



**FIG. 2C. INPUT AND MULTIPLEXER CIRCUITRY**

# the world's first digitally tuned ham SSB transceiver



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### 10 exclusive features:

- Ultra-stable frequency synthesizer
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Discover a whole new world of communications with the CIR ASTRO 200... the Ham SSB Transceiver that has established a new plateau of sophistication for the serious enthusiast. The built-in digital synthesizer with LED readout gives you over 39,000 crystal controlled channels in the 80 through 10 meter bands with 100Hz resolution. Just press a momentary switch and tune your frequency with no moving parts. Calibrate it with WWV at the turn of a switch for absolute accuracy. No more crystal calibration. And, as for frequency drift, the ASTRO 200 is ten times better than VFO types. Total filtering sets the ASTRO 200 above all others for TVI and harmonic suppression. Selectable USB or LSB allows you complete flexibility, and extended band coverage covers many MARS frequencies. CW operation features include semi break-in CW with adjustable delay and side tone... no key click or CW chirp.

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This extremely compact transceiver is only 2.8" high by 9.5" wide by 12.3" deep including heat sink. With all of these features plus all plug-in, rugged militarized type construction, it has no equal for SSB and CW operation.

Be the first to learn more about the exciting new CIR ASTRO 200... ham radio's next generation transceiver. Introductory price \$750. Write or phone for complete details.

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actual received frequency. For example, the receiver used in this station is a Hammarlund HQ215 which has a crystal locked HFO, a VFO range of 2.5-2.7 MHz and a BFO of 456.33 and 453.63 kHz depending on which side-band is required.

Hence for a received frequency of 14.200 MHz:—

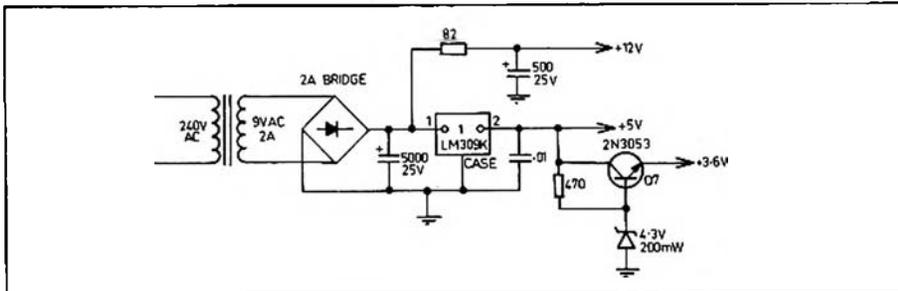
HFO (crystal locked) 17.155 MHz  
 VFO 2.500 MHz  
 BFO 0.455 MHz

Therefore, HFO-VFO-  
 BFO = 14.200 MHz

The sequence of operation is to count the HFO for ¼ of the counting cycle then count down or subtract the VFO and BFO frequencies in the 2nd and 3rd quarter, then the final quarter initiates the display of the resultant frequency. The beauty of this counter is that by disconnecting the BFO and VFO inputs, the HFO input may be used to measure any frequency within the range of the counter which, by using selected components, is about 35 MHz.

The construction of this counter is similar to those using the readily available SN7400 series ICs excepting for the timing and multiplexing circuits involved in selecting which frequency is to be counted.

Figure 1 illustrates a block schematic of how the counter works. The entire counter is constructed on double-sided fibre glass circuit board by firstly drilling all the IC pin holes and, after painting in the circuit with resistant paint, using a very fine brush (would you believe about 3 hours' work!). A separate board is used for the power supply module which provided the +10V and a 1 Amp 5V LM309K IC used for +5V regulated (see fig 2 (d)). Seven segment LED readouts are used and are mounted on a small piece of circuit board which is mounted behind the front panel. They are operated at a lower voltage than +5V to lessen the brilliance of the display — this is far easier than replacing the 42 dropping resistors. The readouts also have provision for decimal points. Six decade counters are used to give a readout to the nearest 100 cycles/ ¼C.



(NOTE: Mount IC1 on Heatsink) — FIG. 2D. POWER SUPPLY CIRCUITRY

### CIRCUIT DETAILS

Most people will be familiar with how the counting and display circuit works, so no detailed descriptions will be given of these stages.

### INPUT CIRCUIT

The three input circuits are practically identical excepting the biasing of transistor Q2 as can be seen in fig 2(c). An MPF121 dual gate mosfet is used at the input to provide amplification and a reasonably high input impedance which, in this case, is determined by the variable resistor across the input and earth used to adjust the Input signal. Transistors Q2, Q4 and Q6 interface the output to digital logic levels.

### CLOCK AND FREQUENCY DIVIDER

The clock oscillator is formed by IC2 and a 1 MHz crystal (see fig 2(a)). A trimming capacitor adjusts the crystal to exact frequency. The 1 MHz output is divided by IC3 through IC9 to give a 6.25 Hz frequency. Four timing outputs are used to operate various parts of the circuit. During one cycle (6.25 Hz) of duration 160 milliseconds, there are four periods each of 40 MS, and during each period a different frequency is counted and in the case of the fourth 40 MS period, the resultant received frequency is displayed.

### SEQUENCER AND MULTIPLEXER CIRCUITS

The function of these circuits is to process the output logic of the clock frequency divider so that three input signals are

selected in the correct sequence and routed through the proper channel to the up/down counters. The three oscillator inputs are always present, but all are inhibited by gates during the fourth period. Only the proper signal is permitted entry to the counters during the other three time periods. The up/down counter has a limit of 10 MHz so IC 25 performs a divide by four function to bring the 10 meter band HFO crystals within this limit. This IC must be able to function at the highest HFO frequency, so a high speed or selected unit must be used. The circuits are shown in figs 2(a) and 2(b).

### TRANSFER AND STORAGE

During the fourth 40 MS period, the storage latches and clear are activated. The timing circuit divides this period into two 20 MS periods. During the first 20 MS the latches transfer the count to the display, and during the second 20 MS period the counters are reset in preparation for the next counting cycle.

### CONCLUDING REMARKS

The described counter has been successfully operating in the author's station for some months and it is a worthwhile accessory to any receiver.

A word of warning to any constructors — use molex pins for mounting the ICs. They don't require through contacts in the IC pin holes and one will be surprised just how many ICs won't work. The author found a total of 5 ICs which were in some way faulty.

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# A BEACON MONITOR

PMG requirements state that unattended beacons should have a monitoring device to sense

- (a) the loss of ident on the carrier
- (b) permanent tone on the carrier

The monitor described below monitors these two functions plus four more. These being:

- (c) low transmitter power
- (d) high SWR
- (e) early warning of low power
- (f) battery charger fail

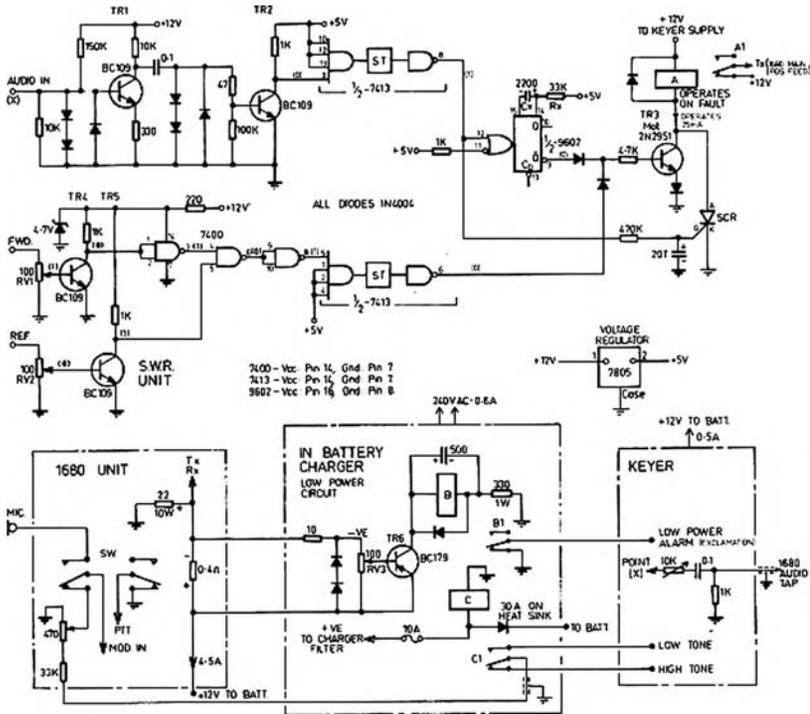
If any of these fault conditions appear except e & f, the monitor will shut down the transmitter. There are many ways one could come up with, of monitoring these

functions, but it is surprising how many of them do not work when tried. Perhaps a timer IC would work in place of the monostable in this monitor.

The unit was built on veroboard and mounted in the keyer box where space was available. The layout on the veroboard is not critical.

### CIRCUIT DESCRIPTION

The heart of the monitor is the retriggerable monostable multivibrator type 9602. There are two in the one package and only one is used, so a 9601 would also be O.K. The device changes state when a trigger pulse is applied and stays in that state for a time determined by the values of CX and RX. In this case, this time has been set to about 30 seconds. Note



**BEACON MONITOR AND AUXILIARY CIRCUITS**

that because it is a retriggerable device the 30 seconds timing will apply as from when the *last* audio trigger pulse is applied. As long as the device is in its changed state (i.e. audio pulses present on the input pin 12) a logic 0 will be present on pin 9 which is applied to TR3 via an isolating diode. Therefore TR3 is off and relay A released. The audio from the transmitter can be sampled from the last point before entering the phase modulator in an FM beacon, or from a diode detector coupled to the output of an AM transmitter. This audio sample is applied to a two stage audio amplifier consisting of TR1 plus TR2. Note the use of diodes on the inputs to eliminate spikes which we found present in the keyer output wave form and which can cause the destruction of TR1 and TR2. This amplifier may not even be required depending on how much audio sample level is available.

The Schmitt trigger type 7413 is there to square up the audio wave form and thus provide a suitable triggering waveform for the monostable. If there is silent car-

rier for 30 seconds or more then the monostable will revert back to its stable state and apply a logic 1 (+5V) to the base of TR3 via a 4.7k resistor. Relay A will operate and thus cut the supply volts to the transmitter.

**CONTINUOUS TONE**

The Schmitt trigger squares up the audio waveform, and so the waveform at pin 8 on the 7413 will be suitable to charge a capacitor to a voltage determined by the time the pulses are present. With normal ident the charge never exceeds about 0.2V to 0.3V, so the SCR will not fire. If continuous tone is present, then the charge on C1 will build up to 0.6 to 0.7V after about 20 seconds, and this will fire the SCR, which operates relay A. The SCR stays on till the power is removed from the monitor, so this is how resetting is achieved.

**SWR UNIT**

A unit inserted in series with the coax feeder to the antenna produces a positive voltage in proportion to the forward power, and this is applied to the base of TR4.

The unit also produces a positive voltage proportional to the reflected power which is applied to TR5. The reflected voltage will normally be very low and thus TR5 will be off (logic 1 at collector). The positive voltage applied to the base of TR4 will hold it on (logic 0 at collector). By using three nand gates in the 7400 IC a situation can be produced where a logic 0 will appear on the output pin 8 when a fault condition occurs. This will give a logic 1 on the output pin 6 of the second Schmitt trigger which will again turn on TR3 and operate relay A. To help explain the action of the 7400, the way it is connected, I've included a truth table.

The logic conditions marked on the circuit are for normal operation. It should be possible to eliminate the third nand gate (pins 8, 9, 10) and connect the output of the second nand gate (pin 6) direct to base of TR3 if desired. RV1 and RV2 set the points at which the low power and SWR will trigger the 7400 IC.

**EARLY WARNING OF LOW POWER**

Another feature provided is the early warning of low transmitter power. This is sensed in this case by sampling the current drawn by the transmitter with a 0.4 ohm resistor in series with the positive line. With transistor transmitters, the current drawn is proportional to the power output. TR6 is normally held on by the negative voltage developed across the 0.4 ohm sensing resistor, and thus relay B is held operated. When the current falls to a selected value (determined by setting of RV3) TR6 turns off and relay B releases. Its contacts are so connected as to insert "exclamation mark" (!...!) on the end of the call sign, indicating that power output has reached the early warning point.

**BATTERY CHARGER FAIL**

The equipment runs off a 12V battery with a charger keeping it on float. Should the mains fail, or the charger fail, relay C will release. Its contacts change the keying tone frequency from a normally low tone to a high tone, indicating that the mains or the charger have failed.

**CONCLUSION**

This monitor described was built for the two metre amateur beacon located at Mt. Mowbullan in Queensland. Call sign VK4RRT.

**QSP**

**CO-AXIAL CONNECTORS**

"According to a recent report from the Naval Research Labs, weak-signal communications systems can be seriously degraded by Intermodulation Generation (IMG) introduced by coaxial cable connectors which contain small amounts of ferromagnetic materials. Many VHF, satellite and EME operators who use receivers with sensitivities in the -120 to -140 dBm require minimal IMG for maximum sensitivity. NRL investigators have found that even small quantities of ferromagnetic materials in coaxial connectors can degrade IMG

on the order of 50 dB". The Ham Radio June '76 article by Jim Fisk goes on to list the connectors which cause the most problems as those with low permeability stainless-steel, those merely plated with nickel and the Kovar type. Later in the same article is a warning about coaxial cable losses when using commercial qualities.

**LIGHTNING PROTECTION**

"Most amateurs make sure their antennas and towers are well grounded for lightning protection, but sometimes forget that lightning can enter the

service entrance to their homes, causing a good deal of damage. Since the high-voltage surges enter the service entrance and seek the least resistance path to ground, all too often that path is through your carefully grounded amateur equipment. . . . In most cases the damage isn't caused by a nearby lightning strike, but one to the power line a good distance from the house. . . . with a (proper) arrester (installed) and a properly grounded antenna, the only worry is a direct hit on the house — which can be protected with lightning rods". Ham Radio June '76.

# THE AT5 TRANSMITTER

T. O. Wooler  
1 Glenrock Ave., Wahroonga, NSW, 2076

The AT5 transmitter and its companion receiver the AR8 were produced by AWA for Hudson and Catalina aircraft. This unit is available in Sydney for around 15 dollars at disposal stores and as such is an ideal start for a new Novice. It is already crystal locked and operational on 80m and without much alteration, could be made operational on 15m. All that would be necessary would be a receiver, which provides some scope for home construction. The following is useful information to get an AT5 operational on 160m, 80m, 40m, 20m; AM and CW with minimal expense.

## BRIEF SPECIFICATIONS:

Weight: Transmitter 35 lbs; Aerial Coupling Unit 22 lbs; Power Supply 58-73 lbs.

Electrical: 12 or 24V DC Heaters; 550V DC at 160mA; 300V DC at 250mA.

## OPERATION:

For medium frequency a Master Oscillator (VFO) is used providing a range of 140-500 kHz. On high frequency there is provision for both crystal locked and VFO operation, covering 2-5 MHz. Using doubling in the Buffer Amplifier (BA) and in the Power Amplifier (PA) total coverage is 2-20 MHz. Input to the finals (2 x 807) on CW is approx. 90 watts. AM and MCW 30 watts. Power output into a 100 ohm load is approximately 50 watts CW at the fundamental frequency and is somewhat reduced when doubling is used in the BA or PA. Three modes of transmission are possible: CW, MCW, and AM (R/T).

## DETAILS:

### Medium frequency operation.

The VFO used one 807 (V3) covering 140-500 kHz in four bands. This drives the PA (2 x 807; V4, V5). On MCW and AM, the PA is grid modulated by a 6V6-GT(VI). VI is a tone oscillator on MCW, also providing a side-tone on CW. Freq approx. 950 Hz: on AM it is a microphone amplifier. The MCW modulation varies between 40-80 per cent depending on carrier frequency.

### High frequency operation

The H/F VFO uses a 6V6-GT(V2) covering 2-5 MHz in four bands. On H/F there is also provision for crystal locked operation using the same 6V6-GT for an oscillator. The signal then goes to an 807 (V3) operating as a BA or frequency doubler. This drives the PA (2 x 807; V4, V5), which can also be used as a frequency doubler. The PA is modulated by 6V6-GT(VI) in the MCW and AM modes. The modulation level may be increased by detuning the BA.

### M/F H/F changeover

Two mechanically ganged switches S5 and S3 perform all the necessary changeovers.

Contacts are also provided for operation of a relay in the ACU to changeover antennae tuning circuits.

### Keying

All valves are controlled including the modulator. The cathodes are passed to ground by 1M resistor R20, the key "shorts out" R20 thus closing the cathode return.

### Metering

A meter is switched by S2 to monitor various currents to help in tuning up and to check operation of the set. Typical Currents:

H/F oscillator	xtal	2-4mA
	VFO	4-5mA
H/F BA w/out drive		45-50mA
	with drive	25-35mA
H/F PA	Grid 10-2MHz	6-14mA
	Anode	
	w/out drive	90-110mA
	at BA Freq	40-50mA
	2x BA Freq	60-70mA
Mod. Anode		25-35mA

### Interwiring connections

All connections to the transmitter are made through the two outlet sockets on the front: as below—

#### Junction Box (Top)

Pin No.	Purpose
1	Keying relay connection
2	CW remote control
3	LT supply 26V neg
4	Sidetone output
5	Intercommunication microphone input
6	Remote control unit microphone
7	Pulse sender connection
8	RCU Send/Receive switch
9	Operator's microphone
10	Cathode return
11	RCU generator switch
12	M/F H/F relay

#### Power Supply (Bottom)

Pin No.	Purpose
1	LT supply 12V pos.
2	Earth
3	LT supply 26V neg. 12V neg.
4	LT supply 26V pos. 12V neg.
5	
6	
7	Earth
8	Generator starting relay
9	HT supply 550V pos.
10	HT supply 300V pos.

### CONVERSION TO 160m

An AT5 was converted to 160m by the author and Sam VK2BVS and was used for the 160m broadcast relay in Sydney, Christmas 1975. The conversions themselves involved lowering the VFO range and lowering the BA and PA tuning range.

The VFO range 2-2.5MHz is controlled by coil L101 and trimmer C101 to lower the tuning range L101 is adjusted using the slug inside.

To lower the BA range extra capacitance across C210 was added; if AM operation only is desired, this is not necessary as the detuned BA increases the modulation level. Extra capacitance must also be added across C32 and PA tuning.

Anyone who requires more information should contact the author. I have schematic diagrams for AT5, AR8, Power supply unit, Aerial coupling unit, Relay test unit; as well as a complete interwiring diagram and ACU wiring diagram; service and instruction manual for AT5, AR8, PSU, ACU. ■

## LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,  
Amateur Radio.  
Dear Sir,

I was motivated to write this letter by the letter written by Roy VK3AOH in August's AR. In one section he advises against discriminating against the new Novice Licensees by the WIA. In this letter I do not wish to take up the cause of the Novice but that of the associate member of the Institute. Some might dismiss this letter as a disgruntled Associate but it was not written in that light. I do hope within the near future that I might have a call. Hence it would be easy not to say anything about the Associate's position but I will say what I feel needs to be said.

It would appear that an Associate is considered as a second class citizen compared to a full member (this assumes that other States work along the same lines as Victoria does). I say this because an Associate is ineligible to stand for, or even vote in the elections for the Local Divisional Council. Yet associates make up just under 24 per cent of the members of the WIA (this assumes that the figure under 'Other WIA members' (AR July 76, p. 22) equals Associate members). From these figures no State has less than 19 per cent of its members as associates. Yet 24 per cent of the members of the WIA are unable to vote or have any real say in the running of their Institute. My contention is that Associate members should have the same rights as those experienced by Licensed members and hence be able to have a say in the running of the Institute.

The age old cry is that if we do this then we will be flooded with associates. If this is the case then I say great. Look at all these who are interested in our hobby. Yet I would doubt if such a change would cause an enormous influx of Associates or a takeover of the Institute by associate members.

In these days where there is a great emphasis on equal rights for all it seems both a pity and quite wrong that those who have not passed the "PMG Exam" either through lack of knowledge at the present, or no desire to sit the exam, or the inability to pass, should be discriminated against and be classed as second class citizens of our Institute. You might say all this is a bit rich and we never said it. In the long run it is not what you say that counts, but how you say it and then how you live it out.

R. A. Lenthall L30482.

### QSP

#### 10 GHz BAND

In the Microwaves column of Sept. '76 Radio Communication, a new 10 GHz record was claimed of 521 km between G4BRS in Cornwall, England and GM30XX/P in Scotland. The previous known record was between two W stations in 1960 over a 426 km path.

# ELECTRONIC ENTHUSIASTS EMPORIUM

ITEMS OF INTEREST TO HOMEBREWERS. See current issue "Electronics Today International" for more detailed listing of components.

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BC108	.19
BC109	.19
BFY50	.75
MPF102	.55
MPF103	.85
MPF104	1.10
MPF105	.65
MPF106	6.0
MPF131/121	1.30
2N706A	.95
2N918	1.60
2N2222A	.95
2N2905	.95
2N3638A	.50
2N3642	.45
2N3819	1.25
2N5245	.65
2N5590	7.75
2N5591	9.40
2N6084	17.50
40637A	2.85
40673	1.65
40841	1.50
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## DIP SOCKETS

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14 PIN	.39
16 PIN	.45
24 PIN	.78
40 PIN	1.25

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IRRESPECTIVE OF MIX	
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T-25	.75
T-37	.80
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7100CAN	.20
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ZENERS 1.3W	.72
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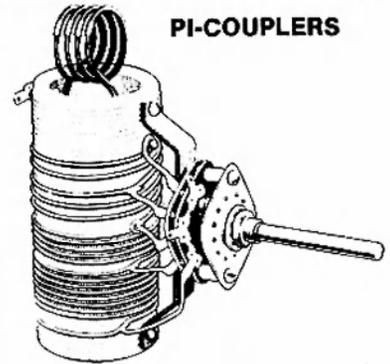
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**THIS ADVERTISEMENT RECTIFIES AN ERROR ON PAGE 27 OF AMATEUR RADIO, OCTOBER, 1976**

**NEW RELEASE — 144 MHz TRANSVERTER MODEL MMT144/28** — This 144 MHz Solid State Linear Transverter is intended for use with 28 MHz transceiver to produce a highly reliable transceive capability for satellite or terrestrial communication. — Power output 10W min. — 28 MHz drive — IF at 500 mW or 5 mW — Receiver gain and noise, typical 30 dB and 2.5 dB — Internal Antenna changeover — Case size 187 x 120 x 53 cm — Power requirements 11 to 13V at 300 mA to 2.2 amp. peak — Spare 144 MHz input socket. Model MMT144/28 — Price \$165, Pack and Post \$2.

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## FROM THE ARCHIVES

*By Alan Powell,  
son of A. L. Powell,*

The photograph displays a spark transmitter built and operated by Mr. A. L. Powell back as early as 1908. To the best of our knowledge the photograph was taken by himself on about 1910.

We can recall him saying that the greatest difficulty in those days was to find someone to communicate with; but with the aid of a 70 ft. mast and a few illegal tricks he was able to talk with a few ships around the coast, and in good conditions one or two experimentors in and around Sydney.

At the outbreak of the 1914 First World War, all his equipment was confiscated by the Government and was never seen again; so a lot of time and ideas were wasted.

In the early twenties his talent came to the fore again with the coming of modulated broadcasting and he spent many a sleepless night experimenting in conjunction with Mr. Norman Culliver who operated 3 DP (3 Don PIP) from his Mont Albert shack.

At about this time he was also spending a great amount manufacturing and selling radio receivers from his Surrey Hill's home.

We can remember the beginning of regular broadcasting by 3LO when Dame Nellie Melba was to give a recital. Great publicity was given to this event and Mr. Powell set up his amplier speaker on the front verandah of his home. The night was wet and cold and the unmade streets were a mass of mud, but at least 50 people were puddling around out there, the impact was terrific and the result was orders for about 10 receivers.

Later he redesigned his sets so as they were much more compact and placed one in the window of Louis Cohen's tobacco shop in the city. It was sold within the

hour, and as fast as they were replaced they were sold again.

Louis Cohen saw the great possibility in the industry and suggested setting him up and financing him on a permanent basis operating from a tin shed in North Melbourne. He gave this a lot of thought and rejected the offer.

Cohen not to be thwarted made a similar offer to another person who was dabbling in the business and so they got started. This was to develop into the giant radio corporation later to be known as Electronic Industries.

Mr. Powell was still making and improving his sets and to get more business he had leaflets printed and gave these to his brother who was an insurance agent to distribute. He did this by placing them in letter boxes while doing his round. I may mention that at the time anyone manufacturing radio sets had to pay a licence fee of 10 pounds per year. One of these leaflets was placed in the letter box of Mr. Jim Molone who at the time was the chief inspector of wireless. You can guess what happened. ■

## EVENTS CALENDAR

**November**

- 5 E. & Ml. Dist. RC Gen. Mtg., Nunawading Civic Centre, Willis Room.
- 7 Hunter Branch Field Day.
- 12 VK2 VHF Group conducts auction at WIC.
- 13/14 VK7 Div. Hamfest, Evandale Mem. Hall.

## QSP

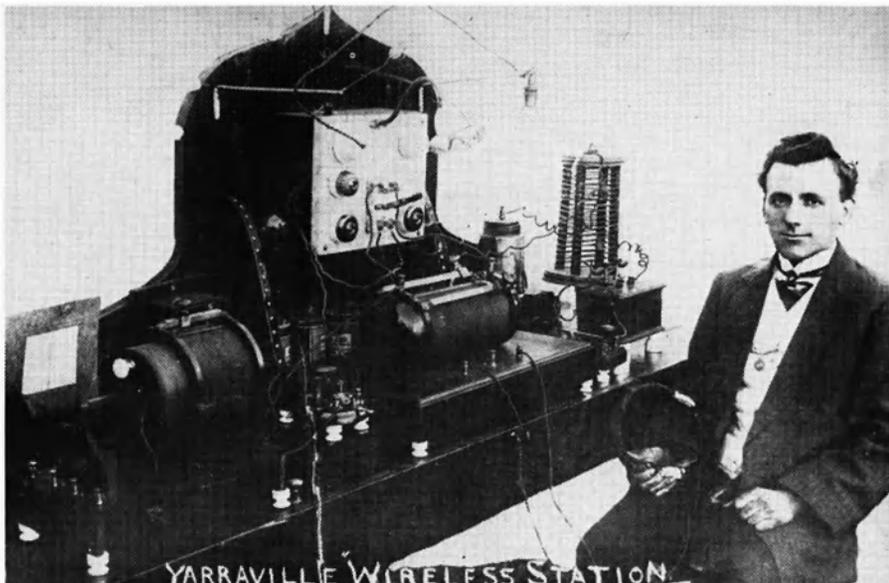
**SSTV**

From the "SSTV Scene" in Sept. '76 Radio Communication comes news of an SSTV reporting system devised by K6IIS and used by the MARS SSTV speciality network. R stands for readability and S for signal strength as in common use, with V for video quality in the scale—

- V5 Closed-circuit quality pictures
- V4 Good pictures with multi-path
- V3 Good pictures with interference
- V2 Readable pictures with multi-path and interference
- V1 Mostly unreadable, loses sync, pictures interrupted.

**NEED A VS6 QSL?**

The Secretary of HARTS, VS6GG, advises that there will be the Hong Kong activity day from 08.00Z on 13th November to 0.800Z on 14th November 1976 and several VS6 stations will be very active on the bands both CW and phone (20m band especially) to give overseas amateurs a good opportunity of confirming a VS6 contact.

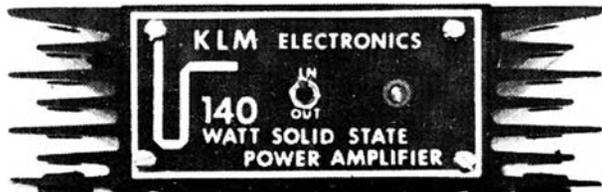


**BERT POWELL ABOUT 1910**

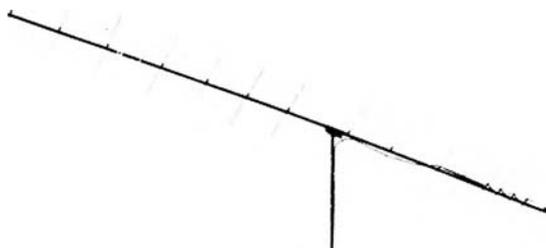
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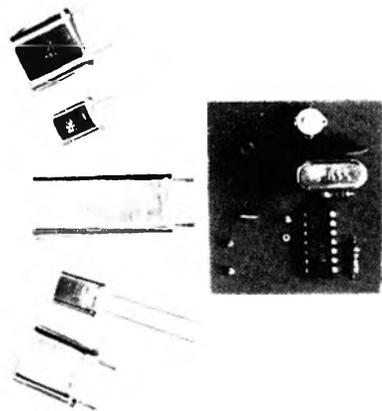
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	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullian	144.400
VK5	VK5VF, Mt. Lofly	53.000
	VK5VF, Mt. Lofly	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTW, Perth	145.000
VK7	VK7RMT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea*	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hut	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

News via "Break-In" mentions the resiting of the Auckland beacon, ZL1VHF on a range of hills to the south of Auckland. The polarisation is horizontal and the power output about 8 watts. Reports would be welcome.

Also from "Break-In" is a comment by the sub-editor of The VHF Scene on a VHF Forum held at the recent NZART Convention in Auckland. . . . "Discussion mainly revolved around the impact of channelised operation and the move away from general tuning of the two metre band. It was also noted that there was a poor turnout in the two metre section of the mobile rally. It was felt that although more people may have two metre capability now, the band was actually quieter than about six years ago. There would appear to be no easy answer, just education and the generating of enthusiasm . . ."

The above rather confirms what I have thought for some time that channelised operation in New Zealand would probably closely follow the pattern in Australia. With the advent of a number of pieces of good commercial gear for two metres now, both in the transverter and transceiver field, there is more chance of seeing a continuation of the slow come-back to tuneable operation of the band, although it seems still the faithful few who keep the flag flying most of the time.

I suppose it is a case of what you see in amateur radio, and speaking personally, channelised operation has its place in my overall picture of operation, but the main interest is still using SSB or CW and I find it thrilling after all these years to work a station a very long distance with signals perhaps in and out of the noise.

With these thoughts at the back of my mind upgrading of two metre capability is always foremost in my mind, and currently the original winch-up tower has been resited closer to the shack to allow shorter feedlines, a stacked pair of 16-element yagis will be up about 80 feet, and mounted between them a 6 by 6 skeleton slot antenna for the FM band. So we should be reasonably set up for two metres. I note also that Keith VK5SV is doing something similar, and with both stations running reasonable power, signals should be available further afield than previously. I see from the Geelong Amateur Radio and TV

Club newsletter that Peter VK3JJP is operating from Shepparton each weekend, and is looking for contacts into Geelong and Melbourne areas each Sunday morning. Peter is using an IC202 to drive into a pair of 4CX250Bs, with 400W PEP to a pair of yagis. It is noted Peter's signal into Geelong is over S9.

Well, Peter, there are stations to the west of you, and contacts from VK5 are possible around 1030Z, so you might care to look this way from time to time.

Also from Geelong comes quite an interesting paragraph, and worth repeating: "With the large number of 'hand-bag radios' (IC202 etc.) in use, portable operation could be very popular this summer, particularly on 6 metres where the old bogey of TVI is ever present. However, most six metre operators get very few TVI complaints (if any) by using the band sensibly.

"Firstly, one must acknowledge that operation on this band will result in interference to TV channel 0, due to the closeness of Ch. 0's frequency allocation to the six metre band. Therefore, a responsible attitude has to be adopted; it is generally agreed by operators to use this band only during the day up to 1800 local as after this hour it is considered to be peak viewing time until close down. Sunday afternoons are also a time when care should be exercised as Sunday sport is also very popular. Additionally, some form of attenuation of the transmitter output should be provided as the running of high power when the band is 'wide open' is completely unnecessary, many good OSOs have been made with a power output of 1 watt and less.

"As a lot of good openings occur during the daylight hours many contacts can be made without interfering too much with neighbours' viewing habits".

Well that all seems very sensible, and whilst the above is mainly for digestion of those living in Ch. 0 areas, it still has points for all of us, as strong signals on six metres can cause interference anywhere, particularly to audio equipment. It has been my experience to find that the introduction of colour TV receivers has not really caused the TVI problems envisaged, with their solid state construction. Possibly the widespread use of coaxial cable antenna installations has helped, but in many cases the front ends of both colour and black and white solid state TV sets are much more tolerant of strong signals than previously believed, which is probably just as well!

## POINT OF INTEREST

On Thursday 2nd September, 1976, crossband contacts were made between VK6WG on 1296.8 MHz and VK6KZ/P on 146.0 MHz in Albany. Wally VK6WG was using a 3CX100A tripler amplitude modulated into a three foot parabolic dish. Wally VK6KZ used a ground plane antenna, diode mixer converter and a Barlow Wadley receiver.

The first path was a 2 km optical. On Monday 6/9/76 this path was lengthened to a 10 km non-optical path with VK6KZ/P using a converted 12 inch diameter electric radiator reflector as the antenna dish! Interest in 1296 MHz in Albany may grow with Bernie VK6KJ an interested observer of these tests . . . from VK6 VHF Newsletter.

What is probably of greater interest to VK5, VK3 and VK7 is the fact that 1296 MHz activity is starting in Albany. With suitable equipment at both ends there seems no reason why contacts should not be possible across the ocean into VK5, and probably further. Those well situated in the Adelaide plains like Garry VK5ZK, Peter VK5ZPS and so on, could well be the forefront in making the distance on that band.

I would also draw the attention of any who may be interested to an excellent six page article in the September 1976 issue of "QRM" from the Northern Branches of the WIA, Tasmania. It is entitled "A 144 MHz Linear Amplifier", by Greg VK7ZYT and is an article on all solid state equipment to provide 12 watts from a 2N5590 from 1.5 watts drive, SSB, and going through various combinations of drive power and transistors to finish up with 50 to 55 watts of SSB with 2 watts input, and finishing up with an output stage only using two 2N5591s to deliver 50 watts from 10 to 12.5 watts drive.

There is a lot of good material for background in the article, together with parts list, circuit diagrams, layout etc. plus info on how to tune the beast. 50 watts into a ten element yagi at 50 feet will be heard a very long way.

## EME REPORT

Via "The Propogator" Lyle VK2ALU reports: "We were advised by K3JJZ of the W3CCX group, which had operated portable 432 EME in Columbia South America, in July-August, that they had experienced a number of power failures during the scheduled test periods. Unfortunately one of these had occurred during the scheduled test with VK2AMW. They were successful in working a number of other stations, some of whom made 432 MHz WAC with their contact with HK1TL.

"Our scheduled tests for August were carried out on 29/8. A transmitter power supply problem prevented contacts during the W test period in the morning but VK2ZEN heard W4ZXI, 'M' copy, while VK2ALU worked on the power supply, including removal of a mouse's nest!

"During the evening a further group of tests were scheduled with stations in Europe. SM5LE was not heard and was probably not on. Signals were heard during the F2TU test period, but bad DRM from another French station, who was peaking to 10 dB over noise, prevented copy. The moon set prior to the scheduled test period with LX1DB due to an error in scheduling by the hardworking ham who provides the worldwide test schedules each month.

"Tests were made on 29/8 for received signal strength of emanations from the concentrated star mass at the centre of the Galaxy. This is a good reference signal level, as it is not subject to the same fluctuations in level as the emanations from the sun and is more comparable in strength to the lower level EME signals received from some stations.

"A QSL card was received during the month from SM5LE for our first Australia-Sweden 432 MHz contact, made on 30/7/76".

Thanks, Lyle, for the continuing receipt of the EME information. I will always be pleased to hear from any other EME operators in VK, and would be interested to hear how you have been getting along with your EME experiments. It is very rare to hear from anyone else but Lyle, and it would spread the interest further to know what others are doing.

## FIELD DAYS

You are reminded again of the ZL Field Day for VHF, on 4/12/76 0400 to 1000Z and 5/12 1800 to 2400Z. All bands will be in use. Although I have not received any confirmation yet, it is probable VK5 will hold a VHF Field Day period at the same time as the ZL Field Day. So those in other States and New Zealand could safely look this way at that time. I feel the December issue of AR will probably be out too late for further reminders so you will need to start your preparations after reading this. I certainly hope to go out with 52, 144, 146 and 432 MHz equipment and using one of my favourite hills.

From an operational standpoint, this month seems to have been very quiet, no one has written. There have been several reasonable openings on 144 MHz during the month to Mt. Gambier and over the border to VK3 from VK5 Adelaide and precincts area, but very little else. With some possible 6 metre openings just around the corner, there may be more to write about next month.

Closing with the thought for the month: These days there is more happening on the screen of a drive-in movie than in the cars".

The Voice in the Hills

## LARA

Ladies Amateur Radio Association

This month LARA contributes — on a serious note — some details of organisation taking place within the ranks.

On the 5th November the LARA VK3 Annual General Meeting will be held so that all the office bearers can report on the busy time each has been having over the past year and what actually got done. The new office bearers will be elected. All willing workers are warmly invited to show up and join in the fun. New or prospective members are, of course, welcomed and have the opportunity of meeting other YLs interested in a common topic . . . (amateur radio, naturally).

To recover from all this solemnity and formal procedure, LARA VK3 is holding one of its famous

foxhunts (or as purists insist — vixenhunts). This will be a Sunday afternoon event held on the 6th of November, so try to cram it into the calendar amongst all the conventions, field days and hamfests which are cluttering up the horizon for weeks to come.

For those who have never attended a foxhunt, it is really simple. We present a set of Easy Instructions to the Beginner:

First unwind a couple of wire coathangers (as everyone knows these are bred from safety pins, but are easily available at the dry cleaner — just get your mink done early). Then wind them up into something vaguely directional. Hang a deal receiver off the end and then put a car round the receiver and yourself. OM, kids, dog, cat and/or budgerigar are of course optional extras. The one essential object is of course a superb street directory. LARA foxhunts are generally happy friendly affairs where the only important competitive feature is turning up at the finish before the chocolate cake is all gone. So trundle along and join in. Don't be daunted by the Hound Sophisticate with her/his complicated aerial farm on the roof of the Land Rover or whatever, with automated, motorised, computerised, polished, dustproofed, waterproofed, chrome-plated double overhead beam-swinging, and accessories such as roo-bars and water bags. These are, we point out, totally unnecessary (unless you forget the street directory!).

On the national scene, LARA is still active. The regular HF skeds are a very good way of keeping our fairly small groups in touch with one another, and provide an incentive to the would-be YL full-calls. YLs in each of the active State groups are sitting for exams or doing classes in preparation. Many of us acquire an interest in the field gradually and then face the rather bewildering task of picknig up a great deal of knowledge, starting from scratch. However, encouragement is there for all who need it and joining a LARA group is often all the extra incentive a would-be operator needs. So plough on all ye fainthearted and we'll see you in the February exam. ■

## AROUND THE TRADE

One of the features of trading of a new company in the electronics field is that of a "send no money" policy.

The company is Electronics Enthusiasts Emporium, Shops 2 and 3, Post Office Arcade, Joyce Street, Pendle Hill, NSW. Phone (02) 636 6222.

Where QTHR, simply order by mail or phone and pay on invoice. No charges, no post/pack under 500g. ■

## YRCS

Bob Guthberlet  
31 Bandon Terrace,  
Marino, 5049

With the passing of Postal Motion 76.20.01 a Federal YRCS Constitution has been laid to rest. For those unable to understand the full meaning of this decision by a majority of State WIA Divisions, the interpretation is that the 1972 YRCS Constitution has been discharged and all Federal YRCS Officers are now unemployed!

I have consulted the dictionary to discover the meaning of "swansong" and to my grief it involves a rather morbid reference to a last or dying work, in allusion to the ancient fable that the swan sings a last song before dying. Although my feathers are somewhat ruffled and my form no longer has the grace of a swan, I assure those who read this my last message as Federal YRCS Co-ordinator that the Great Chief has not called me to publish my demise.

What turbulent years we have been through in YRCS activities — constitutions have been formulated, pondered over, objected to, disintegrated, and now finally the last has been well and truly laid to rest. However, it has been worthwhile, and the Scheme continues to function despite the upheavals we have faced and overcome in the true spirit of amateur radio. Should any reader suspect that I have been deposed from office, let

me assure you that I recommended the postal vote and uphold the decision.

An encouraging feature of the present is the understanding by WIA Divisions to encourage the Scheme Statewise, and I would express my thanks to the Councillors at the last Federal WIA Convention for their understanding of our problems and their willingness to co-operate with YRCS.

This swansong would not be complete without reference being made to Mr. Peter Dodd, who during my term of office, has been a tower of strength. He has sympathised with me, encouraged and upheld me, and with courteous advice has offered me screwdrivers to unscrew the inscrutable, and made it possible for me to exercise an office in the interests of today's youth.

Yes, feathers have flown, but I still have a few quills, and more important still, a sense of humour.

To you all, I say thank you — the swansong has ended, but may the melody of YRCS linger on.

73's, Bob Guthberlet. ■

## 20 YEARS AGO

Ron Fisher, VK3OM

NOVEMBER 1956

**EMERGENCY.** Amateurs in Ocean Yacht Rescue. So read the heading of an enthralling article in the November 1956 Issue of Amateur Radio. The rescue of the yacht "Yasme" and the part played by widely scattered Amateurs was not only of interest to Amateurs themselves, but also to the public as well through several newspaper articles. The Yasme, skippered by Danny Weil VK9TW/MM, was en route from Guadalcanal to Port Moresby when it was disabled by storm conditions. Port Moresby Amateurs arranged help from "Air-Sea Rescue Operations" who finally towed the Yasme to safety.

Back on the home front, the Editorial page was concerned with the ever present problem of "Pirates". One paragraph unfortunately seems even more applicable today than perhaps it did twenty years ago. "Today in the field of Amateur Radio we have pirates who advertise their presence by using bad language, poor operating procedure and discussing questionable subjects. Unfortunately some of these traits are not restricted to pirates but apply to some licensed Amateurs".

