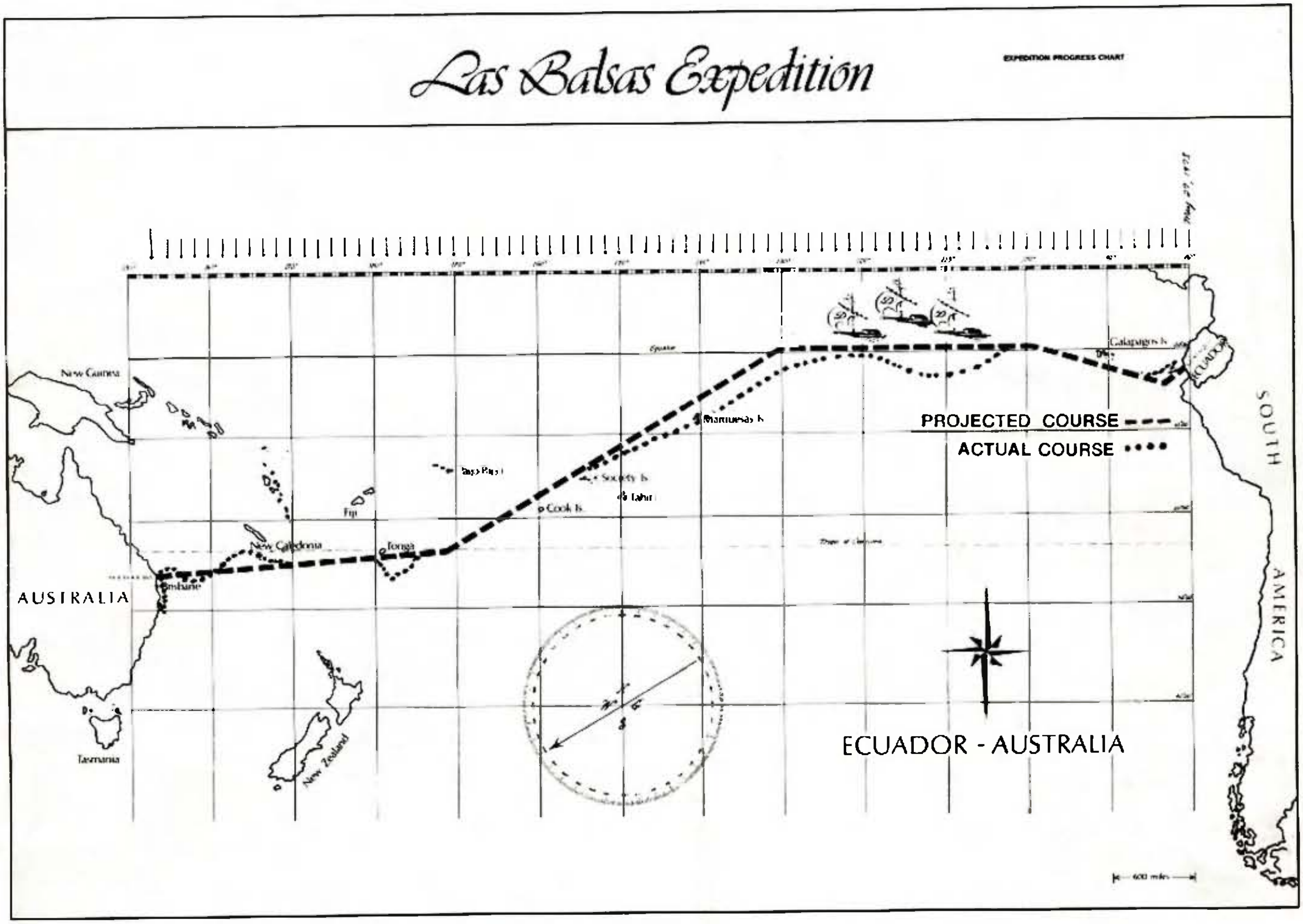
amateur radio

JANUARY, 1974



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FRONT COVER:
Official Las Balsas map showing intended route and actual route of the expedition. See story on page 13.

QSP

THE BUSINESS OF THE EXECUTIVE

As the Institute embarks on a New Year's programme, it is timely that we the members pause and consider a few cardinal points.

Based, as it is, in Melbourne; with Federal Councillors in each Division, the Executive of our Institute is expected to plan and direct the future of the Institute and to reach decisions on those important matters of policy which guide and effect the destiny of amateur radio in Australia.

Maintenance of links with kindred organizations overseas is also expected of the Executive.

To operate such a fragmented organization within a country the size of ours — and operate it with cohesion — is no small achievement.

The WIA has the distinction of being among the oldest Amateur bodies in the World and it is only by cohesive action that it can remain in the forefront of National and International Amateur affairs.

So what? you say.

The business of the Executive is of tremendous importance to all amateur radio operators — WIA members or not — but that business must not include trifling details and regular routine matters.

Ideally, the Executive should be protected from trivia and mundane routine This could perhaps be achieved, at least in part, by ensuring that business which is placed before the Executive is previewed by Divisional Councils; or carries with it some clear-cut statement or recommendation from such Councils or from the appropriate standing committee; always remembering that your Divisional Federal Councillor is your voice, your representative on the Executive.

This Editorial was inspired in part by the Editorial of the Journal of the Institution of Engineers, Australia, Dec 1972; and a quotation from a report written three years ago for the Institution of Civil Engineers, London.

The quotation applies equally well to the WIA — and perhaps to all governing bodies, boards and committees of management of large organizations.

". . . The Council itself (as opposed to any committees it may appoint) should be concerned only with a general surveillance of the profession and its interests and the consideration and approval of policies and broad programmes of development. The details of implementation and organizational housekeeping are not matters for major governing bodies. When fatally interesting detail compete[illegible] time and attention with fundamental issues it is always the latter that suffers [illegible] this the Institution cannot afford . . ."

Therefore, our New Year's Resolution could well be to assist the Executive by enabling it to have a simpler business paper with fewer (but exclusively important and well-documented) matters.

Thus, sufficient time and effort can be provided for full debate on affairs which properly demand the attention of the governing body of our Institute.

John McL. BENNETT
VK3ZA.

SUBSCRIPTIONS 1974.

MEMBERS ARE EARNESTLY REQUESTED TO SEND THEIR SUBSCRIPTION PAYMENTS DIRECT TO THE EXECUTIVE OFFICE AS SOON AS POSSIBLE.

A gentle reminder that subscriptions to the W.I.A. are due and notices should be in the hands of all members by now.

If you joined the W.I.A. last year — except new VK2 members — you should have paid a full year subscription. This would have been pro-rata for the number of months you received AR last year according to the address label code and the balance would be a credit to you for 1974. Your subscription notice would take your liability through to 31st December 1974. New VK2 members however would, in general, have paid only the pro-rata due up to the end of 1973 and their subscription notices would therefore show a full year liability for 1974. Any debits or credits in the EDP file would be added or deducted for the 1974 liability for all other members. As a few members paid twice in 1973 they would have little or nothing to pay in 1974. The WIA Divisional 1974 subscription rates are printed elsewhere in this issue.

To avoid delays in nofications to the Executive office, which could cause names to be automatically deleted from the EDP addressing labels for AR

Members are enjoined to make payment BEFORE receiving FINAL NOTICES because the EDP system will indeed operate automatically. No payment within a given time, no AR.

Cheques, postal orders and money orders should be crossed not negotiable and made out to "W.I.A." or "WIA Toorak" as the case may be. Cash should not be sent through the post. No receipts will be issued unless specially requested — clearance of your cheque will be a receipt in itself in accordance with normal commercial practice.

Remember — the Executive office merely processes subscription (through EDP) and keeps the membership records on behalf of the Divisions.

The address once again is —

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RTS

A total of 33 November AR's were returned to sender (i.e. the W.I.A. Executive office) by the Post Office up to 20th November. This seems to qualify for some record or other. 12 came back from VK3 addresses, 9 from VK4, 4 each from VK5 and VK6. 25 came back 'left address', 5 were unknown or 'not at address'. It seems as if the APO's new re-direction fee of $1 per month might be unpopular. All the addresses were the latest correct addresses, up to 15th October, known to the Executive office. The cost of mailing replacement copies would be nearly $5 quite apart from the time element involved. **PLEASE** therefore advise any address change well in advance because it cannot be effective for AR for at least one issue. Any change notification received after the middle of a month cannot be applied to the following month's AR because of lead times required for EDP processing, print quantities and the like.

SUBSCRIPTION RATES — 1974

The following rates have been notified to the Executive office by Divisions as applicable for the year 1974 —

Division	F	A	T	C	S
NSW	10.00	9.50	9.50	10.00	[illegible]
VIC.	12.50	12.00	12.00	12.50	[illegible]
QLD. x	12.50	12.50	11.00	11.00	4.00
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WA	12.50	12.00	12.00	12.50	6.00
TAS	11.00	9.00			6.00

Grades:

F — Full City
A — Associate City
C — Full Country
T — Associate Country
S — Other standard rate grade (this grade includes certain pensioners and students)
X and G are two further non-standard grades. G members receive AR but X members do not.

x Includes PNG.

AR is available on direct subscription to Libraries, Government and similar instrumentalities in Australia and to overseas readers. The rate is $6.00 per annum post paid (surface mail). A reciprocal agreement on rates exists between NZART and WIA.

AIR MAIL for AR to oceania areas (including Papua and New Guinea) will cost $3.60 extra per annum.

Satellite "1000" Award

Congratulations to VK7PF on qualifying for and on obtaining the first Satellite "1000" Award (No. 157 of 5.11.1973) by any VK amateur. For brief details of this award please see the centre page photograph and caption in A.R. July '73.

a simple single band transmitter

H. L. Hepburn VK3AFQ
4 Elizabeth Street, East Brighton, 3187.

Whilst there have been undeniable technical advantages in the world wide swing to the use of single side band transmission over the past ten years or so, there is still a significantly large number of amateurs who prefer the AM-CW mode for local natter sessions. The 1825 kHz net in VK3 and 160 metre nets in other States are still strongly oriented towards AM and a not inconsiderable number of AM stations can still be found on 80 and 40 metres. Thus no apologies are tendered for presenting an up to date AM design.

Whilst the transmitter now described is intended primarily for home or mobile use on 160 metres, it is easily adapted for 80 or 40 metres, the only changes being in the appropriate coils and resonating capacitors. The design is fully solid state and incorporates features to overcome the poor availability of suitable tuning capacitors and modulation transformers.

VFO

Fig 1 gives the circuit diagram of the VFO-exciter. A 2N3565 n-p-n transistor is used in Lees *synthetic rock* circuit and generates on signal frequency. Output from the oscillator is buffered by means of a 2N5245 FET and then amplified by an MC1550 IC. More than sufficient output is available to drive the subsequent linear amplifier and provision is made in the source circuit of the FET to vary the drive by means of a 1K trim pot.

The exciter was first built using a conventional 50 pF variable capacitor to tune L1. However, it was then found that there was no reliable source for further supplies of suitable variable capacitors and — of necessity — alternative tuning arrangements had to be used. The components contained in the dotted *box* of Fig 1 replace the conventional capacitor with a voltage tuned diode configuration.

Thermal stability with the Varicap is equally as good as with a normal capacitor and there is a significant improvement in the mechanical stability since there are no moving plates in which vibrations can be induced.

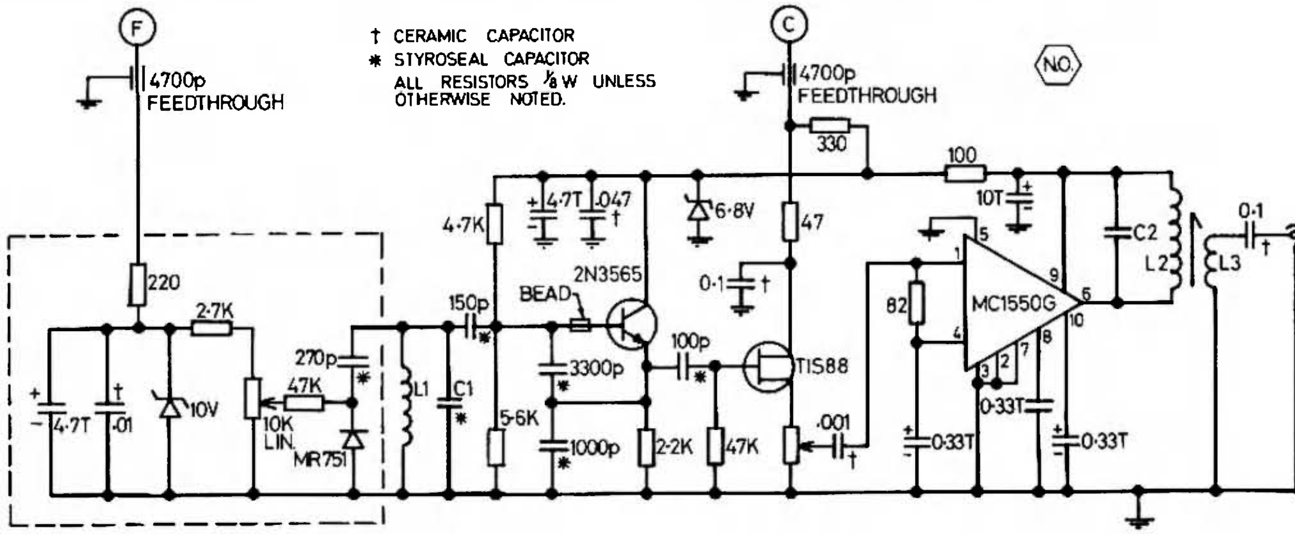


FIGURE 1 — SINGLEBAND TRANSMITTER — VFO

Since silver mica capacitors are no longer stock items in supply houses they were not used in the frequency determining parts of the VFO. Instead, use was made of the freely available *Styroseal* components. They should be used where so indicated in Fig 1. Ceramic disc capacitors should **NOT** be used in place of the styroseals although silver micas could be substituted if on hand.

Keying is effected by interrupting the DC supply to the VFO proper but the supply to the Varicap diode is left on at all times to avoid detuning caused by slightly different turn-on voltages of the zener. Exhaustive tests showed that no *chirp* could be detected when keying the VFO in this manner.

Using the standard Neosid 722-1 0.2" diameter coil form with an F16 slug calls for some 70 - 80 turns of very fine (36 AWG) wire. There are some not inconsiderable difficulties in so doing and an easier way was sought to obtain the relatively large inductances required for 160 metres.

Ultimately the Neosid A1 assembly was chosen since it gives large inductance values for relatively few turns of the wire. The A1 assembly is shown in Fig 4 and can be seen to consist of a plastic former, two mushroom shaped ferrite mouldings, a central former, a tuning slug and a nylon bolt which clamps the whole thing together. Only 24 turns of No 26 AWG are needed to give the necessary inductance and these are scramble wound on the plastic winding former.

Physically, the whole VFO is built on a 3¼" by 4" printed circuit board which, in turn, is mounted on ½" tapped brass stand offs inside an Eddystone 6809 P die-cast box. Component layout is given in Fig 6.

Input DC for the VFO and for the Varicap are brought in through feed-through capacitors. Output is taken via a Belling Lee co-axial socket.

LINEAR AMPLIFIER

Having obtained a *mini* signal, it remains to amplify it to some reasonable output level.

10 to 15 watts of RF — however generated — is quite adequate on 160. Indeed the majority of the transmitters in use around VK3 fall into this category. Whilst there is no reason why the small signal from the exciter could not have been amplified by means of valves, the current availability of the 2N5589-90-91 series of power transistors at very reasonable prices offered a means of power boosting which was relatively cheap and avoided the complication of high voltage supplies for mobile work.

Reference to *AR* for June 1969 will show that these three transistors were used in a Sideband Linear and had proved quite successful. By dropping the band switching used in that instance, but retaining the same general circuitry, a very simple, small, single band linear can be constructed. Fig 2 gives the circuit diagram. The component layout is given in Fig 8.

A resistance coupled 2N5589 is used to drive a 2N5590. In turn, the 2N5590 drives a 2N5591 through a matching network consisting of C3, C4 and L4. The choke in the collector circuit (RFC2) must have an impedence of about five times the collector impedance at the operating frequency and is damped by the 1000 turn 1 watt resistor on which it is wound.

The output circuit of the 2N5591 consists of a series arrangement (L5 C5 C6 C7 C8) and matches the very low collector impedance to a standard 50 ohm output level. The collector is shunt fed via RFC 4 which has a 100 ohm damping resistor across it.

Output *tuning* is by means of C8 — a 20-220 pF ceramic trimmer — and is set for maximum output at mid-band. No other output tuning arrangements are needed after this adjustment has been made.

Variation in output into a 50 ohm dummy load is no greater than plus or minus 1½ watts when the VFO is tuned across the 60 kHz wide 160 metre band. The HT feeds to each stage are individually decoupled with either a resistor or an RFC, the decoupling capacitors in all three cases being an 0.047 mF (Ducon Redcap) ceramic disc in parallel with a 4.7 mF *peardrop* type tantalum capacitor.

In view of the heavy RF circulating currents in the output tank, silver mica capacitors are preferred if to hand. However, in view of the previous comments on availability of these capacitors, a search was made for alternatives and the Ducon Plessy Type LCQ 100 VDCW type were used in the final design.

The Linear is built on a piece of (suitably etched!) circuit board mounted copper side up on a piece of ⅛" aluminium the same size as the PCB to act as a heat sink. Components are soldered directly on to the copper "lands". This method of construction allows the three transistors to be bolted hard on to the aluminium plate for maximum heat transfer.

TABLE 1—Coil and Capacitor Data.

Component	160	80	40
L1	24 turns 28 AWG on Neosid A1 form	12 turns 28 AWG on Neosid A1 form	6 turns 26 AWG on Neosid A1 form
L2-3	As L1 L3 is 6 turn Link	As L1 L3 is 4 turn Link	As L1 L3 is 3 turn Link
L4	60 Turns CW. No 33 AWG on Neosid 722-1 form F16 slug	40 turns CW. No 33 AWG on Neosid 722-1 form with F16 slug	25 turns CW No 33 AWG on Neosid 722-1 form with F16 slug
L5	38 turns close wound. No 16 AWG. wound on ¾" dia. P V C former.	20 turns close wound. No 16 AWG wound on ¾" dia. PVC former	17 turns close wound. No 16 AWG Air core. ½" ID
C1-2	180 pF Styroseal	180 pF Styroseal	180 pF Styroseal
C3-4	470 pF Phillips ceramic	220 pF Phillips ceramic	100 pF Phillips ceramic
C5	1000 pF Ducon LCQ	470 pF Ducon LCQ	220 pF Ducon LCQ
C6	2200 pF Ducon LCQ	2200 pF Ducon LCQ	1000 pF Ducon LCQ
C7	2200 pF Ducon LCQ	20-220 pF ceramic trimmer	20-220 pF ceramic trimmer
RFC1	100K 1 watt ceramic resistor filled with 28 AWG. En. wire	As 160	As 160
RFC2	52 turns 28 AWG wound on 1.0 k 1 watt ceramic body resistor	As 160 52 turns 28 AWG	As 160 but 24 turns 28 AWG
RFC3	24 turns CW 16 AWG. ⅜" I D air core	As 160	As 160
RFC4	18 turns CW 16 AWG. ½" ID air core	10 turns CW 16 AWG ½" ID.	14 turns CW. 16 AWG. ¼" ID. air core

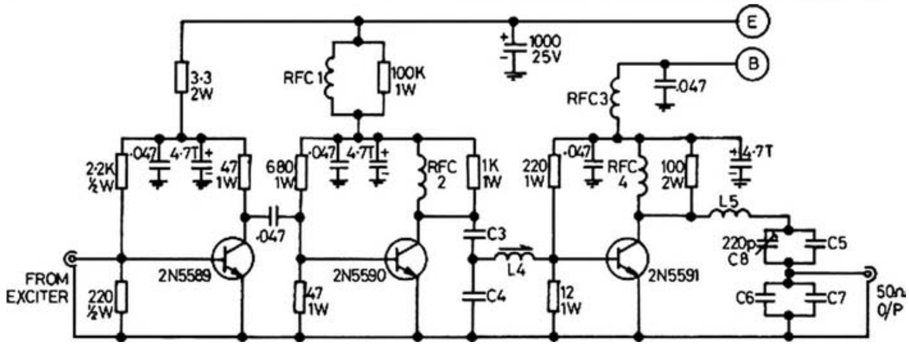


FIGURE 2 – SINGLEBAND TRANSMITTER – LINEAR STAGES

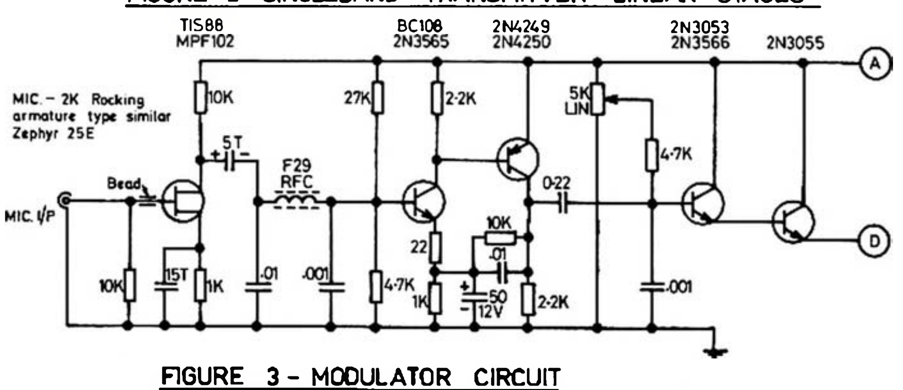


FIGURE 3 – MODULATOR CIRCUIT

THE MODULATOR

The method of modulation used in the present design is essentially series modulation, whereby the RF output level is caused to vary at an audio rate. In many ways it can be compared to the series gate method of modulation popular in valve transmitters. The circuit diagram is given in Fig 3. Component layout is shown in Fig 7.

A microphone pre-amplifier consisting of an MPF102, a 2N3565 and a 2N4250 is used

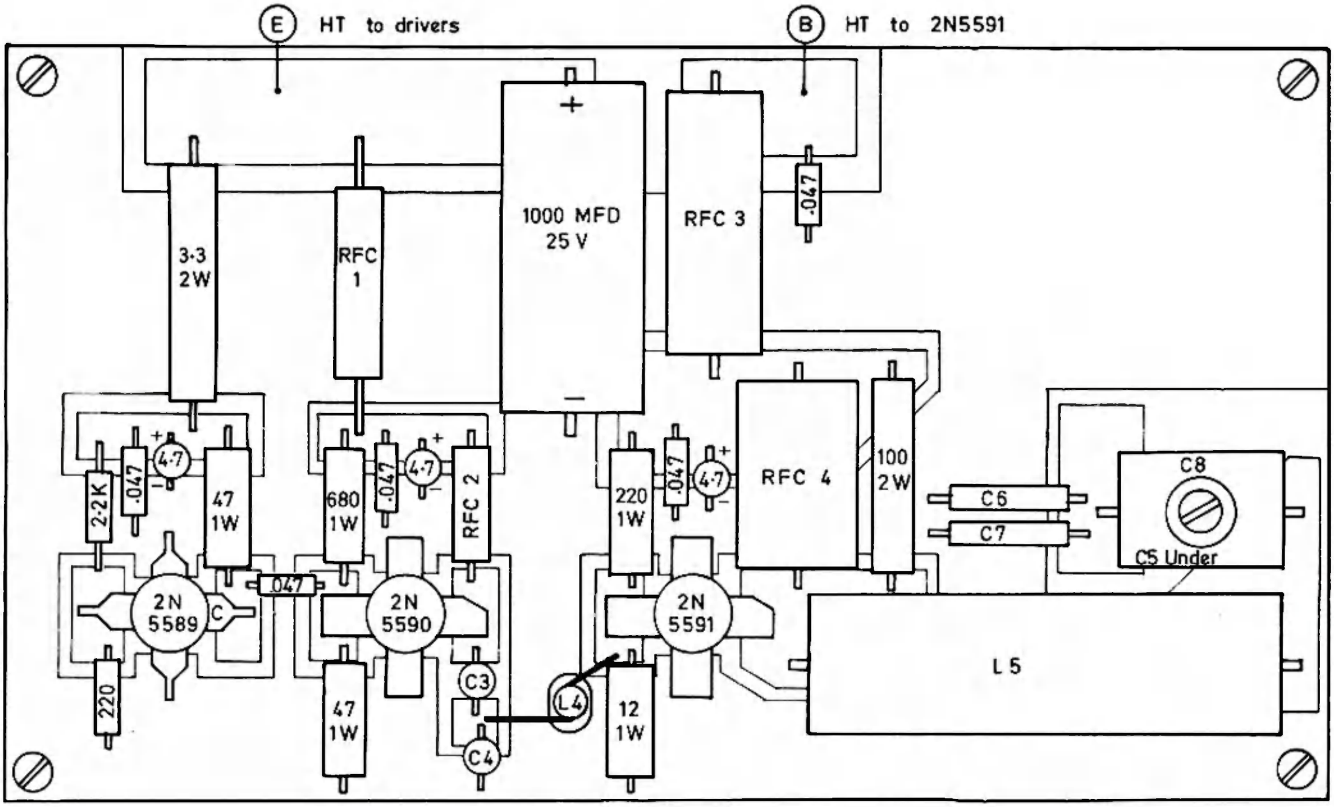
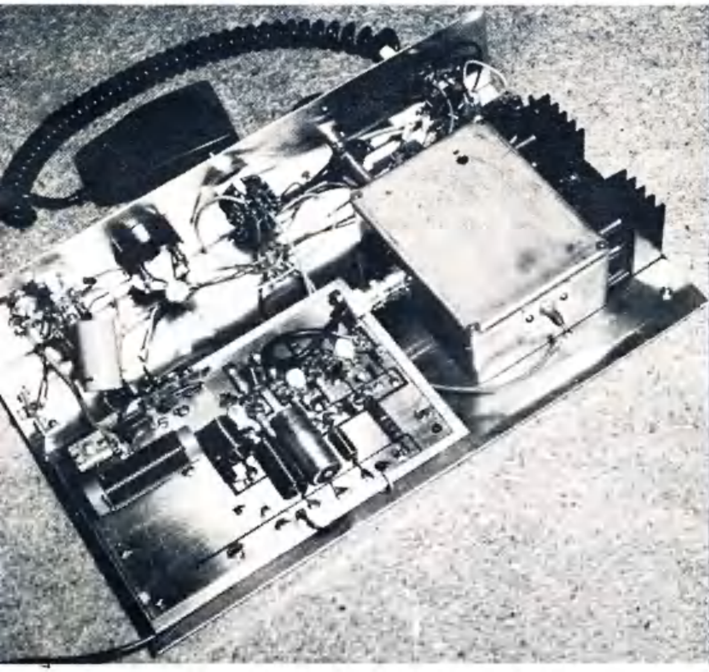


FIGURE 8 — SINGLE BAND TRANSMITTER LINEAR STAGES
P. C. BOARD LAYOUT

N.O.