Technical articles included, VHF Field Strength Indicator Receiver, by Hans Ruckert VK2AOU. Its application was to track down harmonic radiation from amateur transmitters causing TVI.

Part three of Ian Berwick's VK3ALZ "Pulse Theory" article discussed the production of sawtooth waves.

Two other articles reproduced from overseas magazines were. The Tesla Oscillator, and Wide-Range Tone Control in Amateur Phone.

Advertised for the first time in Amateur Radio was the Panda Globemaster 3-Band Minibeam. Designed by G4ZU, this must have been the first commercially available 10/15/20 metre beam in the world. The price incidentally was just under \$100.00. ■

## IARU NEWS

JARL GOLDEN JUBILEE

As stated last month an original shield was prepared and presented to JARL by Mr Michael Owen, VK3KI on behalf of the WIA. A photograph and caption about this are included in this issue.

A study of the agenda for WARC 79 (see WIA NEWS herein for other details) indicates that the Conference will review and, where necessary, revise the radio regulations relating to definitions, frequency allocations and associated rules, the work of the IFRB and associated systems and Articles 12 to 20 dealing with interference and general administrative provisions for stations. Several other agenda items refer to specific matters unlikely to have any special interest to amateurs except one which refers to resolutions and recommendations for adoption.

The above will obviously be more than sufficient for 10 weeks work but it is noted that various other regulations are excluded such as those which deal with what amateur stations may or may not

do. It is a little difficult to see whether or not the limitations in the Agenda are likely to affect all aspects of a particular subject. For example, space services are dealt with under Article 7 which is on the agenda, but harmful interference caused by amateur satellites in RR1567A appears to be excluded.

As part of the annual returns by member societies, the IARU asked if any funding assistance is rendered by Society's governments. Ten societies replied affirmatively showing levels of support ranging from 3 per cent to 100 per cent of society's budgets. Generally the contributions were made in recognition of the technical training provided by the amateur society.

It appears that the UK is also in the grip of CB-fever which has resulted in the RSGB forming views about it. It should be remembered in this context that there is no 11 metre amateur band allocation in Region 1 including the UK.

Like the WIA, the RSGB exists to safeguard the interests of its members and of the amateur service in its own country. It is pointed out that the amateur service is a defined service internationally with world-wide status but a citizens band facility exists only where a national administration sets aside spectrum space for the purpose.

The Society constitutionally would have no direct interest in a CB facility but believes it must take heed of any development likely to affect the Amateur Service. One major consideration regarding any new facility is the ability of the administration to exercise complete and effective control.

Whilst it is not opposed to the introduction of a short range personal communications facility as long as its place in the spectrum and the equipment used are suitable, it believes the 27 MHz band is probably one of the most unsuitable frequency bands that could be envisaged because of proximity to the amateur 28 MHz band, long distance propagation during part of the sunspot cycle and interference to TV receivers. Naturally, the location of a CB band within an amateur allocation was unacceptable and such new facility should be located remote from any amateur band to prevent illegal operation in an amateur band as is being experienced in the USA. ■

## WARC LOVES NON-MEMBERS!

## AWARDS COLUMN

Brian Austin, VK5CA

IARU REGION 1 AWARD

General:

- The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
- Contacts after November 1945 are valid.
- Applicants in the UK must submit their QSL cards or other written evidence to RSGB, applicants in other countries should submit a list certified by the Awards Manager of an IARU affiliated society.
- Contacts must be made from the same call area, or where no call area exists, then from the same country. Contacts made during National Field Day are NOT valid for the award.
- The award is issued free to members of RSGB. The fee for other applicants is 35p, \$1 or 8 IRC.
- The address for applications is:

Mr. C. R. Emary G5GH  
"Westbury End",  
Fimmere, Buckinghamshire,  
England.

Rules: Extra countries may be added to the list of IARU members from time to time and these will be announced in Radio Communication.

Requirements:

- Class 2 — Confirmed contacts are required with 20 member countries.  
Class 1 — Confirmed contacts are required with ALL member countries.

Country List:

Algeria	Luxembourg
Austria	Malta
Belgium	Mauritius
Bulgaria	Monaco
Cyprus	Netherlands
Czechoslovakia	Nigeria

Denmark	Norway
Germany	Poland
Faeroes	Portugal
Finland	Rhodesia
France	Romania
Ghana	S. Africa
Greece	Spain
Hungary	Sweden
Iceland	Switzerland
Ireland	Tanzania
Israel	Uganda
Italy	United Kingdom
Ivory Coast	USSR
Kenya	Yugoslavia
Lebanon	Zambia
Liberia	

#### RSGB COMMONWEALTH SERIES

##### General:

1. The Worked British Commonwealth, British Commonwealth Radio Transmission Award and the Commonwealth DX Certificate are available to licensed amateurs. The British Commonwealth Radio Reception Award is available to shortwave listeners.
2. Contacts after November 1945 are valid.
3. Applicants in the UK must submit their QSL cards to the RSGB HF Awards Manager. Amateurs outside the UK should submit a list, certified by the Awards Manager of an IARU affiliated society.
4. All contacts must be made from the same call area, or where no call area exists from the same country.
5. The awards are issued free to members of RSGB. The fee for non members is 35p, \$1 or 8 IRC.
6. The address for applications is:  
Mr. C. R. Emary G5GH  
"Westbury End",  
Finmere  
Buckinghamshire, England.

Note: Cards from countries which have left the Commonwealth are valid up to the time of their leaving and the dates are indicated in the call area list.

Rules: Cards from National Field Day contacts are NOT valid.

##### Requirements:

WBC — One confirmed contact is required from each of the 5 continents, with North and South America being counted as one continent.

BCRTA — Confirmed contacts are required with 50 of the call areas on the list.

CDXC — Confirmed contacts are required with 50 of the listed call areas on the 14 MHz band and with 50 call areas on any or all of the amateur bands with the exception of 14 MHz. The call areas on the "other bands" do not have to be the same as the call areas on the 14 MHz band. For members of RSGB only a label badge is available with CDXC for a fee of 35p but this is not obligatory.

CCRA — Confirmations are required from 50 of the call areas on the list.

Would all correspondents please include a SASE. ■

## COMMERCIAL KINKS

Ron Fisher, VK3OM  
3 Fairview Ave.,  
Glen Waverley, 3150

This month a look at three different pieces of equipment, the FT75B, our old friend the FT200 and a new one, the Realistic AX/SX190.

A letter from a reader of this column prompted a look at the AX190, and as many of these sets have recently come on to the market at half the normal retail price it seems certain that many amateurs would have purchased one as a spare receiver for the shack. For those who are not familiar with the receiver, a short description might be in order. The AX190

is an amateur band receiver covering the 80 to 10 metre bands plus the 15 MHz and 27 MHz bands in 500 kHz segments. They are of very attractive design and employ VFO tuning that has linear calibrations over the 500 kHz range in one kHz steps. Additional features include 25 and 100 kHz calibrator and a Q-Multiplier. Provision is made for the reception of USB or LSB with a crystal controlled BFO as well as AM with or without a noise limiter. The SX190, which incidentally has not been available at the half price rate, is identical except that the coverage includes several of the popular short wave broadcast bands in place of the 15 and 10 metre amateur bands. For those who would like to know more about these receivers, a complete review appeared in the May 1972 issue of CQ Magazine.

Well, so far so good, they appear to offer everything that is needed. However a few problems arise. Sideband reception is far from satisfactory due to several factors. Firstly the product detector produces a high degree of distortion and then the AGC action is too fast. Next in line is that only one degree of selectivity is provided which of course must be a compromise for both SSB and AM. With the 4 kHz band pass, unwanted sideband rejection is almost non-existent, and unfortunately the rather poor Q-Multiplier does little to help. On the credit side, stability, sensitivity and calibration are first rate. So far as the problems are concerned, I will be looking into some of them over the next few weeks and if all goes well should have something for you in the next months issue. I would of course be pleased to hear from readers who have delved into the works themselves.

#### NOW ON TO THE FT75B

Ian Berwick VK3ALZ has provided the following information to increase the drive on SSB with this unit.

The drive on my unit was inadequate on 80 and 40 metres. When all exciter coils were peaked up on one frequency, drive at that point was OK, but fell away rapidly elsewhere on that band. On 20 metres and above, drive was OK for about half the width of the band.

To increase drive proceed as follows:

(a) Disconnect D305 from the terminal labelled TX-RX. Leave the other end of D305 connected to the board.

(b) Extend the pigtail of D305 by soldering on a piece of wire one inch long. This is then soldered to the terminal adjacent to terminal labelled BM out. This unlabeled terminal in fact connects to the hot side of L201 secondary.

Now listen with a monitor and with the FT75B connected to a dummy load, adjust VR202 (carrier balance) for minimum carrier.

Drive should now be more than adequate on all bands.

#### IMPROVED AUDIO FOR THE FT200

The received audio of the FT200 has always been the subject of some criticism. Laurie Middleton VK3AW has come up with a simple modification to improve the product detector linearity.

Four new components are needed, 1 220K, 1 270 ohm, 1 10K and 1 560K ohm all ½ watt carbon resistors.

Now proceed as follows. Unsolder and remove R110 (100K) and replace it with a 220K ohm resistor. Unsolder and remove L106 from the cathode of V102a the product detector and replace it with a 270 ohm resistor. Unsolder and remove R112 (100K) and replace it with a 10K ohm resistor. Finally connect a 560K ohm resistor between pin 7 of V102 (product detector) and the junction of R126, R127 and R128. The modification is now complete.

Laurie also adds that the audio of the FT200 can be further improved by replacing the original speaker in the power supply unit with a Rola Plessey 3 x 5, 8 ohm unit. ■

## NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

#### MILITARY SURPLUS VALVES — what valve is that?

Often, the newcomer to the hobby becomes the recipient of a 'mystery bag' of components etc., can't wait to get them home to see exactly what the new acquisition is composed of, only to be confronted with components such as valves which bear military markings only, and because the newcomer has no access to the further identification of such markings, the components are put aside to gather dust.

In actual fact, if the newcomer had the supplementary information required, no doubt a lot of the valves could be put to good use in various projects.

Here then is a list of some of these valves which crop up from time to time, but for comprehensive coverage of this subject, the reader is referred to the publication "Military Surplus Valves and their equivalents" by Babani. VK5 HP.

#### Military

Notation	Equivalents
CV 138	Z77, EF91, 6AM6, M8083
CV 2103	DF73
CV 491	ECC83, 12AXT
CV 372	3C45
CV 4009	5749, 5BA6W
CV 850	EF95, 6AK5
CV 136	N77, EL91, 6AM5, 8082
CV 138	Z77, EF91, 6AM6, M8083
CV 4018	PL5727, M8204
CV 4014	M8083
CV 4031	M8081
CV 4024	6201, ECC81, 12AT7WA
CV 455	ECC81, 12AT7
CV 4031	M8081
CV 493	EZ90, 6X4
CV 858	6J6, ECC91
CV 2127	EL821, 6CH6
CV 2103	DF73
CV 492	ECC83, 12AX7
CV 133	6C4, EC90
CV 4003	M8136, 6189, 12AU7A
CV 1136	EF54
CV 4025	5726, E91AA, M8079
CV 4004	M8137

# Latest addition to the YAESU line — 2 METRE ADVANCED TECHNOLOGY

## FT-221R

inc. mic.,  
AC & DC  
power cable  
and Acc plugs

**SPECIAL**

**PRICE \$569**

### FEATURES

#### Operates All Modes

The FT-221R features all mode operation, SSB (LSB, USB), CW, FM, and AM.

#### Plug-in Modules

Yaesu engineering overcame and succeeded in its toughest assignment adopting plug-in modules for VHF. It permits orderly arrangement of the circuit boards, simplified service and alignment, while assuring unsurpassed stability.

#### All Solid-State Transceiver

Guarantees trouble-free operation. All circuits are fully transistorized with IC's and FET's for increased reliability. Instant operation immediately after power on provides tremendous convenience for mobile operation with minimum power consumption.

#### Excellent Crossmodulation and Intermodulation Characteristics

The double tuning system, employing varactor diodes in the front-end, provides optimum selectivity and improved crossmodulation characteristics needed in today's active 2 meter band.

#### Rugged Power Stage

The newly developed 2N5591 or equivalent power transistor exhibits extremely high linearity and power dissipation (70W) delivering super stable power output on all modes, under any condition.

#### PLL System

The local oscillator employs the phase lock loop (PLL) with its fundamental oscillating in the 130MHz range, which eliminates spurious radiation and guarantees clean signal output. In reception, the PLL rejects all unwanted interferences.

#### Dual Tuning Mechanism

The FT-221R is equipped with a precision built dual vernier mechanism consisting of one control that provides bandspread tuning over a 16kHz segment of the band per turn, and the other provides tuning over a 100kHz segment per turn.

This assures precise tuning as well as fast tuning as needed for quick QSY.

#### 88 Fixed Channel

In mobile operation, fixed crystal controlled channel may be preferred. The FT-221R accepts total of 11 crystals, 11 channel per band segment over 4MHz bandwidth.

#### Versatile Clarifier Control

The clarifier control is capable of varying either receive frequency only or both receive and transmit frequencies simultaneously allowing 4kHz on either side of the frequency. This provides for great flexibility in "NET" operation.

#### FM Center-meter

The meter functions as an S meter in receive mode as well as a relative power output meter in the transmit mode. It also functions as a zero center indicator for FM discriminator on receive. This allows perfect tuning of the receive station.

#### Built-in 100kHz Calibrator

The 100kHz marker assures calibration of the tuning scale for the most accurate frequency readout.

#### AC/DC Capability

The FT-221R can be operated on AC or a 13.5V DC car or boat battery supply simply by inserting the proper power plug to the power receptacle on the rear panel.

#### Compact and Wide Versatility

The FT-221R is a precision built, compact, high performance "feature-packed" transceiver offering Noise Blanker (SSB, CW, AM), Squelch (FM), Sidetone, Break-in CW and VOX for discerning 2 meter enthusiasts.

#### Repeater Offset Capability

Repeater operation is possible in the 146MHz and 147MHz bands. The repeater frequency is shifted,  $\pm 600$ kHz or an optional shift frequency at Normal and Reverse positions of the repeater switch.

### TECHNICAL DATA

#### GENERAL

##### Frequency Range

144.0 ~ 144.5 MHz 146.0 ~ 146.5 MHz  
144.5 ~ 145.0 MHz 146.5 ~ 147.0 MHz  
145.0 ~ 145.5 MHz 147.0 ~ 147.5 MHz  
145.5 ~ 146.0 MHz 147.5 ~ 148.0 MHz

##### Frequency Readout

Better than 1 kHz

##### Emission

SSB (LSB or USB selectable),  
AM, FM and CW.

##### Power output

SSB 12 Watts PEP  
FM, CW 14 Watts  
AM 2.5 Watts

##### Frequency Stability

Within 100 Hz during any 30 minute  
period after warm up.  
Not more than 20 Hz with a 10%  
line voltage variation.

##### Antenna Impedance

50 ohms unbalanced

##### Repeater Split

600 kHz and any frequency up to 1 MHz

##### Power Requirement

AC 100/110/117/200/220/234 volts  
50/60 Hz

DC +12 ~ 14.5 Volts, negative ground

##### Power Consumption

AC Receive 30VA  
Transmit 90VA at 10 watts output  
DC Receive 0.6A  
Transmit 3A at 10 watts output

##### Size

280(W) x 125(H) x 295(D) m/m

##### Weight

Approx. 8.5 kg

#### RECEIVER

##### Sensitivity

SSB/CW 0.5  $\mu$ V for 10 dB S/N  
FM 0.75  $\mu$ V for 20 dB OS  
AM 1.0  $\mu$ V for 10 dB S/N

##### Selectivity

SSB/CW/AM 2.4 kHz at 6 dB  
4.1 kHz at 60 dB  
FM  $\pm 6$  kHz at 6 dB  
 $\pm 12$  kHz at 60 dB

##### Spurious Response

Better than 1  $\mu$ V at antenna input

##### Speaker Impedance

4 ohms

##### Audio Output

2 Watts at 10% distortion

#### TRANSMITTER

##### Audio Response

300 ~ 2700 Hz  $\pm 3$  dB

##### Carrier Suppression

40 dB or better

##### Unwanted Sideband Suppression

40 dB or better at 1 kHz

##### Spurious Radiation

Down 60 dB or better

##### FM Deviation

Maximum 12 kHz: Factory set at  $\pm 5$  kHz

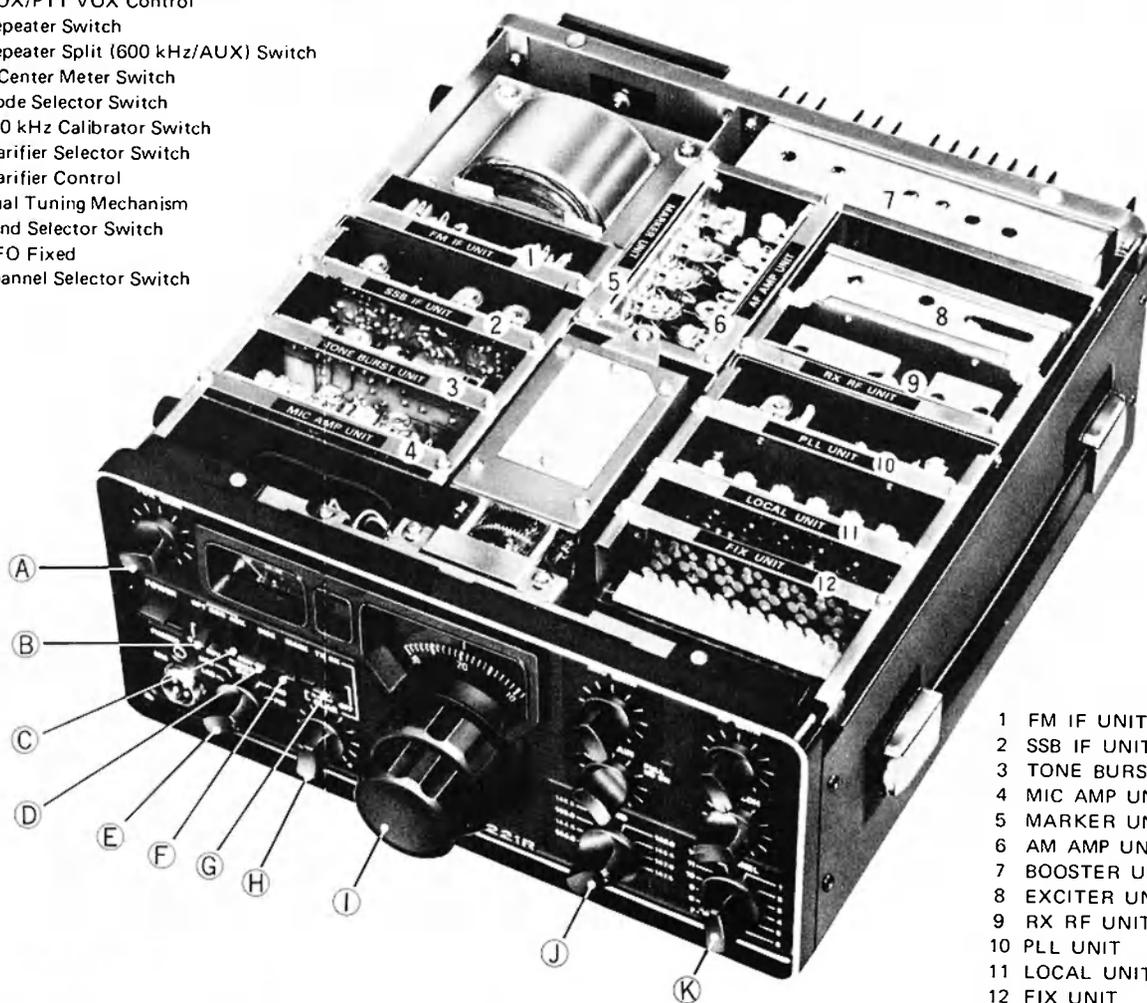
Repeater crystal provided.

# LL MODE TRANSCEIVER WITH PHASE LOCK LOOP (PLL)

— from Yaesu Musen Co. of Japan

Here is a compact, versatile transceiver designed for the active 2 metre enthusiast. The FT-221R features all mode operation — SSB/FM/CW/AM — with repeater offset capability. Advanced phase lock loop circuitry offers unsurpassed stability and clean spurious free signals. Modular, computer type construction offers reliability and ease of service. Pre-set pass band tuning provides the optimum selectivity and performance needed on today's active 2 metre band. Join the fun on FM, DX, or OSCAR, with the FT-221R transceiver. Another winner from the world's leader in amateur communications equipment.

- A MOX/PTT VOX Control
- B Repeater Switch
- C Repeater Split (600 kHz/AUX) Switch
- D S/Center Meter Switch
- E Mode Selector Switch
- F 100 kHz Calibrator Switch
- G Clarifier Selector Switch
- H Clarifier Control
- I Dual Tuning Mechanism
- J Band Selector Switch
- K VFO Fixed Channel Selector Switch



- 1 FM IF UNIT
- 2 SSB IF UNIT
- 3 TONE BURST UNIT
- 4 MIC AMP UNIT
- 5 MARKER UNIT
- 6 AM AMP UNIT
- 7 BOOSTER UNIT
- 8 EXCITER UNIT
- 9 RX RF UNIT
- 10 PLL UNIT
- 11 LOCAL UNIT
- 12 FIX UNIT

All prices include S.T. Freight extra. Prices and specifications subject to change.

**90 DAY WARRANTY**

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Radio amateur equipment from B.E.S. also sold by:—

W.A.	Radio Communication Services H. R. PRIDE, 26 Lockhart St., Como, 6152	Ph. 60 4379
S.A.	FARMERS RADIO PTY. LTD., 20 Stanley St., Plympton, 5038	Ph. 293 2155
TAS.	G. T. ELECTRONICS, 131 Westbury Rd., South Launceston, 7200	Ph. 44 4773
N.S.W.	Aviation Tooling, STEPHEN KUHL, 104 Robey St., Mascot, 2020	Ph. 667 1650 AH 371 5445
	Amateur & Novice Comm. Supplies, W. E. BRODIE, 23 Dalray Street, Seven Hills, 2147	Ph. 624 2691
	DIGITRONICS, 186 Parry St., Newcastle West, 2302	Ph. 69 2040
QLD.	H. C. BARLOW, 92 Charles St., Aitkenvale, Townsville, 4814	Ph. 79 8179
	MITCHELL RADIO CO., 59 Albion Rd., Albion, 4010.	Ph. 57 6830
A.C.T.	QUICKTRONIC, Jim Bland, Shop 11, Altree Crt., Phillip, 2606.	Ph. 81 2824, 82 2864

# PROJECT AUSTRALIS

David Hull, VK3ZDH

Effective 1 October, 1976, all AO-7 mode B orbits which fall on GMT Mondays will be designated as QRP orbits as was done during mid June, 1976. The success of the three day QRP test has prompted these extra QRP orbits and it is hoped that users of the AMSAT-OSCAR 7 mode B transponder will reduce their signals to the recommended TEN WATTS effective radiated power during these orbits. The use of lower power is also highly recommended during other AMSAT-OSCAR satellite passes because of the beneficial effect it has on the battery. As AO-7 grows older its battery is deteriorating, and this deterioration is accelerated by users running higher power than is being recommended by AMSAT, that is 100 watts effective radiated power. This 100 watts ERP MAXIMUM is enough power to produce very readable signals from horizon to horizon with a small antenna and the average 144 MHz receiving setup. If mode B users can not hear their 100 watt ERP signal at all times during a pass of AO-7 they should look at their receiving system and should NOT raise their power in order to hear themselves. With co-operation from all users the AMSAT-OSCAR 7 communication satellite will provide service for the worldwide radio amateur community for years to come.

## DECEMBER 1976 OSCAR 6

OSCAR 6			OSCAR 7		
Date	Orbit No.	Time Long Z °W	Date	Orbit No.	Time Long °W
1	18876	01.46 84.70	1	9350	00.35 58.69
2	18888	00.46 69.70	2	9363	01.29 72.31
3	18901	01.41 83.45	3	9375	00.28 57.19
4	18913	00.40 68.45	4	9388	01.23 70.81
5	18926	01.35 82.20	5	9400	00.22 55.69
6	18938	00.35 67.20	6	9413	01.16 69.31
7	18951	01.30 80.95	7	9425	00.16 54.19
8	18963	00.30 65.95	8	9438	01.10 67.81
9	18976	01.25 79.70	9	9450	00.09 52.69
10	18988	00.25 64.70	10	9463	01.03 66.31
11	19001	01.20 78.45	11	9475	00.03 51.19
12	19013	00.20 63.45	12	9488	00.57 64.81
13	19026	01.15 77.20	13	9501	01.51 78.43
14	19038	00.15 62.20	14	9513	00.51 63.31
15	19051	01.10 75.95	15	9526	01.45 76.93
16	19063	00.10 60.95	16	9538	00.44 61.81
17	19076	01.05 74.70	17	9551	01.39 75.43
18	19088	00.04 59.70	18	9563	00.38 60.31
19	19101	00.59 73.45	19	9576	01.32 73.93
20	19114	01.54 87.20	20	9588	00.31 58.81
21	19126	00.54 72.20	21	9601	01.26 72.43
22	19139	01.49 85.95	22	9613	00.25 57.31
23	19151	00.49 70.95	23	9626	01.19 70.93
24	19164	01.44 84.70	24	9638	00.19 55.81
25	19176	00.44 69.70	25	9651	01.13 69.43
26	19189	01.39 83.45	26	9663	00.12 54.31
27	19201	00.39 68.45	27	9676	01.07 67.93
28	19214	01.34 82.20	28	9688	00.06 52.81
29	19226	00.34 67.20	29	9701	01.00 66.43
30	19239	01.29 80.95	30	9714	01.54 80.05
31	19251	00.28 65.95	31	9726	00.54 64.93

## LOCAL MODE B NOTES

(With grateful thanks to VK3ZBB)  
After a protracted break I returned to Melbourne to find activity on Oscar 7 Mode B continuing with additional stations on the air.

The following new calls have been heard to date (12 September):  
VK1BH, VK3YJ, VK4XQ, VK5EU, ZL4JW, ZL1TAB, ZL1TNS, AA6STC/KG6.  
Capt AA6SIC is in Guam and puts a good signal into Oscar for the last 5 minutes of suitable orbits around AN190. He has worked most VK stations which have been active at the appropriate time.

Whilst in Hong Kong, I spoke with Malcolm VS6HI. He complains that too many VKs call CQ Oscar without a listening break — with a 2 minute opening, calls must be very brief! Malcolm has heard VK7s on both modes A and B and is looking forward to a contact with them.

Barry ZL3AR is at present in Raratonga with Stewart ZL1AA and is hoping to get him operating on 70 cm — we look forward to a new country before long.

Thanks again, Bob. Would anyone care to do a similar job to Bob's for Oscar 6 and 7 mode A. Bi- or tri-monthly would be appreciated. Please contact me. ■

# REPEATERS

Ken Jewell, VK3ZNJ  
Peter Mill, VK3ZPP

Since the 70cm band plan was finalised, the interest is hotting up. The primary and secondary repeater channels are or will be in use in NSW and Vic. by Christmas.

Most States appear to have their own different simplex channel. Is there any activity on the primary simplex channel 439 MHz? This information would be of use to interstate travellers.

## FEDERAL NEWS

George Francis VK3HV has been asked by FRC to co-ordinate the compiling of an Australian Repeater Directory for publication. All information for George should be sent c/- the Federal Office to save postage.

## ACT:

The second repeater for VK1 has been granted a

## NSW REPEATERS

CALLSIGN	Ch.	LOCATION OR SERVICE AREA	TYPE OF IDENT.	RANGE	PROJECT OFF.
VK2RAO	42	Orange/Mt. Canobolas	Verbal	160 km	VK2ZKN
VK2BDR	42	Port Macquarie/Transit Hill	—	65 km	VK2ZHE
VK2RAG	43	Gosford/Central Coast	MCW	60 km	VK2ZRQ
VK2RWG	43	Wagga/Mt. Flakenny	MCW	85 km	VK2ZSW
VK2RLE	44	St. George/Sydney	MCW	—	VK2ZSA
—	44	Lismore	—	—	—
VK2AMW	45	Wollongong/Illawarra Area	MCW	120 km	VK2AGV
VK2RAN	46	Newcastle/Lower Hunter River	—	140 km	—
VK2RBV	46	Waverley/Sydney	MCW	100 km	VK2ZBX
VK2RAS	46	Dural/Sydney	MCW	80 km	VK2ZIM

## ACT REPEATERS

VK1RAC	46	Canberra/Mt. Majura	MCW	100 km	VK1EP
VK1RGI	47	Canberra Area/Mt. Ginini	MCW	—	—

# LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,  
Dear Sir,

I feel I owe an explanation to the many stations I normally enjoy a contact with in the Remembrance Day contest. I am sorry I missed you this year but I decided to make a protest to draw attention to the plight of country stations participating in this contest under the present rules.

The RD is my favourite contest and I have participated as long as I can remember. Records will show my score has always been near the top.

As I pointed out to the Contest Committee last year the new rules 5c, and 5d, are discriminatory against both country stations and stations in the smaller ham States. Rule 5e was bad enough, but I thought it a good idea to get the VHF boys in to the contest; with the increase in VHF operation, and especially the widespread use of nets, the continuation under these rules makes it something else.

It would be stupid of me to complain about offering some suggestions. Therefore I propose the complete elimination of rules 5c, and 5d, and a new section to include novice operators and those unrestricted licencees who wish to work VHF only, this of course as a substitution for rule 5e.

One final thing. I'll be back next year whether the rules are fair or not. If nobody backs me up the RD is too important to miss, and I'll have to accept the fact that I am a voice in the wilderness.

Yours sincerely,  
Brian J. Warman VK5BI. ■

Dear Sir,

My 2-metre rig when purchased, contained ten Simplex channels which, when jiggled around, produced channels 40 and 50, repeaters 1, 2, 3, 4 and 6. I also had half of channel 5. From the remaining crystals I could produce four anti-repeater channels and a couple of obscure simplex channels. (Note: I have no complaint about my rig or the supply of crystals with it).

licence. It will be sited on Mt. Ginini using Ch 7. NSW:

From Sid Ward VK2SW, details of the Wagga repeater VK2RWG: It is on Ch. 3 and located at a DCA repeater site on Mt. Flakenny, 10 miles south-east of Wagga. The equipment is basically a Phillips — TCA 1677 hybrid base. Power output after the cavity is 25 watts. The aerials are gamma fed half-wave dipoles with 15 feet separation on the side of the tower. The average mobile coverage is 50 miles in most directions, and the Wagga group extends a cordial invitation to all mobileers in the area to drop in on Ch. 3 Wagga.

## VICTORIA

The Albury/Wodonga N-E Victorian repeater site on Mt. Big Ben has been completed. The equipment has already been tested in Wangaratta, 50 mobileers in the area keep an ear on Ch. 8.

The Tx of the Mt. Macedon Repeater (Ch. 5) has been tested on site, and there is no interference to existing equipment. A licence has been granted to a group in Melbourne to operate an experimental repeater VK3RAD, at Doncaster, using the primary channel 433.525/438.525. The mobile service repeater for Melbourne on Mt. Dandenong (Olinda) will use one of the secondary channels 433.675/438.675.

At this stage I see no use for the anti-repeater channels and have yet to find anyone to talk to on the obscure channels.

This leaves me with a box of ten crystals in my desk drawer.

Based on my own experience, and, after asking around the contacts on 2 metres and HF bands, I find many other amateurs in exactly the same state — furthermore, they are willing to donate their spare crystals to a central bureau.

It was this response plus the willing help of my many contacts that helped me formulate a few proposed guidelines for such a bureau.

- Crystals donated to the bank would be sorted in types and frequencies and recorded.
- Popular types (for Multi-7, IC 22A etc.) would be listed separately and advertised in "Hamads" at frequent times.
- Special sets of channels for use in ZL or VK would be set aside for hire by amateurs visiting these countries.
- Stations donating crystals and not requiring any in return could be given a credit note on a basis of two for one of the same type for future use.
- Straight exchange — one for one plus postage.
- Purchases — say two dollars plus (or including postage).
- Bulk-Buying — to supply cheaper crystals for new or changed channels (quite a saving is envisaged here).
- Novices would be specially catered for as would the rapidly growing suburban clubs.
- Any small profit made after expenses of postage and packing could be donated to State or Federal WIA.

The above are really first thoughts on the subject. However, if the idea is considered worthy of further investigation, either on a State or Federal level, I would be willing to start such a bureau and build it into a potentially valuable asset to our hobby.

Yours sincerely,  
Les Kinch VK2BBD,  
128A Booralie Road,  
Duffys Forest, 2084,  
Phone 450-2026, Home. ■

Dear Sir,

**WHAT'S WRONG WITH EXAMS?**

With one lot of exam results being distributed, and whilst on the eve of the August AOCPE exam, one reads and hears much about the exam system, individual questions and, of course, the method of marking and result notifying. We read and hear too, how all the knowledgeable (?) people among us, suggest we hand over the exams to this institution or that institution, BUT, I wonder how many of us REALLY know the significance and importance of exams, and with this in mind, allow me to help you look at some objective investigations into the exam system:

1. The following people have scored zero marks for some examinations, and were overall school failures:

Albert Einstein, Winston Churchill, L. Tolstoy, Robert Clive, Emile Zola, Thomas Edison, Verdi, Gauguin, Col. Nasser, Napoleon Bonaparte.

2. A decade or so ago, ten completed exam papers of a trial Leaving Certificate paper were duplicated with ALL errors intact, and six experienced teachers were asked to mark them.

Each of these markers had been teaching the subject concerned, History, for that entire year.

What were the results? Not two rankings of the papers were marked the same. One marker failed 2 students, four markers failed 3, and another failed 6. The teacher who had marked the papers originally had failed only 1.

Too small a number of cases? . . . Too insignificant to be worthwhile? . . . Perhaps this is so.

Let us then look at a more comprehensive study: At Sydney University, between 1943 and 1947, an investigation was carried out concerning the value of the essay type answer and its reliability;

and we must remember that the AOCPE examination still requires answers of this type.

The procedure was as follows: 30 students' essays were printed out and submitted to 450 markers, teachers and undergraduates, who were asked to rank them in order of merit. The essays were considered to cover quite a range from very poor to excellent.

Here briefly, are some of the results:

20 of the 30 essays received ratings of both FIRST and LAST, the smallest range of any essay was first and twentyseventh.

One particularly poor piece of work which was rated absolutely last by 164 Judges, still received a number of high ratings including one "BEST". On the other hand, one particularly good effort, rated first by 200 markers, still rated poorly by some markers, including some "SECOND LASTS".

BUT WORSE IS TO COME . . .

Some months later, the same markers were asked to rank the same essays again.

The second ratings might well have been done by a different race of people; in fact, four of the essays that were placed last on the first occasion, were now placed first by the same assessors.

4. In 1951, in the USA, a Geography paper was set for 116 schools, and the results ranged from 20 per cent to 92 per cent.

In 1962, the same worked papers were marked by six examiners. The first examiner sensibly wrote out a model paper with all the correct answers, but accidentally left it in with the students' work. The other five examiners did not recognise it as such, and awarded it marks ranging from FORTY to NINETY per cent!

5. When one thinks of remarking, one cannot help wondering what would our results be if we always marked our papers again. Such subjectivity in

marking, led to the evolution of the so-called "objective test", in which answers are given usually in one word.

Perhaps you are familiar with the "multiple choice" and "true/false" type of test currently in widespread use (compare with the Novice AOCPE).

This certainly removes subjective assessment and makes a computation easier, but if allowed to become another form of "pressure" examination, or the end of education, it is perhaps even more damaging than the other form, for it must surely be destructive of initiative creativity, and the satisfaction and worth of learning at depth.

Further to this, as recently as a year ago, one prominent radio company in Australia used a "multiple choice" type paper in its Personnel department, for the purpose of being able to rapidly assess the prospective employee's standard of electronic knowledge. Some bright executive within decided to assess the ASSESSING paper, and arranged for the typist to answer the questions with the relevant tick or cross. This she did, un-schooled and under examination conditions, and merely by random answer selection, she managed 63 per cent.

6. To summarise: all types of examinations have value. It is the manner in which they are used in so many quarters that they become highly questionable.

Many methods should be used in evaluation, but without pressure, without threat, and continuously through any course of study. The wider the variety the better . . . oral and written questions, observation discussion and for the purposes of any AOCPE examination, surely a PRACTICAL exam, have their place.

David S. Down VK5HP.

**IONOSPHERIC PREDICTIONS**

Len Poynter, VK3ZGP

Having recently gained access to some of the HF bands with a "N" call, was able to take a closer look at the conditions prevailing prior to, and following a geomagnetic storm.

IPS had issued a warning for Sept. 18 and my own charts showed a possible recurring storm around that date, so a closer look was taken from the 17th onwards.

Around 0300Z on 18th, ZLs on 7 MHz were reporting auroral type signals indicating to them a disturbance. Local VK K figures show the disturbance commencing between 03-0600 GMT whilst VK6 put the time at 0400Z. The first noticeable effect was not felt until the 20th when IPS reported the A index as 40.

Detailed K reading up to 19th Sept. (latest available at the time of writing) were:

Time (GMT) 0-3 3-6 6-9 9-12 12-15 15-18 18-21 21-24  
 date  
 18/9 2 4 4 6 5 2 1 2 A-28  
 19/9 2 2 2 4 5 4 5 3 A-26  
 from Mundaring WA with commencement at 0400Z 18/9. This was the strongest I have recorded since last May.

The sunspot-running smoothed is still on the decline.

Figures for 1975 now read: 1/75 — 23; 2/75 — 22; 3/75 — 21; 4/75 — 19; 5/75 — 17; 6/75 — 16; 7/75 — 15; 8/75 — 14; 9/75 — 14; 10/75 — 16; 12/75 — 17; and 1/76 — 16.

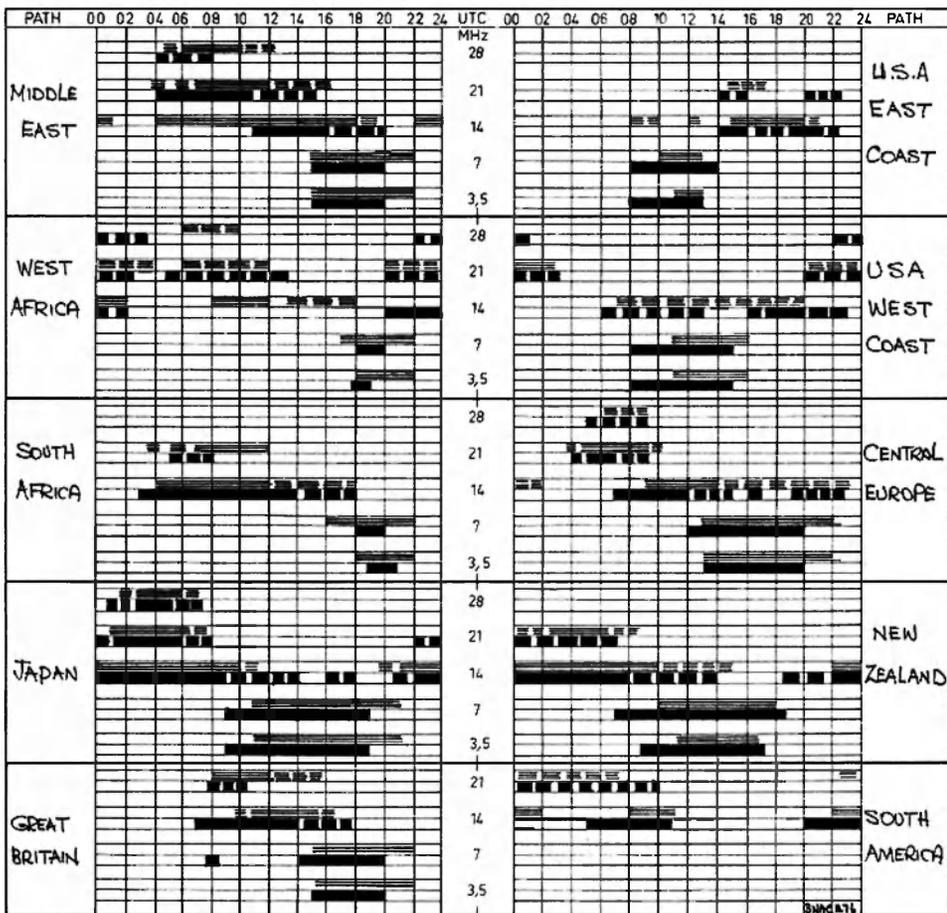
Monthly means for 1976 read: Jan. — 8.5; Feb. — 4.6; Mar. — 23; Apr. — 19.5; May — 12.7; Jun. — 12.4; Jul. — 2.1.

Of the 213 days for 1976, 76 produced no visible spots. The highest daily count was 51 on 19 and 20/3/76.

The latest projected running smoothed numbers: November 4, December 3, January 1977 3. If these numbers are to fall, the only conclusion is that of very low monthly means to at least the middle of 1977.

Since Cycle 20 began in October 1964 it reached its peak in November 1968, 4.1 years and it is still declining after 8 years. So its period will be in excess of 12 years, longer than the average 11.1 years.

It looks like communication satellites for the next 40 years if the experts are correct.



**LEGEND**

FROM WESTERN AUSTRALIA.  
 FROM EASTERN AUSTRALIA

BETTER THAN 50% OF THE MONTH, BUT NOT EVERYDAY  
 LESS THAN 50% OF THE MONTH

PREDICTIONS COURTESY IPS SYDNEY

ALL TIMES UNIVERSAL UTC (GMT)

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**PETER SCHULZ, VK2ZXL.**

# ROSS HULL VHF/UHF MEMORIAL CONTEST

## RULES 1976-77

The Wireless Institute of Australia invites Amateurs and Short Wave Listeners to join in this annual contest which is held to perpetuate the memory of Ross Hull, who did so much to further VHF/UHF.

A Perpetual Trophy is awarded annually for competition between members of the Wireless Institute of Australia and is inscribed with some details of the man the contest honours.