ABOVE—A top view of the completed transmitter clearly shows the location of all major components. (Photo—VK3ZCK)

BELOW—A photo of "a 30-40 MHz Frequency Counter" described in AR March-April 1973. Kit sets for this unit are available from the VK3 Disposals Committee. (Photo VK3ZCK)



to drive, in turn, a 2N3566 and a 2N3055. HT is *gated* to the PA at an audio rate through the 2N3055.

In this method of modulation, the power output from the PA in the CW mode is reduced to half before applying modulation. This is achieved by means of the 5K linear pot across the supply rails which sets the standing bias on the 2N3566 base.

This method of modulation avoids the dangers of overdrive inherent in the more normal *plate and screen* method and does not have *over 100 per cent* modulation capability. When the effect of even momentary back bias on transistors is contemplated this slight lack of modulating capability can be looked on as an advantage rather than otherwise. Also the problems of splatter caused by over-modulation cannot arise. Finally, but by no means least importantly, there is no need for special modulating transformers.

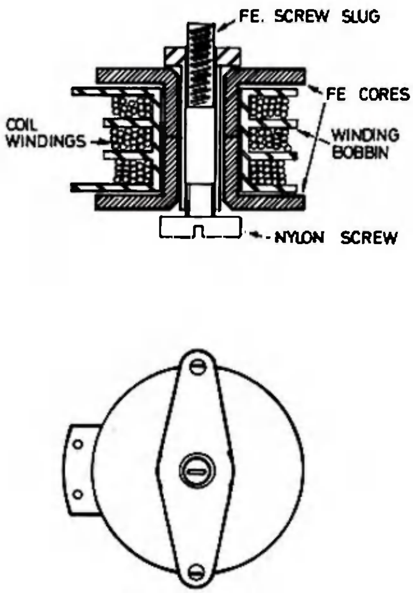


FIGURE 4
L1 & L2/3 COIL ASSEMBLY

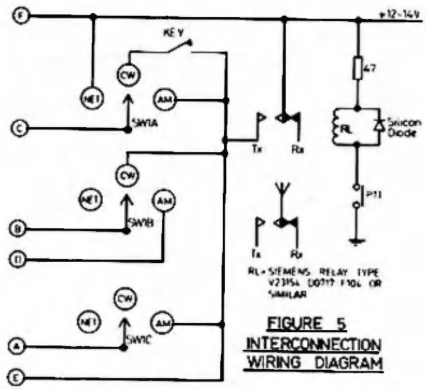


FIGURE 5
INTERCONNECTION WIRING DIAGRAM

CONTROL

Fig 5 gives the necessary control circuitry needed to operate the transmitter.

This is quite straight forward and the only points worth stressing are the 1000 mF 25V electrolytic across the supply and the silicon diode across the relay coil. Both are necessary to prevent damage to the three power transistors.

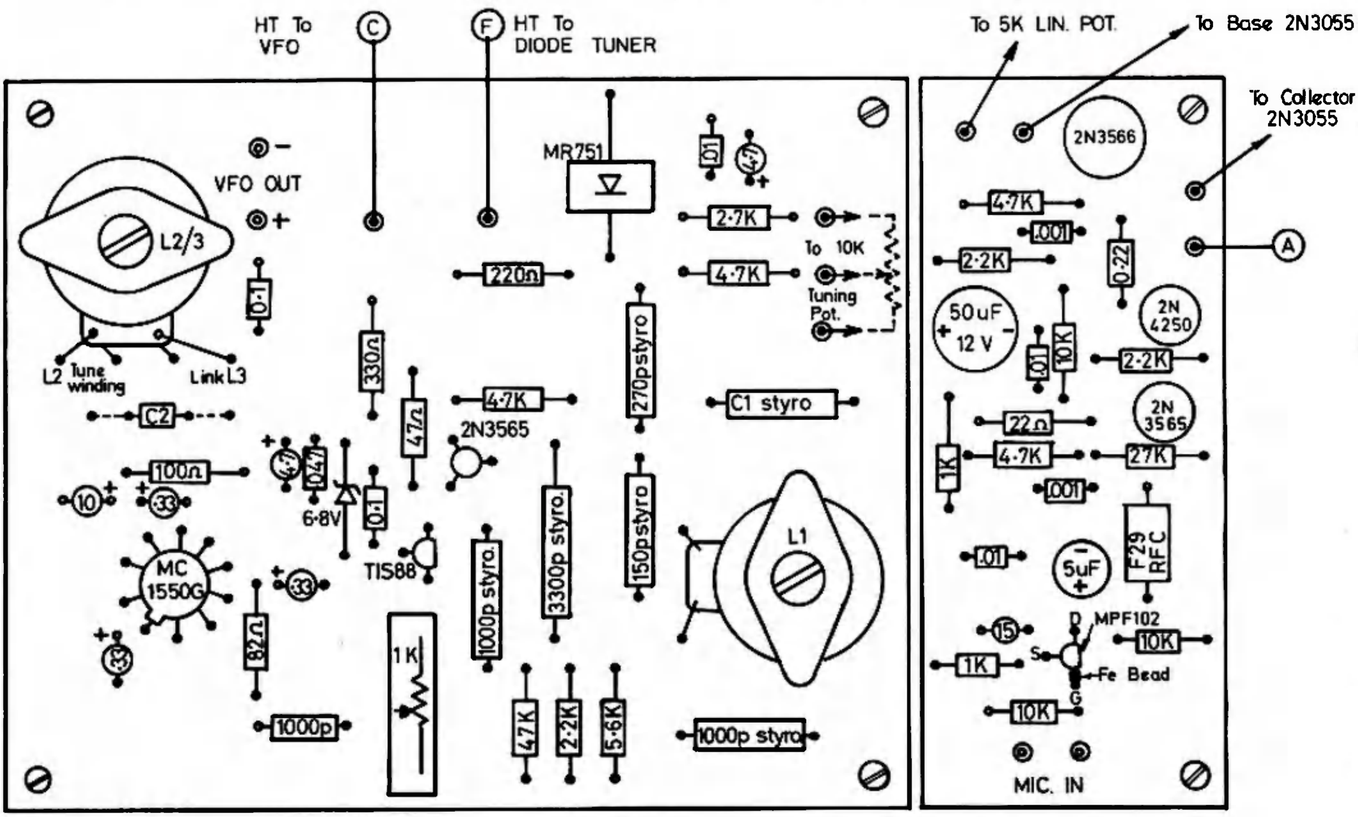
GENERAL

The final form of the complete transmitter is quite uncritical. The writer's prototype is built on a simple L shaped piece of aluminium the base of which is about 12" by 8", the front panel being 3½" high. Placement of parts can be varied to suit the individual constructors requirements.

A simple Japanese direct dial drive is quite adequate for the VFO — indeed anything more elaborate is both unnecessary and over-expensive.

In its various developmental stages the 160 metre version of this transmitter has been shown at the VK3 division of the WIA, the Moorabbin Club and the Western Districts Club in Melbourne. It generated a rather surprising amount of interest and the Moorabbin Club has undertaken to provide circuit boards, kits, etc.

For further information on this aspect, those interested are asked to write to the Secretary, Moorabbin and District Radio Club, 20 Lygon Street, South Caulfield, Victoria, 3162. ●



VFO
MODULATOR

FIGURES 6 & 7 — VFO AND MODULATOR P.C.B. LAYOUTS

a noise gate converter

CLEM MALOOF VK2AMA
7 Harrow Road, Bexley 2207.

At this station, located in an historic Sydney suburb, there has long been a need to suppress pulse pollution radiated principally from auto ignition and power line inductive apparatus. It is hoped the device to be described will go a long way to help the Radio Amateur beat this nuisance.

It is not uncommon at the VK2AMA location to discover that one's transmitted signal is being copied around the world solely from information relayed by intermediaries such as relay stations or cards from SWL's! Many of those who acknowledge one's CQ calls are simply masked out by local pulse noise. The noise pulses are short in duration but high in amplitude compared to the envelope of information on the signal sought.

As the name implies, the Noise Gate Converter is suitable for using with valve type receivers which otherwise possess satisfactory gain, stability and bandwidth considerations for the Amateur Service. Although the circuitry has been chosen to interface with valves, it is basically discrete solid state in nature it is thus also compatible, after modification, for solid state receivers.

All modes of reception will benefit from installation of this Noise Gate. Being untuned, the Noise Gate Converter will upgrade receivers having all the common intermediate frequencies.

There are no adjustments.

The whole unit including power supply, is accommodated on a five centimetre square of "Vero Board". Mounting is below chassis in a vertical position between an IF transformer and its succeeding valve, employing an aluminium bracket, self tapping screws and separate common ground wire.

The power required is 16mA at +12 volts. In my old Drake 2B this was most simply arranged from the standard 6.3 Vac tube filaments but obviously other sources are available.

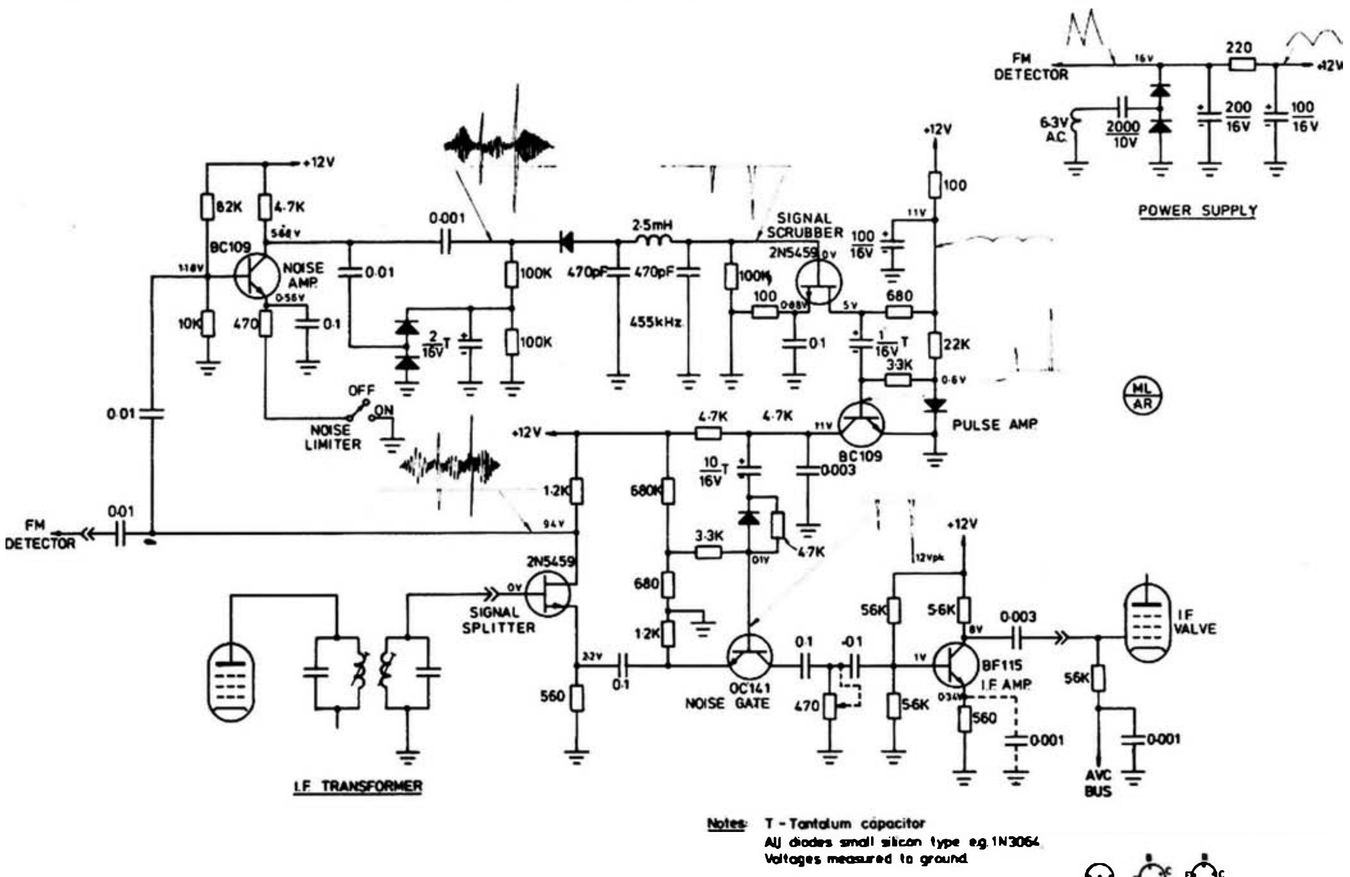
On-Off control is a single pole slide switch already present on the front panel. No threshold control is required as this is automatic over a wide range of IF levels.

If AVC is applied to the selected valve stage, re-routing will be necessary unless the grid is shunt fed. The IF transformer secondary winding should work the signal splitter FET gate against ground. This arrangement avoids detuning and maintains full design Q of the transformer.

Before disturbing the IF channel it is advisable to establish a gain figure which can be confirmed after installation of the Noise Gate Converter. In the case of my 2B it was a simple matter to inject crystal calibrator. On 80 metres the S meter reads 20dB over 9 at maximum sensitivity.

If one wishes to experiment with more or less IF gain, the opportunity is here presented. An emitter bypass on the IF amplifier together with an IF gain controller the form of a tab pot are dotted into the circuit diagram for this purpose. Most commercial equipment will have already been built with optimum gain — anything further may only jeopardise the signal+noise to noise ratio.

Effectiveness of the converter is such that it is left in at all times. It is turned off only to demonstrate its action.



NOISE GATE CONVERTER - VK2AMA

THE CIRCUIT

The splitter stage divides signal two ways and impedance matches the IF transformer to the converter. From the source, signal amplified somewhat less than unity is capacitively coupled to the noise gate emitter. The base is forward biased and receives gating pulses. Observe the collector is open for direct current, thus preventing hash during gating action as no electron flow is interrupted. Signal from the drain of the splitter stage is about twice IF voltage level. It provides IF injection for my FM detector (AR June 1970) and drives the high gain noise amplifier which is controlled from the front panel. Output feeds the signal scrubbing elements, effectively delivering 'clean' signal-free IF noise pulses. A half-wave doubler automatically back biases the series diode to almost peak envelope voltage over a wide range of IF levels. As signal must pass through this diode, only rectified negative going pulses of higher amplitude than the envelope will reach the gate of the signal scrubber FET. The low-pass filter restores pulse envelope shape and ensures RF stability. Its parameters are set in the diagram for 455 kHz. As a rule of thumb they can be varied in inverse proportion for higher IF's. The gain of the signal scrubber FET is less than two but it matches the higher impedance of the scrubbing elements to the lower impedance of the pulse amplifier. Positive going noise pulses are capacitively coupled into this pulse amplifier. The latter is biased to cut-off similar to class C operation. Because of the absence of emitter ballast, temperature stability was obtained by placing a silicon diode in the ground leg of the bias divider. Negative going pulses of the order of the full low tension supply voltage, viz:11.5 volts, are capacitively applied to the base of the noise gate through another diode. This latter diode may not always be necessary but it was observed that extremely high amplitude noise pulses could form small positive pulses at the collector of the pulse amplifier dependent on the discharge time constant of its base coupling capacitor. The series diode guarantees stable operation at all noise levels.

ACKNOWLEDGEMENTS

Acknowledgement is given to William K. Squires (QST October 1963) for describing a certain symmetrical germanium transistor exhibiting very fast switching properties and for the suggestion to incorporate it into a hash-free noise gate. Suitable local equivalents include the OC139, 14O,141 family, each of which performed successfully in the design presented.

It is noted that some current models of Yaesu equipment employ similar automatic signal scrubbing circuitry.

Finally, most parts for the project were obtained from the Victorian Division WIA Disposals Committee P.O. Box 65 Mt. Waverley 3149 by way of a convenient and expeditious mail order service.

Footnote: An ever present source of noise suitable for evaluating the Noise Gate Converter will be found on 10 metres near any main road!

2 KO Newcastle

The Hon. Sir Allen Fairhall, K.B.E.
VK2KB, 7 Parkway Avenue,
Newcastle,
NSW 2300.

For reasons which will become clear I was more than interested in "Fifty Golden Years of Broadcasting" by Maxwell Hull in the Ausust issue of Amateur Radio. It is a national misfortune that the history of Broadcasting in Australia was not written, while so many of the people who made such rich contribution to it, were still around to tell their tale. But that is another story. Perhaps I can add a paragraph or two to Max Hull's story which is illustrative of the times of which he writes.

I had built my first working receiver in 1924 when there was little official broadcasting but with Amateurs providing a good deal of rough (!) interest.

When serving an apprenticeship to Electrical Fitting in the years 1925 on I met fellows who actually knew the Amateur Broadcasters including 2CS, 2 MS and some others! Then the bug really bit me and I became A2KB in 1927 complete with a UX201A in T P T G, Slop Jar rectifier and an OV1 receiver. "Young Squirts" please note!

My interest also led me to build an Electric Gramophone with a pair of UX250's with all of ten watts output!

The great Depression hit the bottom of its curve coincident with the end of my apprenticeship in 1929 and I was looking for a non-existing job for quite a while, meantime filling in the rest of the day on 40 metres.

Those were the happy days when Amateur's could still romp on the 240 Metre (Publicity) Band. It occurred to me that a little publicity might drum up a little work in Radio Servicing.

So Sunday mornings found tank coils switched to 240, the gramophone tied in as a modulator and 2KB became a regular Sunday Morning Broadcaster to the great content of Listeners charmed by faithful rendition of such records as I was able to borrow. Some of it was even very good, since I was ignorant of little things like copyright and played one or two well known works over the air which were banned to every other Broadcaster!

Then out of the blue some hopeful business man asked me to do some advertising. Sadly I refused. But a great light dawned and with hand shaking with eager anticipation I wrote the Chief Radio Inspector and had the temerity to ask for a "B" Class Licence.

Twelve months went by while I floated a Company, argued myself into the support of local organisations, brought forward the evidence of an already appreciative audience and waited. Then one day the Licence turned up!

However, I soon learned that having a Licence was one thing. Knowing what to do with it was quite something else, since money was now needed in what were considerable quantities for the hard times we were enjoying.

I never knew that business men were so cagey about a bit of cash — or maybe they were broke too — or did not have any confidence in the obviously inexperienced character who was trying to sell them a hot idea.

Raising money for Broadcasting Stations has come a long way since 1931 but the answer then was a good round lemon. After another six months of that state of affairs the Radio Inspector was once again breathing down my neck, this time muttering, "Use it or send it back".

But I was not going to give in that easily. I bought another length of 2" x 2" oregan and put another 20' on the rear mast to make 40'. Now I turned my UX210 TPTG into a Power Amplifier with crystal control, bought a microphone on the "pay if ever I can basis" and 2KO Newcastle was in business.

Happily in the 240 metre days I had met a young musically inclined character by name Pic! hover, who knew where there were stacks of gramophone records for the borrowing. He became Chief Announcer and between us we managed to do a reasonably professional job as engineers, copywriters, announcers, salesmen, accountants and anything else that had to be done about a Broadcasting Station.

The performance seemed to be acceptable to the Radio Inspector who blinked a little at the general layout, but gave a somewhat reluctant blessing to the use of 6 watts in a suburban back yard on a temporary basis.

Now our 9 AM Sunday morning romp became a fixed 1 hour programme after which the station closed until 7 PM!

There was however one snag. The Trawlers fishing the NSW Coast at the time used 240 metre CW to check fish prices to see whether it was worth bringing the catch in. They mostly managed to choose 9 AM on Sunday morning and since their signals were mostly RST592 the QRM was killing the audience!

It became routine opening drill on Sunday morning to key the rig and tell the Trawlers to get to hell off my frequency to let us get on with the business of entertaining the populace. This is the only case to my knowledge of a Commercial Broadcasting Station sending CW.

For the record it is interesting to note that the Log Book, of which I retain proud possession, shows the revenue for the first month coming from two Commercial Announcements at 4 shillings each!

But that is the story of how one Amateur got into Broadcasting in the good old days.

Ultimately I had the pleasure of inviting into the service fellows like 2KG, 2MS, 2ZC, 2AHA and one or two others who have since left town and whose calls escape me.

Most of them are either still there or have left the service of the station for honorable retirement.

2KO Newcastle therefore became perhaps one of the more concentrated examples of the contribution Amateur Operators made to Commercial Broadcasting — and happily vice-versa!

las balsas (part 2)

S. E. Molen VK2SG

The Australian Communications Co-ordinator
13 Pendle Way, Pendle Hill, 2145.

While His Highness the Duke of Edinburgh was in contact with the rafts they were in the position of 166 degrees 00" east and 24 degrees 15" south and had travelled 61 miles for the last day, making a total distance travelled of 7888 miles. This put them due south of New Caledonia, and as I said previously it was raining and the winds were 15 to 18 knots. The next sked was on the 26th November, and the rafts were still making good progress. At this time we were getting a little worried that the rafts would be in Australia before we could get up to Mooloolaba for we had arranged our holidays to coincide with the anticipated arrival of the rafts.

As they were getting closer to the Australian coast it was decided to have the skeds every two days instead of the previous four days. The sked of the 1st November was more or less normal, apart from the fact that during the morning I had packed my campmobile with the necessary clothes, food etc. that one normally takes on holidays, together with an FT200 with both AC and DC-DC power supply, a 30L1 linear amplifier, a foldup two element Yagi beam, a 25 foot collapsible mast together with baseplate and guys coax cable, and most of the things that one needs to operate a portable station. After the sked which finished at 1600 hrs. local time we said goodbye to the six visitors, both local and overseas, that we had had for lunch and headed for Mooloolaba where we arrived 14 hours later.

Having found a place to set up the gear, at the home of Dr Win Fowles, we proceeded to erect the station and check it out, glancing every now and then out to sea to make sure that the rafts were not appearing over the horizon. About 1300 hrs the station was tested out with several contacts and, strange as it may seem, it all worked and we were ready for the next days sked. The next day we had the sked as usual, only to find that the rafts had slowed down and had only done 60 miles in the two days, making a total of 8260 miles. On the sked of the 3rd November it was decided that as 4LZ had arrived at Mooloolaba and could take over the operation for a few days, it would be possible to go out to the rafts and take them some fresh fruit and vegetables.

They were at that time about 420 miles from the coast, the seas were smooth and the winds were light. A hurried trip around the shops, with our minds in a turmoil trying to think what the chaps would appreciate after more than 150 days at sea, and trying to organise a boat to take us out, one that had sufficient range to get us there and back.

We finally left early in the morning, well loaded with all kinds of goodies, and of course some Beer. We travelled for a long time and over lots of ocean, until the sked of the 5th when we found that the rafts had hardly moved. In fact they had only travelled 9 (nine) miles in the past two days and they were just sitting there with no wind and very little movement in the water. For some people on the boat this was a happy thought, because most of them, being landlubbers, were leaning over the side of the vessel talking to "Herbie". At this point I asked Vital for a sked at 1930 hrs. local time so that I may get a fix on him and we would not have to spend the night looking around the ocean trying to find him. At 1930 hrs. there was Vital with a big signal. After I stopped him singing I was able to get a good bearing on him, slightly off the starboard bow, but as I was only using a whip aerial to get a bearing, I was not sure whether he was ahead of us or behind, so I asked for another sked at 2000 hours.