The name of the winning member of the Wireless Institute of Australia for each year is inscribed upon the trophy and that member also receives a suitably inscribed certificate.

**Objects:** Amateurs from Australia and Territories will endeavour to contact as many other Amateurs as possible under the following conditions:

**Date of Contest:** 11th December 1976, 0001 GMT to 16th January 1977 2400 GMT.

**Duration:** Any seven calendar days within the dates mentioned above which need not be consecutive. These periods are at the operators' convenience. A calendar day is from 0001 GMT (1001 EAST) to 2400 GMT (1000 EAST).

### RULES

1. There are two Divisions, one of 48 hours duration and the other of seven days duration. In the seven day division there are four sections:

- (a) Transmitting Open
- (b) Transmitting Phone
- (c) Transmitting CW
- (d) Receiving Open

An open log is one where points are claimed for more than one mode, i.e. Phone, CW, RTTY, ATV, SSTV. (AM, FM and SSB are grouped together as Phone).

In the 48 hour division, the best score over any consecutive 48 hour period is the winner.

In the seven day division the best score over any seven days of the contest is the winner.

2. Any Amateur operating fixed, mobile, or portable within the terms of his licence may participate.

3. All Amateur VHF/UHF bands may be used, but crossband contacts are not acceptable. At any one time, single frequency operating only is permitted. Cross mode contacts are permitted.

4. Amateurs may enter for any one of the sections and either or both divisions. The seven day winner is not eligible for the 48 hour award.

5. Two contacts per band per day, irrespective of mode are permitted provided that at least two hours elapse from the previous contact with that station on that band.

6. Logs from a multi operator station are not acceptable. One operator only may operate a station at any one time, and must submit a log for his own operation.

7. Entrants must operate within the terms of their licences.

8. The exchange of RS or RST reports with a serial number starting at 001 and advancing by one for each successive contact, will be proof of contact.

9. Entries should be set out on Quarto sheets, using one side of the paper only, and must be forwarded to reach the Federal Contest Manager, Wireless Institute of Australia, Box 67, East Melbourne, 3002, in time for the last opening of logs on Friday 18th February. Envelopes should be clearly marked Ross Hull Contest. Early logs will be appreciated.

10. Scoring will be based on the following table:  
All bands — Contacts within own call area — 2 points  
All bands — Contacts with other call areas — 10 points

**Bonus Points:** Each new call area contacted, 50 points, once only per band per day (including own call area). In addition, 1 point per valid contact made during the contest to be added to the final seven day score.

Operation via active repeaters or translators is not permitted for scoring purposes.

11. Logs should be set out as in the example and must carry a front sheet showing the following information:

Name  
Address

Section  
Call sign  
Claimed 7 day score  
Operating dates  
Highest 48 hour score  
Operating period  
Declaration—I hereby certify that I have operated in accordance with the rules and spirit of the contest.

Comments.

12. All times to be logged in GMT only.  
13. Certificates will be awarded to contestants who break any VHF/UHF record during the contest.

The VK contestant who returns the highest score in the transmitting section and who is a member of the WIA will have his name inscribed on the trophy which will be held by his Division for the prescribed period.

A certificate will be awarded to the operator with the highest 48 hour score.

### RECEIVING SECTION

1. Short Wave Listeners only may enter for this section.

### EXAMPLE OF A VK3 TRANSMITTING LOG

Date/Time	Band	MHz	Emission	Call sign	RST Sent	RST Received	Points	Bonus
GMT								
Dec 19	52		SSB	VK4DT	59001	58037	10	50
0207	52		CW	VK4XA	569002	579012	10	—
0212	144		SSB	VK7ZAH	58003	58026	10	50
0216	144		SSB	VK3ZBB	59004	59042	2	50
0327	432		FM	VK3AAU	56005	56018	2	50

### EXAMPLE OF A VK6 SWL RECEIVING LOG

Date/Time	Band	MHz	Call Heard	RST Sent	Station called	Points	Bonus
GMT							
Jan 2							
1146	52		VK5ZYG	56087	VK8OK	10	50
1207	52		VK2ZDD	56244	VK6DB	10	50
1400	432		VK6JX	57061	VK6TG	2	50
1815	144		VK5RF	47004	VK6ZDO	10	50
2309	52		VK2ZAY	56143	VK6XY	10	—

## CONTESTS

Kevin Phillips, VK3AAU

Box 67, East Melbourne, 3002

### CONTEST CALENDAR

Nov 8/7	RSGB 7 MHz Phone
9/10	YLRL Anniv. Phone
13/14	Delaware QSO Party
13/14	Missouri QSO Party
13/14	European RTTY Contest
20/21	Austrian 160 Contest
27/28	CQ WW DX CW

Dec. 11/

Jan 16 Ross Hull VHF Memorial

### REMEMBRANCE DAY CONTEST

I have not finished compiling the list of placings as yet, so the results will not appear until next month. At the time of writing about 840 logs have been received, quite a few with comments both in favour and against the present rules. Comments generally favour a change to the whole structure of the rules to even up the chances of all Divisions of winning. Many operators found the contest friendly though. I will comment further after all the logs have been processed. Thanks to all who participated and sent in logs.

### ROSS HULL VHF/UHF MEMORIAL

There have been a few changes to the rules for this year's contest and comments would be appreciated on them. The biggest change is to the scoring, which was fairly time consuming and complicated.

The old scoring table has been replaced with a much simpler scoring system, where your own call area counts 2 points and other call areas count 10 points.

Bonus points are awarded for each new call area worked on each band each day. One point

2. Contest times and logging of stations will be the same as the transmitting section except that there will not be a 48 hour Division.

3. Logs must show the call sign of the calling station, the serial number given, and only the call sign of the other station. Scoring will be as for transmitting stations.

4. Any scoring contacts may be logged. There is no limit to the number of times that a station may be logged provided that serial numbers are given.

5. The logs for any seven days may be submitted and the winner of the section will be the highest scorer.

6. Certificates will be awarded to the highest scorer in the contest, and if sufficient interest is shown, to state winners.

7. A certificate will be awarded to the club station with the highest 7 day score.

General—It is preferable that complete logs be submitted as an aid to checking, but contestants must clearly show their best 7 days or 48 hours. Enjoy yourself in another friendly contest, and try to exchange names with each contact.

per contact added to the final seven day score is to encourage activity throughout the contest.

Time will also be in GMT only, as the old system was a bit hard to work out, and not many people are on EAST at this time of year. Daylight saving is in force in most States, and anyway, GMT with EAST days is a ludicrous idea.

I hope the changes will be for the better, and will encourage greater participation. Most changes came about as a result of past comments on the contest. See you in the contest, I hope. ■

## BOOK REVIEW

### ARRL ELECTRONICS DATA BOOK

This data book is the first collection of useful data by the ARRL. The data collection is a worthy addition to the range of ARRL books. The book consists of an interesting collection of tables, nomographs, graphs, circuits and other useful information.

A great deal of data from many sources has been concentrated in this book. The volume and range of data make it a very useful addition to both the hamshack and the office bookshelf.

In a few places the American origin of the data book is evident, but the amount of USA-only data is minimal. This compares more than favourably with data collections compiled in other countries.

A well thought out and well presented collection of data. ■

## QSP

### STATISTICS AGAIN!

"Based on latest statistics available, it is estimated that there are 364 million television sets in the world, compared with 360 million telephones and 300 million automobiles and trucks". ITU Telecommunication Journal, June '76.

# INTRUDER WATCH

All Chandler, VK3LC

1536 High Street, Glen Iris, 3146

Of recent months a mysterious noise has been consistently reported occupying the 14 MHz band. It has been described as a sound like a "Vickers machine gun" and like a "slow wood pecker". No matter how it is described as, it has been identified, for it is heard world wide. A recent letter from my contemporary G3PSM says "Subject — Pulse transmission — During the past month a pulse transmission has been causing severe harmful interference in the 20 metre band, centred on 14215 MHz. This transmission has been identified as a four channel P9 (pulse) emanating from a site in the area of Poltava in the Ukraine. Emission analysis shows the pulse to be an exact square wave. As far as can be established, representations to Moscow have been made by the Federal Republic of Germany, Norway, Sweden and the United Kingdom. It is anticipated that should this transmission continue, other administrations will take the appropriate action". A VK4 observer further describes it, and I quote, "I am writing about an intruder in the 20 metre band which totally blanks out the entire band making it useless for even local communication. The signal is a popping noise somewhat like a slow wood pecker, the noise blanker has no effect. The signal strength is usually 20 to 40 dB over 9 and it is not on any one frequency". In a further letter he says "Since my letter last week about the popping noise some new information has come to hand. While reading the mail on a DJ station last night, I learned of the source of the noise. It is coming from the USSR and appears to be intentional. According to the German station, the Russians have three transmitters going, one for the low end of the band, one for the middle and the third for the top end of the band. One of these is located at Minsk. They are each transmitting a sweeping signal which traverses its range many times per second, thus causing the popping sound and that is why the noise blanker has no effect. This would also explain why the interference is worst when the band is open to Europe. He said that complaints to the USSR Government had had no effect, and that they (the German equivalent of our intruder watch) had many tapes of the interference. One action they were recommending be taken in Europe was to refuse to work any Russian Amateurs until these intruders were removed, and tell them why. I heard an OH station doing just that this past week-end.

One last bit of info, he claimed that of the 200 or so intruders in the 20 metre band 90 per cent were in Russia!

How about that, the Russians are sabotaging our bands, hi!

# MAGAZINE INDEX

Syd Clark, VK3ASC

Sometimes the unexpected happens; readers will remember that in May of 1975, Bill VK3ABP led a party on an expedition to Lake Eyre. Although that trip was successful, some aims remained to be achieved and so Bill planned to return to the lake during the August/September School holidays in 1976. Since the "law of Murphy" operates just as effectively in respect of such expeditions as in other matters a week before departure Bill found himself short of starters. A quick whip round was made and Ron VK3OM and Syd VK3ASC joined the party of fourteen who went away for fifteen eventful days filled with loads of fun, some sailing, some Amateur Radio and some problems.

Now, back to the "Magazine Index".

**BREAK-IN** July 1976

NZART Golden Jubilee Conference, Auckland 1976; The Early Days, New Zealand-U.S.A.; Wireless Telegraphy in New Zealand

**CQ MAGAZINE** April 1976

DXing from Deception Island; A New Look at Helically Loaded Antennas; 1975 CQ World Wide DX

Contest Claimed Scores; Cheap and Easy Bandspread for the SP-600-JX Receiver; A One Ounce External Oscillator for the FT-101-E; Armed Forces Day Tests; A Simple Kilowatt; The Prolonged Sunspot Minimum and its Implications with Respect to Future Sunspot Activity; Feeding Multi-band Antennas; An Early Report on USA-WPX-76.

**HAM RADIO** June 1976

Stable VFO Design; RTTY Time/Date Printout; Survey of FM Detectors; New Audio Speech Processing Technique; Improved Selectivity for Collins S-Line Receivers; Linearity Meter for SSB Amplifiers; Improved Transmitter Keying; Circuits & Techniques; Frequency Readout for Collins S-Line; Receiver Trouble Shooting; Time-Out Warning Indicator; Microprocessors.

**HAM RADIO** July 1976

Modern Design of Frequency Synthesizers; Wind Generator Characteristics and Installation Techniques; How to add an Inverted V or Delta Loop to Your Tower; Five Frequency Receiver for WWV; Shirt Pocket Transistor Tester; Integrated Circuit Base-Step Generator; Readout Display for Two-Meter Digital Synthesizers; Matching Techniques for VHF/UHF Antennas; Carrier-Operated Relay for Repeater Linking; Microcomputer Interfacing.

**QST** June 1976

Helical Resonator Design Techniques; Your Radio Signal — Short May It Wave; Linear Loaded 20 Metre Beam; Learning to Work with Integrated Circuits, Part 6; NBS — Ears for Your Ham-Band Receivers; His Eminence — The Receiver, Part 1; CER-verters; Odyssey; Joint-Effort Communications Development; Terremoto — Ayuda.

**RADIO COMMUNICATION** July 1976

Some New Insights into the Mechanism of the Sunspot Cycle; Learning About Logic; A Transistorised Slow-Scan Television Monitor; A Simple Solid-State 1.3 GHz Converter and Tripler; A 10-80m Aerial Tuning Unit; The Interference Survey.

**RADIO COMMUNICATION** August 1976

A VFO for Use with a Trio 2200G; The Suppression of Television Timebase Interference; Semi-Vertical Trap Aerial for 1.8, 3.5 and 7 MHz; Solid State BC221 Frequency Meter; Calculation of Distances from ORA Locator Codes Using the HP-25; Review of Icom IC202 Hand-Held 2m SSB Transceiver; Learning about Logic.

**SHORTWAVE MAGAZINE** May 1976

Operational Amplifiers; Some Receiver Improvements; Intelligence; Oscar, Where Art Thou?

**SHORTWAVE MAGAZINE** June 1976

The IC-202 SSB/CW Two-Metre Transceiver; How to Raise a Versatower; Simple Active Filter; Multi-Range DC Millivoltmeter; Indoor Quad for Two Metres; The Contest Power Unit; Useful Timing Circuit.

# HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

## FOR SALE

**AM Tx:** Globe Scout 65, DX-40, CW Tx: EICO 720. All complete, working to 50W, but 110V AC supply required, transistorised Rx 0.5-170 MHz, ATV home brew connector with preamp. Prices \$50 to \$25. VK3ARR, QTHR. Ph. (03) 314 6743.

**BC221**, built-in AC power supply, \$20. VK3QW, QTHR. Ph. (03) 560 6545.

**3 Bedroom Home** in Ryde (Sydney), complete with TH6DXX up 75 feet and guys forming inverted V for 80 and dipole for 40. Tilt-over system. House has huge family room (air conditioned), two toilets, lock-up accommodation for 4 cars, large workshop etc. Available early 1977. VK2ABW, QTHR. Ph. (02) 88 1101.

**UHF Base Station**, needs setting up, \$60. Teletape punches, \$5.00. Boards for solid state video, RTTY. VK3BOB, QTHR. Ph. (03) 58 7441.

# SILENT KEYS

It is with deep regret that we record the passing of —

Mr. T. W. A. HALLEY  
Mr. J. GEORGEON  
Mr. P. L. LEMPRIERE

VK4TI  
VK2AKU  
VK3ALL

**Lindenow 5/8 2 Mx Mobile Whip**, fibreglass, heavy duty, \$15.00. VK3UV, QTHR. Ph. (03) 90 6424 evenings.

**Yaesu FLDX 400 Transmitter**, in perfect order, \$250. VK3BW Portarlington, QTHR. Ph. (052) 59 2322.

**Tower** in 12' spigotted sections 18" x 18" triangular construction, climbing rungs, hot dipped galvanised, in eight sections, commercial construction, designed for up to 800' and high wind velocities, excellent condition, \$960. VK2AAK, QTHR.

**Akal XIV tape recorder**, stereo and mono, battery or power, four speeds 15/16 to 7/2, runs 16 hrs. on 5" spool at 15/16, 4 track, 4W stereo output, portable, crossfield head, \$150. VK2AAK, QTHR.

**Telecom low loss helical membrane cable**, imported, 100', 2.8 dB at 1000 MC, new, \$50; NP 108 fitting for above type N, 2 only, \$30. VK2AAK, QTHR.

**Parks Converters** 144/28 MHz, \$24; 432/28 MHz, \$50; VHF Assoc. Converter 1296/28 MHz, \$ Varactor triplers, imported 144/432 (40W input), \$, 432/1296, \$74. VK2AAK, QTHR.

**QSTs** back to 1960, practically complete, wish to sell as a set, 50c each or offer. VK2AAK, QTHR.

**VHF 2m amplifier**, 2 4X150s blown; as per ARRL Hand. 1967 p. 453, with regulated screen, bias and filament, fully metered, 3000V 500 mA, Variac controlled solid state supply. Suitable for high power 2m moon bounce. \$420. VK2AAK, QTHR.

**FT200 Transceiver**, complete with power supply, mic. and handbook, in mint condition, in original carton, very little use, all bands work well, \$375. VK2GZ, QTHR. Ph. (069) 62 3576.

**Variac**, Warburton Franki, adjustable auto transformer, 0-265V, 9A, \$30; power supply and modulator, pair 866As and pair 809s, Class B, \$30. K. Moore VK3ASM, QTHR. Ph. (03) 754 4194.

**FRDX500** 160-10m/2m/6m with FM, \$240; 50 ft. 5 section mast C/W rigging kit, \$50; 18 el. yagi, 70 cms, \$10; 8 el. 2m, \$5, 5 el. 6m, \$20; RF-1U gen., \$30; IG-18 gen., \$75; IP-28 L/V PSU, \$50; 70 cms PA 8W RF 1/P, 150W DC 1/P 4CX250B fan cooled with PSU, \$120. VK3ZFO, QTHR. Ph. (03) 718 2364.

**6 year-old Quality Textured Brick Veneer House**, on new estate, bayside suburb (Aspendale), 20 sqs., 3 beds., BIRs, ensuite, ultra modern kitchen (plenty cupboards), large lounge and dinette, huge rumpus room (4 sqs. — incorporating shack, and suitable table tennis, billiards, etc.), garage, workshop, above ground pool, high brick fence in front, courtyard, schools, shops, kinder, station, beach, all within 5 mins., quiet location — plus 42' crank up/tilt over lattice tower, 204BA, Ham "M", dipoles, ringoes — \$54,500. Enquiries VK3UV, QTHR. Ph. (03) 90 6424 evenings.

**Yaesu FT2FB FM Transceiver**, 5 ch., mobile mount, mike and handbook, \$120. Scalar Magnabase and 2m whip, \$15. 160m Table Top Linear 400W out, \$250. Lafayette HE30 communications Rx with original packing and handbook, \$50. VK5AS, QTHR.

**Linear Power Supply**, 700/1400V, 250V, 210V, reg. etc., in commercial case, plus 2x6146B linear and sundries, \$100. VK2SM, QTHR.

## WANTED

Could any amateur in the Sandringham District be able to fix up for me a Lafayette HE52 FM/AM which covers 145-175 MHz. Circuit can be supplied. Ph. (03) 598 1915 after 4.45 pm or any time weekends. Barrie Boyle L30425.

Circuits for transistorised vidicon TV cameras, suitable for ATV, Peter Williamson VK4ZPW/T, 3 Rabaul St., Soldier's Hill, Mt. Isa, 4825. Ph. (077) 43 2155, ext. 27 bus.

**Donation** or purchase of a figure "4" in 24 point Times Bold for small hand press donated to club. Please contact Townsville ARC PO Box 964, Townsville, 4810.

**DRAKE****R. L. DRAKE**

# COMMUNICATIONS GEAR

**DSR2** Digital readout communications **RECEIVER** 10 kHz-30 MHz continuous coverage, fully synthesised, for AM-USB-LSB-CW reception. **\$3495.**

**SPR4** communications **RECEIVER** for AM-USB-LSB-CW reception. Direct frequency dialling 150-500 kHz plus any 23 x 500 kHz ranges between 0.5 and 30 MHz. **\$715.**

**R4C** Amateur **RECEIVER** covers HF ham bands plus any 15 x 500 kHz ranges between 1.5 and 30 MHz except 5.0 to 6.0 MHz. **\$685.** (Transceives with T4XC.)

**SSRI** Synthesised communications **RECEIVER.** Provides continuous coverage 500 kHz to 30.0 MHz for AM-USB-LSB reception. Operates from AC Mains or internal batteries. **\$290.**

**TR4C** sideband **TRANSCEIVER** full amateur band coverage 10 through 80 metres. **\$630.**

**T4XC** sideband **TRANSMITTER** full amateur band coverage 10 through 80 metres plus 160 metres accessory crystal plus 4 fixed frequency positions. **\$630.** (Transceives with R4C.)

**MN4 and MN2000 MATCHING NETWORKS** — enable Feedline SWRs of up to 5:1 to be matched to the Transmitter. Built-in Wattmeter. MN4 handles 200 Watts. MN2000 handles 1000 Watts continuous and 2000 Watts PEP. MN4 **\$115,** MN2000 **\$230.**

**T4XC TRANSMITTER****ELMEASCO****Instruments Pty. Ltd.**

**TV — 42 — LP FILTER** for Transmitters below 30 MHz — 100 Watts continuous. **\$16.00.**

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**WV4 WATTMETER/SWR METER 20 — 200 MHz** with 100 Watt and 1000 Watt ranges. **\$85.00.**

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**DC4 POWER SUPPLY** for battery operation of TR4C or T4XC. **\$187.00.**

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**MOSLEY ELECTRONICS — 3 Element BEAMS —** arriving soon.

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# RAC ANTENNA

## Now appears in a completely new style LOADED DIPOLE



AL 48DXN a 1d  
AL 24DXN

Equipped with the new traces that combine the merits of linear loading and corner loading.

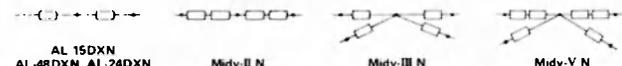
Wire and wire locks - 5/32 type  
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New Deluxe series designed for easy installation rather than for additional shortening.  
Almost no need of adjustment for any band. May be mounted in non-standard configuration.

AL48DXN	\$40	+	\$2	P&P
AL24DXN	\$40	+	\$2	P&P
AL15DXN	\$45	+	\$2	P&P
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MIDY 111N	\$45	+	\$3	P&P
MIDY VN	\$48	+	\$4	P&P

Model	Description	Impedance	Freq.	Power	VSWR	Overall Length	Net Weight
AL 48DXN	New Deluxe type, Double Loaded Dipole	52 ohm	3.5 - 7MHz	2KW PEP 1KW CW	Less than 1.7:1@80KHz	26m	1.2kg
AL 24DXN		52 ohm	7 - 14MHz	do	do	14m	900g
AL 15DXN		52 ohm	21 - 28MHz	do	do	6m	870g
Midy II N		52 ohm	3.5 - 7 - 14MHz	1.5KW PEP 750W CW	Less than 1.7:1@50Hz	23m	1.4kg
Midy III N	New Deluxe type, Multi band Loaded Dipole	52 ohm	7 - 28MHz	2KW PEP 1KW CW	do	14m	1.4kg
Midy V N		52 ohm	3.5 - 28MHz	1.5KW PEP 750W CW	do	23m	2.7kg

### ANTENNA STYLES NEW DELUX TYPE



## The Atlas transceiver fits anything that moves!

At 7 pounds, and 9 1/2" x 9 1/2" x 3 1/2", the Atlas 210x or 215x is less than half the size and weight of other hf transceivers. Whether for an automobile, bicycle or sailboat, it's the perfect mobile or portable radio.



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An VICOM are the sole authorized distributors for Australia a comprehensive supply of spare & accessories. All sets are guaranteed through pre-delivery check-out.

Whether you're going mobile or portable this summer, we invite your inspection of the Atlas 210x or 215x. It fits anything that moves, from a bicycle to a Mark 1 truck.

## GO MOBILE THIS SUMMER!

### HF MOBILE ANTENNAS

A5303A Antenna Set 80 thru 10 metres, cable loaded, incl heavy duty ball mount and spring.  
Quality Hustler Resonators Precision wound with optimum design for each band, adjustable trap rod for lowest SWR.  
RM40 (80 metres) \$25 RM20 (120 metres) RM40 (140 metres) \$25 RM11 (111 metres) RM11 Bumper mount \$15 RSS-2 spring \$12

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14AVO/VB 40 thru 10 metres trap vertical. True 1/4 wave resonance on all bands. \$76  
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Vertical omnidirectional capabilities. Automatic band switching. Loaded up HY-D traps. Top loading coil uses 1/4 wave resonance on all bands. SWR 2:1 or less at all band edges. Outstanding low radiation pattern. Entirely self supporting.



## \$ 598 Uniden

The fabulous Uniden 2020 phase-locked-loop transceiver offers separate USB/LCW 8-pole crystal filters as standard and 6.14kHz in the final with screen voltage stabilization for minimum distortion products. Features plug-in p.b.'s and even the front panel can be swung out for easy servicing. A full spares catalogue is available together with changing pcb's. Compare the Uniden 2020 with other HF transceivers and you'll be quickly convinced that it offers the best value!

QUALITY MIC COMPRESSORS Increase average talk power by 3dB... connection to the transmitter mic... includes 2 tone generator and built-in compression level meter.

## \$65



### KENWOOD TS-700A \$575

The promise of 2 meter operation the Kenwood way, The TS-700A operates all modes - SSB, SSB, A, CW and provides the dependability of solid state circuitry. Has tunable VFO and 4 MHz band coverage (144 to 148 MHz). Automatically switches transmit frequency 500 KHz for repeater operation. AC and DC capability through its built-in power supply. Outstanding frequency stability. Complete with microphone and built-in speaker.

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AS-210AN 2 metre 10 element beam with 14.5 dB gain. Front to back 1:10:20 dB. Boom length 4 metres. Weight 2.0 kg. \$49 + P&P. 2100N 2 metres, new 10 elements, 18 dB gain 20 dB P&P. Boom length 4 metres, weight 1.8 kg. \$99 + P&P.

### 10 ELEMENTS



Why take the gamble? We sell only the VICOM on give a thorough pre-delivery check-out... Your parts are available too!

### SWR/PWR METER \$29.80



### ANTENNA COUPLERS

CL66, 500 watts, 80 thru 10 metres, quality construction with 4 position coax switch. CL66, 2.5 kW, 80 thru 10 metres, heavy duty. CL99, 200 watts for 144-148 MHz. CSW216 ALL-IN-ONE incorporates swr/pwr meter and antenna coupler. Covers 3.5-28 MHz up to 500W. SWR measurement 1:1 to 150 MHz to 200 watts. A real bargain \$162

### Popular VC2 swr/pwr meter operates 3-150 MHz with power measurements 12/21/20 watts. Will handle up to 1000 watts 50 ohm impedance, twin meter. A bargain! \$29.80

### SWR/PWR METER \$29.80



### Yes, the famous Barlow Wadley general coverage receiver with crystal controlled reception of AM/FM/USB/LCW now includes the Australian FM band!

BARLOW WADLEY STANDARD WITH FM \$268 + P&P \$298 + P&P



### PLUGS AND SOCKETS

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3" coax jumper lead with PL259-\$2.30  
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RG58/AU 52 ohm coax .45c/metre  
RG17 low loss coax .45c per foot

### TVI PROBLEMS?

BSL500 quality built-in 52 ohm, 1.8 30 MHz, max power 4 kW up to 2 kW cw. Housing and shield with built-in 200 lb tension. Standard hardware \$22 + P&P

### BALUN \$22



### COUGAR 23 B AM DELUX TRANSCIVER

Delux mobile 23 channel synthesized for the quality conscious Novice. The Cougar features built-in test meter, noise blanker, delta tune, 4 gain control, meter control, built-in modulation meter, separate PA switch. Circuitry consists of 1 IC, 20 transistors, 18 diodes. RECEIVER: dual conversion, sensitivity 0.5 uV for 10 dB S+N/N, selectivity 6 dB bandwidth 5 KHz, PA audio power 5 watts. TRANSMITTER: SW input, spurious harmonic suppression better than 55 dB. Comes complete with mic, mobile bracket, dc cable and manual.

### NEW \$140

Not sure that this is the best deal you can find... The VICOM sales team are all licensed Amateurs who are happy to advise on equipment selection and give technical advice.

# VICOM

... where quality counts!

SYNTHESISED!  
NO CRYSTALS  
IC22S \$220

## NEW IC22S PLL

The new IC22S transceiver is a PLL synthesised rig with pre-amplified ROM for frequencies in the Australian fm allocation 146.185 MHz. Single, duplex or double reverse is achieved by a flick of a switch on the front panel. The features new rig features separate intermediate DC, electronic 12/18 relay, full swr protection and VICOM 90 day warranty. Circuitry includes 34 transistors, 13 IC's and up to 128 diodes. Receiver sensitivity better than 0.4 dB for 30 dB coupling. Four new IC22S comes complete with mic, mobile mount, bracket, cable, spare parts, 90 day warranty and English instruction manual. YES IT'S CRYSTAL CLEAR.



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Perth: Netronics, 338 Huntriss Ave, Woodlands Ph 46 3232  
Canberra: The Electronics Shop (Daicom), 29 Colben Court, Phillip, Phone 82 3581  
Adelaide: Graham Stallard, 27 White Ave, Lockleys, Ph 437588  
Brisbane: Elite Electronics, 69 Warden St, Dorrington, Ph 38 4480

Prices and specifications subject to change without notice. Prices include Sales Tax but exclude freight and Insurance. Allow 50c per \$100, minimum \$1.



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DECEMBER 1976

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### COVER PHOTO

EMDRC junior member Frank Walsh operating portable station set up in the foyer of the Nunawading Library. See article on page 8.

(Photograph by Bill Rose)



# RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286

Our Disposals Store at 104 HIGGETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

### CT-500 — \$24.90 — Postage \$1.30

Popular, medium-size, mirror scale. Overload-protected.

AC/V: 10V, 50V, 250V, 500V, 1000V, (10,000 ohm/V), DC/V: 2.5V, 10V, 50V, 250V, 500V, 5000V (20,000 ohm/V), DC/A: 50 uA, 5 mA, 50 mA, 500 mA.

OHM: 12k ohm, 120 k ohm, 1.2M ohm, 12M ohm, dB: 20 dB to +62 dB.

Approx Size: 5 1/2" x 3 5/8" x 1 1/2". P&P 50c



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LAFAYETTE MICRO 66 5 watt transceiver, 6 channel operation, fitted with one set crystals. \$139

LAFAYETTE 27 MHz fibreglass cowl mount mobile loaded antenna. 36" long, complete with base and coax. \$28.45

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LAFAYETTE 27 MHz gutter mount mobile antenna complete with coax cable and PL259 plug. \$22.50

1/4 WAVE STAINLESS STEEL 27 MHz mobile antenna with heavy duty spring, base and insulator. \$30

LAFAYETTE "Range Boost" 1/2 wave vertical antenna for 27 MHz base station use. \$59

LAFAYETTE 1/4 wave ground plane antenna. \$35

52 OHM COAX CABLE, 1/4" diameter. 50c yard

PL259 COAXIAL CABLE PLUGS. \$1.60 each

REDUCER to suit for 1/4" coax. 40c each

SO239 COAX CHASSIS SOCKETS. \$1.40 each

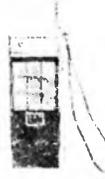
### MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCEIVER

- WITH CALL SYSTEM
- EXTERNAL AERIAL CONNECTION

#### SPECIFICATIONS:

Transistors: 13  
Channel Numbers: 3, 27.24 OMHz  
Transmitter Frequency Tolerance:  $\pm 0.005\%$   
RF Input Power: 1 watt  
Tone Call Frequency: 2000 Hz  
Receiver type: Superheterodyne  
Receiver Sensitivity: 0.7 uV at 10 dB S/N  
Selectivity: 45 dB at  $\pm 10$  kHz  
IF Frequency: 455 kHz  
Audio Output: 500 mW to Ext. Speaker Jack  
Power Supply: 8 UM-3 (penlite battery)  
Current Drain: Transmitter 120-122 mA  
Receiver: 20-130 mA.

**\$49.50 each or \$95 a pair**  
Post & Pack \$1.50 per unit



### 11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.155	27.880
27.085	27.165	27.235
27.125	27.225	27.255
27.240	27.910	27.265

**\$6.50 A PAIR (Transmit and Receive)**

### XTALS FOR MODEL AIRCRAFT HOBBY MEN

<b>Tx</b>				
29.730	29.75	29.77	29.79	29.81
29.83	29.85	29.87	29.89	29.91
29.92	29.95	29.97	29.99	
<b>Rx</b>				
30.185	30.205	30.222	30.245	
30.265	30.285	30.305	30.345	
30.365	30.385	30.405	30.425	
30.445				

**\$7.50 each — made to order**  
Postage 50c extra

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Suitable between age of 9 and 14 years

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120 minute on/off timer, 2.4" 8 ohm plus 2.2" 8 ohm. Night switch. Push button system, tone control, AFC on/off switch, level meter, output 1.5 watts. AC/DC two-way, earphone, jack and instruction book.

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Operates from car cigarette lighter socket. 12V neg. earth cars only. Output 6V, 7.5V and 9V (switched) to 300 mA max.

**\$6.90 — Post free**

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#### MODEL S501

1-way loudspeaker system. 1" x 5" speaker, 8 ohms, frequency response 90-12000 Hz, 4 watt rating. Suitable for transistor radios, portable cassette players, etc. Cabinet size: 12" x 8 3/4" x 4 3/4".

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1. DROWSE (SNOOZE)
2. ALARM OFF
3. FAST SET
4. SLOW SET
5. SLEEP DISPLAY
6. ALARM DISPLAY
7. SECOND DISPLAY
8. FUNCTION SWITCH
9. BRIGHTNESS CONTROL
10. TONE CONTROL
11. VOLUME CONTROL
12. TUNING KNOB
13. FM AFC SWITCH
14. SELECT SWITCH

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#### SPECIAL



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MODEL 1000 — 27.240 only, PMG approved

Features:—

- Full 100 per cent Modulation
- Jacks for earphone or speaker, AC, and cutting changer
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- 11 Selected Transistors
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# amateur radio

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## QSP LET'S LOOK AT THE YEAR

In 1976

The WIA was invited to join the Australian Planning Group for WARC 79 and has been represented at all meetings held so far.

The IARU held the first ever inter-regional conference in its history. Much forward planning was done at this conference on the Amateur Services stance for WARC 79.

This conference, being well aware of the problems of the small society, or country with no society at all, initiated the preparation of material for our "Amateur Radio World Wide Position Paper" for their assistance.

The WIA appointed a Federal Education Co-ordinator as it was felt there was a distinct need to widen our horizon in this area.

The WIA made numerous suggestions to the authorities with regard to examinations, and at present the Education Co-ordinator is discussing these with the examination section of the RFMB.

The reaction to the Arnold Report gave the impression that most divisions are satisfied with the present organisational system. However during my trip to Queensland which extended as far as Townsville it was apparent that the members who live well away from their divisional H.Q. have different requirements from those who live in the capital city.

Taking these matters and many others mentioned throughout the year in WIANEWS it is easy to see that 1977 will be another very busy year for the executive, with many very critical matters under negotiation.

I would like to take this opportunity of wishing you all the Season's Greetings on behalf of the executive and Executive Office.

DAVID WARDLAW

## EDITOR'S DESK

Bill Roper, VK3ARZ

This being the final issue for 1976 the Editors and members of the Publications Committee wish to take this opportunity to wish you all a Very Merry Christmas and Prosperous New Year.

Because of holiday closures in the printing works, January AR will be delivered immediately before Christmas and should be in the mail before the New Year. The closures also affect February AR which should go out early in the second week of February.

## QSP

11th AUSTRALIAN SCOUT JAMBOREE

The 11th Australian Scout Jamboree will take place at Rossmoyne Park, Dandenong from Dec 29th to Jan. 7th. VK3BSA, the official station of the Jamboree will be operating 24 hours a day for the duration of the Jamboree.

Primary frequencies will be 3.590, 7.090, 14.290, 21.360 and 28.990 MHz.

PUBLICITY

"Very early after taking office, I learned that many members expect their Director to solve all of 'their' problems. An example of this is the problem of bad publicity sometimes received from Citizens Band trouble that appears in the press under the name of "ham radio". We all decry such bad publicity and want to do something about it. The League has written hundreds of letters to newspapers about the country telling them the difference between CB and Amateur Radio. Directors write letters. Club and other amateur groups do the same but with seemingly little effect . . . somehow many newsmen cannot seem to get the difference between CB and Amateur Radio in mind, at least over a long period of time". "Doc" Gmelin, W6ZRT, the ARRL Pacific Division Director writing in Worldradio News, July 1976. He went on to say "sometimes, even when something is printed, it does little good if no one will read it".

TRANSCIVERS FOR MINES

A report in the S. African Digest of 1-10-76 shows that special low-frequency radio transceivers have been developed for use in gold mines and are to be mass produced early in 1977. The transceivers

provide underground communication with a range of about 300 Mx through solid rock, but base stations could increase this by a further 1000 Mx

READABILITY FIVE?

Contributors of "Letters to the Editor" and some of the other features in AR, would make the Editor's task a little easier if material that is hand written is done so in a legible manner.

Material submitted for publication should (where possible) be type written, double spaced and on one side of the paper only. Thank you VK3UV.

AR POSTINGS

Very strange or perhaps not so strange in Mr. Murphy's law book. This business of getting AR out on time. No matter what care is taken all along the line something unforeseen fouls up the system more often than not. If a delay of a day or two occurs mid-month it seems reasonable that this will become magnified into four or five days by mailing time. A holiday of weekend intervenes at a critical point to cause that additional delay. On the other hand one would believe that a day or two might not matter so much near the end of the production cycle. Not so. This stretches into maybe 5 or 6 days because perhaps the mailing service had scheduled AR for a particular day but because of the delay other mailing had to be programmed instead and AR thereafter slotted in "as and when". The production of a monthly journal is in the hands of many people all working together to meet a deadline. Unfortunately all of these people (and companies) are also busy with other work, so if AR is late arriving from one link in the chain the delay tends to snowball by reason of throwing other schedules out of gear. Everything possible is done to keep AR production on time, especially is this important to those who live far from Melbourne and suffer the inevitable additional transit delays.

SATELLITE SEARCH AND RESCUE

The Telecommunications Journal Aug '76 carries a report that the Canadian authorities have successfully demonstrated the feasibility of a new satellite-aided search and rescue concept that could reduce the time fuel and other costs associated with conventional methods of finding downed aircraft. Experiments were employed using Oscar 6 and simulated distress signals showed that a relatively low-cost, low altitude polar orbiting satellite could pinpoint crash sites in Canada and elsewhere in the world to within 8 km in as little as 15 to 20 minutes after the spacecraft first "hears" the signal put out by an ELT operating on 121.5 MHz.

AN UNWANTED EXPORT

It is noted in HR Report that FCC agents and US marshals arrested some dozen outlaw opera-

(Continued on page 5)

# WIANEWS

## CITIZENS BAND

One of the main topics of discussion in recent months has been CB.

Already reported in WIANEWS Nov. AR the Executive listened to what a group of CBers had to say about legalisation of this service in Australia. The background information from this meeting is likely to be useful when the Government calls for comments on this question in the near future — maybe before the end of this year.

Meanwhile the media are enjoying themselves with CB and almost everyone is getting into the act. If the 'man in the street' reads the material served up to him he would be really naive to believe all of it.

There is no reason at all why amateur radio should be linked with CB. Unfortunately few journalists can resist the temptation to refer to our service, oftentimes in derogatory terms and occasionally in the most offensive manner. Many writers on the subject display their ignorance by incorrect references even to the proper licensing and controlling authority for radio frequency spectrum management.

It seems that we in Australia are not alone in suffering from media falsehoods and deceptions. Those who listened to the Federal tape broadcast on 3rd October will have noted the problems experienced in the U.S.A. on bad publicity appearing in the press under the guise of "ham radio". Doc Gmelin, W6ZRJ, the Pacific Director of ARRL had a lot to say about this in a recent issue of Worldradio News. He bemoaned the fact that it was almost impossible to get the true picture of amateur radio across to the media. His article went on to comment that respect is not bestowed, it is earned, and respect for Amateur Radio comes from the good things we do for the public. Often the radio amateur does not do nearly enough to get attention from the masses, he thinks; even if, by some great good fortune, something good does get into the Press it has little benefit if no-one will read it.

An article in a recent issue of a U.S.A. business magazine carried the news that the CB channels had been increased from 23 to 40 in an attempt to relieve the overcrowding in urban areas. Coupled with this, the article pointed out, was the tightening of equipment specifications to reduce interference to other electronic apparatus, including TV sets, and that the F.C.C. themselves would in future undertake their own testing of CB gear instead of relying on manufacturers claims.

The announcement by our Minister for P & T that strict standards will be laid down in Australia for CB equipment if citizens band radio is legalised appeared in the press as a warning to purchasers if dumping occurs as the result of the stricter controls in the U.S.A.

The WIA has under consideration a policy not to support any amateur service licence below that of the Novice grade. This had been suggested in several quarters as an alternative to CB or as a transitional stage between CB and Novice. Quite apart from international regulatory obligations there are a number of very cogent reasons why such a permit or licence could create fresh areas of difficulty and complexity. The decision will rest with the Federal Council.

Any member having thoughts about the ACADEMIC concept of CB in Australia would be wise to convey them to his Divisional Council. The Institute will have an opportunity to comment to Government when the question is thrown open for public debate. The attention of the Minister has already been drawn by the Institute to certain fundamentals which can be deduced, as likely to affect the amateur service, but actual detailed comments can only await the precise nature of the proposals if the political decision to introduce CB takes the next step.

Members are fortunate in possessing an Executive responsive to the changing circumstances surrounding radio Communications as a whole and which is quick on behalf of the amateur service to take advantage at the right moment in time of the constant changes going on around us.

## EXAMS

The Federal Education Officer held useful discussions with the head of the examinations section of the R.F.M.D. during October. It is understood that the marking of Novice examination papers will henceforward take place in State Offices and that the issue of a syllabus for this examination will be expedited by the Institute preparing one for the section to edit and amend. Consequently Mr. Scott promised to submit a suitable syllabus by the end of November.

Discussions on multi-choice type of questions for all amateur exams were carried one stage further and it is possible that future Regulations exam papers might well include a number of multi-choice questions plus a few essay type questions so as to preserve flexibility.

Pressure was exerted in relation to the need for a greater number of examination centres and the desirability of some thought being given to the invigilation of exams by responsible amateurs. Once again the response was unfavourable in the same way that the response was unfavourable to the increased frequency of examinations.

The submission that Novice exam morse speeds be altered to faster characters with larger pauses in between was again rejected. The RFMD follows the procedure laid down by ITU in the International Telegraph Regulations and any departure from these principles is regarded as likely to introduce unnecessary complexities particularly in the light of the proposed introduction of centrally prepared tapes by up to date mechanical methods.