Again Vital was there and I took another bearing and sure enough he had moved slightly more to the starboard, which meant that he was ahead of us and that we were slightly north of him. We changed course by 11 degrees to put him right on the bow, and steamed on. We kept up a continuous chatter for a while, and at 2057 hrs. there appeared on the Radar three small blips at 4.6 miles. Sure enough there were the rafts right on the nose. We came alongside them at 2130 hrs. and were they pleased to see us.

I guess at this point I had better digress and explain this direction finding with a whip aerial. I know the thought has occurred to someone that a whip radiates equally poorly in all directions. Basically this is so, except for one direction, and in this direction it radiates very badly, and that is from the top. In effect if you take a vertical and rotate it into a horizontal plane you will find that the ends are very dead, and the end away from the coax is the really dead end. So if you are looking for a station you just take your vertical into a horizontal plane by holding the coax end, without touching the coax center or the actual aerial, and point it. You will find a null of signal in the direction from which that signal is coming, with the possibility that it may be coming from 180 degrees, hence the second sked to prove that the station was moving towards us from the bow, and not passing us from the stern; a little crude maybe, but effective.

So there were the rafts, but unfortunately it was night and we could not transfer food to them at that time, and as we had a film crew with us and they wanted to film the procedure, we waited until daylight. Possibly some of you saw the film on the news services.

We stayed with the rafts until about midday when we reluctantly turned back to the Australian coast about 400 miles away. We wished we could have towed them those last few miles, but we realised that this should not be. If we had known what was to happen later maybe we would have given them a little push in the right direction. In the next two days they travelled 30 miles, mainly in the wrong direction, for they were getting fairly close and they were too far south for what we felt was a good position to arrive at their destination of Mooloolaba. But there was nothing that they could do as they were totally dependent on the winds, and there was no wind.

Between the 7th and the 9th they started to move again and in these two days they did 88 miles and in the right direction. We were feeling better and a little happier, but it was short lived, for on the 11th, even though they had travelled 59 miles for the two days, they were again going south, and so it went on until the 14th November when their position was 155 degrees 57" east and 26 degrees 23" south, which put them about 120 miles off the coast and about due east of Mooloolaba.

This would appear to be a good position to be in, but there was a fast flowing current down the coast which they would have to cross, and it was felt that they would have no possibility of doing this from their present position. It was at this point that Vital was told that unless he made more than 25 miles north before the next day, we would come out and tow him in because he could get into serious trouble with the southerly set in the current, which the locals knew could flow at up to 6 (six) knots. This current incidently is one of the fastest flowing sea currents in the world.

I forgot to mention that while we were out at sea a visitor arrived at the control point unannounced and unsung. The story of his introduction to VK2SG-P operated by VK4LZ I will leave to Les to tell you. The people concerned are still blushing because the visitor was Admiral Don Samuel Fernandez (ret.), Navigation instructor to the Mexican Navy, and the person who taught Vital and his crew to navigate and who assisted greatly in the organisation of the trip. At home he operates under the callsign of XE1EB. Have you ever tried to convince someone that you are not a newspaper reporter in a language that you are not really conversant with. Anyway, ask Les some time to tell you, that is if he can stop laughing.

But Samuel is a real gentleman and he took it all in good part when it was explained to him and he is still smiling about it. During this time, or really from the time before we went out to the rafts, radio conditions played us dirty. Mexico and South America had virtually disappeared, and as the rafts were starting to get inside our first hop we were having trouble with copy. But as VK4GD was our northern backup from Townsville he became more and more important to us as he was hearing the rafts just like locals and also he was hearing us and we were also receiving him at good strength.

He was taking over the skeds and repeating the figures back to us. Len spent many weary hours just sitting at his set helping out, and at times when we were a little down in the dumps, his infectious laugh brightened us all up. After we had threatened Vital with a tow unless he could make better than 25 miles north, Vital showed his spirit and went north 44 miles, with the help of favourable winds, so for the moment we were satisfied, and all he needed was some more of

the favourable winds for another day or two and he would be in a perfect position to turn southwest and come straight into Mooloolaba. To make sure that he maintained his northerly progress we arranged another sked for the next day, and sure enough Vital had made a further 22 miles north, but unfortunately the wind had turned to the east and he had headed about 42 miles west, this brought him to within 48 miles of the coast and 94 miles north east of Mooloolaba.

At this point we felt that he was too far from the coast and too close to Mooloolaba to be in a safe position. We would have preferred him to be further north and nearer the coast to dodge the southerly current, but the position he was in could be tolerated if the winds strengthened a little and helped him across the current. In any case, to be sure, we arranged a sked for the next morning at 1100 hrs. At the sked time when we received his position, we realised that what we had feared had happened; during the night he had come 61 miles south.

With no assistance from any wind Vital and the other rafts were fast drifting south in the grip of the current. After a discussion with Samuel Fernandez (XE1EB) it was decided that the position was such that if we did not arrange a tow immediately, there was a great possibility that the rafts would miss Australia completely and possibly drift back to South America.

The Navy in Brisbane was informed of the position and immediately offered their assistance. There was some delay due to the fact that the crew of the rescue vessel had just returned from exercises around the New Guinea coast, and were on leave. But I doubt if this delay materially altered the situation to any great extent. While we were waiting for the navy vessel Labuan to catch up with the rafts, the rafts established a record days run for the whole trip. A distance of 91 miles was travelled in one day, with no wind assistance. At 1100 hrs. on 19th November the rafts were sighted by a Canberra aircraft from Amberley just south of Point Lookout. This was 24 hours after we had asked for assistance. I am not making that statement as a criticism of the length of time taken for the rafts to be sighted but just as a statement of fact.

The Canberra aircraft was in contact with HMAS Labuan, and could be heard passing his information as he was operating on the same frequency as the net had been operating, namely 14105kHz. As the Labuan was also operating on that frequency under the callsign of VKDY while the aircraft was using the callsign of VMPM, it made it a nice tidy net, with everyone knowing what was going on. Vital on the raft could also hear the conservation, and so he was kept informed of the exact situation. The Labuan made contact with the rafts at 1826 hrs. on 19th November when their position was 153 degrees 54" east and 27 degrees 55" south, or about half way along Stradbroke Island and a little north of Point Danger.

At this point in a discussion with the Navy in Brisbane and with the captain of the "Labuan", Lt. Old, it was requested that if possible the rafts be towed back to Mooloolaba as a lot of organisation had gone on there to welcome the crews of the rafts.

In a later contact with Lt. Old it was learned that the Labuan was towing the three rafts north at four knots but, owing to the current, the whole tow was proceeding south at one and a half knots. This was an impossible position, and left two choices. One was to tow the rafts back out to sea about 100 miles so that they cleared the current then tow them north about 100 miles and approach Mooloolaba from the north from about 80 miles. But as they were only towing at four knots, which was as much as the rafts could stand, you can see that it would have run into about a 70 hour tow, providing the weather remained calm, which it threatened not to do.

The other alternative was to tow the rafts to the nearest port of safety, which was chosen to be Ballina. The second choice was agreed upon and the tow was turned in that direction. This left me in the position of being in Mooloolaba and the center of operations being transferred to the Ballina area.

Luckily we had a stalwart person sitting on the frequency in that area, who had not said much at any time, but who we knew was willing to help if needed. At this time he was needed and he did help. Fred Carruthers VK2PF suddenly found himself to be the control station for the network. He did an excellent job. Being well known in the area he was able to put his finger on all the correct people to get things done. But I will let Fred tell you about his side of the operation, for while he was in control I was packing my gear and proceeding south to Ballina at a rate of knots. Here is what Fred had to say.

On the evening of 19th November 1973 the three rafts of Las Balsas expedition were taken in tow by the Naval Landing Craft "Labuan". During the night, the third raft in the tow, captained by Vital Alzar, broke loose and the "Labuan" continued with the remaining two rafts.

Shortly before 0700 hours EAST I switched on the equipment at VK2PF and heard a discussion between VKDY (the "Labuan") and Syd VK2SG portable at Mooloolaba where the rafts had intended to end their drift. I found that they had been becalmed and were in a four knot current being swept South when taken in tow. At the time I first heard the contact they were 13 miles due east of Ballina heading for that Port.

I called in and offered my services if required, whereupon VK2SG transferred control to me, telling "Labuan" that I would take over.

When communications had been established "Labuan" asked me, at exactly 0800 hrs. to arrange for some local vessels from Ballina to take over the tow of the two rafts from him, setting him free to go to the aid of Vital in the third raft. I immediately rang the Ballina Police and requested the necessary assistance. The information passed was as follows:- "13 miles due East of Ballina, raft dimensions 46 feet by 18 feet, weight approximately 22 tons each, low in water, heavily water-logged, 4 knots Southerly drift, rate of tow 4 knots."

Forty minutes after the "Labuan" requested assistance I was advised by the operator at the Fishermen's Co-op at Ballina that three trawlers were then casting off. This was a remarkable performance in view of the fact that the men had come in from sea that morning and were in bed asleep. They had to be alerted, the ships had to be fuelled and made ready for sea, and the message had to be relayed from "Labuan" to VK2PF, phone to Ballina police, phone from police to Fishermen's Co-op and then the crews rounded up. For this to be achieved in forty minutes was a remarkable performance.

At 0828 I informed "Labuan" that the boats would be leaving at 0845.

At 0914 the raft requested consideration being given to tow to Byron Bay. I contacted "Labuan" and the raft and informed them that Ballina was a safe all weather port, whereas Byron Bay was an open Port and not good for all weather and without the necessary facilities. It was then decided that the original plan of towing to Ballina be carried out. At that stage it was tentatively arranged that the first two rafts be held off Ballina until the third raft was brought up and they would all enter together, but this was later abandoned.

At 1017 VKDY reported to me that the fishing boats were taking over at a distance of 8 miles from Ballina, and estimated Time of Arrival in port would be about mid-afternoon. At 1043 VKDY reported the trawl taken over and asked the third raft for a report of position. At this stage it appeared that skip distance would affect my communication with VKDY and VK4GD relayed for a short while. However conditions improved and shortly I was able to carry on direct. VK3OL also stood by in case of necessity.

At 1252 it was established that the raft was 10 miles south of "Labuan" which altered course to make a pick up. At 1317 I passed a message through VK4GD to VK2SG mobile on his way to Ballina telling him of the arrangements made for setting up his station on his arrival.

At 1505 I received a Special Weather report which I passed on to "Labuan" and the fishermen which read as follows "Strong wind warning issued. 20-30 knot southerly change extending north from Moruya preceded by 20-30 knot N.W. winds near Coff's Harbour. Local squalls 40-50 knots with isolated thunderstorms and change. Seas rising to moderate and rough seawards." At this stage it was decided to bring the first two rafts into the estuary at Ballina and give them a midstream anchorage to await the third.

Also at this stage "Labuan" reported to me that the third raft was in tow and the crew and their belongings had been transhipped to "Labuan".

At 1709 "Labuan" reported that the tow was at four knots and that they did not expect to make port until early morning on 21st November 1973.

At 1721 I handed over control to VK2SG and thankfully closed station.

During the morning I was greatly assisted by my wife who handled telephone calls which were very numerous, and kept me nourished. Telephone calls came in from Melbourne, Sydney and Brisbane, and numerous local calls were received from various pressmen, police and others.

The operation would have been much more difficult without the extraordinary co-operation of other amateurs, the fishermen, the police and many other people in the area.

After arriving at Ballina I contacted the police and several other people that I had been informed about on my way down. I still had my mobile running, and then proceeded to re-erect the station, at Fred's request, and get back on the air. The setting up of the station and two element yagi took 45 minutes. I was starting to get more practice. Incidentally I knew this gear very well, for it belongs to Harrold VK2AAH, and it is the same FT200-30L1-2 element Yagi combination that we have used successfully on many field days, and had won many field day contests with. But never before had we managed to get it erected in 45 minutes. It just shows what practice can do for you.

After establishing contact with Fred, he immediately handed the whole thing back to me (totally unfair I thought for I was very dry by this time and the pub was just across the road and I did not have time to go for a thirst quencher). Len 4GD was also on frequency and between us we tried to raise the "Labuan", which was by this time somewhere south and east of us. After several unsuccessful attempts, the Navy in Brisbane was contacted and we were informed that the third raft had been abandoned due to the fact that the tow rope (a 3 inch manilla) had broken three times and the seas were getting rough. It was impossible to launch the "Labuan's" small boat and a further tow rope could not be attached. In no way helping was the fact that the Labuan was rolling 52 degrees and the winds had risen to 20 knots.

The "Labuan" had towed two of the rafts in towards Ballina, where the tow was taken over by three trawlers from Ballina. The "Labuan" then turned around to the third raft which had broken free previously. The irony of the whole thing was that it was Vital's raft the Guyaquil that was causing all the trouble with the tow ropes. It almost appeared as though the Guyaquil did not want to come into port by any other means than under its own steam. Before it was finally abandoned most of the valuable equipment was taken off and very little was left on the raft. This raft is to the best of my knowledge still afloat and could be heading back to the land of its birth, Ecuador.

When the crew arrived at Ballina they were very tired and very hungry. They certainly gave the steak and icecream a good workover, not having seen either for well over five months. When they stepped ashore from HMAS "Labuan" they were given a tremendous welcome from the people of Ballina, and of course having met Vital, Marc and Gabriel on their previous trip, we fell upon each other like long lost brothers.

One thing that Vital did that I will never forget, was when he came ashore with his crews. He came up to me and said, *Syd we have a little present for you, for all the work you have done for us.* He then presented me with the FT101 that they had used all the way across the ocean. Also all the crews had signed the case of the transceiver. Vital said as he presented it, *So many times you break my speaker with your big, big signal this time you fix the speaker yourself.* It is now one of my prized possessions and I have carefully sprayed the case with clear lacquer so that the names will never rub off.

Since I arrived home I have tested it out, and apart from the final tubes being a little low in emission, there does not appear to be any faults in the gear at all. The thing that amazed me was the complete lack of salt corrosion anywhere in the set. None of the circuit boards appear to be effected by the long period in the moist salt conditions, all the switches work, and on a quick test, it appears to give good drive on all bands from 160 to 10 metres. I guess that one cannot ask for more than that. To say the least it is the greatest honour I have ever had to assist Vital and his crews, and to receive this further gift of their transceiver left me speechless.

I do not want to hurt anyone's feelings by failing to mention them for helping in this operation, but my log is just full of callsigns of people who did help. There were some who only helped when they had time, and there were others who came to the fore whenever they were needed, and who must have spent many hours just listening and feeling a little on the outside. Then again there were others from whom we never heard, but who were willing to assist if needed. There were some stations who we could always count upon to be on frequency. People like VK3LC and VK3OL and VK4YE to mention just a few. The others have not been forgotten, but the list would take a long time to complete.

To those who did assist, and to those who listened, please accept the sincere thanks from Vital Alzar and the other eleven crew members of the rafts Guyaquil, Aztlan and Mooloolaba. Without your assistance the expedition could not have been the success that it was. On my own behalf and on behalf of Amateur radio I wish to thank those who stayed clear of the frequency and did not cause interference, and those who guarded the frequency and kept it clear.

To the others who caused deliberate interference, because of some peculiar quirk of their nature, may I say that I am sorry that two of you lost your licence because of this expedition, and hope that you both may be able to return to the Amateur fold in the near future much wiser and more learned gentlemen.

Finally I want to finish with the thought that but for amateur radio such expeditions are doomed to failure communications wise; once again amateur radio has proved its flexibility and its forcefulness in the field of communications. To quote the radio officer of HMAS "Labuan", *I have operated under many different types of control systems, but never before have I run into an organisation so efficient or so quick to get things done as happened on this trip. I was delighted at the procedure, quick response and complete understanding between stations; it made our job so much easier and resulted in a much quicker recovery of the rafts than would have been possible under most other methods in control.*

Distance travelled 9213 miles, the longest recorded drift by man.
Time taken one week short of six months or 177 days. The longest recorded time that man has survived at sea.
Accuracy of drift. To within 43 miles of aiming point from 8726 miles away. Nature being what it is we feel that the expedition was a complete success and proved that man can control his destiny, with some slight help from the elements.

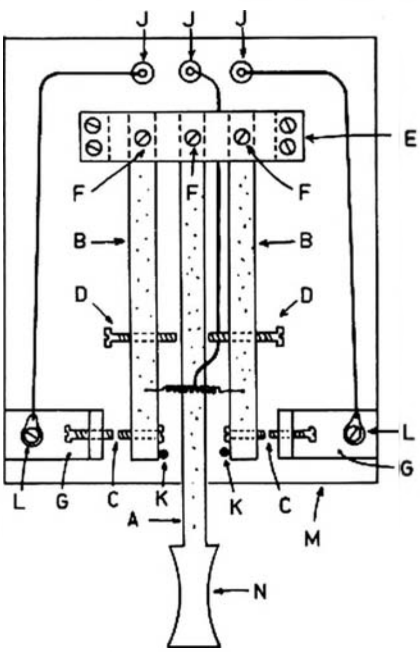
an actuator for electronic keyers

W. E. Pearson VK2LH

19 Balaclava Road, Berowra, N.S.W., 2081.

After building a fine business digital keyer many home brewers have trouble activating it. Their troubles often start with the proverbial hacksaw blade. The solution is quite easy to build. Bill, VK2LH, says try this idea and you will never look back.

If you are a CW operator you will appreciate the merits of this device which is an original idea as far as I know. The drawings, Figs 1 to 9 should provide sufficient detail to anyone interested in building it up; however a few



Plan view

FIG. 1. ACTUATOR FOR ELECTRONIC KEYERS

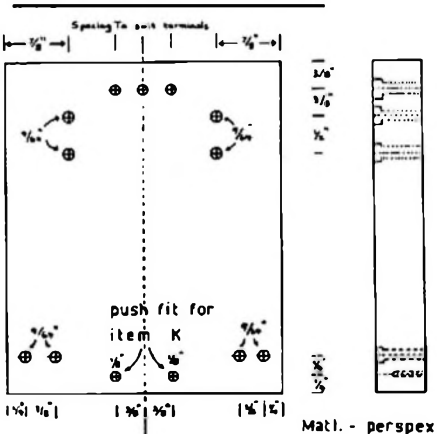


FIGURE 2. DETAILS OF M - BASE

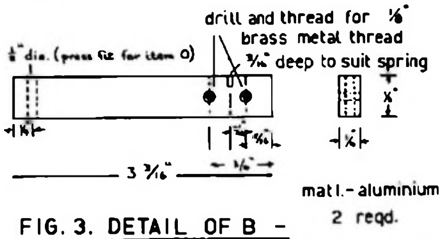


FIG. 3. DETAIL OF B - 'DIT' AND 'DAH' BEAMS

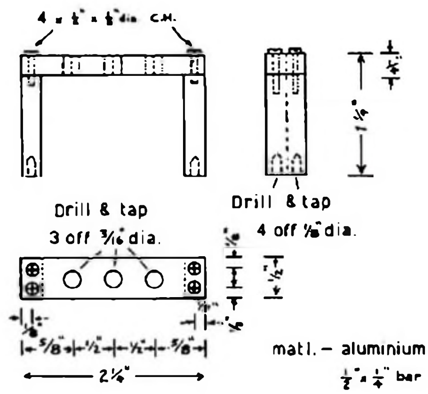
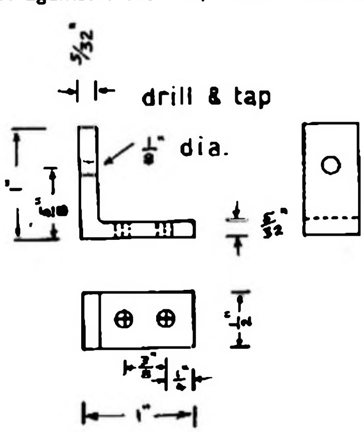


FIG. 4. DETAIL OF E - REAR SUPPORT BRACKET

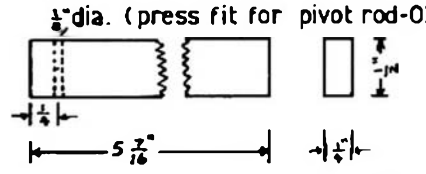
words about the operation and construction may help.

The actuator consists of three movable beams mounted on a heavy insulating base. Pressure to the left or right on the central paddle beam causes it to strike the differential adjuster screw D. This forces the outer "dit" or "dah" beam to move out and close the contacts C. The opposite beam remains stationary as it is held by the spring H against the steel pin K which acts as a



Matl. - Al. extruded angle

FIG.5. G - CONTACT BRACKETS



Matl. - aluminium bar ½" × ¼"

FIG. 6. A - PADDLE BEAM

mechanical stop. This spring may be obtained from a worn out ballpoint pen. It is fitted tightly into holes in the top of the outer beams. Sufficient of the ends of the spring is straightened so that it clears the paddle beam when fitted.

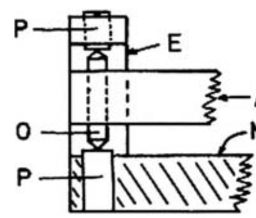


FIG.7. Section through pivot mounting of beams

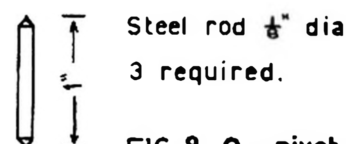


FIG.8. O - pivot rods

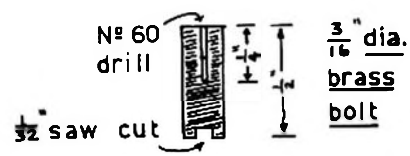


FIG.9. P - PIVOT BEARING

Terminals are fitted at the rear of the base and wires run from these to soldered connections on the contact brackets G and the tension spring. The pivots F are made from ⅛" steel rod. To form the ends place the rod in a drill and file the point while the drill is spinning. The pivot bearings are made from 3-16" diameter brass bolts cut to length. A hole about 1-64" diameter is drilled through the centre for ¼" and a hacksaw cut made to provide a screwdriver slot at the other end. The contacts C can be made from ⅛" brass metal threads. The ends should be dressed with a file. As they only interrupt a small current they are not self cleaning and should be given a rub with a clean cloth occasionally.

All screws should be given a drop of coil dope to hold them after their correct position has been found. Rubber grommets may be glued to the base of the keyer to act as feet if desired.

With the aid of a file, a hacksaw and an electric drill you should be able to build this gadget in an afternoon.

a visible mute indicator for your carphone

Bob Broughton VK3ZKO/T

9/38 Wattletree Road, Armadale, Vic., 3143.

The circuit below is something that should be handy for those operators on 2 metres who call CQ with the volume turned down. It provides a visible indication of a signal strong enough to operate the mute.

The unit was designed around the 2 metre carphone circuit that appeared in this magazine about two years ago. Except for the light-emitting diode, it uses readily available components. The LED is available from Radio Parts for about 50c.

Operation of the circuit is extremely simple. Q1 is a DC amplifier to boost the input to a suitable range to operate the Schmitt trigger formed by Q2 and Q3. That's it! When the input level is sufficient to operate the Schmitt trigger, the diode lights.

Construction is also very simple. I built mine on a piece of Vero board (complete with LED) and mounted it behind the front panel of the rig, with the LED poking through a hole in the panel. However the unit can be placed remote from the rig (for example behind the speedo in your car) but it would be a good idea to bypass the input at the unit to prevent RF getting in and causing false triggering. Apart from this, there are no construction problems.

A LED was used in the prototype mainly because it should (theoretically) outlast the case it is mounted in. Also I got a handful cheap! A 3V incandescent lamp could be used quite successfully by those who prefer.

To connect the display into the carphone circuit, take a look at Fig 2. The input to the display is taken from a tap across the noise rectifier. This can be done quite simply on the prefabricated circuit boards by drilling a small hole through the copper conductor between the AN2001 and the 150K ohm resistor and soldering in a wiring post. Shielded microphone cable should be used between this point and the display unit if it has to be run any distance.