The principle of conceded Novice level passes in the AACP theory exam — namely that those candidates obtaining some percentage below the 70% pass mark should automatically qualify for a pass at Novice level — was previously considered. However, a similar principle applied to the AACP morse exam was received with considerable reservation.

It was apparent from the discussions that RFMD is conscious of the international reaction to changes in examination standards as affecting reciprocity. Any measures which would result in any loss of their direct control over examinations were viewed most unfavourably. This principle also acts in reverse. This results in Australia not recognising many overseas, and even academic, amateur licensing qualifications as acceptable either in relation to the syllabus studied or the nature and methods of conducting the examinations.

The thought that some suitable Australia-wide educational Institution should conduct examinations on behalf of the licensing authority — as, for example, the London City & Guilds Institute for U.K. examinations — remained merely as a thought.

One meeting of the Executive was held during October at which reports from the various Committees were received and debated.

## REPEATERS

One of the most intractable of problems is the condition that Radio Inspectors should be able to switch off any repeater in their areas at short notice if the need arises. This is still under discussion.

There arose a proposal that the time seemed ripe for holding another All-States repeater meeting similar to the last one in Wodonga some years ago. It was considered however that the expense involved in holding such a meeting appeared unnecessary when, in reality, the bulk of the difficulties related to adjacent areas in VK2 and VK3 in particular. A joint meeting between the State repeater committees immediately affected appeared more suitable.

A case for additional repeater channels on 2m (see WIANEWS Nov. AR) was believed to be imminently ready for submission. Arising out of this, when it comes to hand, will be the number and extent of active FM net frequencies. Details of the latter would be appreciated by the Federal Repeater Subcommittee.

In connection with net frequencies an interesting development relates to the exchange of digital information with the aid of microprocessors now becoming more available for amateur use. Another topic discussed was the possible establishment of a repeater for RTTY.

The VHFAC bent their minds once again to the problems of TV channels O and 5A. This was reported by the Executive in AR for June 1975 page 31 paragraph 34. The difficulties centre round the 'long distance' reception of a channel O station in an area designated for a Ch. 5A translator. The 1976 ABCB report on this question may assist in providing additional material for consideration.

Feedback from Divisions concerning beacons and beacon planning had been negligible. This had retarded progress in this field. Since 'beacons' had been allocated to the VHFAC it was agreed as sensible that this committee would also undertake any planning work needed for 10m band beacons even though this was outside the VHF area.

## PENSIONERS

A letter received during October from the Secretary of the P & T Dept. advised that the Minister had indicated his agreement to the reduction of licence fees from \$12 to \$2 for amateur radio operators in receipt of a pension under the Social Services Act subject however to the restriction of the concession to those persons whose pensions were granted subject to the standard means test provisions.

This entails an amendment to the Wireless Telegraphy Regulations which might cause some delay before the proposed concession becomes effective. Readers of WIANEWS will be

aware of the efforts made by the Institute on this question over a long period of time. Letter RB4/4/32 of 19-10-1976 refers.

## WICEN

The WICEN organisations of the Federal, ACT, Victorian, W. Australian, Nth. Queensland and some individuals joined together in the Natural Disasters Organisations' annual exercise "BACKUP" on 27th/28th October. Two concurrent disaster situations were simulated, bushfires in VK3 and a cyclone in VK6. Various Federal Departments, State Emergency Services, police, service personnel and others joined in the exercise at very short notice for many.

The Federal WICEN Co-ordinator, Brig. Rex Roseblade, VK1QJ, wrote that the exercise was very successful. Aside from demonstrating to NDO the usefulness of WICEN for the second year in succession, some valuable publicity was obtained for amateur radio and a number of lessons were learned from it. A letter of thanks for assistance by all concerned was received by the Federal President from Major-General Alan Stretton.

The call sign VK1WI was used in Canberra and the 'provisional' WICEN frequencies on the three HF bands were activated with stations identifying messages with the words "WICEN Exercise Station". Exercise traffic was relayed by VHF link to the home QTH of VK1QJ. ■

## QSP—continued

during a raid in northern New Jersey on premises of those engaged in illicit 27 and 28 MHz operation. The report goes on to say that a photo of the seized equipment looks like the transceiver/amplifier counter at any well equipped radio store.

Under the heading "CB radio users jam airwaves, tune in trouble" the Ottawa Citizen details the problems with the General Radio Service, as it is known in Canada. Department of Communications officials are quoted as saying that closing the entire band might be the only solution if things continue the way they are going. The editorial continues: "Originally designed for urgent general purpose conversations, the system has become, in the words of a department official 'a refuse pile for the dregs of the radio community whose main interest is in hearing themselves talk.'" Strong sentiments but they reflect a growing mood among government, radio enthusiasts and the public. — From Radio Com., Oct. '76.

## CB — U.S.A.

The writer of "Zero Bias" in July 1976 CO has much to write about CB and the continuing general hostility by radio amateurs. "Amateur radio", he writes "has a lot to offer on its own not at the expense of CB. If we take as fact that CBers like to communicate, buy equipment, put up antennas, engage in public service, seek out awards and QSL cards and intellectually disregard the ethics of legality of the situation, we can see the possibility of presenting an augmentation to their by rather than a replacement. What we have to offer and how we offer it may or may not be better; this is debatable from where you stand. What is true is that what we offer is different and unique. If you knock what somebody has or believes just to improve your own position you are in fact calling him a fool. Why should he continue to listen to you?"

## EARTHQUAKE EMERGENCY

Ten resident radio amateurs in the earthquake devastated N.E. Italy early in May alerted and carried traffic on the first night of the catastrophe when no other radio communication services were operative. They used three repeaters which were still operational as well as an 80m emergency net. A mobile repeater was used later on. Their efforts were rewarded in a public speech by the General Director of the Italian P. & T. Department in Rome. A detailed report about this emergency appeared in IARU Region 1 News of Sept. '75.

## NAVIGATION PROBLEMS

For small craft enthusiasts the following edited extract from an article in Worldradio News of July 1976 might be informative. It was written by an amateur working as Radio Officer aboard both tankers and freighters. "Many yachts and other small craft often misunderstand and underestimate

the manoeuvrability of large ships. A tanker drawing 30 feet or more is often restricted to a channel and cannot turn without going aground. Small craft are very difficult to see at sea. A white hull and white sails are easily lost in the white caps of even the slightest sea. If a moderate-to-heavy sea is running, it is almost impossible to see a yacht. Remember, you can probably see us for miles due to our size and colour, but don't expect us to see you. Most wooden and fibreglass hulls provide a very poor radar target so make sure you have a good radar reflector installed on top of your mast so that you can be seen. Another factor to take into consideration is the visibility from the bridge of a large tanker. There is a distance of close to 700 feet (say, 230 metres) between the bow and the bridge, and if you approach too close to the bow or cut across her bow you are very easily lost to sight. That can be a very dangerous situation for a small craft."

## THOSE WERE THE DAYS

Vince Kerr VK4LK has kindly forwarded a copy of "WIRELESS A Handbook of Instruction for Radio Enthusiasts" circa 1926. It contains over 100 pages of the (then) most up to date theory and practice. Also included are 8 most interesting pages listing Australian telephony stations. These included A and B class stations plus dealers stations as well as the Experimenters (amateurs). Quite a few of the operators listed are still active; Harold Hobler VK4DO and Max Howden VK3BQ to name just two.

Other callsigns that were listed and are still going include 2BL, 2FC, 3LO, 3AR, 3UZ and 4QG.

Even then the "Call Book" had problems — 2WI was shown against two different operators and the 3B— series of calls preceded the 3A— series.

Australian and New Zealand ships equipped with radio were listed against their callsigns.

The advertisements are fascinating. A 1 valve set was available for £9 and 5 valve sets from £24-32. An RCA Raditron (valve cost 17/6 and 1.5V cells 3/-). Strange to think that all the latest gear advertised in this magazine today will seem quaint also in 50 years time. ■

# WIA EDUCATION

The Education Committee has met twice so far. Graeme Scott VK3ZR is Chairman with John Wilson VK3LM and Peter Cossins VK3BFG as members.

All are teachers and have a background in Radio and Electronics teaching.

The committee set some priorities at its inception. The major one was to draw up suggested syllabi which instructors can follow in amateur

radio courses. Also a published syllabus, if adopted by the P and T Dept. will lay down a framework for the course to which exam questions can be set. The Novice syllabus is expected to be handed to the P and T Dept. by Nov. 30th, 1976.

Interested persons are invited to forward suggestions, proposed syllabi for other exams, and multi-choice questions to the chairman via the Executive Office, Toorak.

The P and T Dept. recently asked the WIA to forward 100 multi-choice questions to create an exam bank. This has been done and further follow-up with more questions is welcomed from members. On the Youth Radio front there is little to report at present.

Graeme VK3ZR.

WIA Education Co-ordinator. ■

## "To Be or not To Be" — A "Ham" (let)

Doug Anderson VK3ZW, Director Victoria Promotion Committee.

We have all experienced the amused cum tolerant smile as the layman says "Oh so you're a ham are you?" and although my skin is relatively tough, the connotations of the word "Ham" and its consequent public relations value have often caused me to wonder why we accept such a title. I must confess I prefer the term "Amateur".

However, let the Oxford Dictionary (5th edition) be the judge. I quote an extract: "Ham — (sl) an operator of an Amateur radio station. An inept performer or ineffective actor, one who rants and overacts, (sl) Hamfisted, Hamhanded, One who is heavy handed and clumsy".

"Amateur — One who cultivates a thing as a pastime".

Of course it's either a matter of habit or taste and in some instances the observance of some obscure tradition that causes the term "Ham" to continue to describe us and our activities but for my part, if any of my neighbours regard me as a "Ham" when they experience their next dose of Hi-Fi 1, then I hope they don't look me up in the dictionary. ■



**IC211**

2 metres ssb/fm/cw



New Icom IC211 PLL synthesised Digital Transceiver

**A great new wave**

ICOM introduces the first of a great new wave of Amateur Radios, with new styling, new versatility, new integration of functions. You've never laid eyes on a radio like the IC211, but you'll recognise what you've got when you first tune the single knob frequency control on this compact new model. The IC211 is fully synthesised in 100 Hz or 5 KHz steps, with dual tracking, optically coupled VFO's displayed by 7 segment LED readouts, providing any split.

**FEATURES:**

- \*Frequency memory, twin VFO's
- \*Noise Blanker
- \*Built-in SWR bridge
- \*VOX
- \*CW monitor
- \*AC/DC operation
- \*ICOM developed PLL
- \*ICOM developed PLL
- \*Devices incl. 92 transistors, 15 FET, 14 IC, 90 diodes, 1 LSI
- \*144-148 MHz coverage
- \*90 day VICOM warranty.



**\$659**

**NEW**



IN FACT, THERE ARE SO MANY FABULOUS FEATURES IN WOULD TAKE PAGES TO EXPLAIN THEM! FOR FURTHER INFORMATION AND SPECIFICATIONS PLEASE WRITE (ENCLOSING SAE)



... where quality counts!

It's crystal clear

**SYNTHESISED!  
NO CRYSTALS!  
IC22S \$220**



The new IC22S (Special Australian Model) is a PLL synthesised rig with programmable ROM for frequencies in the Australian FM allocation. Simplex, duplex or duplex reverse is achieved by a flick of a switch on the front panel. This fabulous new rig features ceramic discriminator, IDC, electronic Tx/Rx relay, full swr protection and VICOM 90 day warranty. Circuitry includes 34 transistors, 7 FETs, 13 ICs and up to 128 diodes. Receiver sensitivity better than 0.4 dB for 20 dB quieting. Your new IC22S comes complete with mic, mobile mounting bracket, plugs, cable, spare diodes for programmable matrix and English Instruction manual (Aust. edition). You will never need to buy another crystal with the fabulous new - crystal clear - IC22S!

**SPECIAL KEH** Repeaters 2, 3, 4, 5, 6, 7, 8, Simplex 40, 49, 51. Anti-repeat 2. A few only at this price! **\$5.00** PR

**LINEAR FOR TWO \$98**

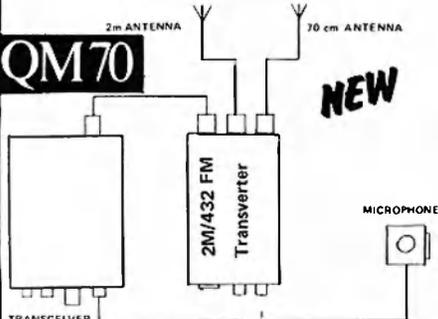
All solid state 70w pep [ssb] output linear amplifier (for 14w pep input), 12 vdc operation and internal automatic RF sensing switch means that you only need to connect this unit in your 2m antenna line together with a source of 12 vdc for 10w pep OUTPUT. Accepts ssb, fm, am, or cw with switchable hang time for ssb and cw operation. Supplied complete with dc power cord and fitted with SO239 sockets. \$98.

**TRANSVERTERS 2M High Power**

**28/144 HIGH POWER TRANSVERTER.** A 10 m to 2m hybrid transverter offering up to 200w pep input. Excellent FET receive converter with two IF outputs fitted as standard. Master oscillator is doubly stabilised and the pa section is well ventilated. Takes all drive and switching from your 10m rig. Built-in antenna change-over relay, metering and power on warning neon. Complete with harness and plugs for connection to your 10m rig. \$198.

**2M/432 FM Transverter**

This small unit obviates the need for the expense of a second transceiver or the complexity of numerous add on units with multiple connecting leads. By simply inserting the unit in the antenna lead of your 2m fm transceiver you are ready to transmit and receive on either 2m or 70cm AT THE FLICK OF A SWITCH! The unit has its own 70 cm to 2m receiver converter built in and all switching is carried out within the unit. Size 105 mm x 40 mm x 180 mm. Supplied complete with power cord and mobile mounting bracket. Price \$110.



**UNIDEN ... the best value**

HF PLL Transceiver



More expensive than an FT101E

New uniden 2020 Mark II

Featuring a number of circuit improvements as a result of a year in the field, the fabulous "2020" PLL transceiver offers separate usb/lsw/cw 8-pole filters as STANDARD and 6146B's in the final with screen grid voltage stabilisation for minimum distortion products. Features pcb's and even the front panel can be swung out for easy servicing. A comprehensive range of spare parts is available together with back-up service support. Overseas this rig sells for at least \$65 more than the FT101E! Compare the features of the UNIDEN 2020 with other HF transceivers and you'll be quickly convinced that it offers the best value!

UNIDEN 2020, complete \$649  
UNIDEN VFO \$119  
Matching speaker \$18

Vicom for technical support



**ATLAS RADIO INC.**

The fabulous Atlas 210X solid state transceiver with noise blanker \$625



**PACESETTER**

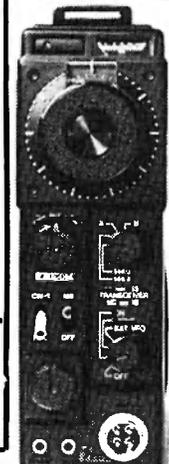
KENWOOD TS-820 PACESETTER

The 820 allows you to command the band with superb selectivity. Employs the latest phase lock loop circuitry. High stability VFO. Has a satin smooth planetary drive VFO tuning dial system. The built-in monitor circuit allows you to hear your own voice during transmission. Uses an efficient noise blanker circuit. Incorporates a unique RF speech processor. During receive, a handsome, easy to read meter functions as an S-meter. The same meter displays ALC level, plate current, RF output and plate voltage during transmit. During CW reception, a special filter is used to alter the audio frequency response to provide a more comfortable, easy to copy tone. Has built-in speaker and 25 kHz calibrator.

**\* \* \* \* \$800 \* \***

SSB Transceiver Kit

Includes all IF and AF signal circuitry for a fabulous SSB Transceiver designed by Applications Department of Plessey Semiconductors using their SL600 series of Integrated Circuits. The unit consists of a single PCB which requires only the addition of a local Oscillator, Preselector, Linear Amplifier, Volume Control, Mic and Speaker to make a complete Transceiver. The Transceiver may be used on any frequency from a few kilohertz to 500 MHz.



**IC502 \$185**

Six metres during the DX season and using the IC502 can be great fun! This handy portable runs 3w pep ssb 52.53 MHz. Featuring VFO control, switchable noise blanker, RIT and provision for external power and speaker, 9 long-life C batteries factory produced English Manual and 90 day warranty. A comprehensive range of spare parts available. (serial no required when ordering parts).

**IC202 \$195**

The famous IC202 handy portable runs 3 watts pep with VOX control 144.146 MHz. Features noise blanker, RIT, lighted dial and meter, telescopic antenna and of course, that ICOM quality. Your new IC202 comes complete with mic, shoulder strap, connectors, batteries, English Manual (revised 2nd Edition) and 90 day warranty.

**\* \* PORTABLES**

This is ICOM's first FM portable, and it puts good times on the go. Change vehicles, walk through the park, climb a hill, the ICOM quality FM communications go right along with you. Long lasting internal batteries make portable FM really portable, while accessible features make conversion to external power fast and easy!

- Fully collapsible antenna
- 15 channels (12 on dial and 3 priority)
- Dual power - 3 watts high/400 mW low, nominal
- Lighted dial and meter
- 36 transistor, 3 FET, 2 IC, 51 diodes
- super sensitive receiver
- Crystal specifications identical to IC22a

Your new IC-215 comes supplied with; 3 popular channels, handheld mic with protective case, shoulder strap, connectors for external power and speaker, 9 long-life C batteries, English manual and 90 day warranty

**IC215 \$169**



Vicom for personalised service

**CONVERTERS**

Utilising modern technological design features a 2nd built to demanding specifications, this range of Converters has been produced to meet the increasing requirements of High Performance Equipment.

**144/28 CONVERTER**

- 116MHz Crystal Oscillator. Maximum Frequency Error 1 kHz
- Modern RF Amplifier Inductively Coupled to Mix Mixer
- All Signal Path Inductors utilize Permalloy Straps. For long term performance stability.
- Gain = 28 db (typical)
- Noise Figure = 2.5db (typical)
- Power Requirements 12V DC Negative Earth @ 10mA (typical)
- I.F. = 28.30 MHz
- Aerial and I.F. Sockets both BNC as Standard

**\$36**

**432/28 CONVERTER**

- 101MHz Crystal Oscillator. Maximum Frequency Error 1 kHz
- Two R.F. Amplifier Stages in cascade using P. tuned Stripline tuned circuits before AND after each Stage
- Dual Core Mixer I.F. Head Amplifier
- All UHF 50Hz Tuned Circuits use Permalloy Straps
- Gain = 30 db (typical)
- Noise Figure = 3.5 db (typical)
- Power Requirements 12V DC Negative Earth @ 35 mA. (typical)
- I.F. = 28.30 MHz
- Aerial and I.F. Sockets both BNC as Standard

**\$41**

**12/432 CONVERTER**

- 105.66 MHz Crystal Oscillator
- Hybrid Ring Mixer using Semorbs Diodes
- Dual Core Mixer I.F. Head Amplifier
- All UHF 50Hz Tuned Circuits use Permalloy Straps
- Gain = 25 db overall
- Noise Figure = 3.0db (typical)
- 12V DC Negative Earth
- I.F. = 28.30 MHz
- Aerial and I.F. Sockets both BNC as Standard

**\$56**



Quality VHF/UHF swr power meter, pwr up to 120w, no power calibration required. Superb construction. \$95

**SW-410**

**NOVICE**



BUILT-IN SWR BRIDGE!

**NEW \$140**

**COUGAR 23 B AM DELUX TRANSCEIVER**

Delux mobile 23 channel (synthesised) for the quality conscious Novice. The Cougar features built-in swr meter, noise blanker, delta tune, r gain control, mic gain control, built-in modulation meter, separate PA switch. Circuitry consists of 1 IC, 20 transistors, 18 diodes, RECEIVER: dual conversion, sensitivity 0.5 uV for 10 dB S+N/N, selectivity 6 dB bandwidth 5kHz, PA audio power 5 watts. TRANSMITTER 5w input, spurious harmonic suppression better than 55 db. Comes complete with mic, mobile bracket, dc cable and manual.

# hy gain

for the finest in Ham Radio Antennas! QUALITY USA ANTENNAS

- 14AVQ/WB, 40 thru 10m quality trap vertical, 19' high. True 1/4 wave resonance on all bands \$ 79
- 18 AVT/WB, The great wideband vertical performed 80 thru 10 metres. Self supporting, 24' high \$ 99
- TH3MK 3 3el beam 10/15/20, 14' boom, outstanding performance at reasonable costs \$198
- TH3JR 3el beam 10/15/20, 12' boom. Ideal for top performance in limited space \$152
- TH6DX 6el Super Thunderbird, impressive coverage on 10/15/20 metres. Self less than 1.5:1 on all bands \$245
- BN86 Balun for the above beams \$ 25
- AS203W (Asahi) 20m monohander, 3el, 8 dB gain \$160

## GO MOBILE HF MOBILE ANTENNAS

- AS303A antenna set 80 thru 10 metres, centre loaded, incl. heavy duty ball mount and spring \$118
- Quality Hustler Resonators, precision wound with optimum design for each band, adjustable tip rod for lowest swr:
- RM80 (80 metres) \$26 RM20 (20 metres) \$21
- RM40 (40 metres) \$25 RM11 (11 metres) \$17
- MO2 Mast \$24 RSS-2 Spring \$9.60

- Bumper Mount Assembly Model ASNK. Zinc plate steel and stainless steel. \$18
- ASKDA Heavy Duty Spring and base assembly. Chrome plated steel swivel ball \$11.50
- AS-GM gutter mount \$10
- M r n g body mount \$ 5

## 2M ANTENNAS

- \$49 AS-210AN 14.5dB
- AS210AN 2m 10el beam with 14.5 dB gain, F/ 20 dB. Boom length 4 metres, weight 3 Kg \$49
- AS210BN 2m twin 10el, 18 dB gain, F/B 20 dB. Boom length 4 metres weight 6.8 Kg \$99
- Lindenow quality 5/8 wave 2m mobile whip, heavy duty \$26
- Model Y7 crossed yagi 7el 7dB gain \$65

## NEW FM GAIN RINGO RANGER

The new Ringo Ranger ARX-2 2m omnidirectional offers 6dB gain over a 1/4 wave whip. Features 3 half waves in phase and a 1/8 wave matching stub with an extremely low angle of radiation for better signal coverage. Tunable over a broad frequency range and perfectly matched to 52 ohm coax



\$40

## HAM II CD44

CONTINUING THE TRADITION OF THE HEAVY-DUTY CAST ALUMINUM, IN-LINE ROTORS, SUPPORTING BIG VERTICAL LOADS ON TWO SIX INCH RACES & BALL BEARINGS. BOTH MODELS HAVE A HUSKY 800 IN/LB TURNING TORQUE. THE STRIKING NEW CONTROL BOX HAS A FRONT PANEL CALIBRATION CONTROL WITH SEPARATE ON/OFF CONTROL FOR CONTINUOUS METER INDICATION AND INDIVIDUAL SNAP ACTION SWITCHES FOR EACH DIRECTION ROTATION. NORTH CENTER

CDE Ham II, Heavy Duty, designed for large beams up to 7.5 sq ft wind area, positive electrically operated wedge brake with 96 segments spaced 3° 45' apart. 240v model complete with control box, 8 core cable available \$195

CDE CD44 Medium Duty type, 240v complete with control box Quality USA Rotators \$155

## COUPLER

CL66 500 w pep max, 3.5 thru 29 MHz, input impedance 50-70 ohms, output impedance 10 600 ohms unbalanced. Includes 4 position coax switch \$118

ALL IN ONE!

CSW216 All-in one includes quality swr/pwr meter. Antenna matching 3.5-28 MHz, pwr/swr 1.8 to 150 MHz 20/200 watts. Insertion loss better than 0.2 dB. A real bargain! \$175

CL666 Heavy duty (2.5 Kw) 1.8 thru 28 MHz will handle output impedance 10 to 600 ohms unbalanced \$235

CL99 for 2 metres. Max pwr 200w pep, output 10-200 ohms unbalanced \$ 58

POPULAR EIMAC TUBES, BASES ETC. WHY NOT MAKE A LINEAR THIS SUMMER?

4CX250B	\$ 40.00	3500Z	\$ 69.75
3400Z	\$ 68.00	4X150	37.50
4CX1000A	\$340.17	4125A	\$ 60.22
SK600A	\$ 29.20	SK606	\$ 6.75
8873	\$115.00	8874	\$115.00

AND MANY MORE!

## BALUNS

BALUNS for coupling 52 ohms unbalanced transmission line into a 52 ohm load balanced system such as a beam or double antenna. It improves the transfer of energy to the antenna eliminating stray RF from the feeding. When a beam antenna or dipole is fed directly from coax cable, there is an unbalance condition due to currents flowing down the outside shield of the coax. These currents radiate and thus effect both the pattern and the front to back ratio. In addition they case TV and drain away effective power.

BL 50A quality heavy duty dipole type, 4 Kw pep, 2 Kw ant 1.8 thru 38 MHz, 52 ohms, vswr better than 1.2 at 30 MHz Housed in sealed cycloac which will withstand 250 Kg tension Price \$22. BL70A (72 ohm model) \$24.

BN86 (Hy-Gain) for beams. Covers 3.30 MHz handles up to 1 Kw dc. Negligible insertion and feed-thru loss VSWR 1: when terminated into 52 ohm load.

ASBL (ASAHI) for beams, 3.30 MHz, max 1 Kw. \$26

## SWR/PWR METER \$29.80

Popular VC2 swr/pwr meter operates 3.150 MHz with power measurement 12/120 watts. Will handle up to 1000 watts, 50 ohms impedance, twin meters. A bargain! \$29.80

## RECEIVERS FOR THE SERIOUS SWLI

Yes, the famous Barlow Wadley general coverage receiver with crystal controlled reception of amlsb/usb/low now includes the Australian FM band! BARLOW WADLEY STANDARD WITH FM \$269 + P&P \$298 + P&P

The new Yaesu FRG 7 general coverage receiver features ac/dc operation and the famous Wadley Loop principle with spin tuning and phase-locked synthesiser providing complete coverage from 500 KHz to 30 MHz with an accuracy better than 5 KHz. Please write for further technical details (enclosing SAE) OUR PRICE \$275 + P&P

## ANTENNAS

Listener 1 "W" type antenna. Covers 3-30 MHz with special trap. Ideal for DX reception. \$21 + P&P

Listener 3 Long Range wire dipole antenna 3.30 MHz complete with balun, feed wax, VHF plugs, insulators. Ideal for the serious SWL \$42 plus P&P

## Mic Compressors

for those extra "s" points

Increase average "talk power" by connection to the transmitter microphone circuit.

Model MC33A ac/dc includes tone generator and built-in compression level meter \$85

Model CM22 as above, with iut compression meter \$54

## AL ANTENNA LOADED DIPOLE

Now appears in a completely new style

AL48DXN and AL24DXN

AL48DXN \$40 + \$2 P&P

AL24DXN \$40 + \$2 P&P

AL15DXN \$45 + \$2 P&P

MIDY 11N \$45 + \$3 P&P

MIDY 111N \$45 + \$3 P&P

MIDY VN \$48 + \$4 P&P

## WHY BUY A LEMON?

Any transceiver, irrespective of the brand or model could turn out to be a lemon - it often depends on where you made the original purchase. At VICOM all equipment is given a thorough pre-delivery check-out, support by technical expertise and well equipped workshops. A 90 day warranty is offered on all new gear!

## PLUGS AND SOCKETS

(Minimum mail order \$5)

PL209 plug with reducer \$1

SO239 chassis socket \$1

SO239 PL259 to probe connect \$1

SO239 J female "T" adapter \$2

Superb quality low pass filter (34 MHz cut-off) will handle up to 1 Kw pep, 50 ohms impedance with insertion loss better than 0.2 dB. Copper construction with SO239 sockets. \$29

Model	Description	Impedance	Freq.	Power	VSWR	Overall Length	Net Weight
AL 48DXN	New Deluxe type Fullband Loaded Dipole	52 ohm	3.5 - 7MHz	2KW PEP 1KW CW	Less than 1.2:1 @ 30KHz	2.5m	1.2kg
AL 24DXN	do	52 ohm	7.14MHz	do	do	1.4m	900g
AL 15DXN	do	52 ohm	21.28MHz	do	do	6m	870g
Midy II N	New Dipole 4 1/2 Wave	52 ohm	3.5 - 7.14MHz	1.5KW PEP 750W CW	Less than 1.3:1 @ 50MHz	2.3m	1.4kg
Midy III N	Multi-band Loaded Dipole	52 ohm	7 - 28MHz	2KW PEP 1KW CW	do	1.4m	1.4kg
Midy V N	do	52 ohm	3.5 - 28MHz	1.5KW PEP 750W CW	do	2.3m	2.2kg

## ANTENNA STYLES NEW DELUXE TYPE

## HI-MOUNT

1. ECONOMY KEY, chromium plated parts with a steamlined transparent cover. Hard silver contacts \$18

2. QUALITY KEY, smart appearance, chromium plated keying mechanism, spring adjustment \$19

3. HEAVY DUTY DELUXE KEY, fully adjustable, ball bearing shaft, plastic protective cover \$28

4. MANIPULATOR (Side swiper) for an electronic keyer. Accurate and restful keying operation assuring owing to heavy metal plate and frictional rubber belt beneath the periphery of the main base \$29.50

Morse Keys

## VICOM

DIRECTION: Russell Kelly, VK3NT Peter Williams, VK31Z

Head Office & mail orders . . . 139 Auburn Rd, Auburn, Vic. 3123 Ph: (03) 82-5398

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DEALERS:

Perth: Netronics, 388 Huntriss Ave., Woodlands Phone 46 3232

Adelaide: Graham Stallard, 27 White Ave, Lockleys Phone 43 7981

Canberra: Dacom Electronics, 29 Colbee Court Phillip Phone 82 3581

Brisbane: Elite Electronics, 69 Wardell St Dorrington, Phone 38 4480

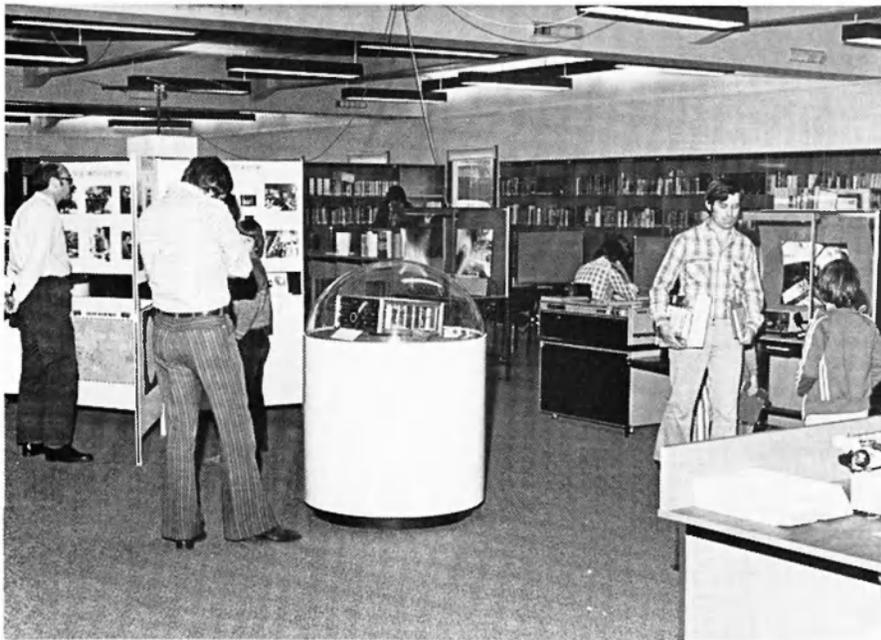
Newcastle: DigiTronics, 188 Parry St, Newcastle Phone 69 2040

Prices include Sales Tax but exclude freight and insurance. For insurance allow \$1 per \$100, minimum \$1. Freight sent Kwikair (freight "collect") unless otherwise specified. Prices and specifications are subject to change without notice.

# WHO ARE YOU?

Mike Thorn VK3ZVN

In October 1975 the Eastern and Mountain District Radio Club changed its venue from the Mooroolbark Technical School to the C.L. Willis room in the Nunawading Civic Centre. At its first meeting in the new venue, the club was addressed by the then Mayor of Nunawading, Cr. Peter James. Of the many topics that Peter spoke about perhaps the one that really struck home was "Who are you? No one in the eastern suburbs has heard of you and what you do".



## OVERALL VIEW OF THE DISPLAY AT THE LIBRARY

Like most other amateurs, we had taken the view that it was impossible to get publicity in the local press and therefore, did nothing about trying. However Peter's words did not fall on stoney ground and at subsequent committee meetings much discussion centred around publicity and what we could do. As a result, earlier this year, it was decided to approach the Head Librarian at Nunawading Library. Members had noted that the library regularly had static displays of various skills and crafts, why not amateur radio? There was only one way to find out. Very tentatively, I made an appointment to front the lion in its den.

To my delight and surprise I was greeted as manna from heaven. A local organisation was actually interested in its library! The library staff, led by Constance Pavey, the Head Librarian, were actually grateful to us for offering to put on a display. Very quickly a date was decided, it was to be National Library Week, 11-18th September.

To put it mildly, we were on the spot. No-one had anticipated quite that reaction, and we had only a few short months to get it all together. Planning began immediately. Fortunately the library had four large show cases and two domed display units. A visit to the library with a tape measure to get the sizes of the show cases and to decide what to put where. The final layout decided by sub-committees was for a central photographic display with the showcases around it in the central area of the library. Each of the showcases was to cover a specific subject i.e. Test equipment in one, antennas in the second, VHF Mobile/portable equipment in the third and HF equipment in the fourth.

The two domes would contain home brew equipment. A portable station would

be installed in the foyer on each Saturday.

The search for suitable photographs began and here again we struck it lucky. One of our newer club members, Reg Gouge, was a keen amateur photographer. Reg was very quickly railroaded onto the sub-committee with a brief to obtain suitable photographs. An approach was made to both the Federal Executive and to the Victorian Division. Very willing help was given by both and photographs and literature provided. The final layouts of cases and display boards was decided upon and equipment for the portable station in the foyer had been arranged.

On the evening of Friday 10th, a shower of equipment, amateurs, photographs and other display material descended on the library and with much rushing around and numerous cups of coffee, all was nearly ready for library opening time the next day.

Unknown to us the librarian and her staff had earlier prepared and printed a supply of handbills and these had been despatched to all schools, business houses and various community organisations throughout the City of Nunawading. In addition, several large posters had been displayed in the library itself.

Saturday morning and about an hour before opening time, club members arrived to set up the portable station in the foyer and to put the finishing touches to the static display. Finally all was ready and we waited to see what sort of response there would be from the public. It was enormous. The library was crowded all day and great interest was shown in the Static display and the station.

### WHAT DID IT ALL ACHIEVE?

Constance and her staff were delighted at the public's response. Using their

measuring sticks of book issue and new enrolment, book issue was the third highest ever, and new enrolments doubled the Saturday norm. So obviously the involvement of the library in the exercise was worthwhile.

Constance has already spoken to other librarians around Melbourne and from what she tells me, the interest is very high. There doesn't appear to be any reason why the same interest shouldn't be evident in other parts of Australia.

From our point of view it was also a success. Although we did not have a means of objective measurement, we feel we succeeded in our main aim of showing the public what amateur radio was all about. Of course, we gained some new members, but it was not meant to be a recruiting exercise.

We've learnt from the exercise too. We should have had the station operating each evening the library was open. There is a need to display information on the QSO in progress. It is very hard to hear what the operator is saying so the audio on transmission needs to be broadcast on the extension speaker as well as the received audio.

As far as the static display went, we wouldn't do it very differently next time — and there will be a next time without doubt. The local newspaper printed a follow-up article as well as announcing the display in the issue in the week prior to Library Week. So we gained valuable publicity in the local press as well.

If any Club or group would like to know more about the details of mounting such a display, write or call the Club Secretary P.O. Box 87 Mitcham, Victoria, 3132, and we will be only too happy to assist in any way we can. ■



THESE MODELS DISPLAYED WERE BUILT BY NICK VK3ZND



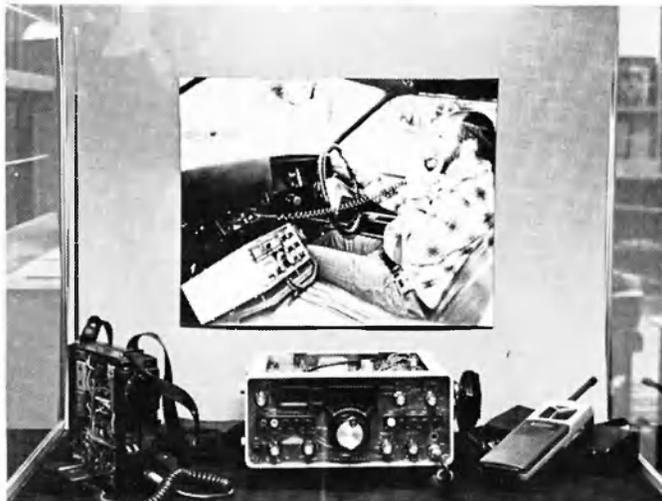
PART OF STATIC DISPLAY WITH WALL PHOTO OF JOHN VK3JH



HOME BREW EQUIPMENT UNDER PROTECTIVE COVER — TO LOOK BUT NOT TOUCH



STATIC DISPLAY



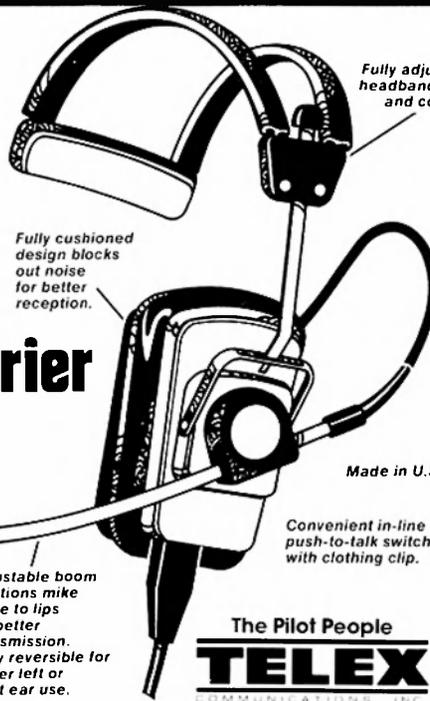
WALL PHOTO OF MOBILE INSTALLATION AND DISPLAY OF POPULAR HF TRANSCEIVERS



INTERESTED ONLOOKERS AT PICTORIAL INFORMATION BOOTH

From out of the blue comes a significant improvement in CB from Telex, the aviation communications experts.

# At last, the CB noise-barrier breaker.



Fully adjustable headband for fit and comfort.

Fully cushioned design blocks out noise for better reception.

Made in U.S.A.

Convenient in-line push-to-talk switch with clothing clip.

Sensitive, high quality voice mike maximized by a battery-powered FET amplifier.

Adjustable boom positions mike close to lips for better transmission. Fully reversible for either left or right ear use.

The Pilot People  
**TELEX**  
COMMUNICATIONS, INC.

**Telex CB-1200—blocks out vehicle and highway noise.** Especially suited to high noise environments like eighteen wheelers and tractors. Comfortable, fully-cushioned dynamic receiver cuts noise, lets the message through—loud and clear. Unique FET-amplified mike stays in position close to your mouth—for sharp, clear transmissions. Safe, convenient. No reaching for the hand mike. See it now! Break your noise barrier.

## Audio Telex Communications Pty. Ltd.

**SYDNEY:**  
54-56 Alfred St., Milsons Point 2061  
Telephone: 929-9848

**MELBOURNE:**  
828 Glenferrie Rd., Hawthorn 3122  
Telephone: 819-2363

# si

CRYSTAL FILTERS - FILTER CRYSTALS - OSCILLATOR CRYSTALS  
SYNONYMOUS for QUALITY and ADVANCED TECHNOLOGY



Listed is our well-known series of 9 MHz crystal filters for SSB, AM, FM and CW applications.

# KVG

Export inquiries welcomed

Filter Type	XF-9A	XF-9B	XF-9C	XF-9D	XF-9E	XF-9M	XF-9NB
Application	SSB- Transmit.	SSB Receive	AM	AM	FM	CW RTTY	CW RTTY
Number of Filter Crystals	5	8	8	8	8	4	8
Bandwidth (6dB down)	2.5 kHz	2.4 kHz	3.75 kHz	5.0 kHz	12.0 kHz	0.5 kHz	0.5 kHz
Passband Ripple	< 1 dB	< 2 dB	< 2 dB	< 2 dB	< 2 dB	< 1 dB	< 0.5 dB
Insertion Loss	< 3 dB	< 3.5 dB	< 3.5 dB	< 3.5 dB	< 3.0 dB	< 5 dB	< 6.5 dB
Input-Output Termination	Z <sub>t</sub> C <sub>t</sub>	500 Ω 30 pF	500 Ω 30 pF	500 Ω 30 pF	500 Ω 30 pF	1200 Ω 30 pF	500 Ω 30 pF
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	> 45 dB	> 100 dB	> 100 dB	> 100 dB	> 90 dB	> 90 dB	> 90 dB
Price	\$31.95	\$45.45	\$48.95	\$48.95	\$48.95	\$34.25	\$63.95

In order to simplify matching, the input and output of the filters comprise tuned differential transformers with the "common" connections internally connected to the metal case.

Registration Fee: \$2.00; Air Mail: 31c per 1/2 oz. Shipping weights: Filters 2 oz. ea., Crystals 1/2 oz. ea. All Prices in U.S. Dollars.

### Matching Oscillator Crystals

XF900 Carrier	9000.0 kHz	\$3.80
XF901 USB	8998.5 kHz	\$3.80
XF902 LSB	9001.5 kHz	\$3.80
XF903 BFO	8999.0 kHz	\$3.80
F05 Crystal Socket (HC 25/u)		.50

Oscillator Crystals 50 kHz through 150 MHz available to order. Parallel resonant (30 pF) to 20 MHz, series resonant above 20 MHz. Write for quotation to your requirements (include mechanical size & frequency).

### Matching FM Crystal Discriminators for XF-9E

	Freq. Dev.	Slope	Price
XD-9-01	5 kHz	-40 mV/kHz	\$24.10
XD-9-02	10 kHz	-24 mV/kHz	\$24.10
XD-9-03	12 kHz	-50 mV/kHz	\$24.10

**SPECTRUM INTERNATIONAL INC. Box 1084A, Concord, Mass. 01742 USA**

# MEASUREMENTS ON LINEAR AMPLIFIERS

R. A. J. Reynolds VK3AAR

## AN AUDIO STAIRCASE GENERATOR

During and following the development of the VK3AAR Linear Amplifier (AR April, May and June '76) I became interested in measurements on sideband amplifiers, and in tuning methods. Whilst a lot of what was learned is of not much more than academic interest, several observations were made which are worth repeating. I don't for a minute suggest that these observations are "previously unknown", but from some of the sounds that you hear on the air, a lot of operators have forgotten.

The first observation concerns power and VSWR meters. Whilst the low cost parallel line SWR meters do provide a reading that is related to the real SWR, they are rather sensitive to voltage levels on the line. As a result, readings vary with position on the line and with the input power level. Link type meters that are really directional power meters, Sierra, Bird thru-line, Collins etc., do not suffer from this problem to anywhere near the same extent. The unfortunate part of it is that

the lesser VSWR meter errs very much on the optimistic side. A feedline which showed 1:1 on a Hansen FS5 showed 1.5:1 on a Bird Ham-Mate 4351. Introduction of some more cable between the load and the measuring point left the Bird meter much the same, but inspired the Hansen meter to read 1.3:1. Now we all know that for a lossless system, the VSWR is constant along the line, and 1.5:1 is probably the right figure. I am indebted to Tom, VK6MK for drawing to my attention an article in CQ for July 1975, which treats this subject in somewhat more detail.

The second observation concerns that wide subject of tuning, loading, output and linearity, all of which are interdependent. I touched on this subject briefly in the construction article mentioned above. Playing with a normal power amplifier with Pi-coupler output fitted with a power output meter and a monitor-scope or high frequency oscilloscope, will soon display the following observations.

If output coupling, or loading, and tuning are optimised for each of various input conditions, say single tone at full power, tenth power, 2-tone, and voice, it will be found that it is possible to tune towards maximum power on the meter, or

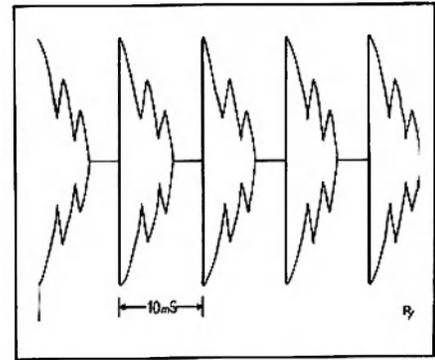


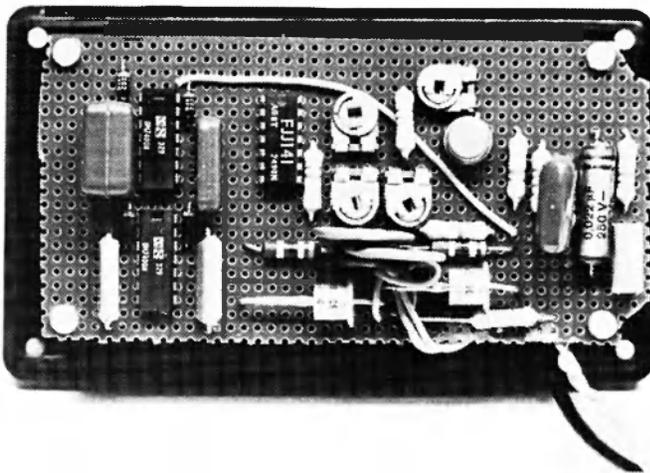
FIG. 1

maximum amplitude on the 'scope screen. A whole range of settings for the load and tune knobs will be discovered, and depending on the design of the amplifier, the comparisons will not necessarily be the same.

The problem is: under what conditions should an amplifier be adjusted, and to what parameters? Surely it will depend on the service for which the amplifier is to be used. RTTY or SSTV will have a fairly fixed duty cycle under signal conditions, and a static output can be displayed on the scope, and the amplifier can be adjusted accordingly. For CW, single output level from a mechanical "ditter" will provide a usable signal. But what do we do for voice? There is a wide peak to average energy ratio range to be found amongst operators' voices. We have all heard the "peaking" and "smooth" voices, to consider the extremes. Have a look at the waveform of your voice (at audio frequencies) on an oscilloscope, experiment with various sounds, and you will discover that there is considerable variation in the peak to average energy ratio within one voice, let alone from voice to voice. However, considering no distortion, a couple of things are obvious.

- (1) The ratio is nothing like single tone.
- (2) The ratio is nothing like 2-tone.

Yet these are the two most common



COMPONENT LAYOUT — AN AUDIO STAIRCASE GENERATOR

Photo: Ken Reynolds VK3YCY

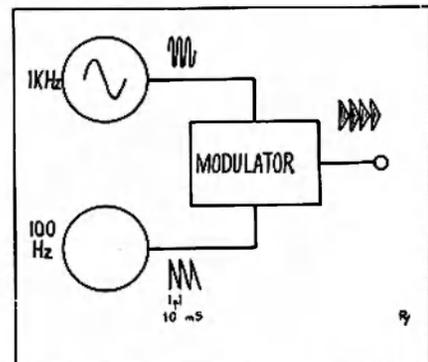


FIG. 2

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## HF EQUIPMENT

Cat D-2520	Kenwood TS520D transceiver, 80 - 10m, SSB/CW. 240V & 12V operation.	\$570.00
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Cat D-5202	Kenwood SP-520 remote speaker for TS520 transceiver. (Also for TS820 - see below)	\$34.00
Cat D-2110	Kenwood TS820 transceiver, 160 - 10m, SSB/CW/FSK.	\$800.00
Cat D-2111	Kenwood VFO-820 remote VFO for TS820 transceiver.	\$137.00
Cat D-2112	Kenwood DG1 digital display (option for the TS820 transceiver)	\$154.00
Cat D-2530	Atlas 210 transceiver, 80 - 10m, 200W input, SSB & CW.	\$599.00
Cat D-4306	Hy-gain TH3MK3 antenna, 3 el. beam, 20, 15 & 10 m. 8.5dB gain, 1kW rating.	\$195.00
Cat D-4308	Hy-gain TH6DXX antenna, 6 el. beam, 20, 15 & 10 m. Fantastic F/B ratio.	\$238.00
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Cat D-4300	Hy-gain 14AVQ antenna, 40, 20, 15 & 10m. 19 ft vertical.	\$140.00
Cat D-4705	RAK 580N antenna, dipole for 80, 40, 20, 15 & 10m. SWR 1.2:1, 2kW rating.	\$39.75
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Cat D-4154	Hustler MO-2 mobile mast, as above but bumper mounting.	\$25.00
Cat D-4156	Hustler RM80 resonator for 80 metres, suits MO-1 or MO-2 (see above)	\$26.50
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Cat D-4160	Hustler RM20 resonator for 20m	\$21.50
Cat D-4162	Hustler RM15 resonator for 15m	\$21.00
Cat D-4164	Hustler RM11 resonator for 11m	\$17.00
Cat D-4166	Hustler RM10 resonator for 10m	\$17.00
Cat D-4170	Hustler SSM2 antenna mount (mobile) inc. 180° adj. stainless steel ball.	\$22.50
Cat D-4180	Hustler MM1 cowl mount, includes 180° ball and SO-239 skt. Accepts PL259 plug.	\$9.50
Cat D-7010	Dummy load, 50 ohms, rated 100W cont. (int. would be far higher)	\$19.75
Cat D-7080	Shinwa 1005 TVI filter, low pass 30MHz, 52 ohms, loss 0.7dB, max. attn. 50dB.	\$19.75
Cat D-7190	MC-701 microphone compressor, 25dB max, fully variable, internal batteries.	\$39.50
Cat D-5500	HC-500 antenna coupler. Tunes any antenna for 1:1 SWR, 3.5 - 30MHz. 52 ohms input.	\$139.00
Cat D-7200	6KD6 transmitting valve	\$8.55
Cat D-7201	6SJ6 transmitting valve	\$8.25
Cat D-7202	6146 transmitting valve	\$9.00
Cat D-7203	6LQ6 transmitting valve	\$12.00

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Cat D-1436	Midland 13-882C transceiver, AM, 11m, 23 channel, delta tune, ant. warning light.	\$149.50
Cat D-1430	Midland 13-830 transceiver, 11m, AM for budget minded. 23 channels, 5W input.	\$109.50
Cat D-4142	Mobile 1 Helical antenna. 11 metres, covered in durable plastic. B/Lee base.	\$20.00
Cat K-3134	Novice Transverter Kit. Build yourself. 27MHz to 3.5MHz novice channels. Max. output.	\$99.50

Cat D-3100	Kenwood TS700A transceiver, 2m, SSB, FM, CW, & AM. AC/DC, 22 channels. Special:	\$599.00
Cat D-3007	Multi 7 2m transceiver, 23 channel capacity (one channel fitted) FM.	\$189.00
Cat D-3010	Multi 2000A transceiver, SSB/CW/FM, 2m. 144 - 148MHz in 10kHz steps. AC/DC.	\$550.00
Cat D-3050	Kyokuto FM144 10SX transceiver, Synth. FM, 144 - 148.995MHz. 10W or 1W output.	\$315.00
Cat D-3500	Europa B transverter, 28-30MHz to 144-146 MHz. Capable of any mode trans. uses.	\$239.00
Cat D-3502	Kenwood TV-502 transverter, suits TS520 transceiver, output 144 - 146MHz.	\$240.00
Cat D-3040	Icom IC202 transceiver, 2M, SSB & CW. Covers 144 - 145MHz, comp. portable.	\$183.00
Cat D-4620	Green GA6020 antenna, 5/8 144MHz; 1/4 50MHz. S/steel whip, 1.3m long.	\$22.50
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Cat D-2560	NAG144XL linear amp for 2m band, same specs as above unit.	\$379.00
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Cat D-3806	Ham Prods ERB6 RF amplifier, 6m, 20-30dB gain for rec. 9 - 12V DC @ 15mA.	\$21.50
Cat D-3802	Ham Prods ERB2 RF amplifier, 2m, same specs as above.	\$21.50
Cat D-3832	Ham Prods. EXC2 converter, 2m, for 52-54 MHz, IF output on 28-30MHz.	\$27.50
Cat D-3836	Ham Prods. EXC6 converter, 6m, for 144-146MHz, IF output 28-30MHz.	\$27.50

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Cat D-2866	Kenwood QH-666 receiver. 170kHz-30MHz. All modes (FM optional), band spread, ANL.	\$229.00
Cat D-2801	Drake SSR-1 receiver. 550kHz-30MHz, Wadley / Loop. 5kHz dial accuracy, 3 way power.	\$300.00
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Cat Q-1360	F55 SWR/power meter. 3 - 30MHz, dual imp. Pwr 0-100W; SWR 1:1 - 1:3.	\$29.50
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"formal" tuning conditions. However, there are the "Haaarlooow" tuners, and I am one of them, that try to simulate an average voice for long enough to observe the nearly static pattern on the 'scope and make appropriate adjustments to exciter load and tune, linear load and tune, and mike gain. Not very satisfactory, and not very polite either!

Some wit on air considered that I should build an electronic "AAR" (read "Ah") generator. It would say "Ah" as long as the batteries lasted, and would give a static approximation of a voice waveform for long enough to allow for considerable experiment. So I plugged a mike into the rig and observed that without compression and processing, my voice averaged the oscillogram of fig 1, when viewed at the antenna. The repetition rate was about 100 Hz, in a rough triangle form. Such a waveform would be quite easy to generate. A tone of about 1 kHz modulated by a triangle wave would yield the required waveform as shown in fig 2. Modification of the 100 Hz triangle wave would tailor the generator to any particular voice.

So there we are, a waveform that will allow the operator to set his output controls so that the output is at a maximum with a waveform at the output that can be made as similar to the input as he likes.

Note that if the envelope frequency is too close to the modulating frequency, unwanted outputs will be developed that will change the character of the wave.

All the same the method is useable. However, there are still problems in interpreting the output wave form. The shape has still to be compared with a picture of

the original, in much the same way that a 2-tone output has to be judged. Whilst gross distortion is obvious, small deviations from the ideal are not so evident.

At this stage I borrowed a page from the testing methods used in television circuits. One very effective method of measuring linearity in television is to measure the height of successive steps in a staircase waveform. In particular, a modulated staircase is used to examine the performance of a video link at the colour subcarrier frequency. So why not a version at audio frequencies? The height of successive steps could be examined at the output of the transmitter, and the effect of each control in the system can be examined in turn. It is very obvious when the top step begins to crush, and it is very obvious when the transmitter output, on the top step, is at a maximum.

The advantages of using a test signal of this type are beginning to mount. The waveform is fairly similar to that of a voice, deviations from good linearity are fairly obvious, and the testing power level is at 25% of the PEP value. At this level there is little danger of anything overheating if the system is fairly well tuned.

The generator that I built is described here.

The staircase repetition rate and the modulating frequency were not more than an educated guess, 33 and 1700 Hz being chosen so as to have 10 cycles of audio on each step of 5 steps. 1700 Hz was chosen as being somewhat on the high side of the middle of the audio band of most transmitters. The block diagram of fig 3 shows the principle of operation. The non-symmetrical square wave 170 Hz oscil-

lator "A" is counted by the modulo-5 counter "B" whose outputs are weighted into a low resistance by network "C" to give the staircase as shown. This signal is used to modulate the output of the 1700 Hz oscillator "D" in the balanced modulator "E". The output of the modulator is put through a very simple RC low-pass filter "F" to produce the required waveform.

The detailed circuit diagram is shown in fig 4 and is quite straight forward. A total of 4 integrated circuits are used, TTL for the oscillator and counter, and the general purpose C 1496 for the modulator. It all fits on a piece of matrix board, 10 by 5 cm. The 4 controls are set as follows: RV 1, 2, 3 are set to obtain as close to even steps as possible at the input to the modulator, with a total amplitude of 150 mV. It will not be possible with this circuit to obtain exactly even steps, but the available result is quite acceptable.

RV4 is set to obtain +6 volts on pin 6 of the MC1496. A slight adjustment of RV4 may be necessary to obtain a symmetrical output when viewed on an oscilloscope. It might also be necessary to readjust RV1, 2, 3 to obtain equal steps in the modulated steps. The output of the prototype had a peak to peak amplitude on the top step of 1 volt. The power was provided from a -9, 0, +9 volt supply. A couple of 5.1 volt Zener diodes provided regulated rails for the TTL chips and the reference potential. Make sure that the 1700 Hz modulating frequency is within the audio range of the transmitter, as a 4 kHz signal for example just won't get through most filters used in sideband service.

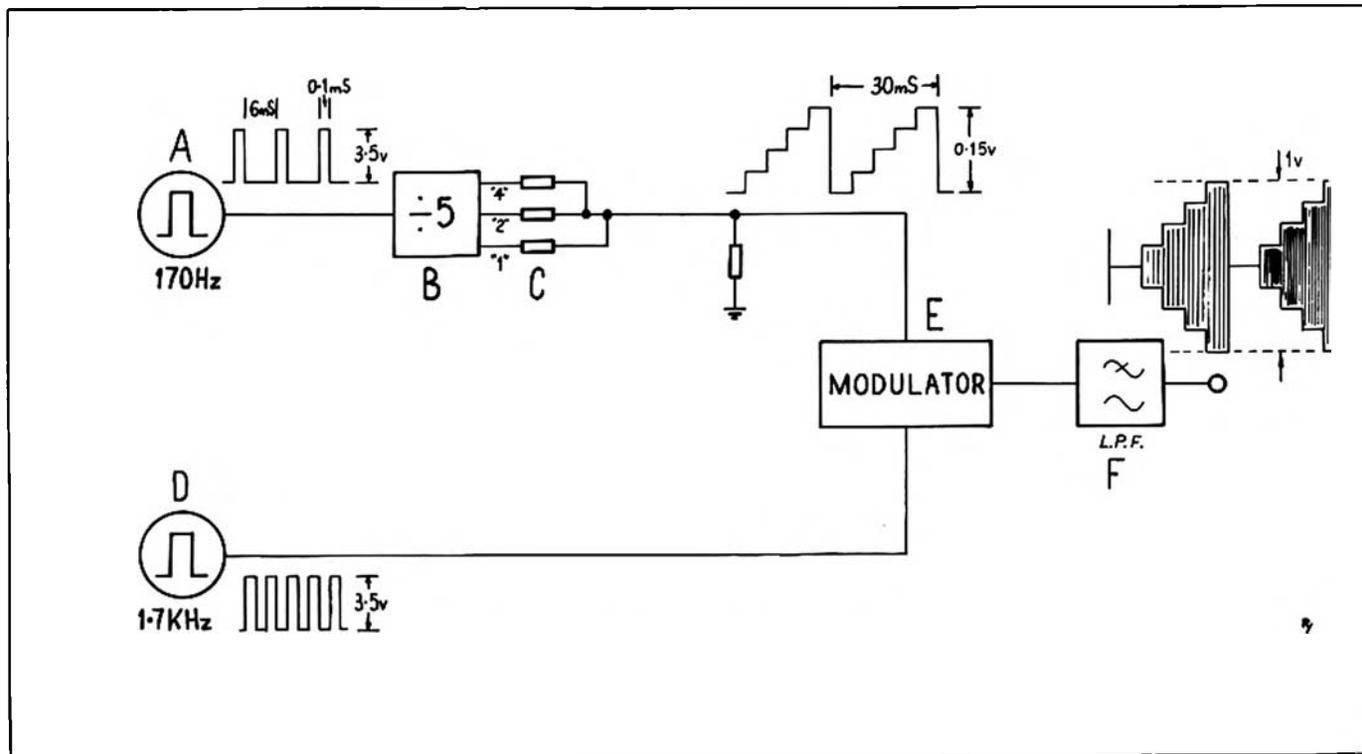
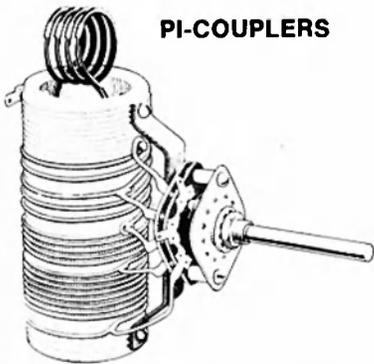


FIGURE 3



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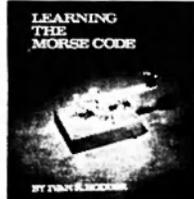
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2.16	5/8	16	3	No. 3007	\$1.16
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Reference: A.R.R.L. Handbook, 1961

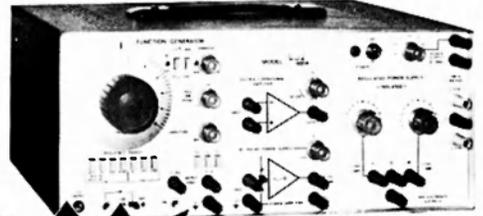
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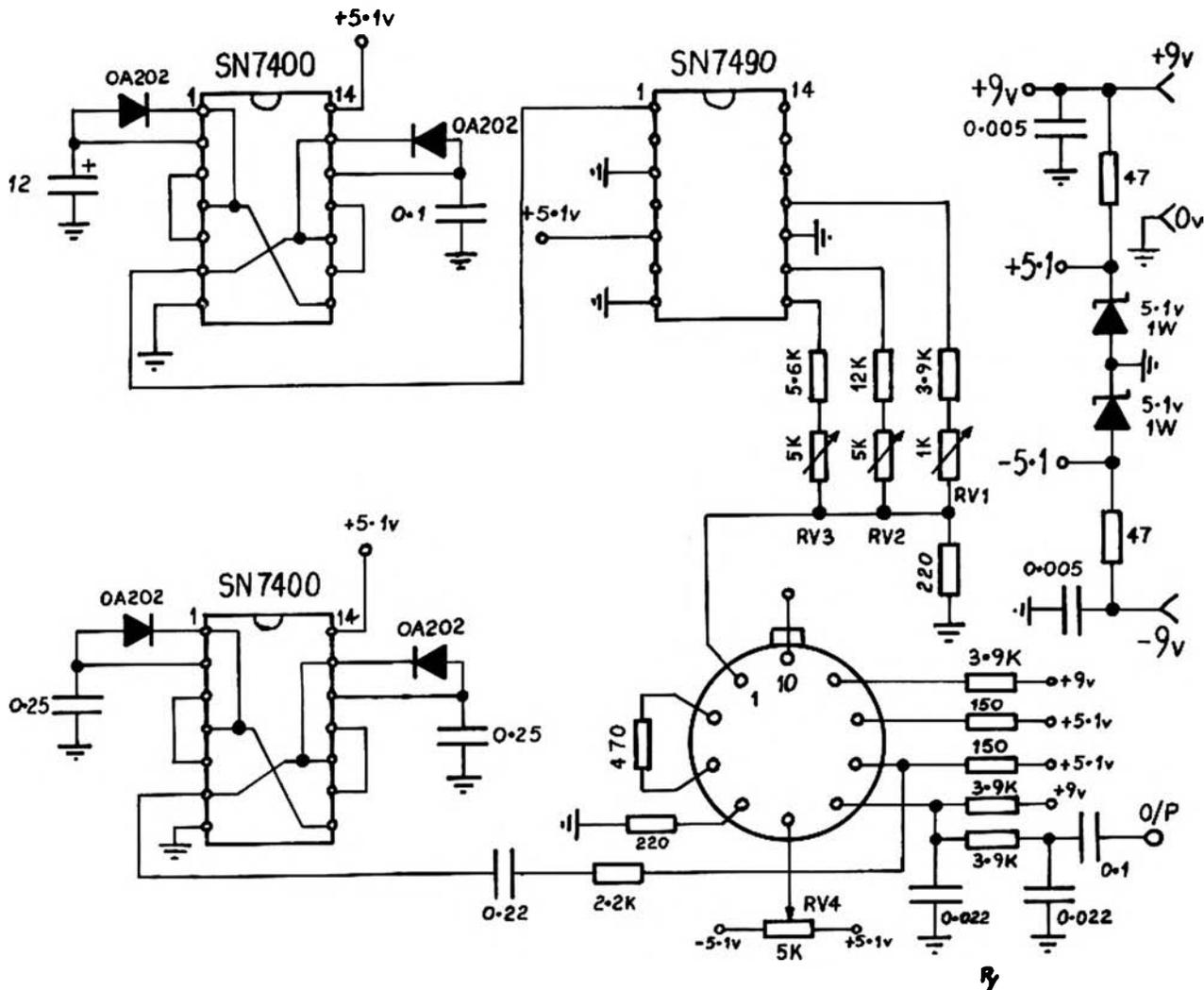


FIGURE 4

My transceiver uses a tip-ring-sleeve type of mike connector, so I fitted such a plug to the generator, with the tip connected to earth so that the Tx is operated whenever the unit is plugged in.

The circuit of fig 4 was theoretically derived, and when I put it together, it worked much as I expected and further development was not necessary. Thus there may well be some details that could be further developed or varied to suit individual tastes.

In use, without speech processing, the oscillogram at the output of the transmitter will be similar to that at the mike input, but only if the system is linear. The 1700 Hz modulation will of course appear as 14 MHz odd on the 20 metre band for

example. Inadequate filtering at the output of the generator results in a small amount of ripple on each step, although it is not a nuisance. So, set the load and tune controls for maximum amplitude top step, with even steps at the same time, setting the mike again so as not to cause overload. If you use an in-line power meter, note the reading and multiply by 4 to obtain the PEP output on equivalent voice peaks. You may well get a surprise when you compare it with the result of a 2-tone test. The chances are that the PEP output on equivalent voice peaks is higher than the 2-tone PEP by 20 to 40% since the average system loading on power supplies is lower. Unplug the stair-step and plug in a mike, and adjust the mike gain for voice peaks

of about the same level as the level on the top step as viewed on the 'scope, and you will have an optimised signal that is one of the cleaner signals on the band.

The use of the generator does not end here. It may be used to observe the operation of speech processors, which, after all only modify the linearity of the system in an ordered way without overloading the system, hopefully. A linearity fault in a system may be examined by observing the linearity at intermediate points with the aid of a suitable probe. At VK3AAR, this unit has certainly replaced the 2-tone generator, and may well disappear inside the exciter to operate in the "tune" position. ■

**DRAKE****R. L. DRAKE**

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# TELETYPE MESSAGE AND KEYBOARD GENERATORS

H. G. Kociemski VK4ZAP  
61 Spring Street, West End,  
Brisbane, Qld., 4101

Expensive and complex mechanical GONKULATORS are now defunct, or nearly so. This design was originally intended to replace the transmit section of the mechanical teleprinter, and indeed it could do so if a keyboard was installed at the input to the code converter. However, problems may be encountered with contact bounce.

## MESSAGE GENERATOR:

Basically, the device is a 5 unit code generator which can generate a sequential message e.g. "VK F/S 2 L/S ZHK SPACE TEST C/R L/F" and repeat, in standard teletype form complete with start and stop pulses.

The output of the device is standard TTL logic and can be used to drive an FSK or AFSK transmitter, though this has not been tried yet.

The unit functions very well, giving virtually zero distortion 20 mS pulses (variable) in serial form. Commercial practice dictated the use of 30 mS stop pulses. The stop pulses here are 20 mS (due to ease of design), however, it will generally be agreed that this is inconsequential.

I have tested the device on OTCs standard mechanical 50 and 75 baud teleprinters via a mercury wetted polarized relay and double current to single current converter.

Operation starts at the Automatic Sequence Generator which is driven by a (variable speed) clock. This sets the rate at which letters are printed.

The binary counter sequentially addresses the 1 of 16 decoder causing a sequential logic zero on each of the output lines. Hence the output of the transistors driver goes high and forward biases the respective diode encoder.

Hence the 5 unit code is generated in parallel form, and is displayed on the LEDs.

The 5 input NOR gate senses the presence of the 5 unit code and triggers the monostable multivibrator which "loads" the shift register within 3 microseconds. When the monostable returns high, the shift register is already loaded and immediately clocks the data, including the fixed start and stop bits, out to line.

The serial data is now a 7 unit code and could be used to drive a teleprinter

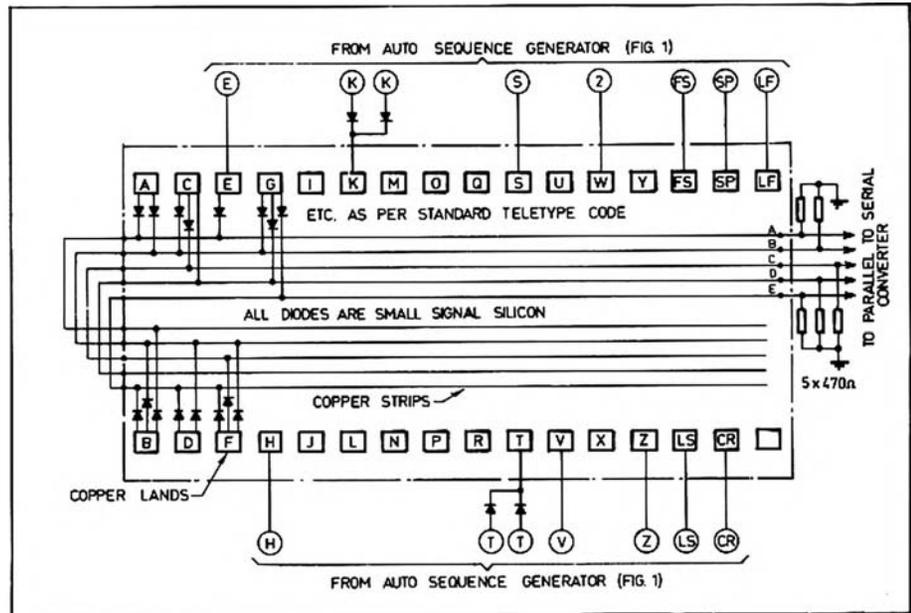


FIG. 1. DIODE ENCODER, PRACTICAL CONSTRUCTION

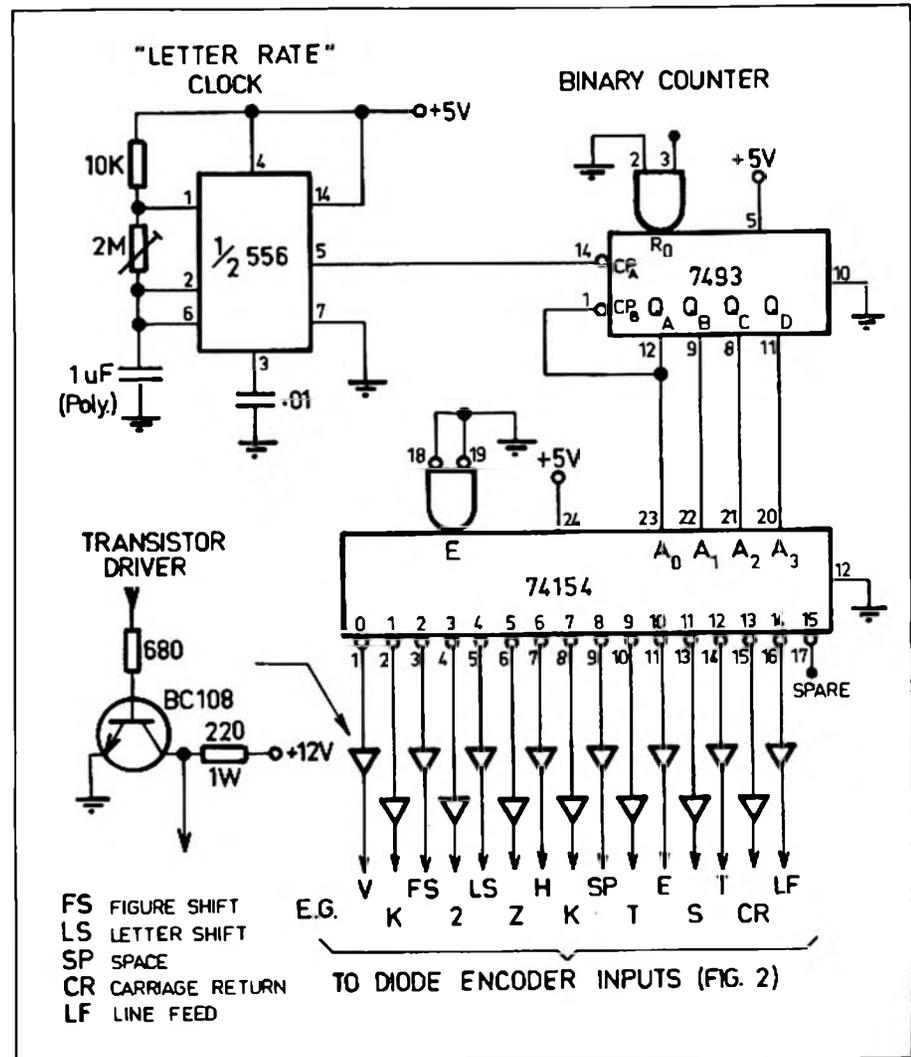
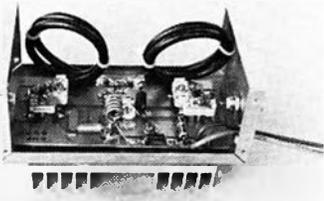


FIG. 2. AUTOMATIC SEQUENCE GENERATOR



### VHF CONVERTER KITS (ETI, Feb., 76, p. 63)

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Premium quality CTC transistors for FM or SSB service to 220MHz, 12.5V. VSWR protected.

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\*Please ask for membership form beforehand.

- **BACK ISSUES** of VHF Communications are normally available from stock except 1969 issues which are out of print. Single copies are \$1.10 each to 1974 and \$1.40 each from 1975 (average weight of each is 90g); VHF Communications binders to take 12 issues are \$2.25 each and weigh 250g.

- **BACK ISSUES** of other magazines are not available but sometimes can be obtained against special order.

- **BACK ISSUES** of Amateur Radio are available to members. Some issues are out of print however. Issues March to May 1972 at 30c each, June '73 to Dec '74 at 40c each, Jan-Oct '74 at 50c each, Nov 74-Aug '75 at 70c each, Sept '75 onwards at 90c each. Calculate average weight as 120g per issue.

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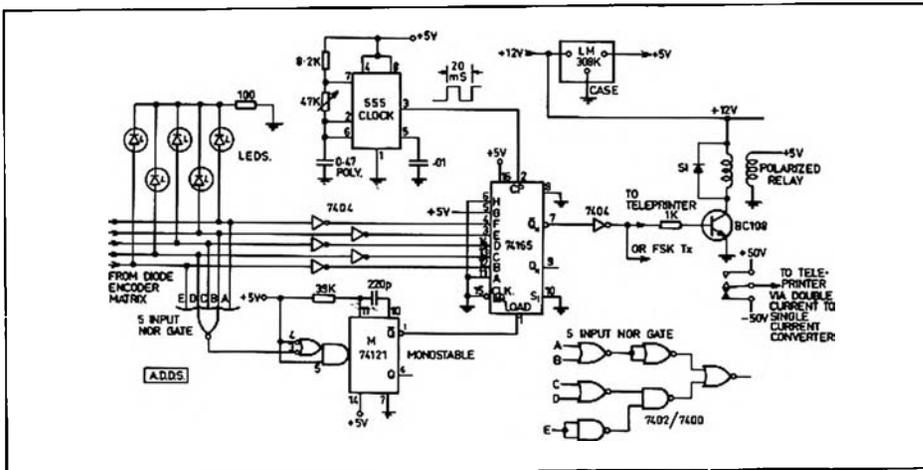


FIG. 3. 5 UNIT CODE PARALLEL TO SERIAL CONVERTER

via the interface shown, or it could modulate an FSK or Audio FSK TX.

Construction is non-critical with regard to layout due to the relatively slow speed — a legacy of mechanical days gone by. The device was built on Veroboard using readily available and cheap TTL ICs.

The beauty of it lies in easy programmability. Any message of up to 14 letters plus line feed and carriage return can be generated. A method of extending to 32 lines might be to use relays to switch the 16 output lines of the sequence generator to another 16 inputs on the diode matrix every time the counter recycled.

A possible application would be to replace the "answer back" code wheel in mechanical teleprinters or as a "quick brown foxes . . ." or "RY, RY, RY . . ." generator (with extended binary counter/decoder circuitry). On the other hand it does make an interesting conversation piece!

When typing blindly into a transmitter with an electronic RTTY generator, or when typing into an FRXD (typing reperforator), which is what I use for the receive leg or local loop, it is very difficult to determine where to place the "carriage return" signal so that the receiving page printer will not print a great "blob" at the end of the line or return prematurely to the start of the page. Some FRXDs have an ingenious gear which rings a bell when the end of the line is reached.

The "carriage return" indicator presented here (fig 6) is composed of 2

counters in series (capable of counting to 256) but only counting to 70. 72 characters is the maximum per line, so when the alarm switches on at 70 there is a warning that the end of the line is approaching.

The first counter is fed from the output of monostable 2 in a previous circuit and counts every time a key is pressed. The counter outputs are wired so that count 70 is detected and drives an alarm circuit.

The counters need to be cleared to zero for the next line, and this is done by a detector circuit which responds to a "carriage return" signal and changes the state of the reset line. The alarm switches off and all is ready for the next line of characters.

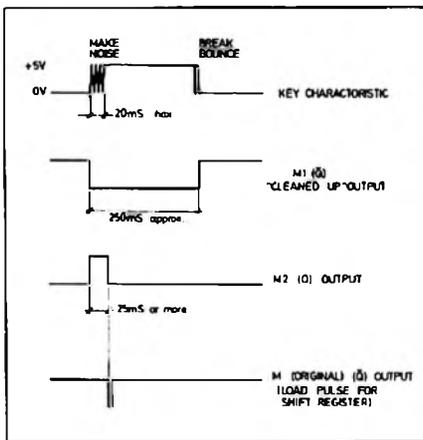


FIG. 4

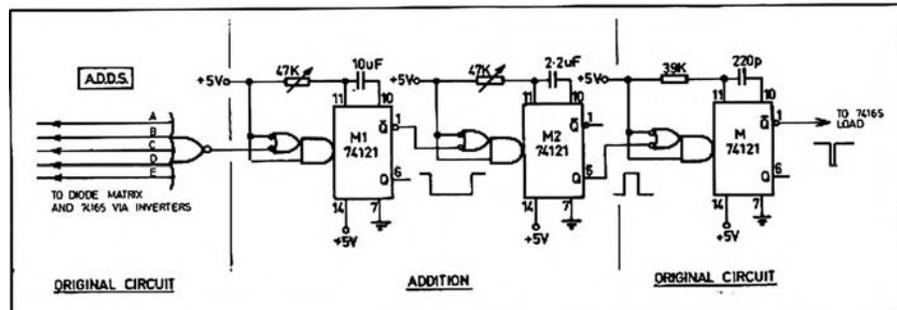


FIG. 5

# MAKE IT ON 70 cm FROM YOUR MOBILE OR HOME STATION, 2m RIG

## NEW RELEASE — TRANSVERTER MODEL MMT432/144

UTILIZING an IF of 144 MHz ★ 10 WATTS DRIVE OR ½ WATT ★ VOX OPERATED

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A wide range of applications is offered by this MMT432/144 transverter, which by virtue of its linear mode of operation will enable 144 MHz SSB, FM, AM or CW equipment to be used at 432 MHz.

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Limited supply only available ex stock, further units currently on order for expected early delivery.

Model MMT432/144 — Price \$235, pack and post \$2

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MMT TRANSVERTER

All MMT TRANSVERTERS are supplied with individual factory report. All units are housed in highly durable black diecast case, circuitry is constructed on high Q fibre printed boards. High power stages are housed in separate internal compartment.

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THIS PRESCALER USES HIGH SPEED ECL TECHNOLOGY TO ACHIEVE ×10 OPERATION TO A FREQUENCY OF 500 MHz.

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All modules are enclosed in black cast-aluminium cases of 13 cm by 6 cm by 3 cm and are fitted with BNC connectors. Input and output impedance is 50 ohms. Completely professional technology, manufacture, and alignment. Extremely suitable for operation via OSCAR 7 or for normal VHF/UHF communications.

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The double NOT is necessary to keep the input of the 7430 from floating to a 1. (This input was originally tied directly to line 4 and caused a permanent 1 there).

The 4.7 uF capacitor was used to remove very fast transient pulses which tended to interfere with counter operation when certain keys were pressed.

(Note: Each counter should have a bypass capacitor at the supply pins for best results. The popular 7490 decade counter could also be used with similar decoding. Tech Ed.).

**KEYBOARD GENERATOR:**

As a companion to the RTTY message generator, this keyboard would make a valuable addition to the shack.

Further development of the Message Generator has produced a complete solid state teleprinter transmit unit, thanks to the recent availability of a good quality, low cost keyboard from Melbourne.

2 ICs and associated components are required to transform the original "fixed message" generator to a keyboard unit.

The big problem was elimination of false triggering due to contact noise and bounce in the keyboard.

Monostable M1 and M2, take care of this as can be seen from Fig 4. The monostables, as wired, only triggers on negative going edges.

With this simple but effective system, a criterion must be observed for correct code generation. The typing action must be carried out within the period of operation of monostable M1 i.e. less than 250 mS approximately (normal typing action), otherwise a false trigger will occur, producing an "a:l spaces" condition.

Even though the circuit has been modified, the fixed message facility still performs perfectly, and that part of the circuit is built on a plug-in board so that it is quite easy to change from keyboard to fixed message.

**FOOTNOTE**

The circuits shown here could probably be simplified somewhat to reduce component count and power consumption, but obviously works "as is".

Technical Editor ■

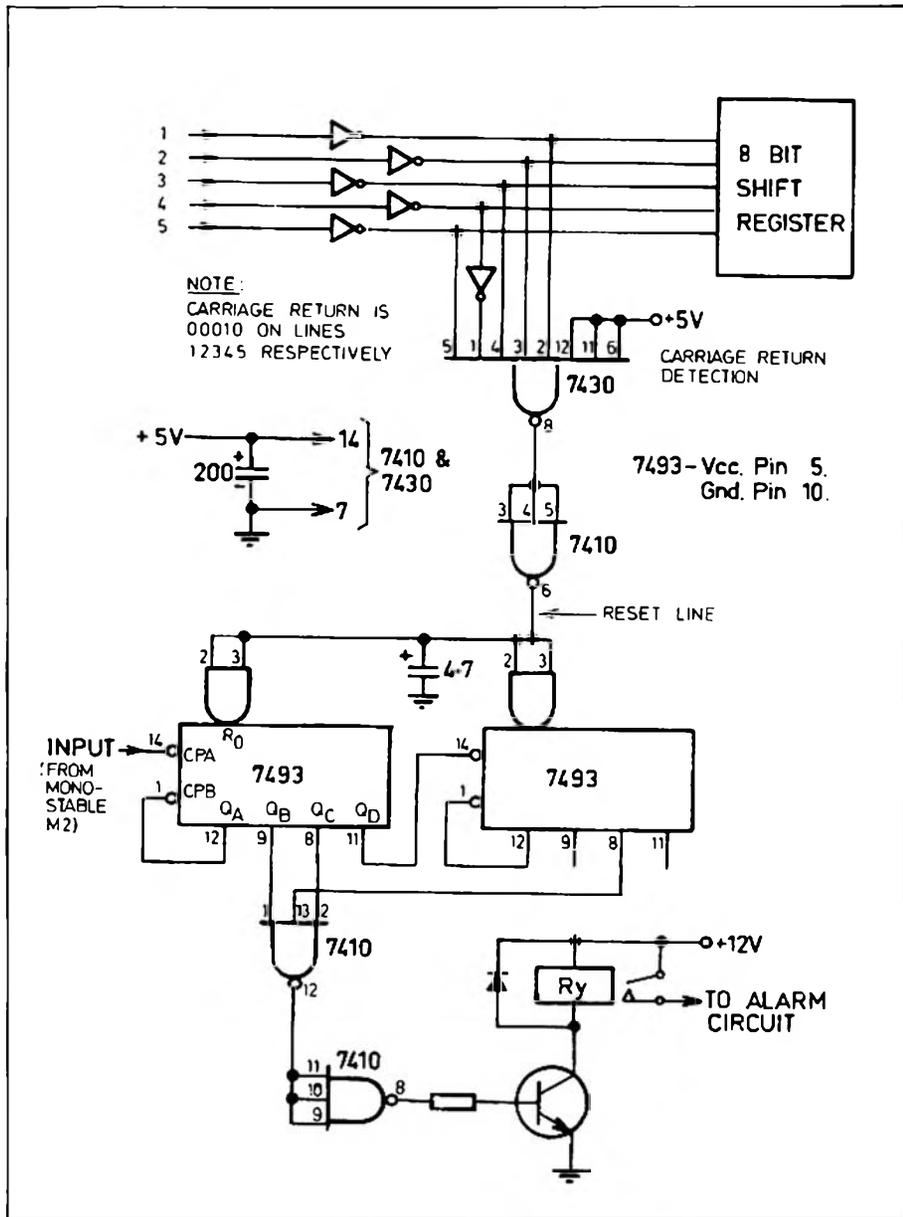


FIG. 6. CARRIAGE RETURN ALARM CIRCUIT.