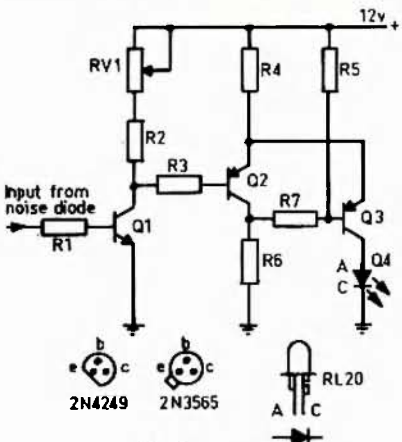


Fig. 1

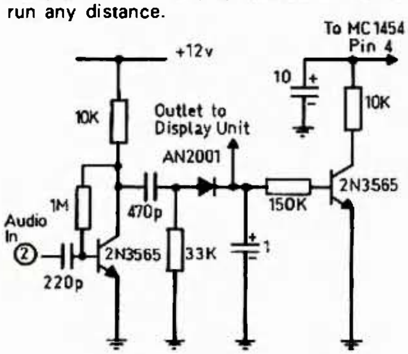
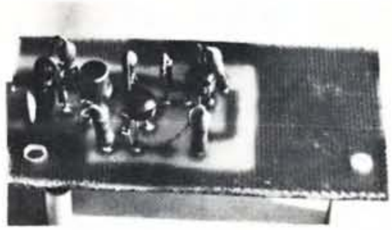


Fig. 2

Connecting the display unit will make a noticeable change in the position of the mute control. No other change in the operation of my rig was observed. RV1 sets the threshold of operation of the display unit. To set it, the mute control should be adjusted until the receiver is just muted. Then adjust RV1 until the LED is just extinguished. No further adjustment should be necessary, as the threshold is now controlled by the mute control and the LED should light whenever sounds appear from the speaker. Consequently I have made RV1 a trimpot and mounted it on the Vero board with the rest of the circuit. ●



ABOVE—A component side view of the assembled circuit board.

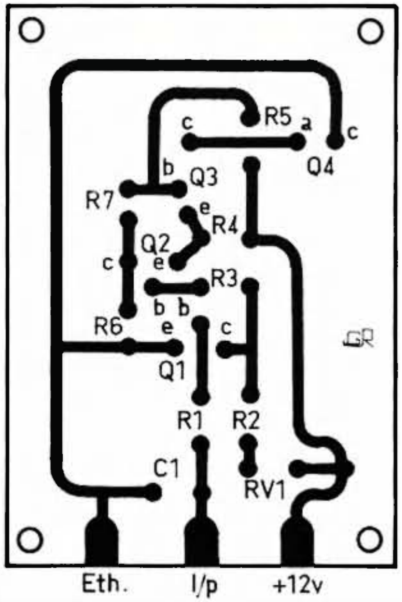


Fig. 3

BELOW—The completed unit installed in a carphone.

BELOW—Bob, VK3ZKO/T operating the carphone in which the visible mute indicator is installed.

feeding mf aerials against ground on 160 metres

Phil Williams, VK5NN

It has always been difficult to feed aerials on 1.8 MHz because of the difficulty of getting a large resonant wire on the average suburban block of land. A good compromise however, may be obtained by feeding the 80 metre (or even 40 metre) aerial as a top loaded vertical.

Satisfactory loading may be obtained with long and exhaustive testing. This method requires the use of an HF "Noise Bridge" so if you do not have one, borrow or build one.

A good earth system is essential, the best one available to most amateurs being the nearest tap in the backyard water reticulation system. This may be supplemented by connecting up further earth stakes or the galvanised iron or wire fence. The best solution for this is left to your ingenuity.

The radiating part of the antenna system is the vertical portion of the parallel feeders; in my own case, the 300 ohm open wire section of the G5RV. These are connected together and connected to the noise bridge via a series tuned circuit as shown in fig. I. The capacitor is one of those large AWA transmitting capacitors of about 300 pF, and the coil is about 60 turns of insulated hook-up wire wound on a 2½" diameter plastic bottle with taps brought out every five turns. Select a tap which will resonate the aerial at 1.82 MHz with about 150-200 pF in series. The noise bridge will probably balance at a resistance setting of between 15 and 30 ohms which is typical of this kind of antenna.

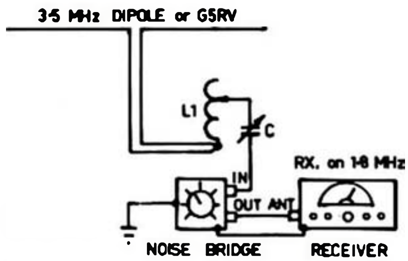


FIG 1 TO DETERMINE ANTENNA RADIATION RESISTANCE

Next wind up a matching transformer on an old TV line time-base ferrite core with the two sections Araldited together permanently, with a turns ratio to step up the impedance to 50 or 70 ohms as required. If the previous radiation resistance was, say 24 ohms, then to multiply this by 3 to make 72 ohms (approx.) would require a turns ratio of the square root of 3, or I.7. Thus 34 turns tapped at 20 turns was tried and proved satisfactory. The winding was made by putting I2 turns distributed right around the core, then another I2 turns going round again (bringing out the tap at 20 turns, of course), and then the last I0 turns on the final circuit.

Check the impedance again with the noise bridge, readjusting C for resonance, and measure the resistance as before.

You have now made the antenna/earth system look like 72 ohms resistance by means of the ferrite transformer, with zero reactance by adjustment of C. Remove the noise bridge and feed the transmitter at point A. You now have an antenna system of I60 metres which acts like 70 ohms for the first time in history, and the Pi-network even matches and loads as it should.

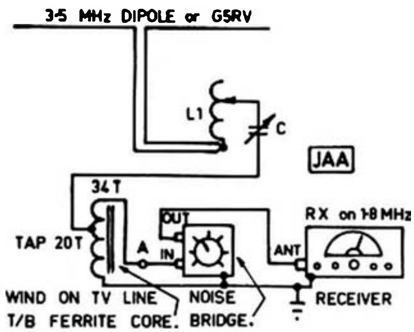
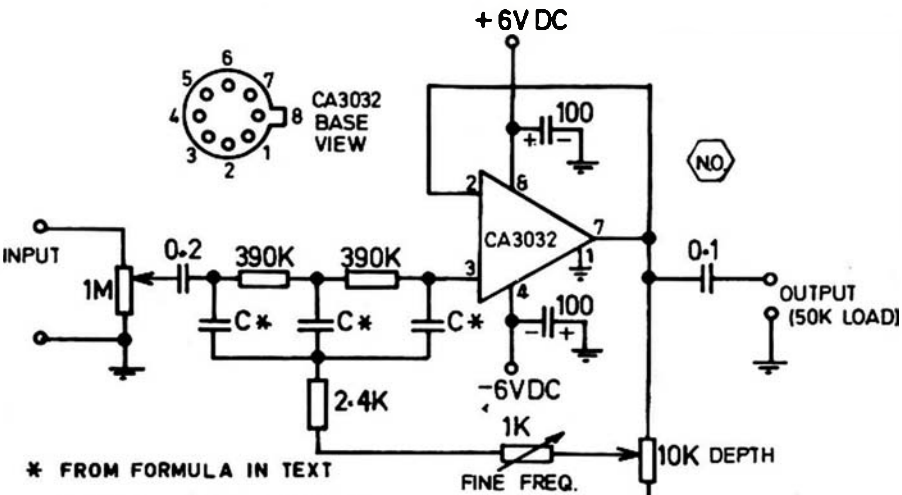


FIG 2 MATCHING TO 72 OHMS

It must be remembered that any new wires, aerials, TV's, power lines, phone lines, or even growth of trees and differences in soil moisture may require that C should be tweeked up for the maximum performance — but it only takes a few seconds.

an active hum filter

Reprinted from the VHFer.



AUDIO HUM FILTER

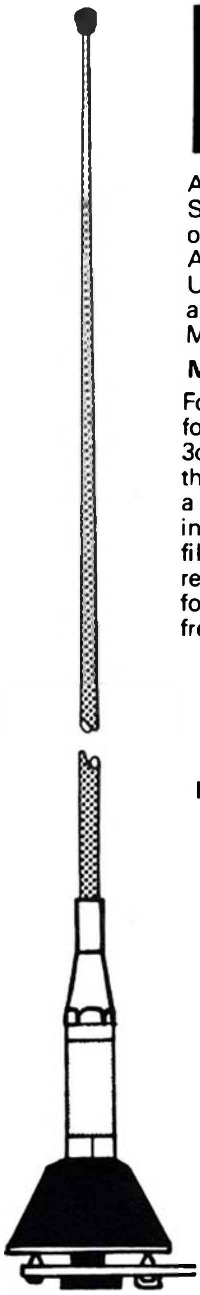
If you have a recording of that rare DX contact and the hum level makes it unreadable, try this: an active hum filter.

Using an RCA CA3022 Integrated Circuit, the filter will notch out the desired hum frequency, with minimal effect on other low frequencies.

The equation shown enables calculation of the desired value of capacity to operate the filter at a set frequency. For example, for

50 Hz $C = \frac{1.44}{6.28 \times 399\,000 \times 50}$

An idea worth trying!!



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Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

BATTERY CONNECTORS

A ready supply of battery connectors for the rectangular 9-volt batteries in common use can be had by removing the terminal end of discarded batteries of this type and wiring the connectors appropriately. Don't forget that the formerly positive terminal now goes to the negative contact of the battery, and vice versa. — *J. Paul Alexander, K5LZT*

Reprinted from QST, August, 1967

DIODE PROTECTION FOR THE HEATH R.F. PROBE

I have been building an s.s.b. rig for 6 meters. In the process of testing the transmitter, I have burned out three or four 1N34 diodes in my Heath 309-C r.f. probe by exceeding the 30-volt r.m.s. rating of the unit.

I solved the problem by connecting a NE-51 neon bulb across the diode as shown in Fig. 5. Before the p.i.v. rating of the diode is exceeded, the NE-51 conducts and acts as a protective

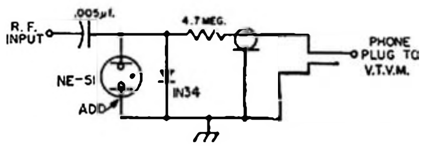


Fig. 5—The addition of a NE-51 neon bulb to the Heath r.f. probe protects the unit from overload. Resistor is ½-watt composition.

short across the diode. The particular diode now in use has not been damaged, even though it has been subjected to the same voltage levels that burned out the other diodes, and the accuracy of the probe doesn't seem to have been impaired by the addition of the NE-51. — *C. A. Danforth, K3OKG*

Reprinted from QST, May, 1968

THUMB-GROOVE INDEXING THE *HANDBOOK*

Sections of the *Handbook* that are frequently used by the reader can be located quickly by filing thumb grooves in the *Handbook* pages as shown in Fig. 3 and labeling these grooves as pictured in Fig. 2. As illustrated in the second sketch, I filed thumb grooves for only three subjects: the wire-size table, the tube index and the general index. These items seem to fill 99

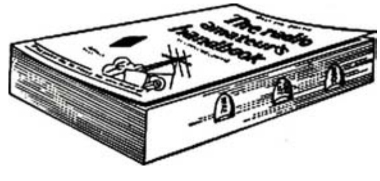


Fig. 2—K1LFH's method of thumb-groove indexing the Handbook.

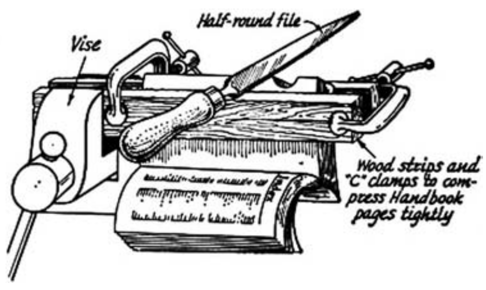


Fig. 3—One method of labeling the thumb grooves.

percent of my general requirements. Other grooves can be added at any time, but usually the sections of the book they indicate are only of short-term use. — *Norm Cucuel, K1LFH*

Reprinted from QST, January, 1967

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

A Pet Hate

I find it rather surprising that people ring or write to me asking about something that is perfectly well explained in an article. For example, I was asked where a person could obtain one of the YRCS signal injectors. The article (September 73) mentioned the name of the distributor 3 times and gave his address once. I claimed no actual connection with the units, construction or sale. I use this to bring home a point. If you read an article whether it is mine or that belonging to someone else, read it thoroughly several times, and then ask, if you can't understand it. Don't expect the author to do *your* thinking for you. Naturally enough, you will have trouble with articles on complex subjects which are new to you; I do, too.

Amateur Examinations

Following upon my pet hate, we come to another problem — passing the amateur exam. No doubt most have had some trouble from time to time passing exams. The amateur exam needs to be tackled in the same way you did or still do your school exams — it is a worthwhile qualification. Too many people, from what is heard, treat it quite lightly and then bleat because they fail. To pass the exam, it is very necessary to study the syllabus and any old papers available. Once again if you do your study carefully and *understand* what is said in the text books, and *accurately* put this down in an exam, you should pass. Unfortunately many people mislearn and think they have everything accurately stored away in their head. Because of this or the fact that they have only skimmed through the study text — it is *sooooo* boring (yawn) — they only have a thin veneer of knowledge which will let them down.

There is *no substitute* for the boring study of fundamentals before you study the exciting technology of single sideband or FM, etc. Once you have mastered the fundamentals the other more complex things like SSB become much easier to understand. I give an example; do you realise that the diode signal detector stage of a superhet receiver is the same circuitry as the power supply, with the only exceptions being that the component values are different and one is usually half wave detection, the other full wave? Fascinating when you look at things that way. Can you think of other circuits which are virtually identical, but do different jobs? If you can spot these similarities you are well on the way to *knowing* electronics.

TVI, BCI and the Irate Neighbour

You may remember the January 1973 issue of *Amateur Radio* where I described in *Newcomer's Notebook* the reasons why a 6 metre transmitter can cause TVI. Do you know that not one single amateur is apparently interested enough in helping his fellow amateurs with 6 metre-Channel 0 interference to reply to my plea? I really do hope that this isn't the attitude of the average amateur towards TVI-BCI. It is regrettable that most amateurs are not interested in developing suppression techniques to overcome TVI-BCI problems. Over the years only one name really stands out and that is Rob Gurr VK5RG. September 73 issue of *Amateur Radio* shows one of his more recent articles on this very important but largely neglected and misunderstood subject of interference suppression. The average reader of *Newcomer's Notebook* will find much of interest in Rob's articles and those of a few other authors who have taken the time and effort to write for *Amateur Radio.* The Victorian Division of the WIA is hoping to get an Interference Committee going to help amateurs with advice and perhaps physical help in the solving of interference problems. I believe they had three volunteers. Aren't there any more interested amateurs who could spare a little of their time, or are they quite content to cause interference to their neighbour?

A bang on the door. Your wife opens the door and standing there is one of your neighbours frothing at the mouth, breathing fire and brimstone, because your stupid transmitting is causing his TV picture to roll — and it has also caused his beer to go flat. Now Mr Amateur you are a pretty irresponsible type to do this to your neighbour, he is trying to enjoy his TV — it was a real sexy bit that he missed too — and your voice booms over his loudspeaker and the picture gyrates, etc. In fact, I wouldn't be surprised if his last TV repair — you know that EHT tranny that blew up — wasn't caused by your transmissions. The more that I think about it the more convinced I am that not only did your transmissions (you're a nut case anyway Mr Amateur) cause the faults in the TV but the dog had never bitten anyone until you put up those stupid aerials, etc., etc., etc...

Now that you can imagine what your neighbour is thinking you are on the way to defusing the situation, I hope. It probably has taken weeks for him to get up enough courage to come and see you, and to help him, he probably instilled a goodly quantity of alcohol.

An amateur is unfortunately thought to be a little off beat by the general community. Minority groups nearly always seem to be thought of in this way, and we as amateurs are no exception to this rule. In dealing with TVI-BCI we start off being considered guilty until proven innocent. Even when proven innocent, often we are still considered guilty.

Considering all of these points we can start to formulate our method of approach to the irate neighbour. It's not nice to be accused of causing interference particularly when you know for sure that there is nothing wrong with your equipment. Of course there is nothing wrong with your equipment? Well if there is, you had better get it fixed, and fast. You cannot afford to have any defect in your equipment which may possibly cause interference. Before any neighbour gets the opportunity to find out you may be causing interference, check with your TV and broadcast receiver in the shack and be sure that you aren't. If you are certain that your equipment is clean, you could invite the complainant — your irate neighbour — out to your shack and show him that none of your radios and TV get the trouble when used right alongside the offending equipment — so called.

The main thing when you do get the neighbour breathing fire and brimstone is to keep your temper. He may have lost his and has accused you of something that isn't true — but don't lose yours.

Sure, you might tell him to go and jump in the lake if you lose your temper, but this will only cause more trouble than enough. He may get together with several other neighbours and really make things uncomfortable for you. Let him talk out his problem whilst you stay nice and calm. Once he has talked himself out, you can start to ask him about the interference. You can start to whittle the complaint down to size by asking discreet questions. Like for instance, does it occur on both TV sets? Does it really occur on all channels? Does it affect the record player, and does the volume control affect the level of interference? There are a lot of questions like these that can be asked but the ones to ask will become evident as the complainant unfolds his tale of woe. Now that you have an idea what the trouble is, invite the complainant out to the shack and show him that in fact you have no trouble in your home. You should now almost have him on the defensive, as he can see that in your home at least, there is no interference.

Don't think that you have won yet, you may be accused of turning off the particular equipment that causes the trouble. Get him to check or preferably go to his home with him and ask his wife whether she had any interference in the last quarter of an hour or so. Of course she may have altered the channel on the TV or turned the radio off or something like that, so you haven't necessarily won yet.

In the discussion with the complainant you will be able to determine which transmitter causes the trouble and to what piece-s of his equipment. Your log book is of considerable help in this regard to actually determine if in fact you are causing any trouble at all. Amateurs have been blamed for interference that they had nothing to do with. A neighbour mentioned to my wife that I was causing interference to their TV set on a particular night — I was working late that night for my employer. Another case in another area; I was accused of causing interference to a TV set; I was told that I blotted out the sound on all channels, and caused a few other troubles to the picture. I arranged my transmitter to be operated whilst I visited this neighbour. I did indeed cause interference to the sound — at a very low level and the volume control had no effect on the interference. It was caused by grid rectification in the first audio stage. The feedback to this stage incorporated the voice coil and the owner, a so-called technical person, had lengthened the speaker leads to about a resonant length for 80 metres. His other set suffered no interference at all. I instructed him how to overcome the problem and left it up to him. Three points to note from this case — 1. the complainant's description of the trouble may be exaggerated — 2. only one of a selection of equipment was affected — therefore clearing you — and 3. enlist the aid of another amateur to operate your rig whilst you check the problem out.

It is now proved that your transmitter is clear of any other than its intended emissions, and that something is amiss with the equipment that is susceptible to RF fields. Don't criticise the electronic organ or what-have-you that has cost your neighbour perhaps $1000 or more. He will be most upset if you do condemn his pride and joy. How do you get around the unfortunate truth of saying that his piece of equipment is at fault? This is a difficult one, and if you can master this one you should do well selling refrigerators to Eskimos. Praise the good points of his piece of equipment — if any — and there will be unless it is an economy special put out at rock bottom price. You could explain that very few manufacturers are aware of the minor alterations that could be undertaken at manufacture to make domestic equipment immune to the effects of transmitters in the near vicinity. Not only could your transmitter cause break-through into his equipment, but so could the local taxi radios, police, fire-brigade, certain beacon transmitters, broadcasting transmitters, radars, and interference direct off the mains themselves. Quite a formidable list and it doesn't end there. I am at the moment mainly concentrating on Hi-Fi type interference, but the same points also apply to BCI-TVI. With the latter types of interference many more possibilities do rear their ugly heads. One thing that can be pointed out is that if a piece of equipment is proofed against these interference problems the performance of the equipment is better anyway.

I use the word neighbour in context with ***irate neighbour*** and ***complainant*** to differentiate between the attitude of your neighbour at various stages of the proceedings, so don't despair at my apparent jumping around in terms. With luck you have convinced your neighbour that the problem is something that he could not be expected to be aware of, and that manufacturers are only just now becoming aware of this problem. Some manufacturers have standard modifications to cure this problem, but unfortunately some manufacturers are reluctant to face their responsibilities.

Now how is the suppression accomplished, providing of course that the neighbour is willing to have alterations done to the equipment? If possible don't have anything to do with the modifications yourself, unless you can see that something mounted externally to his equipment may cure the problem, then proceed with caution, as you may get the blame for every fault that occurs in the equipment thereafter. If possible his serviceman should attend to the problem; perhaps you could talk to him to help with knowledge on how to fix the trouble if he is unaware. Of course if the serviceman is called in, who is going to pay a repair bill of $10 to $20 for this suppression work? This is a sticky one and the answer to it is hard to give. You may be prepared to put a few dollars towards it, even though it is his equipment. It would hurt me to do this, but it may be worthwhile, as long as everyone in the neighbourhood hasn't the same problem. If this was the case, you would soon be too poor to afford the electricity to run your rig. Whether you do the mods. to his equipment yourself for the price of components, or help pay a serviceman's bill, or suggest that you will help the serviceman but with no hint of any financial assistance, is something you will have to judge for yourself.

It will not be an easy decision. I would strongly advise you not to tackle the suppression yourself unless you know very well what you are doing, as you cannot afford to degrade the performance of his equipment. It may so happen that the equipment is quite new and under warranty. If so, it may be possible to get this done under a warranty claim. Your neighbour could certainly try this approach and it is in my opinion a very worthwhile one. Any manufacturer worthy of his salt should come to the party. Some manufacturers have been known to come to the party outside of warranty, particularly where a recurrent type of fault manifests itself.

I'm not going to tell you here this month how to go about suppression as this article is long enough now. I would suggest however that you read up the interference sections of the various amateur radio handbooks, and more particularly suggest you endeavour to obtain a copy of *Television Interference Manual* published by the RSGB, available from the booksellers who advertise *Amateur Radio* and via Magpubs. It is priced between $2 and $3.

One final point on dealing with your neighbour, the complainant. I have assumed that in all cases you will get co-operation from your neighbour but unfortunately this may not be the case at all. Some people can be far from co-operative and if anything thrive on being trouble makers, and manage to be downright vicious. These people will make life *hell* for you if they can. They would want you closed down and most definitely *don't* want their interference troubles fixed up.

I would particularly draw your attention to a section of the ***Handbook for Operators of Radio Stations in the Amateur Service*** dealing with ***Avoidance of Interference.*** Paragraphs 68 and 69 on page 18 deal with your obligations to the public and to the Licensing authority, the Postmaster General's Department. If you don't know what this says about interference you had better buy a copy from the PMG.

The last part of this point; don't let yourself be socially blackmailed by an unco-operative neighbour. There is no point in closing your station down because a neighbour is unco-operative and threatens you with some sort of legal action etc. If this type of thing threatens to erupt contact your local division of the WIA.

Coming Articles

Within the next few months I hope to have more on receiver modifications — such as the fitment of a product detector. Kevin Plew of Drouin supplied me with some information on his particular adaption. I expect to run an article on proper layout of equipment and if possible general design practices. I have yet to come up with thoughts on a simple station monitoring system, and here I don't mean a crystal set to monitor an AM transmitter. Something more elaborate than this is necessary if effective operation of an AM transmitter is to be achieved. I have yet to come up with the second article on test instruments for the amateur shack. ●

QSP

Reciprocal Licensing — Denmark.

Advice has been received from the Int. Sec. of EDR that temporary Danish amateur radio licences can be obtained by licensees holding full Australian licences when visiting Denmark for a period less than 3 months. Special application forms obtainable from the Danish P. & T. must be completed and submitted to them with a certified copy of the VK licence at least one month prior to the date when a Danish licence is required. The fee is D.Kr 50.00 payable when the visitor arrives in Denmark.

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

THE AR7 (part two). This month the full alignment procedure will be described.

IF Amplifier. Slight mal-adjustment of the IF transformers will have a marked effect on the sensitivity and selectivity of the receiver. As the IF transformers are of an extremely stable type using permeability tuning and silver mica fixed condensers, it will usually be found that one or two turns of the iron core slug is all that is necessary to bring them into their original state of alignment.

Disconnect the aerial leads and power and speaker cables. Take the dust cover off and remove the receiver from the rack. Stand the receiver on its side with the underneath facing to the right and away from the rack. Reconnect the power and speaker cables. Connect an output meter across the 600 ohm secondary of the output transformer. An ordinary 5 volt AC meter with a 600 ohm 1 watt resistor across it is quite suitable. Remove the grid lead from the cap of the 6K8 and connect the output of a calibrated signal generator to the grid cap through a .005 mfd capacitor. The grid should at the same time be returned to earth through a 100K resistor.

Place the crystal switch in the I position, selectivity control at 8, and phasing control to centre scale. Tune the signal generator through 455kHz slowly and adjust the attenuator until a reading of half scale is indicated on the 'S' meter when tuned to a maximum peak of the IF amplifier. It should be noted that the meter reading will gradually increase until the very sharp peak of the highest amplitude is passed. Return to this peak as this indicates that the generator is exactly on the crystal filter frequency. Switch the crystal **OUT**. Using an aligning tool adjust the iron core slug screws on the top and bottom of the IF transformers. Those above the chassis are for the grid circuits, whilst those below are for the plate circuits, except in the case of IFT2, the crystal filter circuit which is below chassis. IFT2 below chassis and IFT4 above chassis should not be altered at this stage.

Starting from IFT1 turn the iron slug screws in or out until a maximum reading appears on the "S" meter with a minimum input from the generator. As the "S" meter reading increases the input from the signal generator should be decreased, thus keeping the "S" meter reading at approximately half scale. Having adjusted both grid and anode circuits to resonance (with the exception of IFT2 and IFT4 grid) as indicated by maximum reading on the "S" meter (with minimum signal input from the signal generator), check these alignments and the correct setting of the signal generator as follows:-

Switch the crystal filter into circuit, and with the selectivity control set on "10", and the phasing control in the central position, adjust the attenuator on the signal generator until a reading of approximately half scale on the "S" meter is observed. At the same time keep the audio gain control in a position which allows approximately 6 milliwatts on the 0-5 volt range of the output meter.

Rotate the signal generator frequency control slowly backwards and forwards over 455kHz, noting the peak on the "S" meter. If only one sharp maximi is observed, the alignment is correct. Should, however, two peaks occur, incorrect adjustment of the iron slugs, or incorrect setting of the signal generator, is indicated, and the procedure outlined above should berepeated.The correct peak is the highest, and at the same time, the sharpest one. Now adjust T4 grid circuit for maximum peak on the output meter. After checking these circuits several times, only one sharp peak should appear on the "S" meter, and the sensitivity should be of the order of 10 microvolts. Under these conditions, with a 10 microvolt input and 6 milliwatts output the indicated output should drop to 3 milliwatts when the generator modulation is switched off. This reading is taken with the crystal in the **OUT** position.

With the crystal in circuit, the signal-to-noise ratio should be improved. Test to see if this is so, and if this is not the case, it will generally be found that the IF frequency is not the same as the crystal frequency, i.e., 455kHz.

If the test is successful, the signal-to-noise ratio will be further improved on alignment of IFT2 crystal filter grid circuit. The method of accomplishing this is detailed in the next two paragraphs.

Insert coil unit "B" and tune in a broadcast station. Switch the crystal into circuit and set the selectivity control to "O". Adjust IFT2 for the best tonal quality on music, ignoring the volume level. When the tuning control is rotated over the station's carrier, the effect noticed should be the same as with the crystal out of circuit, except for a slight additional sharpness.

On either side of the correct adjustment of the iron slug in IFT2, the tonal response will be low and drummy, and as the dial is rotated over the station, distinct hollowness, due to the crystal filter cutting the sideband, will appear on either side of the station. The reason for this adjustment is to obtain a symmetrical and variable selectivity curve.

Where possible this adjustment should be made with the aid of a signal generator and a cathode ray oscilloscope although the instructions given in the previous paragraphs are satisfactory for normal service use.

BFO Alignment.

Upon completion of the alignment of the IF stages, the alignment of the BFO should be proceeded with as follows:-

Place SW2 in position 2 and SW5 in position 3. With a CW signal tuned in by "S" meter, and 22V applied to pin 1 of octal socket outlet, and front panel "BFO note" control in central position, adjust slug of BFO coil for zero beat. Then to ensure satisfactory normal operation, set SW2 and SW5 to position 1 and rotate "Local CW potentiometer" (R63). A note variation of at least 3kHz each side of zero beat should be obtainable. Set for zero beat. If receiver is later used on local control, R63 can, if necessary, be further adjusted to compensate for any slight changes in BFO or Reactance tube circuit values. The net result is to give correct CW operation under all conditions, i.e., signals tuned to maximum by "S" meter continue to give zero beat with "BFO note" control at central position whether receiver used locally or remotely controlled.

RF and HF Oscillator Circuits.

As with the IF amplifier, extreme accuracy is required for the RF and HF oscillator circuit alignments. The components employed in these circuits are of extremely stable type and only a fraction of a turn of the trimmer condensers, and a very small adjustment of the iron core slugs, will be required. These adjustments should be sufficient to restore the alignment of the circuits to their original accuracy. Such adjustments should only be made if you are certain that they have been made necessary through tube replacements, rough handling or extreme temperature changes, etc., and that you have the facilities to make the adjustments correctly.

The adjustments are made through the holes in the coil acceptor housing, and are marked L1, L2, L3, L4, C1, C2, C3, C4, C5, C6, C7 and C8.

L1 is the inductance adjustment on the aerial coil, L2 the inductance adjustment on the first RF coil, L3 the inductance adjustment on the second RF coil, L4 the inductance adjustment on the HF oscillator coil, C1 is the HF trimmer capacitor on the serial coil, C2 the series trimmer on coil band "E", C3 the HF trimmer capacitor on the second RF coil, C4 the series trimmer capacitor on coil band "E", C5 the HF trimmer capacitor on the second RF coil, C6 the series trimmer capacitor on coil band "E", C7 the HF trimmer capacitor on the HF oscillator coil, and C8 is the padder capacity on the HF oscillator coil. To align the RF and HF circuits connect a signal generator through a standard dummy antenna to the aerial terminal A1, the earth terminal of the dummy antenna being connected to A2, and bridged across to the earth terminal. Plug in the coil units, from Band "A" to Band "E" in turn, and check the dial readings against the calibration curves drawn on the face of the coil unit under test. Note that the BFO should be "ON" and that in conformity with the procedure outlined previously the BFO note control should be set to "O", i.e., 455 kHz. This should be tested in accordance with instructions detailed previously, before checking the receiver coil calibrations.

Observe whether zero beat occurs at the correct dial setting on the receiver. Should this be so, the calibration is correct, and there will be no necessity for adjustments to the HF oscillator circuit. If the calibration is incorrect, i.e., if the dial reading does not agree with the calibration given on the face of the coil, a small adjustment to C7 will correct the situation at the high frequency end of the band, and an adjustment of L4 will correct for the low frequency end (except in the case of Band "E" where there is no inductance adjustment). In the case of Band "E" coil, the series trimmer C8 is adjusted in place of L4.

To check the RF grid circuits alignment, switch off the BFO, and, using a 400Hz modulated signal from the signal generator, tune in a signal at approximately 15 degrees on the dial. The frequency at which the signal generator should be set for each band may be read approximately from the calibration curve on the coil unit. Adjust the trimmer capacators C1, C3 and C5 for maximum peak on the "S" meter, with minimum input from the signal generator. As there will be a certain amount of interlocking between the RF circuits and the HF oscillator at the highest frequencies, it will be necessary to rotate the tuning dial to and fro over the signal to obtain the greatest peak. If this peak is obtained in the incorrect position of the dial, it will be necessary to re-check the oscillator calibration.

If Band "A" will not follow the calibration curve, capacitor C8, the series padder capacitor should be adjusted, re-setting C7 and L4 after this has been done. As these settings mutually effect each other, they may have to be checked several times.

Some difficulty may be experienced on this band with oscillation, especially if the receiver is very far out of alignment. This will occur when the RF circuits are resonating at too high a frequency, causing instability, and therefore difficulty in alignment. If the oscillator section is corrected as above, and the grid circuits are adjusted individually by connecting the signal generator to the grid cap of the second and first RF tubes in that order, the difficulty will be overcome provided precautions are taken to see that the receiver is not set to a higher frequency than 409kHz.

After checking the high frequency end of each band, adjust inductances L1, L2 and L3 for maximum peak at the lowest frequencies. Each adjustment should be checked several times.

If the receiver is properly aligned, it should have a sensitivity of approximately 1 microvolt when modulated 30 per cent. The signal to noise ratio should be 1 to 1 (in watts) or better and the image frequency attenuation at the highest frequency 26dB.

This completes the alignment procedure. In next month's issue some interesting modifications will be discussed.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

CONTEST CALENDAR

The Ross Hull VHF-UHF Memorial Contest is **N O W**.
January up to 20th Ross Hull VHF-UHF.
January 12th & 13th Y U 80 meter CW DX Contest.
January 25th & 27th C Q WW DX 160 CW contest.
February 2nd & 3rd ARRL International DX Phone.
February 9th & 10th 0600 GMT to 0800 GMT.
John Moyle Memorial National Field Day.
A section for everyone.
February 16th & 17th ARRL International DX. C W.
February 24th Central Coast ARC Field Day.
March 2nd & 3rd ARRL International DX Phone.
March 16th & 17th ARRL International DX CW.

If, If If, we are to make a "SMASHING" success of the ROSS HULL you should have started on your log ?????????
Stop me if you have heard that one about "putting it . . . . ."

John Moyle Memorial National Field Day comes up next month.
Have you got your "put put"?
Have you got your site?
Have you got your mates ?
Have you got your ice-box?

REMEMBRANCE DAY CONTEST.

I have been too busy finalising this contest to write notes as promised. Be patient and you may get an answer to your comment, if you forwarded one with your log, direct.

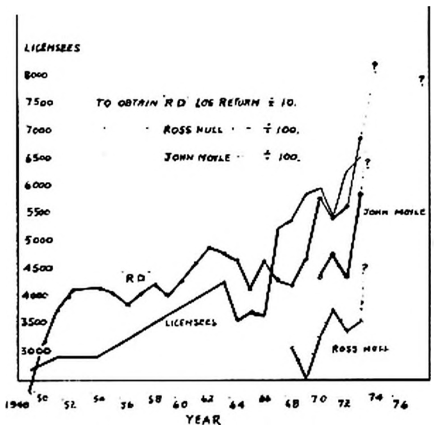
If you were not happy about the CW scoring get in touch with your Federal Councillor . . . or forever remain silent.

Most comments were on the enjoyment received from the contest, and CW scoring. What a beaut contest it will be next year.

If you are "with it" you will read the graph message right away, but PLEASE read on and make sure.

The graph shows the log return for the REMEMBRANCE DAY, ROSS HULL and JOHN MOYLE contests for each year. The "R D" contest has been taken back to the beginning but in the other two contests, for clarity the last few years only have been shown.

The full single line shows the licensees for each past year read directly from the left hand column. The line jointed by large dots shows the "R D" contest logs return for each year when the related figures in the left hand column is divided by **TEN**. To obtain the ROSS HULL and JOHN MOYLE log return for any year the related figure in the left hand column is divided by **ONE HUNDRED**.



Message No 1.
As the graph is drawn, when the "R D" line is below the "Licensees" line we have less than one person in ten returning a log.

Message No 2.
When the "Ross Hull" line is below the "Licensees" line less than one person in one hundred is returning a log. We had about 36 logs in 1972-3 and over 6500 licensees; or in round figures one log in two hundred licensees. To get the Ross Hull above the line we need over 65 logs. We should be able to reach that "no hands". VK3 could do that on its own.
What about some more HF helpers assisting the VHF chaps run the Ross Hull line right off this graph for 1973-4. You still have time to get a log in.

Message No 3.
The John Moyle Memorial National Field Day Contest is on the second weekend in February.

Message No 4.
To make the graph direct reading we would have to extend down 2½ inches and the "R D" line would be in the **FIRST INCH.**

The Ross Hull and John Moyle lines would **not be worth marking in**. Draw your own graph up and see. Disappointing isn't it?????

THE GREAT CONTEST CONTEST

When. January 1974 to August 1974.
Objects. To estimate the number of logs entered for each of the next Ross Hull, John Moyle and Remembrance Day Contests, and to assist in obtaining those figures.
Rules. Mark on the graph the goals that you think we can achieve in 1974.
Update the graph with contest results.
Set a high standard within our capabilities.
Trophy. Your trophy will be satisfaction in achieving your aim.

ARRL INTERNATIONAL DX COMPETITION

Dates. Phone: First full weekends in February and March.
CW: Third full weekends in February and March.
Times. Starts at 0001 GMT Saturday and ends at 2400 GMT Sunday.
Object. DX stations QSO as many stations in the 48 contiguous US and Canada call areas as possible. Repeat contacts on additional bands are permitted.
Points. Each complete contact counts 3 points.
Exchange. Send RST and DC input power. W-VEs will transmit RST and state or province.
Multiplier. On each band your multipliers are the 48 contiguous 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 final multiplier equals claimed score.
Logs. Logs must contain dates, times GMT, bands, exchanges and points. Logs to ARRL, 225 Main St., Newington, Connecticut, USA. 06111 no later than 2nd May.

All Bands 1.8 to 28MHz Single and multi op. Single and multi TX. Usual certification. Photos, comments, suggestions welcomed.

CQ WW DX 160 CW Contest.

Starts 2200 GMT Friday January 25th. Ends 1600 GMT Sunday Jan 27th. The stateside "DX window" is 1825-1830.

Did you get DXCC out of October contests????

YU 80 Meter CW DX Contest.

Starts 2100 GMT Saturday Jan. 12th. Ends 2100 GMT Sunday Jan. 13th.

Exchange. RST plus QSO number.
Scoring. Contacts between stations in the same country, 1 point.
Other countries on the same continent, 2 points.
Countries in other continents, 5 points. YU contacts, 10 pts.
Multiplier. One for each DXCC country and each YU prefix worked.
Final Score. QSO points by sum of DXCC's and YUs.

Mailing deadline is March 15th to SRJ Contest Committee, PO Box 48, 11001, Belgrade, Yugoslavia.
Call areas in VK will be considered as separate areas for awards. Usual summary sheet and declaration. 3 per cent duplications disqualifies. Entries may be single or multioperator.

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	—	52.160 VK0RSG Macquarie Island. +
		53.100 VK0MA Mawson
		53200 VK0GR Casey
VK3	—	144.700 VK3RTG Vermont
VK4	—	52.600 VK4WI-2 Townsville
		144.400 VK4WI-1 Mt. Mowbullan
VK5	—	53.000 VK5VF Mt. Lofty
		144.800 VK5VF Mt. Lofty
VK6	—	52.006 VK6VF (VK6RTV) Bickley
		52.350 VK6RTU Kalgoorlie. +
		52.900 VK6RTT Carnarvon
		144.500 VK6RTW Albany
		145.000 VK6VF (VK6RTV) Bickley
VK7	—	144.900 VK7RTX Devonport. +
VK8	—	52.200 VK8VF Darwin
ZL1	—	145.100 ZL1VHF Auckland
ZL2	—	145.200 ZL2VHF Wellington
		145.250 ZL2VHP Palmerston North
ZL3	—	145.300 ZL3VHF Christchurch
ZL4	—	145.400 ZL4VHF Dunedin
JA	—	52.500 JA1IGY Japan

+ Denotes change or addition.

Various other beacons exist in overseas countries and these have been listed from time to time. The Australian television stations sound carriers from Channel 0 around 51.750MHz are good pointers to openings, whilst New Zealand TV sound on 50.750MHz is to be heard on many occasions at good strength.

This month we are pleased to welcome back VK7RTX in Devonport which was to be operational from November. A change of call sign from the Macquarie Island beacon on 52.160 from VK0WI is noted. A big welcome to the 6 metre band for VK6RTU located at Kalgoorlie. Operational on 52.350MHz the beacon at time of writing is running 600mW to a crossed dipole antenna, with 850Hz FSK. Keying is at 12 w.p.m. The beacon is located at the Kalgoorlie School of Mines. The present low power will eventually be raised to 10 watts, but the beacon has already been copied at good strength in VK5. Thanks to Doug VK6EP for the beacon information.

Following the successful launching of this beacon, it appears it will now be used as a prototype for new 6 and 2 metre beacons for Perth, all solid-state.

Although nothing has come from VK2 officially, it seems pretty certain no beacon exists there at present, so VK2WI has been deleted from the listing. It would have been nice to see those two new beacons constructed by Roger VK2ZRH in operation from there for the DX season but . . . it's a long story why they aren't, and certainly the reasons are not suitable for discussion in this column!

THE DX SEASON.

It's arrived, and at the time of writing looks like being a real good one. Openings to VK5 from all over the continent seem the order of the day for the early part of the season, with particularly good signals coming out of VK6 this year. SSB is certainly gaining a hold on 6 metres (even I am there now!). Anyway, the first really good start to 6 metre DX this year was early November with openings to Eastern States. Spasmodic openings throughout November to the big time at the end of November, and that's as far as it's possible to include for the moment. Maybe the next issue will tell you more in detail.

Andrew VK1DA writes from Canberra, advising he lacks an antenna for 6 metres, but maybe something has been done by now. Eddie VK1VP, Reg VK1MP are both using SSB, while John VK1JL has completed a transverter for 6 and is constructing a 3-20 linear, so looks like more SSB from VK1.

On 144MHz Andrew reports quite a bit of interest from VK1, Gordon VK1NU (ex VK5NU) runs SSB. He advises other VK2 country stations showing a 2 metre interest are Keith VK2ZAA at Tumut, Ross VK2PN also Tumut, Trevor VK2ACZ Tumbarumba, Tom VK2NN Blue Mountains, also Jim VK2ZBP at Illabo.

Andrew ends his letter on a rather pathetic note when he mentions (at time of writing) that 19 months of waiting had expired for a P.M.G. licence for their VK1 beacon. Not much return for their $6 licence fee so far! Perhaps the licence will turn up as a New Year gift.

Steve VK3ZAZ writes with some news of the activities in the Central Zone of Victoria, and stations VK3AMH, VK3YFL and himself are all operational on 52, 144 and 432MHz. VK3TV 52 and 144, VK3YHA and VK3YGY 52.5 and 146.

Steve goes on to give a comprehensive listing of openings on 6 metres for November, covering no less than 14 days during the first three weeks. It is obvious Steve makes good use of TV stations as indicators for openings, particularly ABGS1 and ABNS1. On 21st ZL TV and VK0WI beacon which was peaking 40 dB over 9 around 1430; but by 1630 when VK0WW was supposed to be available there was no sign of the beacon. Steve says he has 2½ hours recorded of the "loneliest sound in the world."

The Central Zone have a net going nightly on 144.100MHz with stations from Birchip, Geelong, Ripplebrook and Bendigo taking part, others are welcome to join. Steve is operating daily from 0715 on 144MHz with 200 watts PEP in, 11 el. yagi; on 52MHz, 300 watts PEP, 7 el. yagi. altitude 1500 feet a.s.l., 20 miles NW of Ballarat and no Ch. 0 problems. Thanks for the letter Steve. Please write again.

GENERAL NEWS

From the Western Australian VHF Group News Bulletin comes a par on 52MHz band planning. It reads "Stan VK6SS reported that meetings with WIA delegates had recommended the following band use:-

DX 52.000 to 52.280MHz; RTTY 52.285 to 52.295; Beacons 52.300 to 52.500; F.M. 52.500 to 52.800; A.M. 52.800 to 53.300; Experimental 52.300 to 54.000. Calling frequencies 52.100. Meteor scatter 52.010. International Calling Frequency 52.020." I can see the A.M. boys being content with their segment! Particularly after RTTY, beacons and FM! I guess we States to the East might still find them in the DX segment when the band opens. Anyway, that's the allocation; it is included here to set you thinking.

A letter arrived (too late for inclusion in last issue) from VK4ZTL with information regarding a VHF Contest arranged by the Brisbane VHF Group for Sunday, 2nd Dec. I hope the Contest was successful, but info. is definitely required no later than 30th of month preceding issue for any hope of inclusion in the next issue. This column is happy to mention ANY coming events if you will write and give details, and don't mind condensation of what you send.

MOONBOUNCE ACTIVITY

The following is taken from November "6 UP", with thanks. I tried to get the information out of Ron VK3AKC unsuccessfully, and I feel it is of sufficient interest to devote some space to the article.

On 6th October, 1973, Ron Wilkinson VK3AKC of Geelong, Victoria, worked W2NFA the Crawford Hill VHF Club at 0357Z on 1296MHz via the moon. Signal reports were 549 to Ron and 559 to W2NFA. There was a team operating the station at W2NFA, located at New Jersey; the team comprising Dick Turrin (W2IMU — well known in moonbounce circles), Bob WA2HVA, Tony K2KLL and Roger Abson.

This is the first accredited confirmed Australia-USA contact on 1296MHz moonbounce and is a world first as well as being a new distance record for moonbounce on this band. Congratulations to Ron VK3AKC and the team at W2NFA for a fine effort. It is all the more a great accomplishment for the fact that Ron operated his equipment entirely unaided on this occasion. His antenna has to be manually aimed and adjusted to track the moon. As can be seen from the resume below, most of his equipment is home constructed.

Equipment: W2NFA: Transmitter: Modified ring amplifier from UPX-4 equipment running six 7289 valves (planar triodes similar to 2C39, same as 3CX100A5). Power output is 500 watts. Driver is mixture of valve and solid state gear. RECEIVER: Transistor preamps using MT4000 transistors into a converter using two type V766 transistors. ANTENNA: 60 feet (approx 20m) dia. parabolic dish, circular polarisation on transmit and receive.

VK3AKC: TRANSMITTER: Coaxial cavity amplifier using two 3CPX100A5 valves (cavity constructed by Trevor Niven VK5NC — ex 5ZTN) running approx. 160 watts DC input. Two blowers are used, one on the anodes and one on the cathode cavity. Ron now has a permit to run 500 watts.

The final is driven by a 2C39BA, 20 watts out which is in turn driven by a 2C39 tripler, 3 watts out, driven by a BAY96 tripler (144MHz to 432MHz). The base rig employs a heterodyne VFO and a QQE06-40 in the output. This runs by remote control.

RECEIVER: A magnetic latching relay isolates the receiver system input by switching to a 50 ohm load. ($185 worth! — donated; Ron is not rich, merely patient). There follows two cascoded preamps using NEC1336 transistors realising approx. 3.1 dB noise figure and about 12 dB gain.

The 1296MHz converter is the well known design by Les VK3ZBJ using one tuned filter ahead of it. The IF is at 144MHz and an ICL FET converter to 28MHz completes the line up. All the foregoing is mounted at the feed horn.

Coax to the operating position is used and the receiver is the RX portion of an FT200 transceiver. A dB level meter and a tape recorder are attached to the output.

ANTENNA: Home-made 20 ft dish on an azimuth-elevation mount employing "armstrong tracking method (i.e. it is manually positioned). Ron's wife usually provides the power-coffee-biscuits etc. The feed is circularly polarised, designed by Tick Turrin W2IMU, and is essentially a section of circular waveguide, all homemade.

The coax employed is ⅞" dia. type HJ5-50 under 5lb pressure of Helium. Loss at 1000MHz is 1.27 dB-100ft, a 40 ft length is used in Ron's installation. Cost? $98 . . . the type 75AW connectors cost $21.60 each. A piggy bank helps.

GENERAL: Ron can receive about 13 dB (measured) of Sun noise and 2dB from the earth. W2NFA reported that Ron's signal was 10 dB above the noise for 3 minutes of the contact. Just for interest's sake, the path loss on 1296MHz is 294 dB!

Ron would like to thank all those who took an interest in the project and gave assistance, particularly to Trevor Niven VK5NC who built the transmitter PA cavity, Varian Pty. Ltd. who donated the 3CPX100A5's, the Crawford Hill VHF Club and the US Naval Research Laboratories who provide the computer predictions for the moon position.

On the 15th October 1973, Ray Naughton VK3ATN worked VE2DFO (Canada) and W6PO (California, USA) on 144MHz moonbounce. Ray's equipment has been described previously. Briefly, he runs 150 watts (CW) to a rhombic antenna array which is semi-fixed (or more correctly, semi-moveable). Ray is returning to more moonbounce work.

On the 16th and 17th October, 1973, Chris Skeer of Hatherleigh, S.A., VK5MC worked VE2DFO (Canada) on 144.107MHz moonbounce and W6PO (California). Reports exchanged both ways were ? . . . this means 'all copied'. The reporting system for 144MHz moonbounce (also used on 432MHz) is: T (or Tango) . . . odd letter copied; M (or Mexico) . . . most letter copied; O (or Oscar) . . . all copied. This is to simplify reporting procedures, as many EME stations on 144MHz can only accommodate fixed antenna, thus there is a limited 'window' during which both stations 'see' the moon and can exchange information. The same system is used on meteor scatter. The window on these occasions was approximately 35 minutes which is rare indeed for stations using fixed antenna. Usually it is 10 - 12 minutes or less. On the 17th Chris also heard KH6NS calling and sent a report of M but no two-way contact was made. An unidentified SSB signal was also heard, the doppler shift causing it to be unreadable.

EQUIPMENT: VK5MC: TRANSMITTER: The PA uses a 3CX150 running 150 watts CW and is home built. RECEIVER: A FET preamp using U310 with a noise figure of about 1.3 dB, grounded gate configuration. This is mounted at the antenna. The converter is home-made as is the preamp and feeds into a modified FR100B receiver with a 600Hz mechanical filter in the RF. ANTENNA: Two stacked rhombics, the long axis being 648 ft long! Height is 30 ft (about 10m.) and Chris built a new shack at the feedpoint end of the rhombics to reduce feedline losses. Mohammed came to the mountain. Now that's what I call dedication to the system design!

W6PO: TRANSMITTER: 8877s running 1 KW input. RECEIVER: Preamp uses 2N245, rest of system unknown at this time. ANTENNA: 160 element collinear, semi-fixed.

VE2DFO: TRANSMITTER: PA runs 1 KW input to one 3CX250R. RECEIVER: Same system as Chris's VK5MC. Preamp uses a U310. ANTENNA: 80 element collinear, 3 metres off ground, fixed.