By Jack Hum, G5UM<sup>9</sup>

<sup>9</sup>(RSGB VHF Awards Manager, member of RSGB VHF Committee, conductor of "Four Metres and Down" column in Radio Communication from 1966 to 1974, member RSGB Council 1952-59, and a Vice President of RSGB).

# A PERSONAL VIEW OF THE METRE WAVE SCENE IN THE U.K. NOW

Any expatriate amateur radio operator returning to his native UK after a few years in, say, VK or ZL would hardly believe his ears as he sampled the 2m or the 432 MHz bands today.

present in its place is band planning by mode. Old familiar beacon signals appear in new places on the dial. And new unfamiliar repeater signals are now to be heard popping up almost 24 hours a day.

Putting his sensations into one sentence, he would probably conclude that metre wave development in Britain was proceeding at a dynamic rate unsurpassed in any other area of amateur radio activity. He would be right, even if he looked at no more than the already mentioned 144

MHz and 70 cm bands. He would be even more right if he took account of the rest of them from 70 MHz right up to 24 GHz.

It has not always been so. In the fifties it seemed as though the metre wave scene in the U.K. was frozen into the pattern it took up immediately after the war, when crystal controlled converters into main station receivers as IF strips, and simple amplitude modulated transmitters were the norm. The 2 m and 70 cm bands were subdivided by voluntary arrangement into

Very much a thing of the past, he would find, is the old geographical band planning he knew so well. Very much a thing of the



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Dimensions: Mounting Centres: 2-1/16". Mounting Hole: 5/32" x 1/4". Overall — Base: 2 3/8" x 1 1/8" — Height: 1 1/2". Weight: 7 oz.

Colour Code: 240 V Black, Red. 12.6 V C.T. Blue, White, Blue. 150 mA.

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**MODEL OL64 D/P MULTI-METER.** Very ruggedly constructed this model is particularly suitable for workshops. It features special scales for measurement of capacitance and inductance. Diode protested movement: **Specifications:** 20,000 ohm/volt DC. 8,000 ohm/volt AC. DC volts — 0.25; 1; 2.5V; 10; 50; 250; 1,000; 5,000. AC volts — 10; 50; 250; 1,000. DC amps: 50 uA; 1 mA; 50 mA; 500 mA; 10 A. Ohms — 4 K ohm; 400 K ohm; 4 M ohm; 40 M ohm. Centre scale — 40 ohm; 4,000 ohm; 40,000 ohm; 400,000 ohm. Decibel: —20 to +62 dB. Dimensions: 6" x 4-1/5" x 2"; 152 x 107 x 51 mm. Inductance — 0/5000H. Carrying case available. Model C.

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zones related to frequency; if you wanted to work a station in Scotland or the north of England you turned your beam antenna that way and tuned only a restricted portion of the band in which Scottish and northern stations congregated. This obviated the chore of having to tune the whole of 144-146 or 432-434 MHz, which are the British communication allocations.

First indications that this pattern was to be defroze came when the F3 frequency modulation mode gathered some strength, followed later by the appearance of single sideband. At first these modes were regarded as disturbing to the ordered staticness of the 2 m and 70 cm bands to the extent that they were confined to spot frequencies, 144.48 MHz for FM and 145.41 for estœric A3J, the sport of kings, electronic kings at least and outside the competence of the drill-and-hacksaw kitchen table enthusiast who delighted in making things work for himself but not anything quite so fraught and frightening as single sideband at VHF.

Today it seems unbelievable that such a state of affairs existed little more than half a dozen years back. Frequency modulation is now the standard mode of voice communication not only in Britain but in VHF circles in most of the European countries that make up IARU Region 1. One should qualify this statement by adding "voice communication for local contacts", for it is closely matched in popularity by A3J for DX working. Each is tidily compartmented, FM above 145 MHz and SSB below 144.5 MHz. The "bit in the middle" is occupied by a mixture of modes from slow scan television, local nets on FM, plus the last vestiges of amplitude modulated telephony that still remain.

The bottom 150 kHz of the British 4 m, 2 m and 70 cm bands is reserved for CW, still the best-ever mode for guaranteeing a sustained contact when ail else fails and when even SSB, reading nil on the S-meter, at last peters out. To some, telegraphy remains the last bastion of true amateur radio, a romantic notion not shared by many; yet the fact remains that it is the last bastion of something else, and that is the ability to demonstrate operating skill. Where no skill is called for to actuate a press-to-talk button on a phone transmitter, a good deal of expertise is needed to talk through the finger tips via a morse key, making it up in the head as you go along to emerge in the brain of the person at the other end as pure conversation, impeccably phrased and spelt.

**COMMUNICATION BY PROXY**

From this image of direct communication via the A1 mode nothing could be in greater contrast, aver many VHF operators, than the concept of communication via repeater. Since the advent five years ago of the pioneer 145 MHz repeater developed by the radio amateurs at the Pye establishment and installed a dozen miles south of the city of Cambridge, repeaters have proliferated throughout the British Isles to an extent that saturation point has virtually been reached in respect of co-chan-

nelled VHF repeaters spaced at 100-mile intervals, and interest is now being turned on the development of a parallel chain on 70 cm. The 2 m chain has 600 kHz spacing between input and output frequencies, the 70 cm chain 1600 kHz.

Two primary causes of this burgeoning of the repeater ethic are, first the enormous increase in mobile operation in the U.K., where one fifth of the 20,000 amateur licensees also hold "Stroke mobile" permits (and most of them use VHF); and secondly the widespread availability of ex-taxi transceivers readily adaptable to the amateur bands, and of Japanese "black boxes" that all too readily earn their owners the appellation of "appliance operators" with not the slightest effect on the huge sale of such devices.

Few developments on the metre wave scene in the U.K. have been so controversial as the repeater one. Extreme positions are taken up, expressed in such statements as "This isn't real amateur radio" to, on the other hand, "This repeater business is the ultimate in ease of communication". Both are right — up to a point! What is incontrovertible is the fact that repeaters have immensely extended the range of vehicle to vehicle equipments and probably made such communication safer than it was in the simplex days of one hand on the steering wheel and the other on the rig. And anyway, as one correspondent to the RSGB's *Radio Communication* remarked "If you don't like repeaters you don't have to use them. Metre waves represent a house of many mansions, and if you don't like one door try another".

**MANY MANSIONS**

A look now through some of those *other doors*. One of them is labelled *70 MHz*; it is the nearest thing to the American 6 m band which the British possess, and is peculiar to the U.K. Strangely, it is denied to the Class B licensees with their G8-plus-3 call signs and no morse requirement. This at once reduces its population to those full-licence owners who find it a fascinating band capable of yielding DX well beyond the range to be expected on 2 m. But it is, one must confess, a minority interest.

So also are the microwaves. But here, as with 4 m, amateur curiosity impels exploration, helped along by the opportunity to earn special operating awards which the RSGB offer for long distance coverage on such bands either from home locations or from contest operation. Particularly on the microwaves, no "frozen into accepted patterns" is evident: antenna dishes once *de rigeur* become supplanted by Yagis, klystrons by Gunn diodes (or vice versa!)

Of other mansions, such as Oscar or high definition television, space prevents one from doing more than to record that they exist, enjoy an enthusiastic minority following and are productive of some surprising results.

**HANDS ON TILLERS**

Lest it be thought that all this dynamic activity is random, self-generating or spon-

taneous, one had better emphasise that most of it is inspired, directed and generally assisted by the national society, the RSGB, operating through such bodies as the VHF Committee, the VHF Contest Committee, the Repeater Working Group and similar voluntary bodies that skilfully hold tillers on to true courses where in their absence there might well be some wild — perhaps dangerous — navigation.

For example, all beacons are an RSGB responsibility. So are the repeaters. The licences for all of them are vested in the RSGB by the UK amateur licensing authority.

Internationally, the RSGB works in close co-operation with sister societies on the mainland of Europe, or what is known as IARU Region 1, mentioned earlier. The dates and rules of metre wave contests are harmonised in this way. Farther ahead lies the watershed of the 1979 World Telecommunications Conference, and the hard look it will doubtless give to amateur frequency allocations. Preparations to surmount it are well advanced in RSGB, and the metre wave content of those preparations is a very sizeable one. ■

**THE FACE BEHIND THE MICROPHONE**

Pictured is Graham Clements VK3TK.

Graham is currently the chairman of the VK3 division broadcast committee.

He first became interested in radio at the age of 12 when he began SWLing to commercial stations. He joined YRCS when he was 14 and progressed to senior level in approximately 18 months.

His limited licence (VK3ZLT) was obtained in 1972 and he became active mostly on 2MX FM and AM. In mid 1973 he joined the Broadcast committee, and obtained his full call in 1974.

He has been active on 40 and 20 DXing, and has now branched out to ATV which he thoroughly recommends to anyone who is looking for something extra-exciting.

Graham is presently studying for a degree in Communications Engineering (3rd year) at RMIT.

We wish him well in his ventures.



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# YAESU AMATEUR EQUIPMENT



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# THE DEATH OF AMATEUR RADIO AS A HOBBY

Andrew Davis VK1DA  
Licensed 11 years, Member WIA, Life Member ARRL

The recent reports giving incredible statistics of the imports of CB radios to the USA (for example, over half the value of air freight shipments being CB gear) were rather mind-boggling.

I remember being surprised, too, on reading that "point-of-sale-licensing" is now being practised in the U.S.A. This is an elegant phrase meaning that you get your licence and call sign from the dealer when you buy your gear.

But the latest report is that all new cars coming out of Detroit will soon be equipped with a combination AM/FM stereo/CB transceiver radio as standard. Just think! Every new car with CB in it! Well, that did it! I now reckon it's only a matter of time before the craze really spreads to Australia. Sure, 27 MHz will be a mess, like it is in the States, but the "citizens" don't care about spectrum pollution any more than they care about other forms of pollution. The 27 MHz pirates currently screaming about "rights to communicate" will turn pale at the interference on the band they wanted to be free to use. But what will amateur's reactions to all this be?

Some will stick their heads into the proverbial sand and pretend it is not happening. Others will react with righteous indignation and others with relief. Some won't notice and won't care when they find out.

I guess some will castigate me for putting these ideas into print. After all, it's tempting fate to speak of unpleasant things, let alone put them into print. This attitude is one of the basic problems faced today by amateur radio, and in Australia, the WIA.

In his report, Bob Arnold stated that "the Institute's . . . policies must be geared to the closing decades of the 20th Century so far as events can be predicted". In recommending a change of name for the WIA he added that "the word 'institute' is somewhat Victorian", so he feels that a change in name would help the members and the WIA to update to today and handle tomorrow better.

But he felt that the individual amateur and member was generally lacking something: "one of the interesting facets of life which has come out of the investigation is

*the attitude of the amateur himself . . . Many comments . . . indicated a lack of understanding of various functions of the Institute . . . (one) hears the comment 'I do not have time to read AR or listen to the broadcast' but yet these people will talk in monosyllables for an interminable period, wasting many hours, a few minutes of which could be devoted to an understanding of the Institute. Perhaps this is part of our way of life today . . ."*

In Future Shock, Alvin Toffler says that "as the rate of change in society speeds up, more and more older people feel the difference keenly. They . . . become drop-outs, withdrawing into a private environment, cutting off as many contacts as possible with the fast-moving outside world, and finally, vegetating until death".

I'm sure that this concept extends to organisations, too. Thus it is that the possible fate of the individual amateur, the WIA and the hobby itself is vegetation until death.

Our hobby could die of future shock. In order to cope with the future, the WIA must become more flexible, its members must open their eyes, not drop-out. Subjects like CB, the use of the term 'radio ham', and the progressive commercialisation of our hobby cannot be ignored. They must be faced realistically, the emotional reaction must be filtered out.

A WIA Federal Council resolved to ban the use of the term "radio ham". Yet how are we known to the general public? You give the answer.

Facing CB realistically, let's see what is in it for us. Some CBers will never tire of endless non-conversations (uncomfortably similar to those conducted by many amateurs), but others will be drawn to the technical side of the hobby and will become valuable members of the amateur body. If 5% of CBers were drawn to amateur radio, our numbers could double within a few years. Check the figures yourself.

Where else will the much-needed infusion of youth and enthusiasm come from?

What would you find more exciting, as a person wanting to "talk on the radio", CB or amateur radio? The amateur bands are full of endless monologues, morse,

broadcast stations etc. and few of the conversations one hears are technical in nature; few of the contacts are other than "skeds". DX activity on some bands is dominated by a few, who take offence if any other station attempts to contact their DX station . . . On the other hand, many CBers are interested in fiddling with their equipment and antennas to improve signals etc. Many, too, are young and enthusiastic about their hobby. The illegal nature of "CB" in Australia only adds to the attraction. I suggest that amateur radio must often lose to CB even when the person concerned is interested in radio as a technical/communications hobby. Can we really be surprised?

Take a realistic look at the International scene and amateur radio's chances at WARC in Geneva, 1979.

Far from gaining HF bands, we run a serious risk of losing HF and VHF bands or at least parts of them. 146-148 MHz is in danger, 420-450 even greater danger. So you're not a VHF type? Never mind, you need not be smug. If possession was nine-tenths of ownership, you wouldn't have much left of 3.5, 7 or 14 MHz. By all means keep the 60 kHz at 1.8 MHz!

But it is certain that the events of WARC 1979 will pass almost unnoticed by many amateurs. Unnoticed until they call CQ on a band no longer allocated to amateurs. (I suspect that if amateur radio was declared illegal tomorrow, most skeds, DX activity, 2m FM contacts including repeaters would continue regardless for years. We would all be pirates, but amateurs now regard the use of "their" bands as a right rather than a privilege; does this sound familiar?)

Do you think your hobby is worth saving? I do, but scores of countries in the world do not (watch them vote in 1979).

To save it, we need to put on a new face and start thinking differently behind our faces.

Bob Arnold reckons the WIA needs a new face. Chances are, you haven't even read his report in April AR, so you couldn't be one of the uncaring ones.

Start taking Amateur Radio seriously. Or you may become a pirate.

— Reprinted from "Forward Bias", Sept., 1976. ■

## AMATEUR RADIO AT EASTLAND

Graeme Scott VK3ZR

During the week July 26-31, the Box Hill Technical College ran a display of its various trade departments to show the public what courses are offered at the college. Parents of prospective students were able to speak to teachers and discuss the future careers of their sons and daughters.

The college amateur radio station VK3BHT was operated portable in the shopping centre at Ringwood. As part of the college's facilities are devoted to teaching radio apprentices and technicians (evening classes), and of course, the form 5 Youth Radio Club Scheme, radio had to be represented.

On Monday 26th, I took my 14AVQ vertical, which covers 40, 20, 15 and 10 metres and installed it on the roof of the Eastland Shopping Centre. For 2 metre FM, I borrowed a Ringo from Vicom, and a power supply for the IC22a, and with the aid of some borrowed coax from Bail Electronics, we had our antenna system installed.

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The FT200, and the IC22a were set up on the desk and, with an appropriate display of QSL cards and posters, we were on the air.

It wasn't long before we were informed that our SSB transmissions on 7, 14, 21 and 28 MHz were disturbing colour TV reception of the Olympic Games! Oh Boy! what to do?

Andy VK3UJ, came to the rescue on Tuesday with a low pass coax. filter. This however, did nothing to reduce the TVI. Later in the day, Andy tried his Uniden 2020 and the TVI was just as bad. We concluded that the TV antenna and our 14AVQ were too close; even though the TV antenna was line of sight to the Mt. Dandenong transmitters, just a few miles east of the centre. There was just plain overloading occurring in the Brash's TV store antenna system.

I then decided that a high pass filter was the only way we could get rid of the TVI. The form of the TVI was evidenced by sound bars completely wiping out the picture, lack of sync., and the reversion of monochrome by almost all the receivers, which, incidentally, were of diverse brands — local and imported.

The ARRL handbook was consulted and a high pass filter was constructed in a box made from a P.C. board laminate. I established good PR with the store manager, who was delighted that I was trying to solve the problem, as sales were being affected! (We were affecting cassette re-



**JULIE, XYL OF GRAEME VK3ZR  
OPERATING THE STATION**

orders etc. too, but that is another matter). Ultimately, the Olympics had priority.

I had no time to dip the coils in the filter, but just installed it in series with the coax to the store's distribution amplifier which was apparently overloading on our HF signals. Once connected, the filter degraded the TV signal slightly, so I tried spreading the turns on the coils, and achieved satisfactory pictures. Once that was achieved, I told the store manager that I'd start transmitting and would he watch for any further trouble.

As it happened, I could see some TV sets from my operating position and 7 MHz and 14 MHz signals had no effect,

on the Olympics etc. I felt that I'd achieved something, and proceeded to log many contacts TVI-free.

Thanks to the excellent response and co-operation of amateurs contacted, I was able to put a number of members of the public onto the SSB and FM microphones and they were able to see Amateur Radio in action. The young boys, especially enjoyed talking to someone at the other end of the microphone.

On Saturday 31st, many VK2's and VK5's were contacted on 7 MHz. My special thanks to Ern VK2AJ whose QSO I interrupted to obtain an interstate contact. Once established, we were called by VK5's, VK2's, VK3's and VK7's. Rob VK2AGK was worked 5-9-QSB mobile in Newcastle using a Uniden and a Hustler whip. You certainly were getting out well Rob!

Later on in the morning, VK3AMR at Monash University was contacted. The University's open day was on and an FT200 was being used with a G5RV to show off Amateur Radio at the Uni.

Overall I feel the display was a great success and it was gratifying to see so much interest in Amateur Radio. A few CBers were put on the right track, and might be doing the NAOCP or AOCPC course at VK3BHT in the evenings in 1977.

WIA membership forms and amateur licence details were taken by many people, so hopefully the whole exercise has been, or will be, quite fruitful. ■



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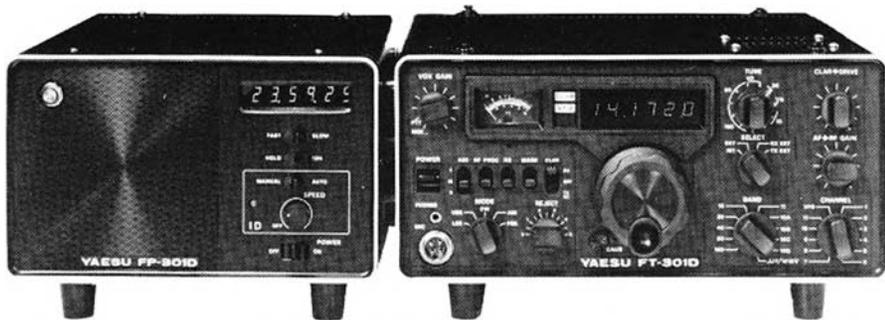
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# REVIEW OF THE YAESU FT301D TRANSCEIVER



It seems that the future is getting closer all the time. The Yaesu FT301D is a case in point. Contained in a package only 280 mm wide, 125 mm high, and 370 mm deep is a fully solid state, 200 watt input, all band HF transceiver with just about every feature that the imagination could conjure up.

However, back to the beginning. The advent of fully solid state HF transceivers for the amateur market has been slow and surprisingly from the United States rather than from Japan. Prior to the new Yaesu FT301 series there have been at least four different American models available in this country over the last year or two. One can only guess the reasons for the rather late appearance of the Japanese equivalent.

The Yaesu Musen Co. are to be congratulated on their new product which will undoubtedly set the pace for other manufacturers to follow.

The FT301 series consists of four models: either 20 or 200 watts input, with or without digital dial readout. The model to be reviewed has the full 200 watts input and the digital readout. Certain other features are optional and these will be itemised later.

## TECHNICAL FEATURES

The FT301D transceiver covers all the HF amateur bands in 500 kHz segments. These are 1.5 to 2.0, 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 27.0 to 27.5 and 28.0 to 30.0 MHz in four segments. Operation is provided for SSB with upper or lower sideband, CW, FSK, and AM. The transceiver is supplied with the normal 2.4 kHz filter for SSB operation but it is possible to install both a 600 Hz filter for CW and a 6 kHz filter for double sideband AM operation. As far as is known this is the first time that a full bandwidth AM filter has been available in an HF transceiver.

Following in the tradition of the FT101E an RF speech processor is included. Another first in HF rigs of this type is a receiver notch rejection filter. Naturally all the other normal features that one expects are there. These include, noise blanker, clarifier for receive or both transmit and receive, VOX, external VFO switching and fixed channel operation with eleven crystal positions provided. Three different AGC time constants are switch selected from the front

panel and allow fast, medium, and slow decay times.

In addition to the band coverage mentioned above, a bandswitch position is allocated for WWV reception on 5 MHz. This is slightly different to normal in two aspects; firstly in the frequency chosen, and secondly that it is fixed tuned to exactly 5 MHz, with an internal trimmer to set the actual zero beat point.

The transceiver requires a source voltage of 13.5 and is therefore all ready for mobile or portable operation from a normal car battery. For home station use the matching FP301 AC power supply is recommended. This unit is capable of delivering 13.5 volts at 25 amps with excellent regulation.

As the photo of the FT301 shows, it bears a strong resemblance to the FT221 two metre transceiver reviewed in the June issue of this magazine. It does indeed share the same front panel and cabinet as well as the plug-in printed board internal layout.

Another design feature of the FT301D is the broadband transmitter driver and output stages. This eliminates the need for the usual final tuning and loading controls. However, in common with all circuits of this type, a close 50 ohm match is required for the output stage to deliver maximum power. Perhaps to satisfy doubts that the receive front end is really peaked up for maximum signal a 'Drive' control calibrated for each amateur band is brought out to the front panel. This operates a permeability system similar to that in the FT101 series transceivers and tunes the receiver front end and the low level transmitter stages. There is no doubt, it's a good feeling to peak this up and know everything is on the nose.

## THE FT301D CIRCUIT

After looking at the technical features, we will now see just how it's all done. The FT301D is of single conversion design. With an IF frequency of 9 MHz the conversion scheme is rather like the FT200. The FT101 on the other hand is a double conversion design with a second IF and sideband filter at 3180 kHz. The receiver front end of the 301D uses the now almost standard 3SK40M dual gate FET as the RF amplifier and also as the first mixer. The IF amplifier section starts off with a  $\pm 10$  kHz monolithic filter which

helps to improve the receiver front end performance in such aspects as cross modulation. This is followed by two stages of amplification before the main filter section is reached. As mentioned before, three filters can be installed and these are diode switched along with the function switch. Unfortunately, the FSK position on the function switch is not explained in the instruction book and it is not clear whether an RTTY filter is available, and if it can be installed. Our review sample had only the standard SSB filter installed and this was in circuit in all positions of the function switch.

The output of the VFO unit is pre-mixed with the output of the heterodyne oscillator to produce the transmit frequency, or to convert the input frequency to the 9 MHz IF, on all bands except on 80 metres where the 5.5 MHz VFO is subtracted directly from the 9 MHz IF to produce 3.5 MHz. The crystal frequencies in the heterodyne oscillator range from 16 MHz for the 160 metre band to 44 MHz for the 29.5 MHz segment of the 10 metre band. An interesting feature of the audio section of the receiver is the inclusion of a top cut filter with a sharp cut-off above 2.6 kHz. This provides very clean audio with a complete absence of high frequency hiss.

The rejection filter works very much like the old single crystal filter common in communications receivers of the era past war years. A single crystal of about 9 MHz nominal frequency is series tuned with a small variable capacitor to vary its resonant point across the band pass of the transceiver. In all a very simple but effective idea. It's a wonder someone has not thought of it before. The idea should be adaptable to most existing transceivers.

A separate AM detector is provided, however it was unfortunate that the optional AM filter was not installed so that we could check out the AM performance.

While the transmitter circuitry is fairly conventional a few interesting design points are worthy of mention. The RF processor is designed to produce similar results to the one installed in the Yaesu FT101E. It is, however, operated at the 9 MHz IF frequency of the FT301D rather than 2180 kHz. A second 9 MHz filter is

included to remove the distortion products produced in the clipping process.

The 301D output stages consist of two broadband amplifiers in cascade. The output of the 10 watt driver stage is connected via a BNC coax fitting to the 100 watt final stage which is attached to the rear of the cabinet as a separate unit. The output of the final is routed back into the transceiver proper via a second BNC connector to the output filter section. If low power operation, or drive an external transverter is required, it is simply a matter of taking output from the appropriate BNC socket.

The digital display as fitted to the FT301D is set up to read the VFO frequency. The 5.0 to 5.5 MHz of the VFO is converted to 13.0 to 13.5 MHz which is the frequency at which the display counts. The MHz prefix for each band is produced by a diode matrix switched by the band switch. Although the display reads to 100Hz points the counter itself reads down to the 10 Hz points. This is to eliminate flicker which would otherwise occur on the last digit.

Front panel indicator lights set between the dial readout and the 'S' meter show clarifier operation, and VFO or fixed channel selection.

#### THE FP301 POWER SUPPLY

This supply will be available in two versions. The FP301D also includes an LED digital clock which can be switched to give either a 12 or 24 hour readout. It also has an automatic CW identifier into which the owner's call sign can be programmed. As a sample of this supply was not available at the time this review was compiled we cannot comment on its operation.

The standard FP301 supply is capable of delivering 13.5 volts at a maximum current of 25 amps. The regulation from no output to 20 amps is better than 1/2 volt. A total of five transistors, four in the output, one driver plus one IC to provide overload protection, and a heavy duty diode bridge make up the solid state complement.

As Yaesu suggest this supply could be very handy around the shack to power other pieces of gear — even that old valve FM rig.

#### THE FT301D ON THE AIR

Setting up the 301 and getting on the air is a very simple procedure. The power input from either the AC power supply or the 12 volt DC source is via a 12 pin Jones socket on the rear of the transceiver. The antenna connector is a standard SO239. Yaesu supply a good quality push-to-talk dynamic microphone fitted with the now standard four pin screw-on connector. As soon as the power switch is closed the set comes instantly to life — both on transmit and receive. After providing a 50 ohm antenna, bands can be selected by simply setting the band switch and peaking the 'TUNE' control for maximum receiver output near the calibrated point for that particular band.

The main tuning control, which is a combination of gear and planetary drive, is extremely smooth. A finger hole is provided to fast tune from one band section to another and this is of adequate size to really spin the knob at a fast rate.

The digital readout is very clear and indicates frequency to the 100 Hz points. There are five digits on 80 and 40 metres and six digits on 20 metres and above. The actual size of the readout is 60 mm wide and 10 mm high. Tuning a transceiver with a digital readout takes getting used to. The initial tendency is to overshoot when aiming at a specific frequency and it takes quite a bit of practice to stop at a predetermined point.

Receiver performance is excellent. The fast-medium-slow AGC selection enables the correct amount of delay to be set to suit the strength of the incoming signal. For instance on 80 metres at night with a moderate static level and fairly strong signals, the slow AGC setting gives a marked increase in signal to noise ratio.

The receiver rejection filter was most effective in removing heterodynes of stations tuning up on or near the operating frequency. An interfering signal reading 20 dB over 'S'9 could be reduced to about 'S'3 and this amount of rejection remained much the same regardless of the actual beat frequency.

Receive audio through the speaker built into the matching power supply was very easy to listen to. The combination of very good AGC action, low distortion in the SSB detector and receiver audio section, and a well matched speaker all added up to much better than average results.

Transmitter tune up consists of advancing the 'DRIVE' control for a 10 amp reading on the meter, peaking the 'TUNE' control for maximum current and then further advancing the drive control for a 15 amp reading. So long as the final is properly matched this reading will indicate a full 200 watts input.

We checked the actual power output on each band with a Swan WM-1500 power meter and the FT301D connected to a Heath Antenna 50 ohm dummy load. A Heath SB610 monitor scope was also in circuit to determine the PEP output. The following results were obtained.

BAND	RMS OUTPUT	PEP OUTPUT
160	100 watts	100 watts
80	110 watts	120 watts
40	150 watts	150 watts
20	75 watts	75 watts
15	125 watts	120 watts
15	100 watts	125 watts

No reason could be determined for the slightly lower output on 20 metres but the difference is small in practice. The output wave form on the scope was true copy book style in both the CW and SSB modes. In fact the CW carrier pattern was the cleanest of any transmitter so far tested.

It appeared that the transmitter could be run at full input in the CW mode almost indefinitely. After several minutes of such operation the heat sink of the transmitter

was only moderately hot but the power supply heat sink was very hot and could represent a hazard to unsuspecting people if in an exposed position. Under normal SSB operation it did not get quite as hot but after a lengthy period with continual use of the RF processor, the temperature built up to quite a high degree.

The action of the processor was quite satisfactory and appeared to produce about 20 dB of clipping. No panel control was provided for adjustment of the clipping level. In use on the air it produced results similar to clippers reviewed earlier this year.

On air reports of the transmitted audio quality were all most satisfactory and in all cases a great deal of interest was expressed in the unit.

VOX operation was quite smooth and an adequate degree of adjustment was provided on the delay and anti-trip controls to enable the most critical VOX enthusiast to set them to his liking. Mechanical noise from the relays was moderately high but no electrical clicks or pops were audible. The VOX was also satisfactory for CW operation however the delay required for this mode is usually much shorter and it is necessary to remove the transceiver lid and reach through a small hole with a fine screwdriver to make the change. The microphone gain control is also an internal preset. It is however provided with a plastic shaft to make adjustment easier.

The front panel controls are a mixture of good and bad so far as operation is concerned. The bad points were mostly covered in the review of the FT221 and unfortunately persist in the 301D. Although the lamp illuminating the meter has been increased in output, the scale is still hard to read. A return to the translucent type scale with rear illumination as used on the FT220 series is badly needed.

The panel knobs have no white indicator to show which way they point. Admittedly there is a small raised moulding but it is easy to miss this when the control is gripped in the normal way.

VFO stability was checked and found to easily meet the specified 100 Hz per half hour. Drift for the first half was almost exactly 100 Hz, and over the next hour and a half did not exceed 150 Hz. However, over the same period of time, the digital readout shifted 800 Hz. An interesting case where the VFO is more stable than the frequency counter.

Calibration of the dial to the marker oscillator was a little different to setting a normal type dial. The transceiver was tuned to zero beat and then the 'Calibrate' control adjusted to bring the readout to the zero point. As no offset shift is provided on the VFO with change of sideband, it is necessary to recalibrate when changing from upper to lower sideband. When the offset tuning is adjusted however the readout changes accordingly; you only have to remember what it was before.

Another unfortunate carry-over from the FT221 is the use of miniature 3.5 mm

**"Antenna" Dummy Load**

1 kW max input; 1.5-300 MHz w/SWR 1.5:1 or less. Oil not incl.

Kit **HN-31**, \$28.50



**Heathkit Coax Switch**

Switches an RF source to any one of several antennas or loads; unused outputs grounded. Use two to switch up to four different transmitters, receivers, etc. 1.1:1 max SWR to 250 MHz. 2 kW PEP max power rating.

Kit **HD-1234**, \$20.75

**Heathkit HF Wattmeter/SWR Bridge**

Remote detector permits placement of meter in any convenient location... 6 ft. of cable supplied.

Kit **HM-102**, \$51.20

**HM-102 SPECIFICATIONS** — Frequency range: 1.8 to 30 MHz. Wattmeter accuracy:  $\pm 10\%$  of full scale reading. Power capability: 10 to 2000 watts. Impedance: 50 ohm nominal. Connectors: UHF type SO-239. Dimensions:  $5\frac{1}{4}''$  H x  $5\frac{1}{4}''$  W x  $6\frac{1}{2}''$  D.

HN-31

**Heathkit VHF Wattmeter/SWR Bridge**

Kit **HM-2102**, \$51.20

**HM-2102 SPECIFICATIONS** — Frequency range: 50 MHz to 160 MHz. Wattmeter accuracy:  $\pm 10\%$  of full scale reading. Power capability: To 250 W. SWR sensitivity: Less than 10 W. Impedance: 50 ohm nominal. SWR bridge: Continuous to 250. Connectors: UHF type SO-239. Dimensions:  $5\frac{1}{4}''$  W,  $5\frac{1}{4}''$  H and  $6\frac{1}{2}''$  D, assembled as one unit. \*Using a 50  $\Omega$  noninductive load.

**Heathkit HP-23B Fixed-Station Supply**

**HP-23B SPECIFICATIONS**

Power requirements: 120/240 VAC, 60/50 Hz, 350 watts maximum. High voltage output: 820 VDC no load, 700 VDC @ 250 mA  $\pm 10\%$ . AC ripple: Less than 1% @ 250 mA. Duty cycle: 150 mA continuous to 300 mA @ 50%. Low voltage output: (High tap) 350 VDC, no load, 300 VDC @ 150 mA  $\pm 10\%$ . (Low tap) 275 VDC, no load, 250 VDC @ 100 mA;  $\pm 10\%$ . Less than 0.5% AC ripple @ 150 mA, continuous duty to 175 mA. Fixed bias: -130 VDC  $\pm 10\%$ , no load, -100 VDC @ 20 mA. Filament voltage: 12.6 VDC @ 5.5 amps. Dimensions: 9" L x  $4\frac{3}{4}''$  W x  $6\frac{3}{4}''$  H

Kit **HP-23B**, \$98.50

**New Heathkit solid-state Dip Meter**

Another Heath value triumph — a better dip meter at lower cost. The Colpitts oscillator covers 1.6 to 250 MHz in fundamentals with a MOS-FET paraphase amplifier and hot-carrier diodes for more sensitivity and a better dip. It uses a Q-multiplier for greater detector sensitivity and a responsive 150  $\mu$ A meter movement for positive resonance indications. It includes a phone jack for modulation monitoring. It's smaller and lighter than others, too. Completely portable. Whether you're checking resonant frequencies, adjusting traps, looking for parasitics, or using it as a signal generator, the HD-1250 is designed to go anywhere. It fits your hand and thanks to its solid-state design and 9-volt battery operation, it's ready to use instantly wherever you are. The custom molded gray carrying case protects the meter and the 7 color-coded, pre-adjusted, plug-in coils in transit, and makes a handy storage place.

Kit **HD-1250**, \$89.00

**Heathkit Code Practice Oscillator**

As much fun to build as it is to use — and it makes a great starter kit for a beginning CW operator. The molded plastic cabinet with dark green front panel matches Heathkit "SB" series gear.

Safe, portable and reliable, the HD-1416 is designed in the Heath tradition of top quality and value. Most components mount on a single circuit board for easy assembly. The unit operates from a single inexpensive 9-volt transistor battery (not supplied) and comes complete with telegraph key and phone jack. The oscillator, with built-in speaker, has a separate control for volume on the front panel — as well as a tone control accessible from the back of the cabinet. The HD-1416 can also be used as a side tone oscillator with any transmitter using grid block keying — such as the Heathkit DX-60B.

Kit **HD-1416**, \$20.00

**HD-1416 SPECIFICATIONS**

Mode of Operation: Speaker or headphones. Tone Frequency: 200-800 Hz adjustable. Battery Required: 9-volt transistor battery equivalent Neda -1604 (not supplied). Speaker: 45 ohms. Headphones: 8-2000 ohms. Sidetone Oscillator: Grid block keying transmitters (400 volts DC, negative maximum). Controls: Volume, Tone (internal). Front Panel Connections: Key, Phone jack. Transistors: (2) MPSA20, (1) 2N5249. Color: Wrinkle grey and dark green.



HD-1250,



HD-1416,

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ADDRESS

P/Code

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sockets for the headphone and key connections. Perhaps Yaesu is trying to set the trend, but until this is established these miniature jacks are awkward to use.

### INSTRUCTION MANUAL

The manual supplied with the FT301D is presented in the typical Yaesu manner. Some forty-six pages cover the following subjects. General Description, Specification, Controls and Switches, Rear Panel Connections, Preparation for Operation, Operation, Block Diagram, Circuit Description, AC Power Supply, Frequency Counter Unit, Maintenance and Alignment, and Parts list.

The circuit description section provides a circuit diagram of each printed circuit board and a clear description of its operation and how it ties in with the whole set. The maintenance and alignment section provides adjustment information for the multitude of preset controls. Unfortunately no printed circuit layouts are included.

Each time I complete a review of a new transceiver I wonder how and who will service it in the future when the need arrives. There is no doubt that the modern transceiver is a very reliable piece of gear. It is also highly complex and requires more

than the old multi-meter to trouble shoot.

In this regard it's nice to know that competent service is available from the distributors of Yaesu gear in Australia. As of now Bail Electronic Services supply with every piece of gear sold a check list covering some 53 different points. A copy of this is retained by the distributor and so at any future date the performance can be compared with the original.

The FT301D used in our review was supplied by Bail Electronic Services from whom details of price and delivery can be obtained. ■

## NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG  
David Down, VK5HP

### AN AUDIO KEYING SYSTEM FOR TRANSMITTERS

This device is designed to accept audio in the form of morse code from a tape recorder to key a transmitter. You may ask of what value is such a device to the average amateur? It is perhaps of value to those amateurs who assist newcomers to amateur radio with slow morse practice and who wish to use their tape recorder to send pre-recorded slow morse. I wrote an article a few months back dealing with slow morse and this is the equipment that can be used by the slow morse transmitting stations in the course of conducting those sessions. To the newcomer this circuit appears to have no relevance. However, it is most useful to show people how the differing characteristics of silicon and germanium semi-conductors can be used to complement one another.

It is assumed by many people that diodes, whether they be semi-conductor or valved, conduct in the forward direction as soon as the voltage applied starts from zero. However, this is not true and the voltage has to build up to an appreciable fraction of a volt before the particular diode will conduct. Germanium diodes appear to have a turn on voltage between 0.15 and 0.333 volts, whilst silicon diodes have a turn on voltage between 0.5 and 0.7 volts. These characteristics are used in this audio keyer to simplify the overall circuitry.

This keyer will accept audio inputs which vary between about 0.4 volts and 6 volts RMS and key reliably. The minimum power necessary to actuate the keyer is less than 10 milliwatts if the germanium diodes have a low switch on voltage. The audio is fed into the audio jack to R1 and the two back to back silicon diodes D1 and D2. D1 and D2 will not conduct unless the audio peak voltage rises above 0.5 volts. They will then clip both peaks of the wave and as the input level rises to higher levels it will clip the audio input to  $0.7 \times 2 = 1.4$  volts peak to peak. This clipped audio wave is then presented via C1 to a half wave voltage doubler using two germanium diodes D3 and D4. The turn on voltage of these two diodes is approximately 0.2 volts, so the capacitor C1 is charged up to 0.5 volts on the first half cycle. On the second half cycle this voltage 0.5 volts, plus the other clipped half cycle of 0.7 volts, is added to give a pulse of 1.2 volts. However, 0.2 volts of this is lost in the voltage

drop in D4, so potentially 1 volt is present across C2. D5 is another silicon diode wired for forward conduction and it conducts clipping this voltage to between 0.5 and 0.7 volts VDC positive with respect to earth. R2 acts to discharge C2 completely between morse code characters. The voltage across C2 is applied to TR1 a germanium small power transistor via a base current limiting resistor R3. The transistor is switched on and draws current sufficient to pull in the relay which keys the transmitter. The switch on voltage of a germanium transistor is of the order of 0.15 to 0.2 volts.

The keyer is a relatively simple device which is tolerant of variations in audio input levels of between 20 and 30 dB. The

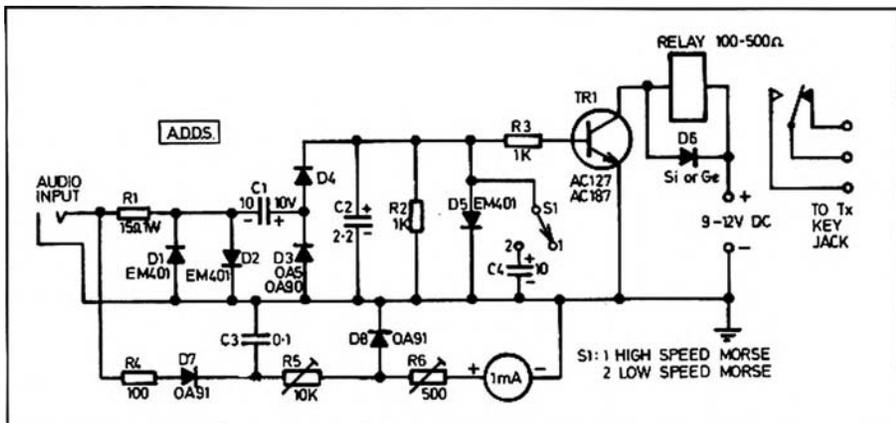
diodes D1, D2 and D5 clip the input wave and resultant DC output to a relatively constant level despite variations in input level. The diodes D3 and D4 rectify the audio and produce a DC voltage which actuates the transistor and relay. If all silicon devices were to be used the circuitry would have been considerably more complex with several more active devices being used.