On the weekend of 27-28th October, Chris copied his own SSB echoes back from the moon. I believe that this is the first time an Australian amateur has achieved this. If anyone can tell me anything different — I would like to hear from them. I have no details of power etc.

I must thank Ron VK3AKC for the above information; I might add that it took some persuading, cajoling etc. to prise out of him the details of his record breaking EME contact.

It is certainly with pride we see Australian amateurs to the forefront in this kind of activity. Someone said a few years ago that anything worthwhile in the future in the way of achievement in radio would be done on VHF-UHF and he was right. I am sure the VHF-UHF fraternity will be most interested in the EME work described above, and whilst only a few have the resources, time and willingness to undertake such mammoth tasks, the rest will read of their exploits with continuing interest. I feel sure we all have to say thank you to Roger Harrison VK2ZTB for prevailing long enough on Ron VK3AKC to get that host of information.

That will be sufficient reading for this month, so the column closes with the thought for the month: *By the time a man realizes that maybe his father was right, he usually has a son who thinks he's wrong.*

The Voice in the Hills.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

Amateur Radio Awards.

This new book from the Radio Society of Great Britain, compiled by the Society's HF Awards Manager, contains details of the world's major awards, where and how to apply for them, and illustrations of a number of the certificates. Many countries allot callsigns on a geographical basis, and 20 maps show the callsign areas. The final section of the book contains much useful operating information such as prefix lists, the ITU zone list and map, and the QTH locator map of Europe. It is attractively finished in a glossy hard cover and has a durable plastic binding. Amateur Radio Awards was compiled by C. R. Emary, G5GH, and has 185 pages, 8" x 10".

PZK issue a certificate to those amateurs (and listeners) who have worked (or heard) the required number of amateur stations located in countries on the Meridian of Warsaw, known as Worked 21st Meridian Award. Details are:

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 1st January 1955 are valid.
3. Applicants who are members of an IARU Affiliated Society should submit their cards, along with full details of the contacts, to the Awards Manager of their locally affiliated IARU Society for certification. All other applicants must submit their QSL cards to the sponsors.
4. The fee for the award is five IRCs.
5. The address for applications is: PZK Awards Manager, Postbox 320, Warsaw 1, Poland.

Confirmed contacts are required with 16 or more of the following countries: CR6 HA JW LA OH OH0 OK SM SP SV (Greece).
TL8 TT8 UA2 UP2 UQ2 YO YU ZA ZS ZS3 ZS9 (A2) 5A. A contact with SP (Poland) is obligatory.

Another Award which may be of interest is the Worked All YU Republics.

1. This award is available to licensed amateurs.
2. Contacts on and after 1st February 1950 are valid.
3. Do not send QSL cards. A list, showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. Contacts must be made from the same location — the "same location" being taken to mean within a radius of 60 miles (100 kms) of the original location and using the same call sign.
5. The fee for the award is five IRCs.
6. The address for applications is: Awards Manager, SRJ, Box 48, 11001 Belgrade, Yugoslavia.

YU7, YU0, 4N, 4O and YT count for the Republic from which the QSO was made.

Stations require confirmed contacts with two stations in each of the six Republics. At least two bands must be used.

List of Republics:

YU1 Serbia
YU2 Croatia
YU3 Slovenia
YU4 Bosnia and Herzgovenia
YU5 Macedonia
YU6 Montenegro

ERRATUM

The list of alterations for the DXCC in last month's issue contained an error. VK4FJ should read

Phone	290-314
C.W.	293-322
Open	303-332

IARU

with Michael Owen VK3KI

IARU R3 LIAISON OFFICER. Mr M. J. Owen, the WIA's IARU R3 Liaison Officer reported that following the resignation of Mr Peter Williams as Secretary of the IARU R3 Association in September the Directors passed a postal vote acknowledging his services to the Association.

The Directors also passed a postal vote appointing Mr David Rankin, VK3QV, Secretary. David had been nominated by the Federal Council as Secretary following the resignation of Peter.

The Directors have been in correspondence in recent times in relation to the proposed World Administrative Conference that has been foreshadowed for late this decade to deal with the whole spectrum.

The 1971 Plenary Conference of the Association fixed the next Conference in 1974 to be held in Hong Kong. Obviously the most important work of this next R3 meeting will be to formulate the plans of the Region for the proposed W.A.R.C. It will be necessary for the Directors to finalise the date of the Hong Kong Conference in the near future.

You and DX

The few notes in Nov. AR produced a few responses and thanks go to the subscribers mentioned in this column for a little initial push. More paragraphs are needed because the comments came too late for the December issue and nothing else is in sight.

Lee Kinsella, VK2AXK wrote a little ditty with a moral thus —

"VK2AXK tunes eighty — violent static;
tunes forty — violent static.
Tunes twenty — silence; fifteen — silence;
ten — silence. "CQ Ten" — silence.
Last go, "CQ Ten" — works UA3QAQ, 9H1CH
and a string of JAs. Time 0900Z
Moral: Always try a few CQs on ten."

Martin Luther, VK4VU passes along the information that a 28MHz beacon is now in operation on Cyprus with the callsign 5B4CY. The ident is in CW and transmissions are on 28.185MHz. The equipment runs 40W to a ground plane. Reception reports are eagerly sought and should go to the beacon keeper 5B4AD at P.O. Box 1286, Limassol.

John Kitchin, VK6TU asks if you have worked Wally, WA0ZUK-aeronautical mobile? Wally is xH-locked about 14ZZ0. With the high internal QRM he cannot read weak signals. Last heard 6th Nov. near Thailand. Ron, 6Y5SR in the Blue Mountains out of Kingston was coming in well at 19.45Z on 16th Nov. on 14175, he goes QRT around 20.00Z week-days but is on later over week-ends.

Does anyone have any idea what prefix will be issued to PNG after Independence?

From the log of Kew, VK3AH, here are some DX stations with their QSL addresses:-

HS3AJX	QSL MGR. K8ZTS
9Y4VV	QSL MGR. K9KXA
VK4AK	QSL MGR. P.O. Box 117, Albion, Qld. 4010.
3A2CP	QSL MGR. WA3HUP (Maryanne)
A4XFD	QSL MGR. G3XEC
KA1BL	QSL MGR. K0SVW
YJ8BD	QSL MGR. K0IJ
5W1AR	QSL MGR. WA7LFD
HL9TL	QSL MGR. ZL2AWZ
HL9VL	QSL MGR. ZL2AWZ
HR1RSP	QSL MGR. W5GTW
KC6SX	QSL MGR. JH1ECG
CR8AM	QSL MGR. WB6BGQ
CR7GJ	QSL MGR. W3ANK
4X4OC	QSL MGR. HS0ISB, C-o Box 2008, Bangkok
VQ9R	QSL MGR. P.O. Box 193, Port Victoria, Seychelles.
VS9MJ	QSL MGR. G3LQP (Roger Brown)
4W1BC	QSL MGR. G3SUW (Geoff).

Y.R.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

To State supervisors and club members I would express my hope that Christmas will be for all a very happy occasion. With the coming of this season we are reminded that the end of another year is not far away. Clubs will be in recess until some time in 1974. What have we accomplished during this waning year? Some answers may come when the statistical forms are returned and numerically at least we shall have some idea of gains or losses.

The coming year will be one of importance to the scheme. Not the least in significance will be the supervisors conference to be held at Maitland, N.S.W. on Saturday, August 31st and Sunday, Sept. 1st. Further details concerning this meeting will be conveyed to supervisors later. It is appropriate that the venue of our conference should be the successful Maitland Radio Club which has won the I.R.E.E. Pennant four times in seven years. An important item on the agenda will be the report by the Syllabus Standardisation Committee, a report which we hope will include provision for the Novice Licence.

Will supervisors please deal promptly with the statistical forms so that I can prepare my annual report to the Federal W.I.A.

VK3BSJ RADIO-SAFARI TO WESTERN AUSTRALIA

To celebrate five years of achievement, the St. John's College Radio Club is embarking on a "Radio - Safari" to Western Australia.

The members will travel by car, with mobile transmitting facilities. During the trip they will operate on the following bands: 20 metres (14.160MHz), 40 metres (7.070 MHz) and 80 metres (3.670MHz). The call signs used will be VK3BAN (Frank, the club leader), VK3BSJ (St. John's College Radio Club), VK3ANE (Youth Radio Club's Scheme of Victoria).

The organizers of the trip would be pleased to hear from any amateur or radio club (especially Y.R.C.S.), whom they can contact either eyeball or over the air. They would also like to hear from people who could point out places of interest which could be visited.

As Frank (VK3BAN) has just been appointed State Supervisor for Victoria he would like to meet the other State Supervisors (W.A., S.A.). Just drop him a line . . .

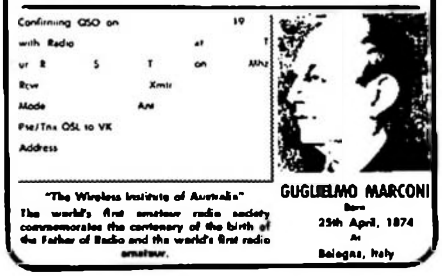
L to R. — Kev Watson VK2BLW, Founder and President of the Maitland Radio Club; Chris Cowan VK2PZ; and Margaret Watson, on the occasion of the presentation of the fourth Pennant won by the club in seven years.

MARCONI CENTENARY QSL CARDS

"1974 is the centenary of the birth of Marconi, who always claimed to be 'only an amateur'. Amateur or not, he was responsible for the early applications of radio from which has grown the widespread use of radio as we know it today. To commemorate the birth of the father of radio the Wireless Institute of Australia, the first organisation of amateur radio operators in the world, is making available a special QSL card. These cards, a sample of which appears below, are available from the S.A. Division of the W.I.A., at $1.60 per 100 cards. Supplies are limited, so it will be a case of first in best dressed. Orders should be forwarded with the requisite amount of money to:-

Marconi Cards,
Wireless Institute of Australia,
Box 1234, G.P.O.,
ADELAIDE, S.A., 5001.

Closing date for applications: 31 January, 1974."



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,

The advertisement put out by the Victorian Division of the Institute in the November issue of AR was very timely.

In the same issue on page 25 a letter from John Lilley VK3AZJ highlighted the plight of an amateur in the eastern suburbs of Melbourne — Camberwell. Apparently, he had experienced great difficulty over the installation of an antenna tower.

One of the headings in the Victorian Division brochure reads as follows —

Assistance

— with representations to Municipal Councils for the erection of masts and towers.

Surely all readers of AR would be interested to learn of the PRACTICAL help the Victorian Division provided in this particular case. How about publishing the details in the magazine?

73

David Rankin, VK3QV.

The Editor,
Dear Sir,

Recent publicity in your magazine regarding the availability of a Morse Course for beginners has resulted in a number of inquiries from VK amateurs. For your information, the following are the details:-

Morse Course, in two parts.

Part 1 — eight 15 minute lessons for learning morse code

Part 2 — 1½ hours of practice, consisting of practice exercises from 6 w.p.m. up to 16 w.p.m. and some off-air morse.

Both parts have a written decode for checking and correcting copy (does not apply to off-air morse).

Cost of copies is $NZ6.00 for part 1 and $NZ4.00 for part 2 plus postage. When ordering please state the following:-

Name and address
tape — cassette or reel
speed — 3¾ or 1⅞ i.p.s. (reel only)
type — ½ track or ¼ track (reel only).

Address all correspondence to:-

N.R.T.S.,
P.O. Box 1718,
Palmerston North,
NEW ZEALAND.

Harry N. Wiggins ZL2BFR
Manager, NZART, Novice
Training Scheme.

The Editor,
Dear Sir,

I wish to draw readers' attention to the article **A Wide-band Pre-amp for the FTDX 401 and FT 200** on page 10 of November's AR.

The circuit and brief notes were originally sent to the owner of a FTDX401 for his information. These were passed on to the Technical Editor of the VK5 Divisional Bulletin for analysis and possible publication in that journal.

The notes were forwarded to AR and published without my knowledge and as such contain several mistakes.

1. The circuit was devised for use in the FTDX401 and was not intended or implied as being suitable for the FT200. Use in the FT200 would probably destroy the TIS88 transistor as the FT200 aerial coils in the transmit mode are used as tuned anode circuits for the driver stage to the finals.
2. The circuit should include a 1000pf capacitor between collector of the OC170 and grid of the 6BZ6 RF amplifier. This capacitor is referred to in the text.
3. Paragraph four should read "No cross modulation has been observed to date even from an FT200 100 yards away . . . etc."

Yours faithfully

J.W.K. Adams
VK5SU

A long letter from Mr Pieniacki of Lismore complains that AR in recent years has forgotten the SWL's and younger members with slender pockets. He claims these members buy disposals gear fairly cheaply but are stuck for lack of circuit and modification details. He believes the trend today is towards the supermarket amateur who understands nothing beyond the knobs. His plea is for the not-so-well-off. Foster **AMATEUR** radio. Print articles, he writes, on the old sets and even many of the old-timers would appreciate this service also.

This is what NEWCOMER'S NOTEBOOK is all about — Ed.

Magazine Index

With Syd Clark, VK3ASC

CQ October 1973.
Storage Tube Scan Conversion: Oscar-6 News and Orbital Predictions: 160 Metre AM from a Motorola - 80D Transmitter Strip: Hewlett-Packard Digital Multi-Meter Fits in the Palm of your Hand: Range Effects During Oscar Passes.

HAM RADIO August 1973.
Phasing Type Communications Receiver: High-Gain Log-Periodic Antenna: Two-Metre FM Base Station: Television DX: Selecting Batteries: 1296 MHz Noise Generator: Two Metre Frequency Synthesizer.

QST October 1973.
A Poor Ham's QRP Transmatch: 8873's in a Two-Killowatt Amplifier: Another Look at Reflections, Part 4: The Tunable Crystal Oscillator: A Tuner for ATV Applications.

RADIO COMMUNICATION. October 1973.
The Cadet Direct Conversion Receiver: Notes on Simple Aerial Arrangement for Oscar 6: 160 M SSB Transceiver for Portable Operation: (Review) Heathkit HA-202 144MHz FM Amplifier.

RADIO ZS July 1973.
The Quarter Wave and Five-eighth Wave Antenna for Two Metre Mobile: Technical Description of the Netset.

SHORTWAVE MAGAZINE July 1973.
General Coverage Receiver: As it Was in the Beginning: QRO Linear for Two Metres.

"73" MAGAZINE Sept. 1973.
Jordan: IC Repeater Logic System: Mono-band Log-periodic Antennas, Part 2: Calibrating Your Tunable 2 Metre Receiver with Surplus Crystals: PLL IC Applications for Hams: The Touch Pad: S-Meter for an HW-7: Inverted Doppler?: The L'eggs Injector Antenna: A Two Metre Converter: Versatile IC Keyer: Measure Antenna Impedance with Your SWR Bridge: Potentiometers: An Improved Method to Prune Antennas: A Visit to Sentry: The QSL Manager.

CQ November 1973.
A Memory for the Integrated Circuit Morse Keyboard: Tips for Copying CW on Paper: No Room for Tower Guys?: The WD-11.

The Australian EEB is back again with copies for February & April 1973 to hand. Subjects covered are:- Car Exhaust Analyser: Low Cost (Abt. $20) Digital Frequency Meter: Semiconductor Testing: A New Synthesizer Principle etc.

20 Years Ago

with Ron Fisher VK3OM

JANUARY 1954.

Technical articles were well represented in the January 1954 issue of Amateur Radio. Leading off was a 'Simple Converter for Two Metres' by Fred Bail VK3YS. Fred used a single 6J6 as a combined mixer oscillator with an output of about 7.4MHz.

One of the popular disposals receivers of the post war vintage was the Bendix RA-10-FA. E. Cornelius VK6EC showed how to modify this receiver for amateur use. A new front panel was added to improve both appearance and operating convenience, also the front end tuning was modified to enable full band spread of the 80, 40, 20 and 15 metre bands.

The Bendix RA-10 was also the subject of G. Loveday's article, a 'Countryman's Double Conversion Receiver'. As the original receiver was a single conversion design with a 1600kHz IF, selectivity was not a good point. Mr Loveday used the double conversion principle, converting down to 455kHz.

The rules of the National Field Day make interesting comparison with our current Field Day. Firstly there was a power limit of 25 watts input. Multiple transmitters could be used but only one transmitter could be used at any one time and the contest was of twelve hours duration on the Sunday only.

VK7WI was operating from the 7th to the 17th of January at the Tasmanian Sesqui-Centenary Celebrations Science Exhibition. A remote operation system was being arranged to overcome the high noise level at the Hobart City Hall.

DX highlights for January were that VU5AB of the Nicobar Islands was operating on 14MHz and DL4QX was organising a DX-pedition to Crete during early 1954.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

We have completed yet another year with Intruder Watch with some successes and some disappointments, but on the whole it has been a successful year from our point of view because we now have a Co-ordinator in every State. Some are very active yet others not quite so active as I should like them to be. Our monthly net on 3580kHz the second Monday of each month at 0900 GMT is spasmodic and I should like to have some participation from Members as well as Co-ordinators.

We have a very cordial relationship with the Radio Branch and so long as they are satisfied that reports are genuine Intruders, they will follow up by monitoring signals at their own monitoring stations. Another success is noted from a letter received from RSGB which states — "The administration running TC* (CENTO) have agreed to move this station out of the band, and from this end I can confirm that this station has not been heard for some weeks". TCX was reported by WIA in the 14 MHz band several times and was situated in Turkey.

At the moment we are chasing GYS in Singapore which has several spurious signals in the 14MHz band. We have had success with a similar situation from 3DN in Fiji, so there is no reason why this one should not be resolved. Thus, some Observers are already doing spartan service, but we need more and I am closing this year's activities with a plea once again for Member Observers to participate in the activities of the Intruder Watch and identify themselves with their Divisional Co-ordinator. Will all Members accept my grateful thanks for work done in the past, and have a Happy New Year.

AARTG

with Ken Kelly VK4MJ

285 Monaco Street, Surfers Paradise, Qld., 4217

I am sorry that I have not had time to write to all those who have enquired about RTTY and in particular those who have expressed interest in joining A.A.R.T.G., as I have been away on holiday for the past six weeks. I am now busy trying to catch up with all the mail, and for those who have enquired about availability of machines, I can say that so far nothing definite has been heard as to when they may be available. However there are several ears to the ground, ready to pounce.

This month we can report that there are now 26 members enrolled in VK6, including Ron, VK9RA, who is located at Christmas Island. He hopes to be operational very soon, and should be a popular new country for RTTY. In VK4 there are sixteen members, and several are working hard on their gear.

The weekly skeds on Sunday afternoons have been disappointing, and only one or two stations worked or heard. Much of this may be attributed to the difficulty in arranging a time to suit all States, and what with the time differences and the rather erratic propagation of late, this round-up has not been the success we had hoped. It might be better to arrange different sked times between pairs of States, rather than try to hook up the lot at the same time, and during the next month I will try to find out suitable times for this.

The progress in the state of the RTTY art at present suggests that ere long the page printer may be replaced by the video read out, and of course gear of this nature is already being advertised in the U.S.A. (but at a price!). For some time I have been trying, without much success, to obtain practical data on the way this equipment operates. I feel that it would be a very useful club project if we could produce a prototype suitable for amateur construction, and I wonder whether any member has any information which would enable a start to be made. If no club members have anything on this, perhaps someone could make a few enquiries which would give a lead, and I will be grateful to receive any information whatsoever.

INTRUDER WATCH SUMMARY FOR QUARTER ENDING 30th SEPTEMBER, 1973

Frequency kHz.	Mode.	Date.	Time. GMT.	Ident.	Traffic & Remarks.
21140	A1	31 July	0800	MH2	Continuous tape "CQ de MH2"
14031	A1	15 Aug	0700	8B18	"OVE3 de 8B18" repeats.
14039-40	A1	1 June	0920	PBJ	Many times, qsv.
		15 Aug	0700		
14042	A1	15 Aug	0700	P8DF	"8FZ6 de P8DF qua 20"
14049	A1	10 Sept	1000	7BQ2	"7AC de 7BQ2 qsa 2-2" (Indon)
14050	A1	Sept	1230	7BD4	"7AD8 de 7BD4" repeats (Indon)
14051-6	A1	various	various	7BD2	"7AJ de 7BD2" chirpy note (Indon)
14051	A1	June	various	WFW6	"UK4 de WFW6" 4 letter gps.
14060	A1	15 Aug	0700	7BD2	. . . de 7BD2 qsa 2" (Indon)
14060	F1	various	various	–	RTTY.
14071	F1	various	various	–	RTTY.
14080	A1	5 Sept	1020	COK	"ITY de COK clg" repeats.
14080	A1	20 Aug	2100	UY5	"vvv UY5"
14080	F1	various	various	–	RTTY.
14090	F1	various	various	–	RTTY.
14095	F1	various	various	–	RTTY.
14099	A1	1 June	0600	TCX	RTTY. (Read outs submitted).
14102-3	F1	various	various	–	RTTY.
14105	F1	various	various	–	RTTY.
14110	F1	various	various	–	RTTY.
14116	A1	21 July	0630	DBD	"vvv de DBD".
14123	A1	4 June	2300	FH6	Call signs.
14134	F1	various	various	–	RTTY.
14137	A4	various	various	–	Facsimile.
14137	F1	various	various	–	RTTY.
14148	F1	various	various	–	RTTY.
14165	F1	various	various	–	RTTY.
14165	A1	12 June	2230	QLR1	"vvv de QLR1"
14180	A1	25 July	0630	UGHG	"vvv de UGHG"
14190	F1	various	various	–	RTTY.
14195	A1	25 July	0030	XQXL	4 letter groups.
14199	A1	23 July	0700	KAS	Call signs.
14205	F1	various	various	–	RTTY.
14216	A1	5 Aug	2300	1S1NA	vvv and Z sigs.
14236	F1	17 Sept	1215	BIL31	RTTY. (Read outs submitted).
14274	A1	6 Aug	0840	U5M	Calling HJ & 4 letter gps.
14280	A1	1 June	2045	FBTF	"FUJF de FUTF".
14280	A1	1 June	2045	FBJF	"FUTF de FUJF".
14292	A1	4 July	0715	8FZH	"VVV de 8FZH".

Frequency kHz.	Mode.	Date.	Time. GMT.	Ident.	Traffic & Remarks.
7004	A1	2 Sept	1130	3TTL	"QS5 de 3TTL" repeats.
7008	A3	daily	2100	–	Propaganda B-c.
7009	A1	4 Sept	1340	L724	"QFGP de L724"
7010	A3	daily	2100	–	Foreign B-c.
7013	A1	24 Aug	1150	3TTL	"QS5 de 3TTL".
7022	A1	10 Sept	1020	CMMS	"BXTI de CMMS qsv k".
7029	A1	16 July	2030	CPGD	"4GG8 de CPGD qsv k".
7030	A1	14 July	2100	AAQJ	"OD9X de AAQJ" repeats.
7035	A3	daily	2030	–	Foreign B-c.
7044	A1	22 July	1115	AAQJ	"OD9X de AAQJ" 4 letter gps.
7050	A3J	8 Aug	0400	–	Japanese language fishing boats
7050	A3	daily	2030	–	Foreign B-c
7056	A3	daily	2030	–	Foreign B-c
7065	A3	daily	2030	–	Foreign B-c
7075	A3	daily	2030	–	Foreign B-c
7090	A3	daily	2030	–	Radio Spain
7132	A3	Saturdays	2100	–	Radio Manila, reb-c BBC.
3503	A1	17 Aug	2100	VTT20	VTN40 de VTT20 & reverse.
3507	A1	3 Sept	1200	3MA	"CAP de 3MA26-32-42-44". 5 letter gps "freq 13766-9090-6500-3507"
3522	A1	3 Sept	1215	BQD11	"TBO de BQD11" repeats.
Following have been heard since 30th September.					
14296	F1	5 Oct	1030	HMD8	RTTY (Read outs submitted)
14237.50	F1	14 Oct	1200	BIL31	RTTY (Read outs submitted)
14237.08	F1	21 Oct	1150	BIL31	RTTY (Read outs submitted)
14296.32	F1	18 Oct	1015	PYH223	RTTY (Read outs submitted)
14038	A1	20 Oct	1215	W5P	Calls only.
14133	A1	20 Oct	1400	SPH	"vvv de SPH4-6-8-9 qsx 8 12 16 22 mhz k" (spurious?)
14198.5	A1	20 Oct	1300	GYS	Call sign tape "GYS4-5-8-7 (Spurious)
		21 Oct	1030		
14236	A1	21 Oct	1030	2POJ	"WJWO de 2POJ qsv k"
14298.36	F1	21 Oct	1030	HMD7	RTTY (Read outs submitted).

SPH (Poland) and GYS (Singapore) appear to be spurious signals, but are potent here (S7 to S9). Also the HMD stations and BIL31 are S9 here. The bearings point to Asia.

Ionospheric Predictions

with Bruce Bathols, VK3ASE December 1973.

JANUARY 1974.