The audio level meter is not strictly necessary, but can be a useful addition to make sure the level from the tape recorder is sufficient to actuate the device reliably. R4 is a peak current limiter for the audio level diode D7. C3 filters the output and the DC is applied via R5 and R6 to the 1 mA meter used to read the audio input level. R5 is set such that the meter registers 20 per cent of full scale when the keyer is keying reliably.

The audio level is increased such that the meter needle hits the stop with R6 at minimum resistance. R6 is then adjusted such that the meter lazily approaches the FSD stop. If the input is increased further, the meter needle will not bang hard against the stop with high level audio morse coming into the keyer.

The audio level is set at 50 per cent of full scale deflection (FSD) to make allowance for variations in tape output levels and the tape lifting off the tape heads when keying a transmitter.

The voltage drop across the meter and R6 is arranged to be slightly greater than the turn on voltage of D8, so that the meter will not suffer heavy overload if a



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- SINGLE METER** **\$12**
- SINGLE METER** with power scale 10-100 W **\$17**
- TWIN METER,** SWR up to 200 MHz **\$22**
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- TIGER ARRAY 204 BA 20 M 4-element 26' boom **\$190**
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- AS-2-DW-E  $\frac{1}{2}$  wave 2 M mobile whip **\$8**
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- DRAKE TV-1000 TVI** low pass filter **\$25**
- DRAKE TV-3300 TVI** low pass filter **\$28**
- DRAKE TV-42 TVI** low pass filter, low power **\$15**
- DRAKE MN-2000** matching network **\$230**
- DRAKE MN-4** low power ant. tuner **\$115**

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PETER SCHULZ, VK2ZXL.

high output is put into the audio keyer. You will see many multimeters with diodes placed across their terminals. These are usually silicon diodes with a turn on voltage of 0.5 to 0.7 volts whilst the meter may well have a FSD sensitivity of 0.1 volts drop across it. The meter will suffer a 5 to 7 times FSD overload before the diodes have any effect. It is rather doubtful in some cases whether in fact the protection diodes are any real value. The meter in the audio Morse keyer, as you

## DIODE CHARACTERISTICS

Type No.	Type	Volts drop at 0.3 mA	Volts drop at 30 mA
EM404	Silicon	0.5V	0.7V
OA5	Ger.	0.15V	0.4V
GEX66	Ger.	0.16V	0.65V
OA91	Ger.	0.22V	1.00V

can see, is fully protected against overload.

I hope that you have found this little excursion into some of the rarely exploited

features of silicon and germanium diodes of interest, each type having its own particular points. — VK3UG.

# VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP  
Forreston, 5233

## AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.800
	VK4RTL, Mt. Mowbrallan	144.400
VK5	VK5VF, Mt. Lofly	53.000
	VK5VF, Mt. Lofly	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RNT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
HL	HL9WI, South Korea*	50.110
KG6	KG6JDX, Guam	50.110
KH6	KH6EQI, Hawaii	50.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hull	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHP, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

## SIX METRES OPENS . . .

And how! Saturday 23/10/76 . . . the day of the sun eclipse will be remembered in several ways. I journeyed 250 miles to the south-east of VK5 and from my position at Southend, a little seaport up the coast from Mt. Gambier, was fortunate to enjoy many breaks in the cloud cover to allow 53 colour slides to be taken of the eclipse — these are now being processed so hopefully some will be OK. Of course things do happen on the few occasions I leave my premises, and this time it happened in a really big way. First news of something special came in a phone call from VK7JV who advised that on 23/10 six metres opened to VK4 during the morning. At 0200Z John heard a JA call sign, answered him, and back came a VK4. After working him, the JA was gone, but on tuning the band more JA stations were heard.

For a period of an hour JA stations were available in Tasmania and a total of 16 were worked. John VK7JV worked 9, Joe VK7JG (ex-72GJ) and Kevin VK7ZAH each 5. Signals varied from S4 to S9. Districts available were JA1, JE1, 2 and 3, JH2, JR3 and JE3. They heard JH1ECU working a VK3, so they knew the VK3 boys were in on it too.

Many thanks for the news John, the promptness of advice is very much appreciated. I also thank Joe VK7JG who phoned to advise of the incorrectness of the call sign for the six metre beacon in Northern Tasmania. I had been listing

it as VK7RMT instead of VK7RNT; the correction is now in effect.

Well, that phone call from VK7JV started me almost wishing I had stayed away from the eclipse, but then a day or so later in rolled a bulging envelope from Steve VK3BIZ in Melbourne, crammed full of news of the opening on that Saturday. The best I can do is to largely give you the news as it came to me as it is all so interesting, and will have a lot of mouths watering before the reading is finished. I am much indebted to you Steve for the constant information you feed me, and this one being so special will be appreciated by all the DX gang.

Steve writes: "What a fantastic 6 metre day 23/10/76. Commencing 0021Z VK4 were worked from Melbourne to Brisbane and up to Ingham areas. Whilst working 10 metres VK4GI came up calling CQ on 6 metres at 0358Z. I was in contact with UA0LBU on 10 metres at the time. I called VK4GI just to say hello. I was still in QSO with UA0LBU, and suddenly bang! A huge signal came up over the top of VK4GI signing JH6UNN, then JH1ECU 5 x 9++. I signed with the Russian station after relaying the JA's back over 10 metres showing him the strength. The following areas were worked:

0400-0432 JA1 — All Prefectures.  
0432-0439 JA2 — Three Prefectures.  
0439-0445 JA3 — Osaha  
0445-0447 JA4 — Okayama.  
0449 JA5 — Kagawa.  
0449-0452 JA0 — 2 Prefectures.  
0500 JH6 — Fukouka.  
Heard were JA7, but no JA8 or JA9.  
0530 JR6 — Okinawa Island.

No HL9WI beacon, plenty of JA's on 50.150. Television birdies all around 50 MHz peaking north. 0451 — JR2OUP 5 x 5 worked.  
0505-0515 CW CQ from VK3BIZ. QRZ call to ?A0CC? Called JA0CC.  
Response in CW: QSY QSY QSY. I moved to 52.010. Called JA0CC?  
Response QSY down 20. I moved to 52.000. Called QRZ JA0CC? No response.  
Tuned down to 51.990 and heard VK3BIZ VK3BIZ de UA0CCW K.

I offset clarifier, gave 569 RST at least 10 times and QTH.

Response: VK3BIZ de UA0CCY 569 UR RST name Viad QTH . . . noise etc. QSB. More tries, same results, noise etc.

0521: UA0CCW de VK3BIZ.

Response: SB SBY . . . QSB . . . noise . . . then VK3BIZ de RA0CCM RA0CCM K  
Response: RA0CCM ? ? VK3BIZ RST 539 539 K.

Response: VK3BIZ de RA0CCM name Victor QTH Kha . . . vk . . . ? . . . noise QSB.

Me: R R R RA0CCM de VK3BIZ RST 539 name Steve k. etc. etc.

Response: R R R VK3BIZ de RA0CCM RST 539 Steve O.K. OM K.

Me: R R R Victor OM TU FB QSO PSE QSL via BURO PSE K K.

Response: R R R 73 73 73 VK3BIZ . . . noise etc. de RA0CCM K.

Me: R R R 73 73 73 de Melbourne, Australia etc. Need I say any more?

A contact with JR6RAY was then started at 0536 from Okinawa on 52.001 but signals QSB into noise, and all TV birdies disappeared by 0600Z. I then moved to 10 metres and worked many more JA and UA0 stations.

Following is some Russian VHF information: UA0CCA to UA0CCZ indicates a class of licence, full class up to 500 watts.

RA0CCA to RA0CCZ indicates a technical or novice type licence to 50 watts.

Location: City of Khabarovsk 800 miles NNE of Vladivostok. Postal: Care of Box 024, Vladivostok No. 10. Soviet Russia.

Six metres allocation on a Club basis only, 50 to 52 MHz. VHF Propagation studies. Antenna: Some type of sterba curtain array. 500 watts output from some sort of Government transmitter, modes FM, CW or AM, no SSB.

Two metres: Allocation 144-146 MHz. FM, CW or AM, no SSB. Power output 200 watts. Antenna 10 element yagi, with 15 element proposed.

JA0-9. Worked on 2 metres tropo July to September 1976, also Western Russia on 2 metres.

In future suggested procedure call on 28.600 SSB for response and nominate 52 MHz frequency. For those with transceiver, use your clarifier with 10 kHz offset, transmit on 52.005 and listen 51.995.

Stations worked during the opening: VK3BIZ 14 JA's, VK3AKK 11, VK3AMK 5, VK3ZRY, VK3ZSJ each 5 etc. etc.

## STOP PRESS:

ZL1VHF beacon copied on 145.100 by K6QJS/KH6 last week! . . ."

Again, many thanks Steve for that interesting run down. This will certainly help to keep six metres more alive this year, and indicates we may not have to always wait for the sunspot peaks to find the long distance DX. With better equipment, and probably with more people able to be around with spare time such contacts may become more common. However, once again it demonstrates the disadvantages we are facing by our 2 MHz allocation above the world wide standard of 50 to 52 MHz. With the case of the Russian stations, they cannot come up into our segment and we cannot go down into theirs, which means all such activity has to be crammed into a few kHz at the band edge.

## GENERAL NEWS

Peter VK4APG writes to advise of a message received on 20 metres that Joe AG6ADX on Guam operates a beacon from 0800 to 1000Z on 52.050 with 250 watts to a 4 element yagi pointed at Australia. The beacon is CW signing "CQ call sign Guam" then listening period before keying again. Joe monitors frequency during breaks. Many thanks Peter.

I have also received a letter from Mike, call sign not mentioned, who is now living at Ceduna in ex-VK5SU territory. Mike advises being able to operate on 6 metres SSB with an FTV650 and FT200 to a 5 el. yagi at 50 feet, and on 2 metres SSB with an IC202 with 3 watts at present, but eventually 300 watts, to a 9 el. yagi at 60 feet. He is building a 4CX250B linear but with the usual problem of some parts. Plans are to eventually monitor the Adelaide Channel 8 repeater. Mike will be somewhat limited for time to operate and indicates therefore the Ross Hull Contest will not be in jeopardy from there for the time being. Anyway, it's good to hear that activity will continue on VHF from Ceduna, and both the VK5 and VK6 boys will be interested to do some listening, particularly when you have 300 watts on 144 MHz SB.

## MOONBOON REPORT

From Lyle VK2ALU and "The Propogator" comes the monthly EME report which mentions that the scheduled moonboon tests were carried out on the morning of 26/9 with W5LO, who was not heard, and W5LUA, who transmitted he was hearing VK2AMW at "M" copy. We heard his signals weakly for most of the test period and they came up to 5 dB above noise on his last transmission.

This allowed copy of full call signs but the test period ran out before a contact could be made.

"Letters were received from K3PGP and W4ZXI before the test weakened, requesting tests with each of them during the hour immediately prior to the scheduled tests. However, moonrise was such that our allowable first transmit time was only 15 minutes before the start of the scheduled tests. Both stations were called but no replies heard. Our echoes peaked to 9 dB above noise during this test period. Sun noise was checked at 13 dB above sky noise.

"A further series of scheduled tests were carried out during the evening of 26/9 with European stations. OZ9CR was called but not heard. SK6AB was heard calling us and he was acknowledged, but another European station came on frequency during the last part of the test period and blotted him out.

"The last half hour of the test periods was scheduled as a 'CQ period' for VK2AMW. We were called by LX1DB in Luxembourg, who gave us 'O' reports (good signal strength). His signals peaked at 7 dB above noise and we were able to copy full calls without difficulty. Reports were acknowledged both ways for the first Australia-Luxembourg 70 cm contact.

"Noise 'signal' emanation from the stars at the Galactic centre was checked at better than 25 dB above cold sky noise. This information is now being evaluated to provide antenna gain — receiving system noise figure relationships which can be correlated with our noise measurements and cold — 50 ohm input termination resistor noise — ation. (3.5 dB).

"VK2ZEN and VK2ALU carried out the September tests".

Also on the moonbounce scene this time we have some news from Chris VK5MC and his 144

MHz EME efforts thanks to the pages of "The Blurbs". Chris writes:

"Over the past couple of months my windows for moonbounce have been troubled by the sun being in the same part of the sky as the moon. But they have now started to separate once more and signals are being heard.

"21/7/76 1738Z After repairing an isolating relay the night before, I found that no echoes were being received at the centre time. Quickly climbing the feed tower, and using a match to wedge closed the suspect relay so that I could receive, I tuned the band and immediately heard K8III. I took the chance of blowing up the pre-amp and called him, and was rewarded with an 'O' report and 349 RST. I later received a QSL card from him with a note from which I quote: 'My array of 32 yagis has been down due to ice since March, all I have now is 8 x 14 element KLM's . . . Man, what determination! Most people are lucky to have 32 elements let alone 32 yagis! 24/7/76 . . . heard W47BJU and W2AZL having a contact — also heard K8III calling me, but no contacts resulted. 25/7/76 . . . worked a new one. K9HMB. Report sent 439, received 'O' report.

"A final note of interest. Have heard 3 dB of excess noise from the Milky Way, and this morning measured 17 dB of sun noise. More later."

Thanks Chris for the report, would like to hear of some of your later exploits.

#### ODD ITEMS

From time to time I receive requests from some writers for news of ATV activity. I will be glad to pass on such information through this column if it is sent to me, but it must be years since anyone has written to say what they are doing. Sorry you guys who are fretting for information, I cannot help you at the moment, but perhaps this plea will bring something of regular results.

Well, the summer DX season is with us now, and by the time you read these notes perhaps some exotic contacts have been made. While 6 metres seems to have a lot of glamour at this time, don't overlook the 2 metre band, lots of things can happen there. Peak time for long distance DX there seems to be towards Christmas so be on the lookout. Once the sporadic E type of 2 metre transmissions have disappeared, keep in mind the ducting and inversion type contacts particularly along the southern coastlines. It has been possible to work from VK3 and VK5 into Albany around January and February for several years now and 1977 may be the same.

As the Christmas season approaches may I take the space to wish everyone a very happy Christmas and a Prosperous New Year. I would like to thank everyone who has written to me during the past year giving me news and information for the column — it's pretty hard to keep it going sometimes, but I do the best I can. My thanks also to those various Clubs, and there are many, who continually forward me copies of their newsletters and publications, I use from them whatever I can which is of overall interest. Special thanks to Mac ZL3RK who keeps my subscription going to "Break In" in return for which I make sure he gets AR. Last but not least my thanks and best wishes to The Editor for his co-operation and tolerance of me, and the lack of complaints which seems to be the situation.

With all those special thoughts for the time of the year I would like to close with a special thought for the month: May all your troubles during the coming year be as shortlived as your New Year's Resolutions". And "Woman, examining diamond brooch, to jewellery salesman: 'I'm looking for a Christmas gift for a husband who got me an outboard motor last year'".

73

The Voice in the Hills.

## IARU NEWS

Mr. Owen reported on return from his overseas journeys that the presentation shield he handed over to JARL on behalf of the WIA was very well received. Greetings to JARL on their 50th anniversary, from many amateur societies, were included in a well-produced booklet specially produced for the occasion.

#### WARC 79

The Federal President attended the 3rd meeting of the APG on 6th October and reported that discussions centred mainly on administrative matters. The next meeting scheduled for early in 1977 should deal with preliminary nitty-gritty details affecting the frequency spectrum in Australia.

During October the WIA voted in favour of the admission of the Radio Amateur Society of Thailand to the IARU Region 3 Association.

A letter was received from the Secretary/Treasurer of the PNG Amateur Radio Society advising that a Constitution for this Society has been agreed and recruiting for members was being undertaken. The writer was Gavin Wylie P29JW and he advised that John Baker P29WB was the President. This will be a most useful addition to amateur radio in Region 3 and deserves full support. The Society's address is P.O. Box 204, Port Moresby.

## IARU INTERNATIONAL WORKING GROUP MEETS IN GENEVA

The "International Working Group" convened by the President of the International Amateur Radio Union, Noel Eaton, VE3CJ, met in Geneva from the 17th to the 20th September, 1976.

Members of this Working Group included Roy Stevens, G2BYN, the Secretary of the IARU Region 1 Division, Michael Owen, VK3KI, a Director of the IARU Region 3 Association and Vic Clark, W4KFC, the President of the International Amateur Radio Union Region 2 Division. Also present were "Tim" Hughes, G3GVV and David Sumner,

K1ZND, the Assistant General Manager of the ARRL.

Two and a half days were devoted to the preparation of a model position paper to assist the smaller societies in appraising their governments of the legitimate requirements of the Amateur for frequencies through to the year 2000.

The International Working Group is making two significant recommendations to the Regional organisations. The first recommendation relates to the 40 metre band. It is the global position of the Amateur Service to seek expansion of that band. In Region 3 the band 7-7100 is presently allocated to the Amateur Service. At the conference in Hong Kong the Region 3 Association adopted a policy of seeking expansion of that band "upwards". Recognising the claims by the broadcasting service to frequencies on the high frequency side of the existing 40 metre band, the International Working Group has recommended a policy to seek expansion of the existing 40 metre band both above and below the existing allocation.

The other important recommendation made by the International Working Group relates to a preference for the frequency band 155-160 GHz instead of the previous recommendation of 165-170 GHz for the Amateur Service and Amateur Satellite Service. This change results from a recognition of the fact that the latter frequency band suffers from high absorption by water vapour and would be useless for terrestrial communication purposes.

The Secretary of the Region 1 Division, Roy Stevens, undertook final editing of these papers which will be printed and circulated to the regional organisations. The Directors of the Region 3 Association will shortly be considering the adoption of these documents and then will attend to circulation of copies to the member societies of Region 3.

The members of the International Working Group also attended a reception held at the ITU and met delegates attending the Frequency Management Spectrum Seminar being conducted under the auspices of the International Frequency Registration Board, members of the International Amateur Radio Club and officials of the International Telecommunications Union. In addition, a meeting was held with the President of Desau Des Emateurs Francais (REF), Messieur M. J. Coussi, F9FF and other officers of REF.

Michael S. Owen VK3KI.

## 20 YEARS AGO

Ron Fisher, VK3OM

#### DECEMBER 1956

What were the aims of the Institute twenty years ago? The Editorial page of December 1956 Amateur Radio stated these aims which might be worth repeating.

To act as the voice of the Amateur in public discussions.

To assist in the investigation of communication problems.

To conduct educational work.

To provide a medium for exchange of ideas and to publish a journal.

To promote friendship between experimenters.

The Editorial then went on to suggest that we all should endeavour to encourage some young enthusiasts. If this was important twenty years ago, it is even more important today. With so many young people turning to illegal operation on the 27 MHz band, we must make every effort to encourage them in the right direction.

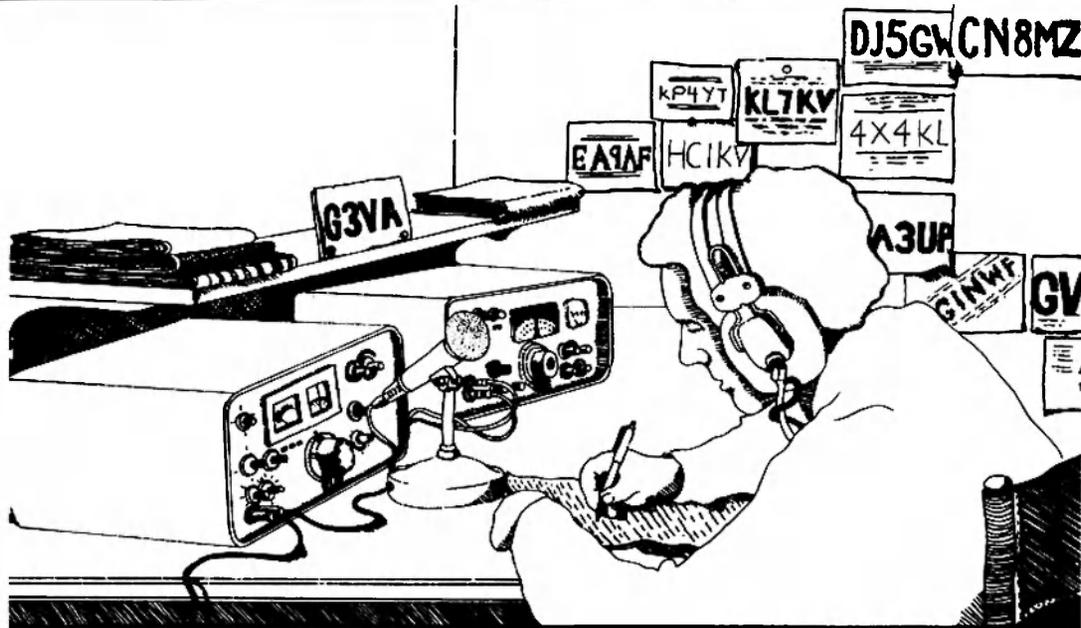
Another Two-Metre Converter. Bob Winch VK20A described his new design that produced a fantastic 5 dB noise figure when first turned on. The RF end used a 6AK5 EL31 cascade to a 6AK5 mixer.

Clamp tube modulation was popular in the fifties. Most people who used the famous type 3 mark 2 transceiver probably tried this system of modulation at one time or another. L. F. Brice, VK5OK described two different ways of doing it.

The 1956 Remembrance Day results gave a win to Western Australia. Top scorers in each State were VK2AMR, VK3ATN, VK4CC, VK5EN, VK6FD, VK7AI and VK9DB.

Federal notes column advise that the VK1 prefix has been allocated to the Federal Capital Territory and that Antarctica, previously VK1 would become VK0.

## How many New Members have YOU introduced this MONTH?



**Newnes Technical Books**

*for the Ham*

**RADIO VALVE AND SEMICONDUCTOR DATA**

10th Edition, by A. M. Ball

179 pages      257 mm x 210 mm      1975

'... Inspection of the book suggests that the data is a good deal more comprehensive and carefully set out than in many other publications we have seen.'

**ELECTRONICS AUSTRALIA**

**NEWNES RADIO ENGINEER'S POCKET BOOK**

14th Edition, edited by P. Lafferty

192 pages      76 mm x 124 mm      1974

An invaluable compendium of radio facts, figures and formulae, indispensable to the designer, student, service engineer, and all concerned in the radio industry. New tables include radio and television frequencies and channels and information on metric wire sizes.

**GUIDE TO BROADCASTING STATIONS**

17th Edition, material supplied by BBC Tatsfield Receiving Station.

176 pages 190 mm x 127 mm      illustrated      1973

This seventeenth edition of a title which has sold more than 250,000 copies contains useful fundamental information on radio receivers, aeriels and earths, propagation, signal identification and reception reports in the chapters at the front.

**FOUNDATION OF WIRELESS AND ELECTRONICS**

9th Edition, by M. G. Scroggie

552 pages      215 mm x 135 mm      1975

'... The 9th edition is much larger than the earlier versions and it indeed needs to be to cover, as it does, the whole gamut from fundamentals, to modern technology.

'... In fact, the contents list is 9 pages long and is itself, a most useful feature of a very comprehensive and useful textbook. Highly recommended.'

**ELECTRONICS AUSTRALIA**

ASK FOR THEM AT YOUR LOCAL BOOK OR COMPONENT SHOP

# 1976 REMEMBRANCE DAY CONTEST RESULTS

	a	b	c	d	e	f
VK5 & VK8	227	848	26.8	1579	65590	19137
VK4	210	819	25.6	1829	57798	16649
VK8	77	522	14.8	962	22663	4305
VK7 & VK0	41	243	16.9	1093	13431	3359
VK2	111	2226	5	1363	30054	2862
VK3	97	2135	4.5	1092	31467	2522
VK1	22	131	16.8	800	7866	2121

a—Logs received      d—Average top 6 logs  
 b—Licences            e—Total score  
 c—% participation    f—Trophy score

## DIVISIONAL SECTION LEADERS SCORES ARE SUBJECT TO FURTHER CHECKS

In the following detailed scores the first figures are the points scores and the second are contacts made.

VK1	Phone	ACA	721 351	MF	297 149	YR	79 79
VP	705 302	LF	250 119	ZMV	66 66		
RV	624 325	BH	193 61	ZPB	45 45		
	592 295	GB	177 82	WI	12 12		
JB	344 172	ZAR	132 132	RY	8 5		
ZT	324 193	ZJJ	123 123	PM	7 7		

CW	VK	418	79
Open	DC	1073 462	AOP 1050 457 DA 626 302

VK2	Phone	BYC	1541 686	BCW	183 64	ZSG	51 51
XT	1147 407	CH	177 77	AWX/2	50 50		
BDT	915 339	WT	162 67	CO	48 48		
AGF	911 310	BZ	158 64	A/B	44 29		
NW	780 321	CM	150 67	ZKQ	44 44		
RW	753 300	AXU	143 56	ZVN	40 40		
BDN	690 298	BRU	137 50	CF	38 17		
AHV	603 255	CAF	130 60	LE	36 20		
AJY	603 266	NF	127 51	BAD	36 36		
ASY	520 240	BSG	127 50	IE	29 29		
ADZ	397 151	AYL	124 59	ZUR	29 29		
ALZ	347 120	PT	123 34	OH	28 9		
RP	343 169	ASG	122 37	SR	28 10		
AJH	334 107	HI	106 35	WD	28 14		
	324 141	PN	105 32	NV	24 24		
	321 133	ASH	105 31	YEC	23 23		
BMX	306 120	BTK	102 34	ZAX	21 21		
PF	302 102	AUN	101 42	JF	18 14		
BZJ	264 114	HO	100 100	AJQ/M	18 18		
OW	255 82	MR	100 46	ZGK	16 16		
BAX	245 124	UJ	92 41	AKH	14 10		
AQ	227 89	ADL	87 30	ZID	14 14		
FJ	223 105	RX	84 54	ZTM	14 14		
ACK	219 100	BJN	81 31	YEG	12 12		
DA	210 150	ZCT	81 81	BSC	10 10		
AIM	209 50	HZ	66 19	AND	7 7		
FM	202 75	EY	64 25	BOC	7 7		
ABC	193 56	CS	61 22	SW	6 6		
BFG	187 95	BJK	57 34				

CW	QL	1342 223	XQ	614 116	ADR	208 48
DT	1134 204	GT	492 91	IV	184 33	
AFG	848 149	JY	314 70	JM	158 35	
GR	796 153	VM	314 56	GW	72 14	
BHO	656 147	NAG	242 61	RJ	38 11	

Open	CAX	1642 520	BYY	227 156	AAC	109 56
BO	1370 417	BLK	197 103	BCU	71 32	
AOA	600 268	BCC	179 49			
HQ	509 145	GS	169 71			

## CONTESTS

Kevin Phillips, VK3AUQ  
 Box 87, East Melbourne, 3002

VK3	Phone	HT	1103 629	BFN	338 181	YAF	73 74
AYF	1032 559	EF	328 145	AL	68 21		
WP	891 471	XF	322 158	AJP	67 23		
ADW	888 424	ZWM	308 308	ZDJ	67 67		
BIZ	848 449	BA	306 107	BER	63 34		
AMK	792 388	KK	290 120	YBE	62 36		
AQZ	765 413	LV	260 105	ZNH	60 60		
YO	708 334	RU	233 85	ZXD	59 58		
CX	705 413	QZ	231 110	ZDN/P	58 58		
SM	698 333	QG	217 97	NV	52 31		
DF	682 473	AFU	191 92	OD	52 43		
GX	667 404	PW	169 61	RF	46 24		
ANM	621 407	WJ	157 88	OB	41 20		
AKK	545 211	WM	157 78	KT	40 42		
LP	501 229	AIE	143 86	WY	35 20		
ZI	501 318	YIE	136 136	AFI	34 31		
YQ	432 179	YH	131 47	ZVZ	30 30		
AIZ	430 196	BFA	113 62	ARA	25 9		
BBH	416 207	AHG	105 51	ALD	23 7		
BHU	394 222	AXV	101 63	OL	21 15		
ASN	382 187	HE	97 31	YHV	19 19		
DS	364 187	AAJ	97 45	BCZ	11 9		
BJH	350 173	ARS	95 66	ZLN	11 11		
ZD	344 155	VQ	75 30				

CW	OP	952 233	XU/3	434 111	IQ	100 28
CM	734 187	XB	358 91	KS	38 10	
FC	626 156	JI	312 62	AZT	36 11	
DG	576 145	UV	150 37	ACV	34 9	
YK	464 106	BDH	132 38			
RJ	460 111	NK	114 26			

Open	UM	1688 913	QI	358 136	AMD	258 84
ALZ	734 288	AYL	293 159	VF	253 105	
WW	648 332	PR	292 111			
YF	483 149	AUQ	264 169			

VK4	Phone	ZQ	2184 981	ZRF	326 333	SD	117 31
YS	1893 663	FN	323 154	ZNJ	111 111		
VU	1519 620	FX	321 102	MA	109 109		
VV	1358 618	U	287 70	BF	108 40		
AM	1274 517	PJ	286 117	UM	108 24		
LP	1049 433	ZBV	255 255	PU	106 31		
DO	1016 358	NQ	234 80	5AN/4	105 67		
RP	964 288	ZMG	234 234	ALM	104 39		
MW	929 311	JG	227 177	ZGI	103 104		
OW	922 515	CW	221 102	ZCL	102 103		
ACM	894 329	LR	218 150	ZA	100 100		
KW	878 335	OE	215 103	ZAE	100 100		
TE	842 400	NIC	209 83	AL/4	98 35		
EQ	839 374	ZNI	200 200	SR	98 62		
AAM	717 342	PS	197 71	HJ	96 37		
AYM	615 287	GS	185 86	BG	95 31		
ABJ	577 238	ZRQ	185 185	ARB	94 37		
ADC	532 298	QC	183 84	AMO/4	92 31		
MM	526 209	XZ	182 123	EH	91 81		
AAU	484 150	HB	178 50	YB	90 30		
AAR	470 221	ZHW	175 176	5HI/4	89 31		
LE	443 153	AEM	162 50	AAK	87 32		
ZSH	427 432	CY	159 57	UD/4	85 28		
CZ	405 131	UJ/4	158 158	ZDT	85 85		
JP	404 120	ZDF	155 160	NEV	84 36		
WIP	399 247	LWB/P	154 55	CR	78 31		
GI	366 162	ZBH	151 149	DY	78 31		
AWR	342 214	KO	148 61	NP	77 31		
QA	340 137	KD	130 46	RR	70 30		
YT	340 137	LA	120 75	FK	68 25		

QW	65 30	XV	36 20	ZJP	19 19
ZDS	65 65	ZMH	36 36	ZET	18 18
LB	64 42	2AGA/4	35 14	BO	17 5
DH	61 61	AZ	35 10	EC	17 8
TO	61 61	ZDA	34 34	HD	17 17
JM	60 61	DV	33 33	NV	17 5
ZIT	60 61	UB	32 10	ABG/M	17 17
ZGB	58 58	LN	31 17	ZIS	17 17
ZZ	56 17	NF	31 9	PY	15 7
PV	54 39	ZDG	31 31	ZGJ	14 14
NBS	51 36	IF	30 30	ZLD	14 14
ZZE	51 51	ZFA	30 30	ZNZ	14 14
AQ	49 23	AAB	28 15	RG	12 12
FD	49 49	ZEA	28 28	GT	9 9
ZLL	48 48	BC	27 27	TN/M	8 8
EO	44 30	TL	24 15	XC	7 7
FE	44 25	ZKA	22 22	2CZ/4	6 6
GM	43 43	ZKL	22 22	DL	6 6
ZIG	43 43	MH	21 21	ZDK	6 6
HZ	42 21	TS	20 20	ZTV	6 6
MU	42 17	WIG	20 18	3TG/4	5 5
JJ	41 42	ZKP	20 20	3ACN/4	5 5
OR	40 21	EE	19 10	RJ	5 5
PD	39 39	FJ	19 19	ZS	5 5
PF	37 17	ACB	19 19		

CW	XA	912 157	XY	404 72	PB	184 60
KX	796 132	XJ	362 70	NJ	86 19	
GH	714 132	ARL	292 55	W/B	72 15	
FB	628 100	QM	236 30	SF	70 16	
AKJ	562 108	AAF	224 40	IJ	36 8	
LV	414 70	UA	197 37			

Open	HE	2096 618	WIT	602 205	ARC	164 60
RH	1862 580	LT	534 156	QF	125 49	
MS	1420 519	SO	507 139	AML	109 106	
YG	1331 423	QO	481 201	RO	100 69	
UX	1268 431	RF	382 168	RZ	86 33	
DT	1201 453	MY	272 50	FI	80 23	
SE	725 725	NX	244 100	ABR	70 40	
UC	717 329	CA	192 55	LZ	60 19	
WL	714 129	NO	187 31	NRT	17 10	
ZE	693 409	EZ	180 51			

VK5	Phone	QX	1794 796
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# BYTE

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WG	80	30	LX	46	47	ZPD	29	29
KW	77	21	WA	43	14	TU	27	27
CC	75	30	LG	42	42	ZPW	27	27
OS	70	25	GJ	40	15	GZ	26	7
RP	68	29	AD	39	39	MK	24	24
ZQ	68	51	ZR	38	12	FO	18	6
ZRA	68	69	UL	34	10	KS	21	10
BS	67	18	AM	33	18	AG	17	11
JX	67	19	3AUG/5	32	32	PI	17	17
CL	66	41	DF	32	11	ZFA	15	15
GX	66	66	KT	32	22	ZZX	15	15
JB/5	62	20	PE	32	15	DO	14	10
HM	62	15	ZFJ	32	32	DH	12	12
EU	61	58	TF	31	31	ZIS	11	11
BG	60	26	ZBM	31	31	ZME	11	11
LZ	56	46	ZIB	31	32	CX	10	10
ZHV	55	56	SD	30	17			
ME	54	30	ZJJ	30	30			

<b>CW</b>								
MD	1052	190	DL	354	65	YY	146	32
SW	952	170	KI	346	60	DS	104	15
OR	878	148	LU	280	55	UE	82	15
LI	868	151	HR	188	37	GK	60	9
FM	774	140	ZF	182	37	KU	58	10
KL	736	125	AU	160	28	KY	34	7
QQ	574	111	QR	146	30	JG	14	6

<b>Open</b>								
NO	2261	679	FH/5	463	132	RK	223	60
IF	1474	588	ZCF	389	369	LM	216	91
IF	1459	431	QL	380	356	IP	210	50
IF	607	600	QI	357	100	RR	185	81
RG	532	139	PK	300	114	ZS	59	38
RC	506	129	ZCR	271	255	JK	57	40
RX	475	105	LQ	229	64	TL	35	16

<b>VK6</b>								
<b>Phone</b>								
CB	989	461	AN/6	271	210	ZAC/6	79	79
OR	977	405	DY	253	160	SR	77	31
AO	855	351	PH	243	108	MM	76	76
QI	794	323	ZIH	203	205	MO	74	34
VW	683	302	DC	196	76	NC	71	32
JO	662	283	SH/6	195	168	TU	70	26
BD	607	251	ZGI	193	192	VE	65	31
OR	556	231	HU	170	171	NE	63	59
TR	529	258	TP/6	169	170	WC	63	63
FP	435	195	ZDA	149	150	JK	53	19
II	435	215	SG	147	55	XD	52	17
ST	425	165	MB	139	67	WI	47	47
FW	416	172	BV	138	59	AWI	47	47
PD	416	284	ZLO	137	137	SI	35	27
WL	413	175	KC	120	34	WD	21	15
EB	367	226	EJ	109	109	CD	20	11
HA	363	347	LG	109	90	XW	17	5
KY	351	277	AV	102	50	JO	10	10
IW	342	233	DZ	84	35	ZDU/6	6	6
DA	336	133	XY	82	31			

WT	856	161	MA	366	76	HG	78	18
AQ	584	123	VK	298	61	HD	72	14
HQ	574	120	SM	176	21	GA	30	11
RS	476	101	ZO	116	24			

<b>Open</b>								
RU	1120	399	HX	390	92	EG	162	80
ED	973	318	RV	292	125			
FI	703	185	HK	291	129			

<b>VK7</b>								
<b>Phone</b>								
JV	1504	618	HK	213	116	ZKC	61	61
FT	765	380	TT	169	87	CF	55	54
KH	685	289	CL	149	52	BJ	50	32
MX	518	256	DK	137	31	AW	48	31
GW	449	153	JA	116	31	ZJG	38	38
SF	346	144	YL	102	35	AB	32	13
JU	256	141	PS	79	71	ZDF	30	30
SG	233	85	ZIE	71	71	JD	20	12
BM/7	215	100	ZBL	62	62	PD	10	10

<b>CW</b>								
OB	916	198	HE	600	143	JB	246	58
CH	810	156	GV	298	59	ZO	48	19

<b>Open</b>								
BC	1288	428	ZZ	402	108	AL	237	70
RH	404	245	RY	276	90	GB	109	54

<b>VK8</b>								
<b>Phone</b>								
CEG	759	305	CW	468	200	4ZEZ/8	10	10
DI	744	277	KP	56	24	ZTW	9	10
AS	528	220	ZCB	16	16	DA	8	10

<b>CW</b>								
HA	1002	183						

<b>VK9</b>								
<b>Phone</b>								
LD	1276	218	TB	108	18			

<b>P29</b>								
<b>Phone</b>								
DJ	2935	753	GQ	586	150	GA	188	50
DM	952	245	WB	213	55			

<b>CW</b>								
EJ	580	92						

<b>ZL</b>								
<b>Phone</b>								
1BKX	1858	498	2AUS	1592	417	2HE	284	73
1AGO	1457	394	2KX	954	247	3SZ	1366	371
1BOL	127	30	2GJ	402	109	4MG	622	166

<b>CW</b>								
1BJH	1000	133	4BE	936	127			

<b>Open</b>								
1GQ	2040	350	1ACL	1239	262	4IJ	235	63
1AFE	1395	266	3ABC	491	123			

**CHECK LOGS**

VK2ACO								
VK2BBR								
VK3BBS								
VK5AI								

**RECEIVING OPEN**

<b>VK2</b>	R. Browne	SWL2-BEQ	257	105
	S. Horon	SWL2-BVS	190	76
	G. Bell	SWL2-NGB	68	34
	P. Anslow	SWL2-PMA	55	21
	R. Gosling	SWL2-PMG	53	22
	A. Stollznow	SWL2-SAR	40	15
	C. Maxworthy	SWL2-MAX	20	10
	A. Brown	SWL2-APB	5	5
<b>VK3</b>	E. W. Trebilcock	L30042	710	170
	L. Cowcher		653	254
	P. Taylor		403	180
	M. Bait	VK3/13062	161	74
	M. Stephenson			Check log
<b>VK4</b>	G. C. Duckworth	L40539	1105	463
	J. L. Crawford		1024	360
	G. F. Featherstone	L40392	689	261
	C. H. Thorpe	L40018	268	102
<b>VK5</b>	R. C. Witford		1804	733
	L. A. Collins	L50805	1347	378
	P. Dreimann		603	209
	R. G. Edmeades	L50122	291	125
	R. W. Parker		279	97
	J. Warrington		239	239
	A. D. Drexel		211	95
	R. Warrington		150	150
<b>VK6</b>	F. H. Price		448	193
	J. R. Baxendale	L60232	157	69
<b>VK8</b>	T. A. Hine		2061	581
<b>ZL</b>	Z. M. Pearce	ZL2-129	842	154

**LOGS RECEIVED TOO LATE FOR INCLUSION IN THE RESULTS**

VK3APZ	31	21	VK5IU	643	129	VK7AX	25	25
VK4CU	184	32	VK6RL	330	142			

**CONTEST CALENDAR**

**December**  
 11/12 ARRL 10 Metre Contest  
 11/12 Hungarian CW Contest  
 11/12 Spanish CW Contest  
 11/Jan. 16 "ROSS HULL VHF MEMORIAL CONTEST"  
 18/19 SOWP QSO Party

**January**  
 8/9 YU 80 Metre Contest  
 15 "Hunting Lions'" Party  
 15/16 DL QRP Contest  
 28/30 CO WW 160 Contest  
 29/30 French CW Contest

**February**  
 12/13 "JOHN MOYLE MEMORIAL NATIONAL FIELD DAY"  
 26/27 French Phone Contest  
 \*Indicates contest for Champions Trophy

**CONTEST CHAMPION TROPHY — Contests for 1977**

- 76/77 Ross Hull VHF Contest
  - John Moyle National Field Day
  - Remembrance Day Contest
  - VK/ZL/Oceania Phone
  - VK/ZL/Oceania CW
- CO WW DX Contest. This contest will be over by the time you read this issue, but I have some late news of a new trophy of interest to VK. The Trophy is for Oceania — Phone — Single Operator — 14 MHz. The John Martin VK3JW Memorial. (International Pacific DX Net donors).

**ARRL 10 Metre Contest**  
 Starts 1200 GMT Dec. 11 and finishes 2359 GMT Dec. 12. The same station may be worked on both phone and CW. Send RS(T) and serial number starting at 001. US and Canadians will give RS(T) and their State or Province. Stations not land based will give their ITU region.

Each completed QSO counts 2 points or 4 points if it's a novice. Multiply by the number of US States, VE Call areas, DXCC countries and ITU regions worked (US and Canada not counted).

Frequencies — CW 28.000-28.050, Novice 28.100-28.150, SSB 28.500-28.600, AM 28.800-29.000. Oscar contacts permitted.

Mailing deadline for entries is Jan. 21st to: ARRL Communications Dept., 10 Metre Contest, 225 Main Street, Newington, Conn. 06111.

**Hungarian CW Contest**  
 1600 Dec. 11 to 1600 Dec. 12. All bands 3.5 to 28 MHz may be used CW only. There are three classes: Single operator single band; single operator all band; and multi-operator all band. Exchange RST and a serial number starting at 001. In addition, HA stations will send 2 letters to identify their county.

Scoring — 1 point for each HA contact and each county counts as a multiplier on each band. Final score is the total QSO points times the sum of multipliers from each band.  
 HA countries: BA, BP, BE, BN, BO, CS, FE, GY, HA, HE, KO, NO, PE, SA, SO, SZ, TO, VA, VE, ZA.