Listed below are the Ionospheric Predictions for January 1974 from information supplied by the Ionospheric Prediction Service Division of the Commonwealth Bureau of Meteorology.

Times are G.M.T.

28MHz

Activity in this band is predicted to be less than in previous months. However some good openings to countries within the tropics and nearby areas are predicted at around noon local time and also at sunset. — Worthwhile having a look at!!

21MHz

VK2 to

SU	0500-1000
ZS	0900-1000
G (S.P.)	0800-0900
G (L.P.)	1000
UA	0500-0900
W6	2100-0200

VK6 to

SU	0500-1200
ZS	0700-1200
G (S.P.)	0800-1200
UA	0400-1100
W6	0100-0200

VK7 to

SU	0500-1100
G (S.P.)	0800-1100
G (L.P.)	1000
UA	0500-1000
W6	2200-0200

14MHz

VK2 to

ZL	1900-1500
SU	0900-1800, 2100-2300
KH6	0400-1300, 1800-2100
ZS	1200-1800, 2000
G (S.P.)	0700-1700
G (L.P.)	0900-1300
VK0	2000-1400
VE3 (S.P.)	1500-2100
VE3 (L.P.)	1500-1600, 2000-2300
W1	1400-2000
VK9	2000-1700
PY	0400-1200, 1900-2300
W6	1600-2100
JA	0500-1500, 2200-2300
9G1 (S.P.)	1400-1600, 2000-2400
9G1 (L.P.)	0400, 0800-2100

VK6 to

SU	1000-1900, 2300-2400
ZS	0300, 1200-1800
G (S.P.)	0900-1700
G (L.P.)	1000-1600
VE3 (S.P.)	1400-1900, 2200-2400
VE3 (L.P.)	2200-2400
UA	0800-1400
PY	0800-1100, 2200-0200
W6	1700-1800, 2100-2200

VK7 to

SU	1000-1700, 2100-2400
ZS	1200-1600, 2000
G (S.P.)	0800-1600
G (L.P.)	0900-1400
VE3 (S.P.)	0800-1400
VE3 (L.P.)	1300-1500, 2100-2300
UA	0700-1400
PY	1800-1200
W6	1600-2000

7MHz

VK2 to

SU	1400-2000
ZS	1600-2000
G (S.P.)	1400-2000
VE3 (S.P.)	0800-1400
VE3 (L.P.)	2000
UA	1200-2000
W6	0800-1600

VK6 to

SU	1500-2300
ZS	1600-2200
G (S.P.)	1500-2200
VE3 (S.P.)	1000-1500, 2100
UA	1300-2200
W6	1000-1600

Hamads

FOR SALE

60W AM VFO Tx genemotor, BC455B Rx and other parts, write for list. Best offer for lot. VK2QB, QTHR, but Post Code 2288.

AWA MR20A, 2M FM Unit, with AC P/S, speaker, Mic., Circuit diagram; Tx has 6146. RX has block filter and limiter meter, Xtls for 146: $60. Homebrew GDO Nuvistor 1.3 to 175MHz, $10.
G. R. Hovey, VK1ZHG, University House, P.O. Box 1535, Canberra City, 2601.

Collins Transceiver KWM-2 Serial 11108 with Waters Q-Multiplier/Notch Filter 337-M2 original factory installation. PSU's available are PM-2 AC and 516E-1 DC units with all cables and instruction manuals. Package deal $750 or offer. Would consider splitting units. Phone or write VK6RU QTHR (but Post Code 6015). Ph.: (092) 85-9664.

Mosley TA33 Jr. Beam and Stolle Rotator with 70' of 5 core cable. All in good condtion and working perfectly, $140. VK3ASE, QTHR, Ph.: (03) 90-6424.

Lafayette Amateur Band Rx Type HA-800 complete with 100kHz cal. Xtl and instruction book. 6 bands 80 to 6m. 240V AC and 12V DC in mint condition. $175, ONO. VK2HW. QTHR. Ph.: (02) 77-4126.

FT200 Complete with FP200 (AC) and DC200 (DC) PSU. All in first class condition. The lot for $380. VK3HC. QTHR Ph.: Bus. (03) 49-1017 AH (03) 45-2535

TCA 1674 FM Transceiver, 20W Hi Band mod. with Xtals. Ch. B-4 Inbuilt DC PSU rocking armature mike.
Low Band TCA Transceivers (2), (1 x 1674) (1 x 1645) unmodified. What offers? VK2AFF. QTHR. Ph.: (042) 61-4287.

Trio-TR2E, AM-FM, AC-DC, 2 Metre, fully tuneable, transmitter receiver. Has netting and Xtl. controls. Complete with Xtls, Mic. Manual, in original carton and in mint condition. Best offer. VK2BJK. QTHR. Ph.: (02) 449-1598.

AWA BS50D Base Stn. $65; RCIA Remote control unit $20; **AWA MR15A mobile align. Ch. B. $60; AWA power supply suit MR10/20 $5; Gen. Cover** Rx. $50; **Talc-Bac AM Transceiver 6M $15; GDO** $35; Exchange for SSTV components, VK4ZKI. QTHR. Ph.: (072) 76-1284.

AR7 Receivers (2) complete with coil boxes, and working, with circuits. What offers?. VK2ZYO. QTHR.

Swan 500 Transceiver, Home built copy, 10 through 80 metres, U and LSB, incremental tuning, 200W output, complete with separate AC and DC PSU's, ready to use, excellent quality and finish: $300, ONO VK2KM, QTHR, but Post Code 2750. Ph.: Bus. (02) 560-8644 Ext. 47.

Going Overseas, cleaning shack. Selling Telequipment Serviscope S32 CRO $90. Eddystone Comm. Rx 840A $70. Star Ham Rx SR600 $125. Yaesu FT200 $210. Linear FL DX 2000 $160. FT101 $390. Mosley Triband 3 El 1 kw Yagi $70. Channel Master Rotator $25. Hills 60 ft. crank-up tower $80. Webster Triband Helical $17. VK2BAN. QTHR. Ph.: (02) 524-8243.

WANTED

40" Length Comalco E865 extrusion. Alternatively is anyone interested in clubbing together to purchase minimum order. D. McConnell, 322 Lig-Street, Ballarat, Vic. 3350.

Prop-Pitch Motor in good condition. VK3HK. QTHR.

Communications Receiver General Coverage or Drake 2B or similar unit. Details to G. Anselme, 325 Marwedel Street, North Rockhampton, 4701, Qld. Ph.: (079) 28-4007.

Facsimile Machine any condition. VK2AAK, Kulnura. QTHR. Ph.: 76-1261.

Instruction Manual or circuit diagram of the Rx BC-624-A or the 522. VHF Rx. Buy or borrow for copying. T. Bird, 75 Horatio Street, Annerley, Brisbane, Qld., 4103.

6C6 and 6D6 tubes, cheap, for SWL. R. Edwards, L60181. 30 Panton Crescent, Karinyup, 6018.

Morse Key, Clipsal, PMG type. VK3QW. QTHR Ph.: (03) 560-0645.

Silent Keys

R. D. O'May, VK7OM

S. J. Henkel, VK4SH

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2nd Prize:
Five year subscription to W.I.A. **$60**

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4th Prize:
Five L.P. Records of choice **$30**

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7th Prize:
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9th Prize:
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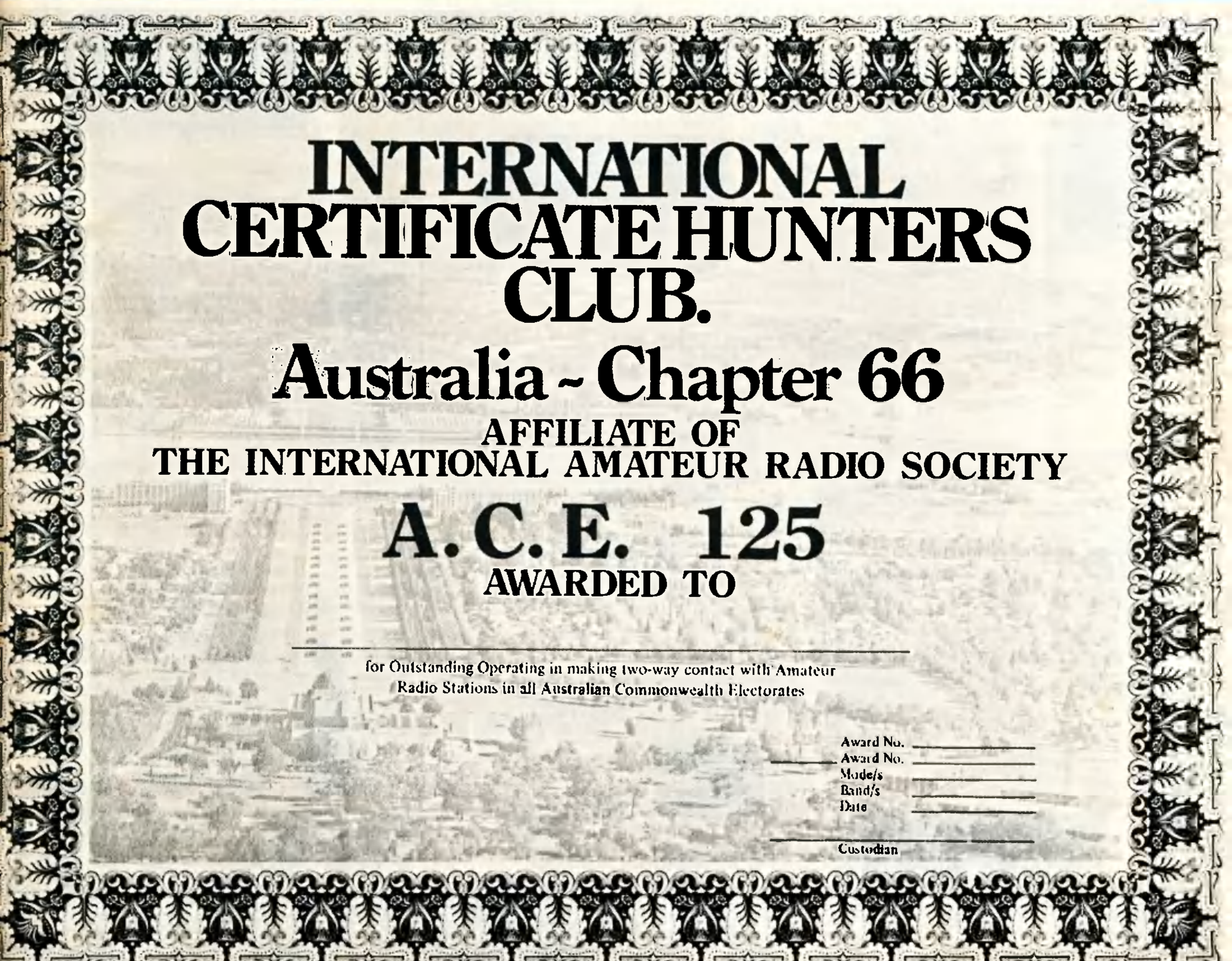
amateur radio

FEBRUARY, 1974



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- SERIES MODE CRYSTAL OSCILLATOR
- JAUNT TO JOHOR

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER **Model TE-15**
SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE **Model HE-22D**
AUDIO GENERATOR **Model TE-22D**
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square 20Hz-25kHz
Output Voltage: Sine: 7 volt. Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
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4 Ranges—1/1, 1/10, 1/100, 1/1K

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Printed Circuit for uniform Characteristics.
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GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
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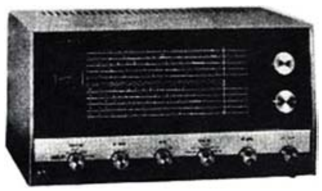

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MODEL SG-402

This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

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2. All solid state construction for instant waveforms, compact and lightweight portability.
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- 4 Bands covering 540 Kcs to 30 Mcs.
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- Calibrated electrical bandspread.
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RF SIGNAL GENERATOR **Model TE-20D**
SPECIFICATIONS

Dial has 7 separate band TE-20D covers 120kHz — 500MHz (6 Fundamental Bands & 1 Harmonic Band)
Freq. Accuracy: +or—2%
Audio Output: to 8 volt
Internal Modulate: 400Hz approx.
Tube: 12BH7A, 6AR5
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TE-20D employs a Xtal socket and can be used as below.
a.—Self-Calibration
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Small size-Space Saving.
Printed Circuit for a uniform characteristics.
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Weight: 2.8kg.

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Ericaion Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50 Tested.** p&p 75c
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Double Phone Plug. 6.5mm **75c**
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FEBRUARY, 1974
VOL. 42, No. 2
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amateur radio

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CONTENTS

FRONT COVER

Who will be the first to qualify for this magnificent A.C.E. 125 award? ZL2AH was the first to qualify for the A.C.E. award. Alex Slight VK2ZA put a tremendous amount of work into the design of the two certificates and a supply has now been printed on embossed Italian paper. See AR, August 1973, for details of the award.

QSP

AMATEUR RADIO — A GOOD THING IN LIFE

Consider for a moment our good fortune to be living in an age when so much is to be had of the good things in life. What could you have been doing a hundred years ago in your leisure time? Try listing the activities you have now which could not have been had then. Even simple things like swimming were virtually unknown. To travel was a perilous adventure.

Technology has brought us so much. Where would we be without the material things we use for enjoyment of the good life. Every preacher warns about the evils of materialism. Every saint stresses the things of the spirit.

Where do you and I stand in all this? Where are we going?

Amateur radio is helping us along the road and we owe it to our hobby to treat it right. The future of our hobby is in our hands but it is the past which has given us this wonderful leisure activity.

It is a finely balanced activity like the receivers and transmitters we operate. These must be designed within certain parameters. Ignore those parameters and you fail. Work within them and you succeed.

So it is with amateur radio. Recognise and observe its parameters. Help others to recognise and observe them, and so help others to enjoy amateur radio the way it should be enjoyed. Whether you like it or not, amateurs must be the goodies in life. This is no pastime for the baddies.

The forces of materialism surround us. These are very powerful forces and their voices are as sweet as honey. Take away our frequencies and amateur radio would cease. There is the key! We must work to prevent this.

The keynote of trade unionism is "united we stand, divided we fall". If amateur radio is to survive we must also adopt this slogan and abide by it. You look to the Institute for support and protection, but you must also give the Institute your support. It is your Society, run for you by other members who devote much of their spare time to it, free of charge.

I have felt it necessary to say these things because over the past few years some amateurs have consciously or unconsciously harmed our image in one way or another.

In order to survive we must create and maintain a good image. Survive we will. Despite the doubters in our ranks who, you will notice, are still enjoying amateur radio.

David Wardlaw VK3ADW,
Federal President.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

FEBRUARY 9th & 10th

JOIN IN THE FUN — MAKE THIS THE BEST FIELD DAY YET

THE COST AND WORK OF THE EXECUTIVE OFFICE

The Federal Council during the Easter 1973 Convention in Melbourne directed that out of the subscriptions received from Full and Associate members the sum of $7.20 be allocated from each towards the costs of the Executive office including the cost of AR and the 20 cents annual contribution for IARU.

The Executive is charged with carrying out the policies laid down by the Federal Council and to provide these services within the approved budget —

Centralised subscriptions processing
Centralised membership records
Production of AR
Production of the Call Book
Magpubs
Negotiations and contact with Federal Government Departments and Federal organisations.
Liaison with IARU and overseas sister societies
General supervisory services affecting common objectives including especially —

YRCS
Intruder Watch
Awards
Australian Contests
Band Planning
Key Section
RTTY Section (AARTG)
Project Australis

Maintaining an office for central control and intercommunications, general administration and associated clerical functions.

The Executive's small office is managed by one full-time Secretary, who is also the legal Public Officer of the W.I.A., assisted by one, or occasionally two, part-time clerical assistants. All other Executive work is done by unpaid volunteer members of the Institute usually appointed by the Federal Council. The 'Managing' Editor of AR is not a member of the Executive if he receives a small honorarium for his work on AR.

The address of the Executive office is P.O. Box 150, Toorak, Vic. 3142. No mail should be sent to any other address — unless specially requested — because other post boxes are cleared very infrequently.

Radio Astronomy Explorer-B; Explorer 49.

The last scheduled U.S. space mission to the moon was launched 9th June 1973 with aerials as tall as the Empire State Building when fully extended and in circular orbit 1100 Km above the moon. ITU Telecommunication Journal Oct. '73 goes on to say that Explorer 49 (its orbit name) is conducting the most extensive study ever undertaken of low frequency signals from galactic and extra-galactic radio sources and from the sun, earth and Jupiter. This cosmic radio noise, in the 20 kHz to 13MHz region of the electromagnetic spectrum, is not observable from the ground because of the obscuring effects of the earth's ionosphere. Explorer-49 is isolated from extraneous radio noise from earth by using the moon as a shield as it orbits the far side during its 225 minute orbital period.

Technical articles.

If your article has been accepted for publication don't expect to see it published in the very next issue. The production times for a monthly magazine are probably much longer than you ever imagined. The articles for this issue, for example, were being prepared for publication during the month of June. Editorial in 'Ham Radio' October '73. (AR is thus no exception — Ed.)

Pinhead stereo — what next?

South African scientists have developed and manufactured a miniaturised electronic circuit packing all the components found in a conventional hi-fi system into an area smaller than a pinhead. S.A. Digest 21.12.73.

Israel Symposium.

A note from the Israel Amateur Radio Club advises that their "International Symposium of Radio Amateurs in the Satellite Era" was duly held in Tel-Aviv on June 25th-26th last. Several hundred amateurs participated from 15 countries including Australia in this event which commemorated Israel's 25th Anniversary Contest won by DJ6QT who was present. The Symposium was opened by their Minister of Communications and talks were given by George Jacobs W3ASK, Art and Madeline Greenberg W2LH and W2EEO and others. 'A successful and memorable event' was the description of this symposium and the social parties which developed from it.

Standards Association.

The S A A has published Australian Standard 1053 which prescribes limits for conducted and radiated interference to radio broadcasting services emanating from radio and television receivers. The limits are similar to those recommended by C I S P R. The press release goes on to state,

The prescription of limits stringent enough to give full protection to all broadcast reception, including that in areas of low field strength, is impracticable. These limits are a compromise between higher receiver costs and desirable limits in order to protect broadcasting services in those areas most likely to be affected. It is appreciated that the standard will not provide adequate protection for other services under all circumstances but it is considered to offer the best protection possible at present.

RECIPROCAL LICENCES — U.K.

"Mobile News" October '73 advises that from September 1973 the temporary licences issued by the U.K. Ministry of P. and T. to foreign amateurs under reciprocal licensing agreements will be valid for 6 months instead of 3 months as in the past.

oscar 7 and its capabilities

(what it is, and how to use it)

Joe Kasser G3ZCZ/W3 and
Jan A. King W3GEY

C/O Amsat, P.O. Box 27,
Washington, DC. 20044, U.S.A.

This paper, presented at the American Radio Relay League Technical Symposium, Reston, Virginia on Sept. 14, 1973, briefly describes the OSCAR 7 radio amateur satellite, its modes of operation, its orbit and tracking information, and also specifies the type of ground equipment needed to work through or receive signals from the spacecraft.

The Spacecraft

Oscar 7 is the second in the AMSAT-OSCAR-B series of long-life amateur spacecraft. It is built in an octahedral (8-sided solid) configuration, allowing sufficient surface area for enough solar cells to provide a positive power budget system. This means that unlike OSCAR 6, this spacecraft should not have to be commanded into recharge modes periodically.

Physically, the experiments and individual modules are built in a "plug-in module" construction. This allows the same spacecraft configuration to contain a number of different experiments and modules. The main difference between this spacecraft and OSCAR 6 is that OSCAR 7 contains two repeaters and two auxiliary beacons, and both Morse code and teletype telemetry encoders.

The OSCAR 7 two-to-ten metre repeater has an output power of 2 watts PEP. This will make received signals somewhat stronger at the ground than those coming from OSCAR 6 The second repeater is the AMSAT-Deutschland repeater which relays signals from 432MHz to 145.9MHz with an internal beacon on 145.98MHz. The unit was designed and built by Dr Karl Meinzer, DJ4ZC and Werner Haas, DJ5KQ. The two beacons consist of a Canadian-built 435.1MHz beacon similar to the one flown on OSCAR 6, and a second auxiliary beacon at 2304MHz developed by members of the San Bernardino Microwave Society.

Ground control of the spacecraft is achieved by means of command receivers in each repeater, redundant command decoders and an Experiment Control Logic subsystem.

Downlinked telemetry and stored message data are generated by the Morse code telemetry encoder, or the Codestore unit, these two systems being identical to those flown on OSCAR 6, and a new teletype telemetry encoder designed and built by Dr Peter Hammer, VK3ZPI and Edwin Schoell, VK3BDS.

The Codestore, Morse code telemetry and teletype telemetry signals can be routed to any of the four beacons in the spacecraft.[1] The four beacons include two in the repeaters and two auxiliary transmitters in a similar manner to OSCAR 6. It is thus possible, for example, to receive Morse code telemetry on the 29.45MHz beacon and teletype telemetry on the 435.1MHz beacon at the same time (on two receivers).

The primary power source of the spacecraft consists of eight solar cell arrays supplying 2.2 Amps at 6.4 volts when illuminated by the sun. A Battery Charge Regulator converts the raw solar cell array output to a +14 volt supply bus. This supply line charges the battery and supplies the spacecraft loads if the solar cell current is not sufficient to run the spacecraft (for example when the satellite is on the dark side of the earth). During these periods, the Nicad battery supplies the extra power. Two other redundant switching regulators supply the remaining voltages needed by the spacecraft modules.

Modes of Operation

OSCAR 7 has four automatic modes of operation defined as follows:

- Mode A AMSAT two-to-ten meter repeater.
- Mode B AMSAT Deutschland 432-to-146MHz repeater in high-power mode.
- Mode C AMSAT Deutschland 432-to-146MHz repeater in low-power mode.
- Mode D Recharge mode.

Each of these modes of operation may be overridden by ground command. In Mode D either the 435.1MHz or the 2304MHz beacon can be operational upon ground command, while none of the repeaters will be operating. It is also possible to have the 435.1MHz auxiliary beacon operational by ground command while the spacecraft is operating in Mode A. The 2304MHz beacon can be operated in any of the Modes A through D.

The spacecraft will normally alternate between Modes A and B. An internal timer in the spacecraft generates a pulse every 24 hours which causes the satellite to switch between these two modes. The 24-hour timer will be set by ground command so that the mode change can be kept at approximately the same time each day. Thus, each repeater will be operational on alternate days.

The spacecraft contains automatic power supply monitoring circuitry, such that if the battery charge drops 60 per cent below the full-charge value, the spacecraft will automatically switch to Mode C and reset the timer so as to stay in that mode for 24 hours. In Mode C, the AMSAT Deutschland repeater output power is reduced to 2.5 watts PEP, and the battery drain should be reduced sufficiently to permit the battery to be recharged by the solar cell arrays.

The switch to Mode C takes place under low battery charge conditions when the spacecraft is operating in either Mode A or Mode B. If the battery charge recovers, the spacecraft will switch to Mode B at the next 24-hour pulse, and then continue normal operation.

If the battery power does not recover, but deteriorates even further so that the battery charge drops 70 per cent below the full-charge value, the spacecraft will automatically switch to Mode D and reset the 24-hour timer. Both repeaters will then be switched off, but the 435.1 or 2304MHz beacons can be switched on by ground command to allow telemetry to be received.

Modes C and D are actually expected to serve as backup operating modes for use if the spacecraft available power reserves are low. Normally, operation in these modes will not be required.

Each of the modes can be changed by ground command so as to turn any repeater or beacon on or off as required. This is done so that any failure of the automatic control circuits can be overcome by ground command.

Initial Launch Operation

The spacecraft contains an initial condition reset circuit so that the antennas will deploy after separation from the launch vehicle and the spacecraft will power up in Mode D with the 435.1MHz beacon on. No repeaters will be operational for at least the first day, so everyone should forget about working through OSCAR and settle down and copy telemetry. It is expected that the repeaters will not be turned on until the spacecraft has stabilized electrically and thermally, as indicated from telemetry data.

Orbit and Tracking Data

The expected orbit for OSCAR 7 is very similar to OSCAR 6. The orbit is expected to be sun-synchronous with an almost identical period and inclination. Thus, the same tracking procedures used for OSCAR 6 will be suitable for use with OSCAR 7.

OSCAR 7 is expected to be placed into orbit so that it is half an orbit ahead of or behind OSCAR 6. Currently, OSCAR 6 comes over daily at a time about 5 minutes earlier every 48 hours. If all goes well, OSCAR 7 is to be launched so that it will come over about 2½ minutes earlier than OSCAR 6 did the day before, and similarly, OSCAR 6 will come over about 2½ minutes earlier than OSCAR 7 did the day before. It is thus possible to expect that instead of three usable spacecraft passes about two hours apart each evening, there will be five or six passes (assuming OSCAR 6 is in operation) about sixty minutes apart.