Send logs within 6 weeks to Radio Amateur League of Budapest, P.O. Box 2, H-1553 Budapest, Hungary.

**Spanish CW Contest**  
 2000 GMT Dec. 11 to 2000 GMT Dec. 12. All bands 3.5 to 28 MHz, CW only. VK to work EA stations, each contact worth 2 points. Each EA call area worked on each band counts as a multiplier. Final score is sum of QSO points by the sum of the multiplier from each band. The same station may be worked on each band. Awards are gold, silver, and bronze medals for the first 3 place winners.

Logs must be postmarked no later than one month after the end of the contest. Include a summary sheet showing scoring and other pertinent information, a signed declaration, and your name and address in block letters. Send logs to — U.R.E. Concurso Internacional CW 1976 P.O. Box 220, Madrid, Spain.

**Ross Hull VHF Memorial Contest**  
 It has been decided to include this contest for the 1977 Contest Champion Trophy as it is one of our national contests. The new rules for the contest were in last month's magazine, and hopefully will lead to a large number of logs being submitted. At the time of writing there have already been openings to JA, and interstate from VK3.



# KENWOOD COVERS THE WORLD

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As an amateur you have the ability to evaluate communications equipment specifications and design features.

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**TS-820\***



SP-520

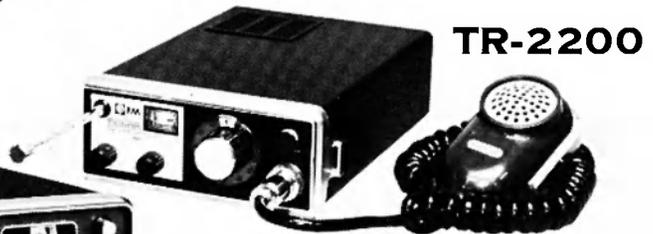
TS-520

VFO-520

**TS-520**



VFO-820



**TR-2200**



**TR-7200**



**TS-700A**



**TV-502  
TRANSVERTOR**

\* DUE TO UNPRECEDENTED DEMAND SOME DELAYS HAVE BEEN EXPERIENCED IN THE SUPPLY OF TS820 HF TRANSCEIVERS

Things look set for a good season, and with the large amount of off the shelf type equipment around now, activity should be fairly high. So join the contest, have a good time, meet all your old friends, make some new ones, and please submit a log. (It's much easier this year).

**John Moy's National Field Day**  
This contest also counts towards the 1977 trophy. Rules will be in next month's AR. It will take place on the second weekend in February. You will have from now till then to check all the antennae, rigs, tents, put-puts, esky's, operators and etc. Make sure you have a site to go to, and be prepared to have a most enjoyable time.  
See you all in the Ross Hull.

#### COMMONWEALTH CONTEST 1976

The following is extracted from the RSGB results of the 1976 contest:—

1. VE7CC 4188 points
2. VR1AA 3755 points
3. VK3MR 3377 points
4. VE3BMV 3345 points
5. VE7UZ 3322 points
6. ZL2BCO 3227 points

#### Receiving Section

1. Eric Trebilcock BCRS195 2145 points.

#### Australian Scores

3	VK3MR	3377	60	VK3RJ	790
8	VK2BPN	3028	62	VK2XQ	743
10	VK5NO	2937	63	VK4UA	738
	VK4XA	2535	65	VK3XU	705
26	VK7BC	2132	69	VK4MY	635
28	VK3ZC	1845	69	VK8ZZ	635
31	VK3XB	1701	72	VK2NS	619
35	VK7CH	1428	77	VK2HC	588
38	VK5DL	1319	81	VK2YB	535
40	VK5KO	1298	82	VK2HW	533
41	VK7HE	1248	86	VK7RY	477
42	VK3CM	1181	88	VK5FM	359
43	VK7JB	1174	91	VK3CG	311
44	VK7OB	1154	95	VK5FG	209
50	VK3KS	1029	96	VK2GT	176
58	VK3YK	823	98	VK5HO	150
59	VK5KL	810	99	VK4XJ	140

#### Other Pacific area entrants

6	ZL2BCO	3227	19	ZL2BR	2142
11	ZL3GQ	2725	29	ZL1HV	1800

and P29EJ 490 in 85th position.

"Snow" Campbell VK3MR therefore wins the silver medallion for the second year running, while the bronze medallion for the middle placing goes to Clarrie Castle VK5KL.

Scoring details, QSOs/Bonus per band, 80 to 10 metres are shown for VE7CC and VK3MR.  
VE7CC 49/33 61/35 119/52 36/27 0/0  
VK3MR 36/31 99/34 106/42 9/9 0/0

#### RSGB Comments:

The name may have changed, but the contest remains the same. This would appear to sum up the overwhelming sentiment among entrants this year. Although there was no repetition of the excellent conditions of 1975, we were glad to receive a healthy number of logs for this year's contest. A complete turnaround in results put the majority of top placings in the Pacific area, contrasting with last year when the honours went to Europe and North America.

Once again we were delighted to welcome the large number of entries from Australia but were rather disappointed to note the continued reduction in support for the listeners section. Can it be that this is a symptom of a decline in CW interest?

Top placing this year goes to Lee Sawkins, VE7CC, with D. Lockyer, VR1AA in second place. The latter result is somewhat amazing as Danny notes in his log that he did not hear or work a single G throughout the entire contest! He must also be one of the few high placings in recent years not to have used a beam.

The small entry in the receiving section in no way detracts from the win by Eric Trebilcock, BCRS195, of the Receiving Rose Bowl in his 35th year of participation.

The main point of comment in logs regarding the rules related to the duration of the contest. There is some feeling that we should revert to 48 hours with rest periods. This possibility was discussed by the committee last year and again this year and after much discussion it has been decided to leave things as they are for the 1977

contest. We feel that a 48-hour duration puts a great strain on VK/ZL entrants where the contest would extend well into Monday morning. Additionally, it is felt that this contest is one of the most demanding in the contests calendar, not only in terms of equipment but also in terms of propagation knowledge required and, most important of all, in the experience of the operator. These considerations are possibly what give this contest its unique appeal.

The other area of comment concerned CO calls. The first few hours revealed the die-hards persisting with BERU and the more forward-looking with CC. We have it on good authority that the gentleman who sent CQ RU is not connected with any rugby organisation! However, within a short period everyone seemed to have standardised on CQ BERU and no doubt this will be the pattern for the future.

1977 contest is 12/13 March, same rules as before.

## QSP

#### 1977 SUBSCRIPTIONS

Members will be receiving subscription renewal notices for 1977 at about the same time as this issue of AR arrives. Early payment greatly facilitates EDP data processing and will ensure that call book information will be correct. This is doubly important because of the separate identification of members and non-members (including unfinancials) in the 1977 call book. This work will begin during February/March when unfinancial members become liable to have their AR address labels suppressed as an automatic EDP function.

# AWARDS COLUMN

Brian Austin, VK5CA

#### EU DIPLOMA (GERMANY)

##### General

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. The award is based on the calendar year. Only contacts in the current year and 4 preceding years are valid — see note below.
3. QSL cards must be submitted with the claim, which must be made in the special booklet, available from the sponsor's Awards Manager — see below — for 3 IRC.
4. There are no mode restrictions.
5. The fee for the award is 8 IRC which covers the return of QSL cards by registered mail.
6. The address for application is:  
Walter Geyrhaller DL3RK,  
Post Box 262,  
D-895 Kaufbeuren,  
Fed. Rep. of Germany.

Note: This is published in 1976 so the current year is 1976 and the 4 preceding years are 1972, 1973, 1974 and 1975.

##### Rules:

One contact per country per band is valid in any one year.

One point is scored for each valid contact in the current year (1976) and the preceding year (1975).

0.75 of a point is scored for each valid contact in the next preceding year (1974).

0.50 of a point is scored for each valid contact in the next preceding year (1973).

0.25 of a point is scored for each valid contact in the next preceding year (1972).

Totals are rounded to the nearest whole point. New applications must be submitted to arrive BEFORE the end of June and BEFORE the end of December to be counted for the current year.

Additions to scores already submitted only require the additional QSL cards to be sent to the Awards Manager.

Requirements: A total of 100 valid points are required.

Country List: C31 CT1 CT2 DL/DM EA E6 EI F FC G GC (Guernsey) GC (Jersey) GD GI GM GM (Shetland) GW HA HB H3 HO HV I IS IT JW (Bear) JW JX LA LX LZ M1 OE OH OJ OK

ON OY OZ PA SM SP SV SV (Crete) SV (Rhodes) TA1 TF UA1, 3, 4, 6 UA2 UB5 UC2 UO0 UN1 UP2 UQ2 UR2 UA (Franz Josef Land) YO Y ZA ZB2 3A 4U1 9H1.

#### WORKED ALL ITALIAN PROVINCES

##### General:

1. The award is available to licensed amateurs.
2. Contacts on and after 1/1/1949 are valid.
3. Members of an IARU Affiliated Society do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of an IARU Affiliated Society. Non-members must send QSL cards to the sponsor.
4. There are no band or mode endorsements.
5. The fee for the award is \$1 or 10 IRC.
6. The address for application is:  
ARI Servizio Diplomi,  
Via Scarlatti 31,  
20124 Milan,  
Italy.

##### Requirements:

Confirmed contacts with 60 different Provinces.

##### List of Provinces:

Agrigento	Messina
Alessandria	Milano
Ancona	Modena
Aosta	Napoli
Arezzo	Novara
Ascoli Piceno	Nuoro
Asini	Padova
Avellino	Palermo
Bari	Parma
Belluno	Pavia
Benevento	Perugia
Bergamo	Pesaro
Bologna	Pescara
Bolzano	Piacenza
Brescia	Pisa
Brindisi	Pistoia
Cagliari	Pordenone
Callianissetta	Potenza
Campobasso	Ragusa
Caserta	Ravenna
Ca'ania	Reggio Calabria
Catanzaro	Reggio Emilia
Chieti	Rieti
Como	Roma
Cosenza	Rovigo
Cremona	Salerno
Cuneo	Sassari
Enna	Savona
Ferrara	Siena
Firenze	Siracusa
Foggia	Sondrio
Forlì	Taranto
Frosinone	Teramo
Genova	Terni
Gorizia	Torino
Grosseto	Trapani
Imperia	Trento
L'Aquila	Triviso
La Spezia	Trieste
Latina	Udine
Lecce	Varese
Livorno	Venezia
Lucca	Vercelli
Macerata	Verona
Man'ova	Vicenza
Massa	Viterbo
Ma'era	

## LARA

Ladies Amateur Radio Association

This month, the LARA column comes from Anne VK7LY. Anne is one of the earliest members of LARA from outside VK3 and is a familiar and welcome face at conventions here in VK3.

"While a YL operator is disadvantaged to a certain extent by lack of strength and lack of height, when it comes to the 'rough' work, the hobby for the female carries with it certain advantages.

First of course comes the flattering looks, and sighs of admiration from other YL's accompanied by the remark 'Oh but of course I could never do that — I'm not brainy enough'. From the om's of course, the remarks are flattering rather than flattering (Just to 'keep them in their place').

The most obvious asset is ones never-ending tool kit and spare parts supply to be found not in

# ELECTRONIC ENTHUSIASTS EMPORIUM

ITEMS OF INTEREST TO HOMEBREWERS. See current issue "Electronics Today International" for more detailed listing of components.

## TRANSISTORS

BC107	.19
BC108	.19
BC109	.19
BFY50	.75
MPF102	.55
MPF103	.85
MPF104	1.10
MPF105	.55
MPF106	6.0
MPF131/121	1.30
2N706A	.95
2N918	1.60
2N2222A	.95
2N2905	.95
2N3638A	.50
2N3642	.45
2N3819	1.25
2N5245	.65
2N5590	7.75
2N5591	9.40
2N6084	17.50
40637A	2.85
40673	1.65
40841	1.50
MRF603	7.90

## 74 SERIES TTL

74S00	1.15
74S74	1.80
74S112	2.50
74S196	5.95
7400	.39
7404	.39
7474	.69
7489	3.90
7490	.65
74121	.75
74145	1.95
9001	1.50
9368	3.20
74C90	1.95
82S90	5.95
95SH90	P.O.A.
11C90	P.O.A.

## PC BOARD

FIBREGLASS —	
4" x 3" S.S.	.75
6" x 4" S.S.	1.20
6" x 3" S.S.	1.20
6" x 6" S.S.	1.50
8" x 6" S.S.	2.20
12" x 4" D.S.	2.90
12" x 12" D.S.	6.00
6M CONVERT	2.50
2M CONVERT	2.50

## SEND NO MONEY

Where QTHR, simply order by mail or phone and pay on Invoice. No charges. No Post/Pack under 500 g (1 lb.)

## LINEARS

CA3018	3.50
CA3028A	1.80
CA3089/LM3089	2.90
CA3130/T	1.85
CA3140/T	1.65
LM370	2.95
LM373	4.70
LM555	.95
LM556	2.75
LM562B	9.50
LM565	2.90
LM567	3.50
LM723	.95
LM741	.49
LM1496	1.80
LM3900	1.75
MC1350	1.60
MC1351	1.95
MC1468	6.50
MC1648P	P.O.A.
MC7805	2.50
MC7812	2.50
MC7815	2.50
SG3009K	1.95
TAA300	2.90
TBA651	3.90
UA720	3.80
ZN414	3.95

## DIP SOCKETS

8 PIN	.38
14 PIN	.39
16 PIN	.45
24 PIN	.76
40 PIN	1.25

## TOROIDs, etc.

IRRESPECTIVE OF MIX	
T-12	.70
T-25	.75
T-37	.80
T-50	.85
T-68	.95

## COIL FORMS

NEOSID772/1	.20
5027/6PLB	.20
7100CAN	.20
5200/8PLB	.25
7300CAN	.25
F16 or F29	.12

## DIODES

ZENERS 400MW	.35
ZENERS 13W	.72
BA102	.60
BB105G	.85
EM402	.20
EM404	.20
EM408	.35
IN914	.10
MV1401	P.O.A.
OA47	.45
OA90	.25
OA91	.25
PA40	4.90
2530	.95
2530R	.95

## MISCELLANEOUS

SO239	1.50
PL259	1.50
BNC Pug	2.30
BNC Sockets	1.60
7 Seg Displays	2.50
Miller Coils	Indent

A.R.R.L. See E.T.I.  
Publications or write

## BOXES

108 x 108 x 50	2.50
216 x 108 x 50	3.75

## INSTRUMENT BOX

160 x 160 x 70	5.90
(Black/White)	

## 12 OR 24-HR. CLOCK

MA1002 Module.	
Transformer. Bits.	
Pieces Data.	
but not case	
(specify version)	27.95

## VALVES

6D05	7.25
6GK6	4.95
12BY7A	1.95
OD3	P.O.A.
7360	7.65
*OQEC6-40	34.90
*6146	8.90
*6146B	9.70
*6939	16.35
*4-125A	63.90
*4-250A	71.90
*6JS6	P.O.A.

\* Indent only.

the ham-shack, but in the so called female domains of the house. And if by chance one essential piece of gear is mislaid just when it's needed, an equally good alternate can usually be found.

While a hair-curling wand may not quite double as a soldering iron (I haven't actually tried it yet, but it gets darned hot) it may serve to bend into shape that piece of ice-cream container you want for insulating purposes. Your coax has water in it? Just put it under the hair-dryer for an hour or so. The laundry has its use too — pegs and ice-cream sticks make excellent clamps, and those empty plastic containers used for soap liquid, bleach, etc., are excellent containers for weather-proofing traps for your dipole.

The rotary clothesline doubles as a 20 metre rhombic and curtain-rods can be commissioned if you are really hard up for elements for your beam.

Hunt through your hobbies cupboard (pre AR of course). I've just found about 1000 yards of plastic tubing from a project long since forgotten. Don't forget the sawing cupboard either — sitch-rippers are handy when working with coax, and needles of various sizes are handy for threading wire through awkward spots.

Some items must remain a YL secret lest the om's catch on and our precious storehouse is looted while we are away shopping. After all, it's bad enough when one of our precious knitting needles is filed down for a tuning tool, but I have it first-hand that a certain gentleman in Western Australia has taken to using cake-lins for chassis! Heaven help us YL operators if ever the om's ca on to what we do use to get that job done.

Just a final word for this year from LARA — the first whole year of LARA activity — to wish all members, associates, friends and neighbours on the bands, a Happy Christmas and New Year. 33's from LARA. ■

## LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,  
Dear Sir,

Some experimenters trying my noise cancelling circuit in AR, Oct. 76, may be having difficulty in obtaining an effective noise null. This is because there is no provision for adjustment of phase, except for that which can be obtained with the noise antenna tuner.

By inserting a switchable phase reversing transformer (ref. Orr's Radio Handbook pp. 25.13), a much improved null can be obtained.

Constructed the same as T2, and inserted between the main antenna and R2 with the pot si reversible so as to obtain either 0 or 180 degrees phase shift.

I would like to hear from experimenters using the circuit and learn of their travels.

Drew Diamond VK3XU. ■

The Editor,  
Dear Sir,

Having been a member of the WIA since 1930 I feel that it is time that I voiced my complaints about the present way "AR" is produced and distributed.

This is brought about by the fact that the October issue only arrived yesterday (Friday 15th) and in the issue that I received there was no VK3 insert or information about the Eastern Zone Convention.

For many years "AR" was always in the member's hands within the first day or so of each month and on occasions was out before the beginning of the month.

With the present drive for new members it is time to get the magazine out at the beginning of the month again as it is very disheartening to wait day after day for the "Mag" to arrive.

Much has been said about the high cost of publishing "AR" and I cannot understand why it is necessary to have it printed on such expensive

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DON'T FORGET P.P.

# IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

## PREDICTIONS:

Have recently been comparing the two basic prediction charts supplied by IPS, the MUF/ALF charts and the Graflex series as used to prepare the AR charts. Along with the current monthly preparations was a series of planning predictions based on various sunspot numbers.

The latter were quite comprehensive listing the spectrum from 3-40 MHz and it was surprising the detail shown that is not evident in the usual MUF/ALF series.

This was prompted by an article in the ITU Journal by Charles M. Rush, USAF Cambridge Research Laboratories on "Ionospheric observation networks for use in short term predictions". My own short exposure has led me to follow short term variations in the structure of the ionosphere. These variations lead to changes that differ significantly from the monthly averages for MUF/ALF.

Comparisons between the MUF/ALF curves and the Graflex system do allow for a closer watch being made on the possible departure from average, particularly during the period prior to, and subsequent to disturbances — that affect propagation.

The paper was interesting in that it proposed a global network of observatories, that could rapidly exchange information of local conditions that are reflected by solar flares, geomagnetic disturbances etc., so predictions could be rapidly made available to users.

The proposition that short term observations provide a better indication of the ionospheric structure and electron content than do empirical formulae. The emphasis being placed on observing and predicting changes in the electron density region of the ionospheric, determining the characteristics of long haul HF circuits.

That so many use the MUF/ALF curves as gospel is unfortunate. Because they vary hourly, daily it is necessary to be able to observe and note just what is going on.

The predictions could well be described as a guide to when a particular path should be open when all the conditions used in preparing the prediction has been met. At this time in the Solar Cycle, an increase in solar activity will enhance conditions, where a large geomagnetic disturbance will degrade.

The provision of a world-wide ionospheric research network to put information into the hands of users without delay could revolutionise predicting and make it very similar to weather forecasting in general. The extremes that scientists went to in the manned lunar probes goes to show how their resources can be marshalled to provide service to users.

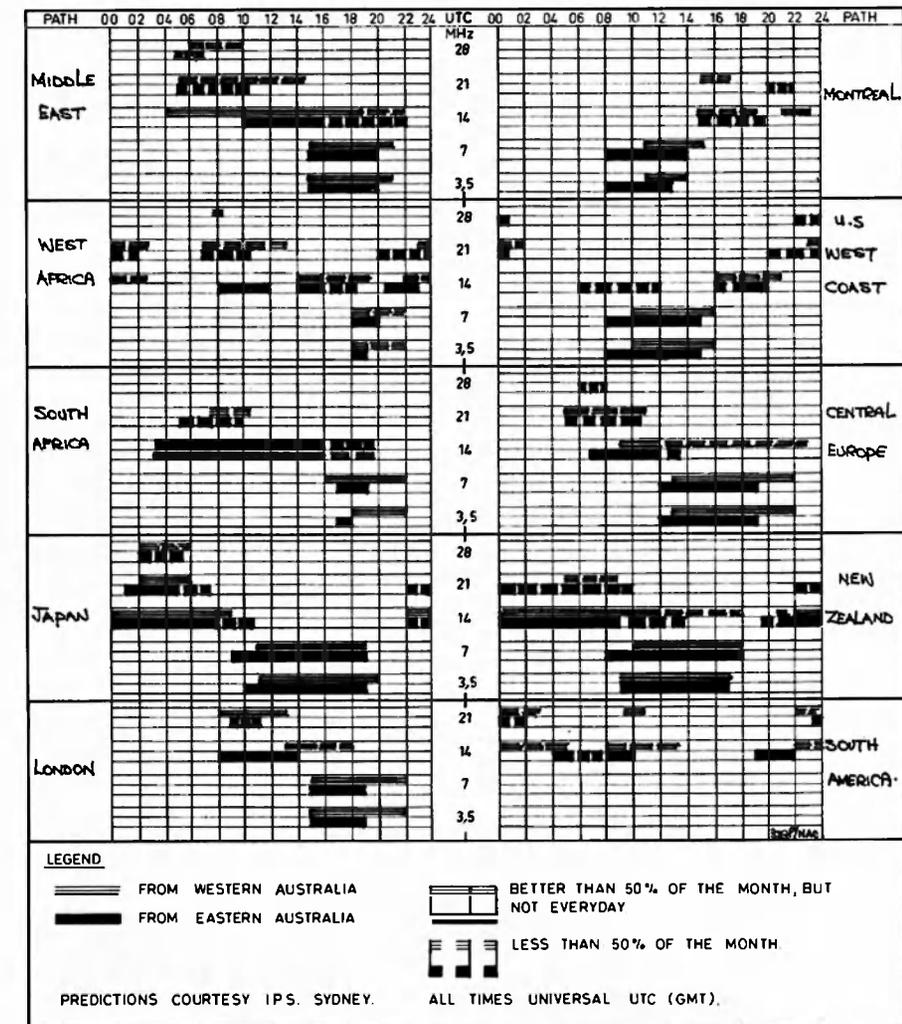
No doubt the costs will kill the proposal but there is no reason why amateur operators throughout the world could not form their own ionospheric alert network. Amateur communications have a wide diversity of systems and should be capable of forwarding information world-wide in a very short

paper. The NZART publication "Break In", "Electronics Aust." and many other periodicals use a good class of newsprint paper which must be cheaper than that at present being used for "AR" and consideration should be given to cutting costs by using a cheaper grade of paper.

If the placing of inserts in the magazine delays the posting of same, then it is time to cut the inserts out and have extra pages printed in the Mag. for the various State's notes as was done some years ago.

I realise that a lot of voluntary labor goes into the production of "AR" and while we appreciate the work that is being done, this is no excuse for the late arrival of the publication.

It is hoped that you will get the magazine out on time in the future even if it is necessary to change the printer or members of the committee (who are not pulling their weight) to do so.



period. A network of stations with RTTY could push data and retain this data for use for local access almost round the clock. Interesting thought? "Dial-a-forecast" service for everyone!

What were your experiences during the recent eclipse? I trust you have made your own observations for your records. I would be interested to hear from you.

Well this is the end of another year and a very quiet year from an activity point of view. The smoothed running sunspot number continued to decline, though increasing numbers of Cycle 21 spots are now in evidence. It does look like

the smoothed low of 5 will be reached early in the new year. If the activity increases by March then there is a strong possibility that activity will rise fairly quickly. The next possibility in lieu of March is the following August. In all 1977 should be worth watching.

The next maxima is expected to be a smoothed number of around 50 — or equivalent to the 1974 period and occur around 1984. Guess 10m will not be very active. Wonder what WARC will produce?

Wishing you all the best of DX in 1977.  
73's VK3ZGP/NAC.

"AR" means a lot to the country ham, in particular, and I trust that we can look forward to an improved service from now on.  
W. R. Jardine VK3PR.

The Editor,  
Dear Sir,  
I was interested to read the article by P29EM/VK4AEM in the September AR. I feel however a few clarifications would be worthwhile. Although (obviously) not a frequenter of the HF bands, I have some knowledge of the events described as I was resident on Tahiti at the time the incident occurred.

Firstly, some pieces of geography. The island where the accident occurred is known as Rapa, the real name of "Touboulawai" is Tubuai — both islands in the Australes group. Tubuai is about 24-30 hours steaming from Rapa

and 2 hours flight time (Fokker F27) from Papeete. Whilst the "normal" steaming time from Rapa to Papeete (in a copra schooner — like the "Tuhaa Pae") is about 50-60 hours.

My heartiest congratulations to all the hams and others involved on this occasion. However there is a definite lack of enthusiasm by the local authorities in Tahiti to give much credence to any report delivered by 'Radio Amateurs'. The reason for this stems from the reluctance of visiting yachts equipped with amateur gear to apply for French licensing but continue to operate whilst anchored in port at Papeete — which to all intents and purposes is an illegal act (within the 3 mile limit). The other problem lies in the fact that a reasonable proportion of these same yachts do not have crew holding amateur licences but take advantage of the high seas to use a molley collection of Panamanian, US, Sth. American etc.

call signs that were never issued in their respective countries.

I feel the solution is identical to that proposed for our own VK CB 'Pirates' a little education and friendly helping hands. It is not difficult to obtain a call (ask the UNSWARS). If we give these people who are on the fringe of Amateur Radio we would do our hobby a great service and as well increase our usefulness in emergency situations.

Douglas C. Rosser VK2ZEX.

The Editor,  
Dear Sir,

I am on a world-wide Dx trip, accompanied by my wife. We started 5 months ago in Germany and are visiting Dx stations on the way to try to activate rare call-signs.

I am writing monthly articles for the German "CO-DL" magazine, which has a circulation of 30,000, describing amateur radio stations in various countries and interesting things about the life there.

So far we have travelled through the Middle East and Asia. We will be coming towards Australia in December '76/January '77. Our route takes us through Papua/New Guinea into Cairns. We would like to travel down to Brisbane, Sydney and Melbourne visiting ham stations along the way. We want to meet several hams and write articles with pictures about them.

Later our trip will take us to New Zealand and the Pacific Islands leading towards Hawaii and then to California, where my wife is from.

I am on the air quite often from rare Dx stations and talk a lot to VK-land. We can bring the QSL's along or send them direct.

Best 73s from Sabah in North Borneo at 9M6MU from Peter and Kathy.

Peter Jenus DJ8XW.



DJ8XW, Peter and XYL Kathy at their station in Frankfurt, Germany.

The Editor,  
Dear Sir,

I have been asked to bring to your attention, a motion passed at the Moorabbin and District Radio Club's October General Meeting on Friday, 15th October, 1976. The motion reads:—

"That the Moorabbin and District Radio Club exhort the Wireless Institute to modify its attitude in respect of Citizens Band operation and henceforward make positive efforts to assist would-be users in their attempts to secure wide and more legitimate operation in that service".

By way of explanation the following points are made:—

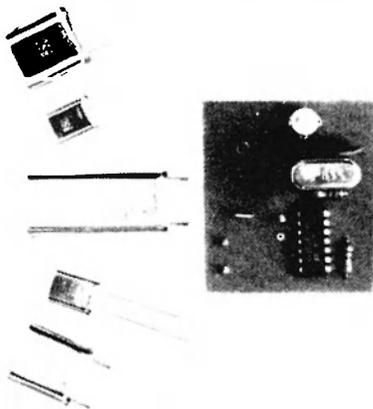
1. There appears to be no fundamental reason why any individual should be denied the use of a communications medium such as the so called Citizens Band, provided that there be compliance with any licensing, fee structure and technical requirements as may be reasonably imposed by the Regulatory Authorities. Difficulties in administration, the need to show reasonable cause, or the attitude that communication is a privilege cannot be considered valid grounds

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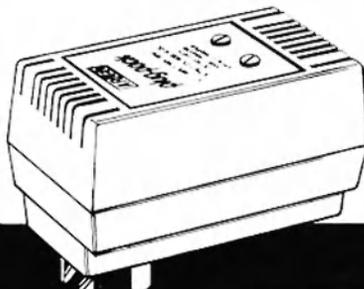
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for continued objection to the exercise of a fundamental right.

2. Rightly or wrongly the expressed viewpoint of the Institute (some facets of which were quoted out of context in the October 1976 issue of AR) has been taken as a contrary one by those seeking legitimate use of the Citizens Band. Recent television interviews with (currently illegal!) operators have made this quite clear.
3. It is the Moorabbin Club's opinion that ultimately the Institute's stance cannot remain substantially neutral as is now the case. Ultimately the Institute will have to come out either for or against the aspirations of would-be Citizens Band users. In the event the Institute did not find in favour of Citizens Band users, it must be clear that the more cogent the "contrary" arguments put forward by the Institute the greater is the probability that these same arguments could be applied against the Institute and its members.
4. Current information indicates that (legitimate or not) there is already more CB equipment in Australia than amateur equipment. It follows there are already more CB operators than amateur operators. In terms of future Institute membership it seems more pragmatic to foster alliance with CB users than to oppose them or ignore their existence. In the event that the present demands in respect to Citizens Band are met, it is not unreasonable to assume that some form of Citizens Band Association will be formed. Such an association will, solely by virtue of the probable number of adherents, be at least equal in influence to the Institute so far as the general public and the Regulatory Authorities are concerned. It is not impossible that such influence could exceed that of the Institute.
5. It would be to the Institute's advantage to see a separate — and legitimate — means of lay communication established. Those wishing simply to have a communication facility could use authorised frequencies (instead of being tempted to "pirate" on amateur bands) whilst those wishing to become technically competent in the design and manufacture of equipment for themselves could, perhaps, tend towards the amateur ranks. Would it be any sacrifice at all if the Australian Amateur Service freely gave up its 27 MHz allocation to CB users?
6. It is a fact of life, however unpalatable to regulating authorities and/or amateurs wishing to maintain the status quo, that mass communications is here and will stay. It would be fatal to the amateurs in general if they and their associations did not objectively recognise the traumatic changes of recent years. The belief that amateurs are still a privileged race has been outmoded by the very technology they espouse.

Toffler in his book "Future Shock" clearly describes the demise of people and organisations who refuse to acknowledge change or who refuse to accommodate change. Their sphere of influence and interaction becomes vanishingly small and may go to the grave as vegetables.

Let this not happen to the Institute.

Yours faithfully,  
Harold L. Hepburn VK3AFQ  
Committee member, Moorabbin and District Radio Club.

## PROJECT AUSTRALIS

David Hull, VK3ZDH

**AMSAT-OSCAR 6 and 7 ORBITAL DATA CALENDAR**  
In co-operation with AMSAT, Skip Reyman, W6PAJ has published an improved AMSAT-OSCAR orbital data calendar containing all orbits for 1977 for both AMSAT-OSCAR 6 and AMSAT-OSCAR 7. Designed so that it may be hung on the wall, the calendar includes information on the operating schedules and frequencies for both spacecraft, and also the telemetry decoding equations. Also included is step-by-step information on how to determine times of passage of the two satellites.

The orbital calendar is available post-paid for \$5.00 U.S. funds or 30 IRC's (\$3.00 to AMSAT

members, and free to AMSAT Life Members). Overseas orders will be air-mailed. Orders and payments should be made to:

Skip Reyman, W6PAJ  
P.O. Box 374,

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Please include a gummed, self-addressed label with your order to speed up processing.

Proceeds from the Orbital Calendar benefit AMSAT.

OSCAR 6 JANUARY 1977					OSCAR 7 JANUARY 1977				
Date	Orbit No.	Time Z	Long °W		Date	Orbit No.	Time	Long °W	
1	19264	01.24	79.60		1	9739	01.48	77.09	
3	19289	01.18	78.35		3	9764	01.42	75.59	
2	19276	00.23	64.60		2	9751	00.48	61.97	
4	19301	00.18	63.35		4	9776	00.41	60.47	
5	19314	01.13	77.10		5	9789	01.36	74.09	
6	19326	00.13	62.10		6	9801	00.35	58.97	
7	19339	01.08	75.85		7	9814	01.29	72.59	
8	19351	00.08	60.85		8	9826	00.28	57.47	
9	19364	01.03	74.60		9	9839	01.23	71.09	
10	19376	00.03	59.64		10	9851	00.22	55.97	
11	19389	00.58	73.35		11	9864	01.16	69.59	
12	19402	01.53	87.10		12	9876	00.16	54.47	
13	19414	00.53	72.10		13	9889	01.10	68.09	
14	19427	01.48	85.85		14	9901	00.09	52.97	
15	19439	00.48	70.85		15	9914	01.04	66.59	
16	19452	01.42	84.60		16	9926	00.03	51.47	
17	19464	00.42	69.60		17	9939	00.57	65.09	
18	19477	01.37	83.35		18	9952	01.51	78.71	
19	19489	00.37	68.35		19	9964	00.51	63.59	
20	19502	01.32	82.10		20	9977	01.45	77.21	
21	19514	00.32	67.10		21	9989	00.44	62.09	
22	19527	01.27	80.85		22	10002	01.39	75.71	
23	19539	00.27	65.85		23	10014	00.38	60.59	
24	19552	01.22	79.60		24	10027	01.32	74.21	
25	19564	00.22	64.60		25	10039	00.32	59.09	
26	19577	01.17	78.35		26	10052	01.26	72.71	
27	19589	00.17	63.35		27	10064	00.25	57.59	
28	19602	01.12	77.10		28	10077	01.19	71.21	
29	19614	00.11	62.10		29	10089	00.19	56.09	
30	19627	01.06	75.85		30	10102	01.13	69.71	
31	19639	00.06	60.85		31	10114	00.12	54.59	

## WIA CONVENTION ROCKHAMPTON

The Convention of the Central Queensland Division of the WIA held on the 28th and 29th of August was indeed a huge success.

The guest of honour, Mr. David Wardlaw VK3ADW, the Federal President addressed a gathering of well over 100 and spoke of the necessity of amateurs and would-be amateurs to fully support the WIA in its WARC work, of course never has an appeal been more urgent.

The repeater VK4RAR — R42 made its debut and Adrian Billard VK4MM gave a summary of its operation. Adrian was responsible for its electronics.

The smorgasbord was nothing less than a gourmet's delight.

The fox hunts saw very short lived foxes. Older "hams" of 60 years plus were seen racing like greyhounds through the undergrowth, such was their enthusiasm.

A 144 MHz signal was heard in Brisbane from Mount Archer the "local hill".

The prize winning antenna that accomplished this feat, a yagi with a 20 feet boom was seen heading towards Bilcoia after the convention, in the charge of its new owner. He's coming back later for "the H.II".

The ladies had a lovely time discussing their complexion with a skin care spe-

cialist who displayed a colourful array of cosmetics. For a radio convention, this we understand is a unique idea with great merit.

My solid state after burner, an exhibit, now smells like Ashes of Roses. Ah well!

Exhibits spanned a half century of progress. The equipment displayed ranged from a horn speaker of the early 1920s to colour TV cameras and monitors.

The convention was rounded off with a barbecue of succulent local steaks, salads and hot meals.

The committee, the organisers and the ladies must be elated at the compliments in praise of their efforts. Well done Rockhampton.

— VK5CGB/VK4 John W. Emmet PR Officer, Central Queensland Branch WIA. ■

## QRP

### IONOSPHERIC INDUCED INTERFERENCE

FCC has been told "that by allowing AM 'clear channel' radio stations more power, other signals passing through the ionosphere could be harmed. These harmful effects could manifest themselves as interference, scattering and severe weakening of signals. Currently, 'clear channel' stations, those given an AM frequency between sunrise and sunset in order to eliminate interference, are restricted to 50 kW. In order to overcome the unsatisfactory night-time service suffered in some areas it had been proposed that the power output be limited to 750 kW". The Telecommunications Journal Aug. '76 article carries on to say that a further field test is to be conducted.

## HAMADS

- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after 12th of the month cannot be processed.
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**FL101B Transceiver**, no mods, good condition, VK2BBJ. Ph. (02) 84 7170 A.H., (02) 631 7588 bus.

**FTDX 400 Transceiver**, good condition, \$325. VK2AAC, 20 Timaru St., Kirrawee 2232. Ph. (02) 521 7080.

**KW Viceroy 10-80m SSB/AM/CW Tx and Hammarlund HQ170 Rx 160-2m, \$230 ONO. VK2ATT, QTHR. Ph. (02) 476 2699.**

**HT32A Hallicrafters**, Tx 240V AC PS, complete with mic, and instruction book very good order, \$175. FL1000 Linear, EC instruction book, \$230. VK2BDN, QTHR. Ph. (02) 521 5149.

**Acitron 12 volt mobile type 3003 power supply with circuit, wired for FT200 transceiver, all voltages for other transceivers, high, low, bias, etc. Can be changed for other sets. \$75.00. VK5JX. Ph. (08) 43 4138. QTHR**

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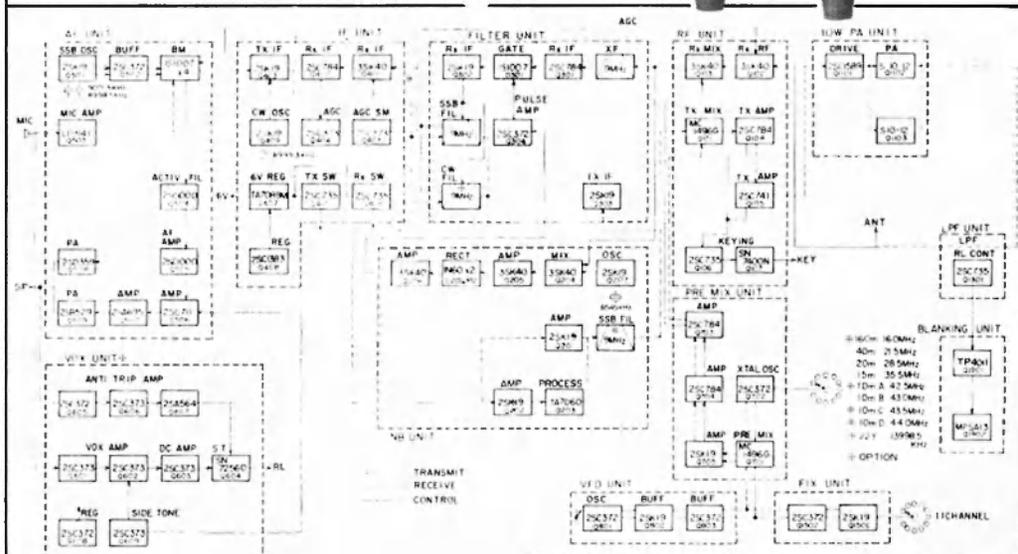


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**FT-301S Block Diagram**

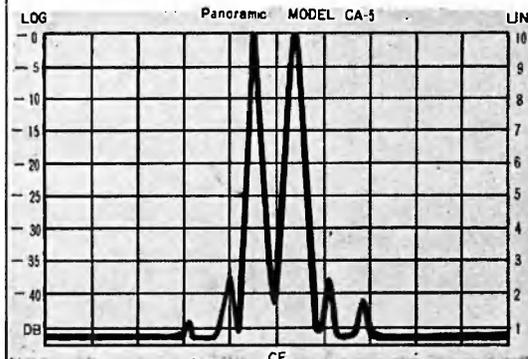
## Technical Data

- Frequency Range**
- 160m 1.8-2.0 MHz
- 80m 3.5-4.0 MHz
- 40m 7.0-7.5 MHz
- 20m 14.0-14.5 MHz
- 15m 21.0-21.5 MHz
- 10m A 28.0-28.5 MHz
- B 28.5-29.0 MHz
- C 29.0-29.5 MHz
- D 29.5-30.0 MHz
- WWV 5.0-5.5 MHz
- Aux. 27.0-27.5 MHz
- Mode**
- LSB, USB, (A3J)
- CW (A1)
- Input Power**
- A1 A3J 20 Watts DC
- Carrier Supp.
- Better than 40dB
- Adj. Sideband Supp.
- Better than 40dB
- Spurious Rad.
- Better than -40dB
- Audio Response**
- 300-2700 Hz  $\pm$  6dB
- Intermod. Distortion**
- Better than -31dB
- Frequency Stability**
- 300 Hz or better within the first 30 minutes and less than 100 Hz after warmup
- Input Impedance**
- 50 Ohm
- Mic Impedance**
- 500 Ohm
- RX Sensitivity**
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- Image Rejection**
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- 60dB at 1.2 KHz

Eleven crystal locked channels and 10 Watts PEP make the FT-301S particularly suitable for the new Novice and, at a later date, a 100 Watt outboard linear amplifier will be available from Yaesu, enabling the FT-301S to be upgraded for full licence operation. Additional plus features include automatic high VSWR protection of the final amplifier output transistors and selectable 100 KHz and 25 KHz calibration. Special care is taken to reduce unwanted harmonic radiation by the inclusion of separate double section Low Pass Filters for each band. Stocks of the FT-301S are expected toward the end of September.



7MHz Spurious Radiation



Graph shows Intermodulation products

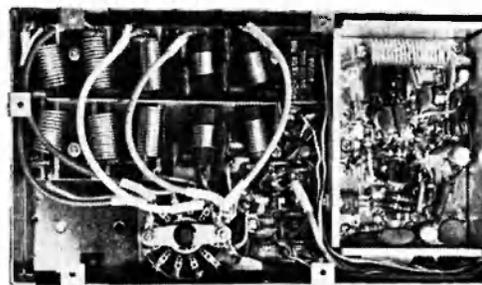


Photo shows double section Harmonic filter used in Final

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- Transmit 3 Amp (at 10W)
- AC 234V Receive 40 VA
- (With FP-301) Transmit 110 VA (at 10W)
- Dimensions**
- 280mm wide 125mm high, 290mm deep
- Weight**
- 7 kg.

\*Options

- Anticipated Prices**
- FT-301S Transceiver \$568
- FV-301 Matching VFO \$130
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