The reference orbit data for OSCAR 7 will also be published in the same format as the OSCAR 6 data has been up to now, so as to enable each individual to plot his own orbital information

GROUND EQUIPMENT REQUIREMENTS

In considering the ground equipment needed for OSCAR 7, each repeater or beacon will be discussed separately in terms of the ground equipment needed to operate with it.

AMSAT Two-to-Ten Metre Repeater

The two-to-ten metre repeater operates in a linear mode similar to the unit flown on OSCAR 6. As such, SSB and CW are the

1. There is one exception; the 2304MHz beacon cannot be keyed with Codestore or teletype telemetry.

preferred operating modes. The repeater receives signals between 145.85 and 145.95MHz and re-radiates them between 29.4 and 29.5MHz. There is also a telemetry beacon on 29.50MHz.

Note that these frequencies are different from those employed with OSCAR 6. They reflect comments received on the operational experience obtained with OSCAR 6. The repeater has an output power of 2 watts PEP, so received ground signals should be stronger — but do not throw those pre-amplifiers away yet!

The same equipment used to work through OSCAR 6 will be suitable for working through this repeater, namely a sensitive receiver, and preamplifier if possible, as well as a suitable ten-metre antenna. Since the spacecraft will again be using a linearly polarized 10-metre antenna, the ground station antenna should preferably be circularly polarized. Linearly polarized 10-metre receiving antennas can also be used, but at the sacrifice of some fading.

The transmitting equipment should be capable of putting out no more than 80-100 watts of effective radiated power from the antenna. It is operationally preferable to use a transmitter with an output power of the order of 80-100 watts and a simple ground plane or turnstile antenna than to use a lower powered transmitter and more directional antenna.

Communicating through OSCAR in a low orbit is a challenge for the single operator. Besides tuning the transmitter and receiver, it is necessary to keep both antennas tracking the spacecraft — and then work someone in between. Surely there must be advantages in minimizing the duties to be performed during each pass so as to be able to concentrate on the important business of making contacts through the satellite. This can be partly achieved by using the low-gain antennas and the 80-100 watts indicated.

AMSAT Deutschland 432-to-145.9MHz Repeater

The AMSAT Deutschland repeater is also a linear device. Again, CW and SSB (or controlled-carrier AM) are the preferred operating modes. The repeater has an input frequency passband between 432.125MHz and 432.175MHz, and an output frequency passband between 145.975MHz and 145.925MHz. The output passband is inverted. That is, upper-sideband signals transmitted to the spacecraft would be received on lower sideband.

The relationship between input and output frequencies is such that a received signal on 432.125MHz would be relayed on 145.975MHz, and similarly, a received signal on 432.175MHz would be relayed on 145.925MHz, i.e., tune up the band at 432MHz and down the band at 146MHz. This repeater also has a telemetry beacon on 145.980MHz.

Any receiver with a good 2-metre converter should be able to receive signals from this repeater, even with a simple antenna. Since the spacecraft antennas associated with this repeater are circularly polarized, linearly polarized antennas will be suitable for ground use. If linearly polarized, the receiving antenna for this repeater can be the same one used to work through the 2-to-10 metre repeater.

On the transmitting side, the recommended effective radiated power output is of the order of 300-400 watts. Thus, a 30-watt transmitter will require an antenna with a gain of the order of 10-12dB, but it would be preferable to obtain or even build a 300-watt amplifier and use an omnidirectional antenna to reduce the antenna pointing accuracy requirements.

Though the spacecraft will have circularly polarized antennas for this repeater so that linear antennas at ground stations will work fine, it is important not to forget that circularly polarized ground station antennas can be expected to provide as much as 3dB more signal, and this might be the difference between making or missing a contact. All circularly polarized antennas used with this repeater should be right-hand circularly polarized (RHCP) in the Northern Hemisphere and left-hand circularly polarized (LHCP) in the Southern Hemisphere.

The easiest way of generating RF for the 432MHz uplink is probably to convert a surplus 450MHz FM transmitter strip for CW operation on 432MHz. This should not be too difficult, even for inexperienced VHFers. Other techniques are to triple 144MHz signals to 432MHz or double 220MHz to 440MHz and use a different crystal to transmit on 432MHz. The best method is to build a transverter from say 50MHz to 432MHz. This would allow both SSB and CW operation with full VFO control.

435.1MHz Auxiliary Beacon

The Canadian 435.1MHz beacon will usually be operating when the spacecraft is in Modes A or D. It will not operate while the spacecraft is in Modes B or C because of interference effects with the 432MHz uplink of the AMSAT Deutschland repeater.

Extremely good signal levels were copied from the OSCAR 6 435.1MHz beacon during the early months that it was operating. For receiving the signals, a receiver with any good converter and antenna will be suitable. Again, a circularly polarized antenna would be preferable. The converter should be fitted with a new crystal so as to cover 435.1MHz instead of the more conventional 432MHz.

Doppler shifts of the order of plus or minus 10kHz can be expected on the signals, so be prepared to keep retuning during the pass.

2304MHz S-Band Beacon

The 2304MHz beacon, built by members of the San Bernardino Microwave Society in California, will transmit a "HI" in Morse code followed by thirty seconds of continuous carrier for tracking purposes. The beacon contains an internal thirty-minute timer to ensure positive control which will shut down the beacon 30 minutes after it is commanded on. The 2304MHz beacon can also be keyed with Morse code telemetry on ground command.

Link calculations have been done for the spacecraft-to-ground communications link to determine the sort of equipment needed.

2. In this case, LHCP should be used in the Northern Hemisphere and RHCP in the Southern Hemisphere.

Consider a typical ground station using a four-foot dish and a converter with a 6dB noise figure. The link calculations are as follows:

Spacecraft output power (100mW)	+20dBm
Path loss to ground for 2000 miles	-170dB
Thus, signal level at antenna =	-150dBm
Gain of four-foot dish	+ 27dB
Polarization and line losses	- 6dB
Signal power at converter input	-129dBm
Noise power in a 500Hz bandwidth, 6dB noise figure receiver	-141dBm
Thus received signal-to-noise ratio is	+12dB

This was calculated for a four-foot dish and a receiver with a bandwidth of 500Hz. The Doppler shift for an overhead pass at this frequency has been calculated to be plus or minus 55kHz. The 3dB beamwidth of the four-foot dish is only 7.5 degrees. Anybody trying to track the S-band beacon is going to have a lot of fun.

COPYING TELEMETRY

OSCAR 7 contains two separate telemetry encoders: a Morse code unit identical to that flown on OSCAR 6 and an 850-Hz shift teletype encoder designed and built in Australia.

Morse Code Telemetry

The Morse code telemetry format is identical to that of OSCAR 6. The format is arranged in six lines of four words. The first digit of each three-figure "word" is the line identifier. Each telemetry frame is separated from the next by the "HI" identifier. The code speed, like OSCAR 6, is commandable between 10 and 20 WPM.

Teletype Telemetry

Sixty channels of data are monitored and encoded by the WIA-Project Australis teletype telemetry encoder. The data is formatted as ten words per line in six lines of data. Each data word contains five digits. The first two digits indicate the channel number and the last three represent the encoded sensor data digits.

Between each data frame are two lines of digital data which provide information on the spacecraft clock and command register status.

The encoder has two operating modes. There is a stepping mode in which each channel is sampled in turn, and a single-channel "dwell" mode in which one channel is sampled continuously. Each line of data is followed by a carriage return, line feed and figures signal, so as to keep the printer in upper case.

The teletype data is transmitted from the spacecraft in Baudot code using 850-Hz shift. Signals will be frequency-shift keyed on 435.1MHz and audio-frequency, shift keyed on 145.98 and 29.500MHz. It may be necessary to be able to reverse the mark and space tones in the ground station terminal unit to receive the AFSK telemetry.

Doppler on the 435.1MHz beacon will be of the order of plus or minus 10kHz for a pass directly overhead. Tests were conducted from WA3EWJ transmitting FSK RTTY through the 2-to-10 metre repeater in OSCAR 6 during January 1973. It was found that the 5kHz Doppler shift encountered there did not cause any appreciable errors. It was just necessary to keep retuning the receiver every few minutes. Thus, the tuning rate will just have to be increased to cope with the extra Doppler shift.

A better idea is to use a special IF with a 25kHz band-width and a phase-lock loop teletype terminal unit using one of the phase-lock integrated circuits now available at low cost.

SUMMARY

This paper has briefly described OSCAR 7, its projected orbit and the type of equipment needed to operate with it. A summary table of the frequencies of interest is presented below.

Beacons

29.50MHz	Mode A	Associated with the two-to-ten metre repeater.
145.98MHz	Mode B, C	Associated with the 432-to-146MHz repeater
435.10MHz	Mode A,D	Teletype, Morse code or Codestore keying.
2304MHz	Mode A, B, C, D	CW tracking beacon and Morse code telemetry.

Repeaters

Mode A	145.85MHz to 145.95MHz input
Mode A	29.40MHz to 29.50MHz output (non-inverting passband)
Mode B, C	432.125MHz to 432.175MHz input
Mode B, C	145.975MHz to 145.925MHz output (inverted passband)

It is hoped that those reading this article will want to try their hand in participating with OSCAR 7, certainly the most advanced satellite yet developed for the amateur service. ●

REPEATERS.

'Within a fifty mile radius of New York a repeater is active on every 30kHz channel from 146 to 148MHz. But many of the repeaters within this area are either closed to outsiders by PL, Touch Tone, or the like, or else the members of the club operating the repeater make it obvious to a newcomer that his presence just isn't welcome. The most common excuse for this attitude seems to be that the repeater has been built and maintained by club membership dues, and therefore "freeloaders" shouldn't be permitted".

"Ironically, the local clubs warmly welcome transient operators passing through the territory from other call areas, yet these same clubs turn a cold shoulder to members of other local clubs". From WA2LRO article in Aug. 73 CQ.

OCEAN RESEARCH BUOYS.

To reduce costs a study is being made of unmanned ocean-located buoys provided with power supplies and equipment to record and transit observations using low powered transmitters operating through a communications satellite. The use of such systems on HF suffers low speed of data transmission — less than 100 bit-s — and error protection devices. *ITU Telecommunications Journal — Jan. 1973.*

a flashback of almost 50 years

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In these enlightened days of transistors and IC's, we can count on economy in our equipment in a way that has never been achieved before. But are you correct there? How many even in the OT class know of a successful project of the mid-twenties known as the "Unidyne", interpreted as "single power". It was just that — a valve used for receiving purposes, powered by a single battery, in my own case, a 2v cell.

At this period of time, all valves were battery powered, from 45 to 135 volts on the plate, and were triodes. Most were still bright emitters, such as the 201A filament which drew ¼ amp at 5 volts. Then some Continental genius, maybe at Philips, hit on the plan of putting in a second grid, to which he applied a high tension of 10 volts, and similar power to the plate. This proved very successful. But then the bright boys at *"Popular Wireless"* in London, also thought deeply. What they finally came up with in 1924 or 25, was to use the inner grid of this valve connected to Filament plus (to suck out the space charge from around the hot filament) and also to the plate through the load. The outer grid was now used as the signal grid.

So now we had that "single power" idea in practical form, and it did work well. Regeneration control was particularly smooth, and was by a variable grid leak, or any of the more usual methods. The quietness of operation was uncanny and if no signal was to be heard, the signal grid connection had to be touched with a moist finger tip to check on operation. There was none of the old rushing noise. Sensitivity was good. I still have QSL cards from every State broadcasting station then operating; 2FC in Sydney on 1200 metres could only be copied before 6WF (then the Wally Coxon station) on 1250 metres opened. This was on a single valve receiver, using phones of course, and total power was 0.12 watts. Multi-valve sets were also built, and a friend of mine used to receive 2LO London on the speaker (cone type) with 3 audio stages. But we reckoned he cheated as he used 10 volts or thereabouts

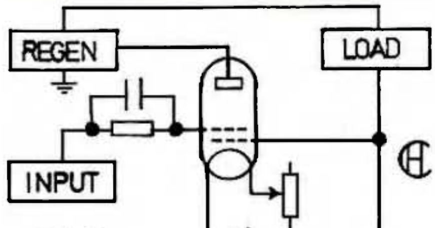

FIG.1.

on the two final stages. Fig 1 is the rough circuit of my single valver, and Fig 2 is an experimental type referred to later in the text.

Shortly afterwards along came the screened grid, and then the screened pentode, both in RF and audio uses. They were followed by the separate cathode and so on to the AC power supply. And so like many another good idea, this one faded.

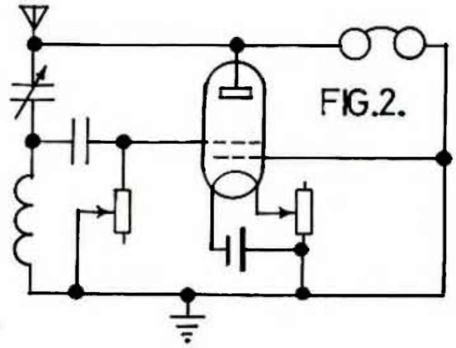

FIG.2.

These were the days when designers by the dozen re-arranged the few components used into various forms and gave them new labels. One, Scott-Taggert, in G-land, published maybe 20 such, under names of S.T.1 (or 19). I modified a number of such to the "Unidyne" principle and found all to work well, even the second circuit shown. Not much imagination is needed to guess results.

However, this 'ere progress keeps on keeping on, so to the "Unidyne" it is curtains. ●

direct conversion receivers

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For those people who know nothing of the technique this article provides sufficient information for them to construct a simple and highly successful receiver which can become the basis of a transceiver. In order to maintain simplicity, solid state methods only are discussed, but the idea can be used with thermionic components.

What is Direct Conversion or Synchrodyne reception?

That question may have been asked after reading the review of the Heathkit HW7 in AR for May 1973. Basically direct conversion involves feeding the desired RF signal and a local oscillator signal of the same frequency to a product or linear detector. The output of this 'mixer' is an audio frequency signal. The audio from a product detector has its amplitude proportional to the input signal and this is very nearly so for all signals of small amplitude compared with the VFO or local oscillator. For selectivity the signal is passed through a low pass filter (usually 2 kHz.) and then highly amplified. See Fig 1.

The beauty of the scheme is that there is only a simple pre-selector tuned circuit (all fine tuning being controlled by the local oscillator), no IF alignment, no ganged circuits and if you like, no volume control. Spurious birdies are nil. All this and a receiver of small physical size and low current drain having 2 kHz selectivity and sensitivity on CW down to less than 1 uV. What more could anyone want? SSB reception is excellent but AM leaves much to be desired as the carrier must remain in zero beat with the local oscillator. Any drift or FMing and the resultant sound is horrible.

There are techniques for those who want to use this method for AM but the circuit is no longer quite as simple. Using linear detection with no sideband cutting and, say, a 10 kHz low pass filter, it has excellent possibilities for broadcast reception for the Hi-Fi addict [1,2] Ref. 3 introduces the outline of a complete direct conversion receiver using SL600 IC's.

There is one drawback to direct conversion and that is audio images. A method to overcome these is two phase direct conversion. Here the incoming signal is applied in phase to two product detectors while the oscillator components are applied 90 deg out of phase. The two signals are then combined before reaching the filter and amplifier. [4] Such a receiver would seem to be better than many conventional superhets.

From Fig 1 it can be seen that a receiver may be formed by module sections and constructors can assemble a receiver using their favourite circuit for each module.

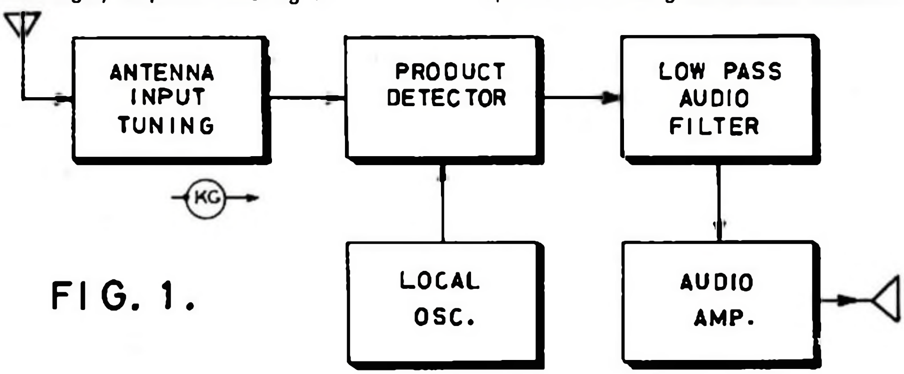
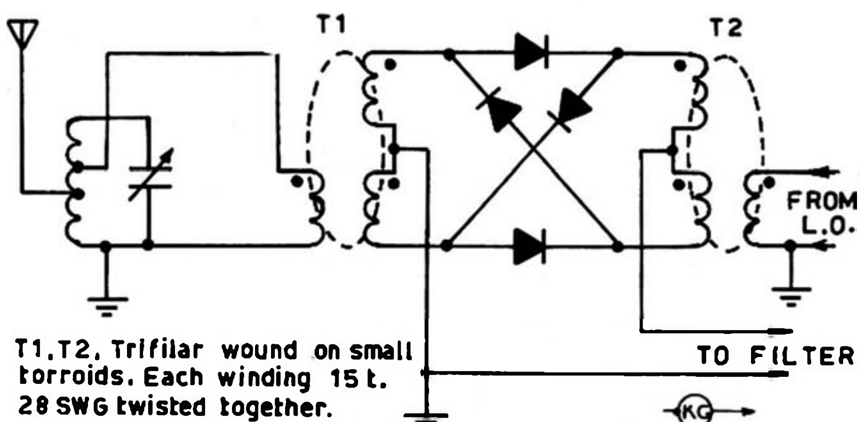


FIG. 1.

BLOCK DIAGRAM OF A D.C. RECEIVER



T1,T2, Trifilar wound on small torroids. Each winding 15 t. 28 SWG twisted together.

FIG. 2. DIODE RING MIXER

Mixers.

As a start, one of the best product detectors is the balanced diode ring mixer using hot carrier diodes. Any fast switching diode from computer boards would perform very nearly as well. Fig 2 shows such a balanced mixer. The nice thing about this is that the local oscillator signal is balanced out and does not appear in the output. Cross modulation is virtually nil and extremely strong signals do not overload the mixer but would tend to saturate the following audio amplifier giving some form of AVC action. There is no conversion gain, but the linearity and absence of noise make up for this lack. The high gain audio amplifier must be a low noise type.

Dual gate MOSFETS, Fig 3, have been used in several designs including the Heathkit HW7 and Ten-Tec PM2 [5] An 0.5 uV signal will produce an audible CW note at the end of the audio chain. Noise figure is low and conversion gain good. There is some susceptibility to cross modulation with strong adjacent signals, but a very nice receiver can be built with this type of mixer.

Integrated circuit Fig 4 a and b differential amplifiers may be used and it is claimed that a 0.1 uV signal can be detected with Fig 4a. A circuit of a direct conversion receiver using the 4b design as the product detector claims that a 0.3 uV signal provides audible CW [6] Conversion gain is greater than MOSFET mixers. The design has cross modulation and overload characteristics similar to many medium and low priced communication receivers.

LOCAL OSCILLATORS

The next block in the system is the local oscillator. Any good VFO will do the job. The main criteria are that it should be **stable** with reasonable output and be free from harmonics. For best results it should be completely shielded from the rest of the receiver and have its power lead adequately bypassed. One thought is W3JHR's "Synthetic Rock" [7]. Another is from VFO Designs and Building a Simple VFO. [8][9]. This reference is particularly good in showing how to eliminate bugs from transistorised VFO's. The above units use bi-polar transistors. I have used with success on 80 metres the FET oscillator shown in Fig 5 which was abstracted from a direct conversion receiver described by W7ZOL and W7WKR [10].

FILTERS

Following the mixer is the low pass filter. Upon this rests the entire selectivity of the

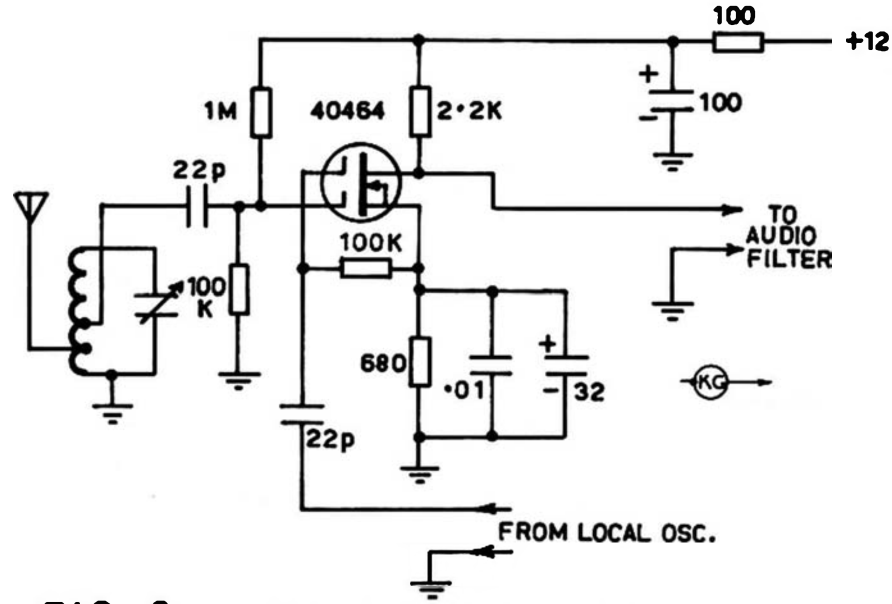


FIG.3. DUAL GATE MOSFET MIXER

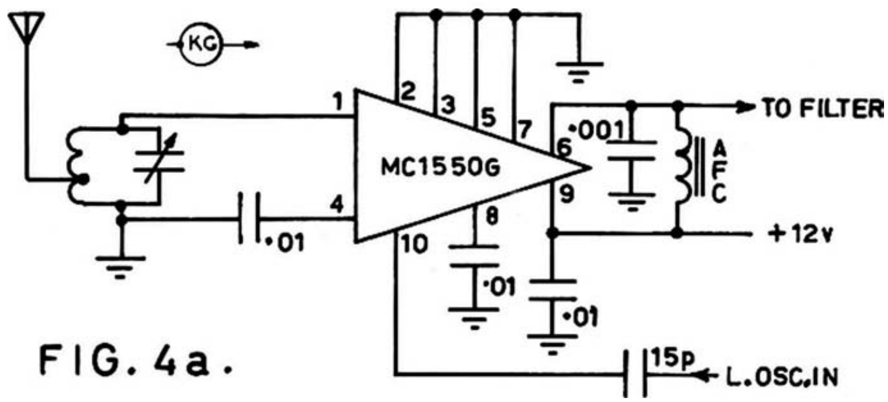


FIG. 4a.

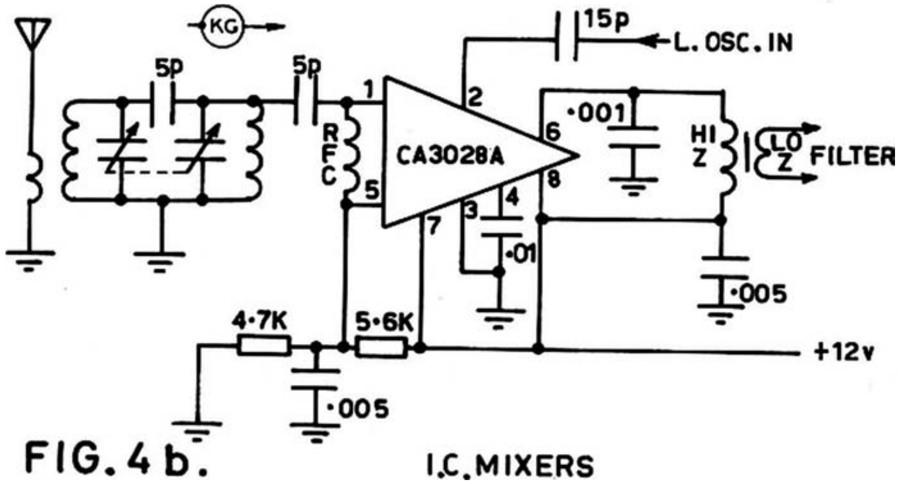


FIG. 4 b. I.C. MIXERS

receiver. I should perhaps modify this in saying that further narrow band selectivity may be added for CW reception, but more of this later.

Possibly the best type is the eliptical filter because of its sharp cut-off. Design information for these can be found in previous issues of AR 11 12. See also 13. For those people who want an established design, mine is shown in Fig 6. Further filters can be those used in the receivers of ref. 6, 10.

AUDIO END.

The audio amplifier will get the least mention here. It is definitely up to the builder to choose what he likes, or what he has on hand. Preference is for low noise, high gain. These days there is a variety of ICs which simplify this end of the chain. Some of the lower gain ICs will need a low noise pre-amp between them and the filter. I am using a Fairchild amplifier which uses complementary symmetry with discrete components which give adequate performance.

THE FRONT END

Nothing more than a coil and capacitor tuning over the required band is required here. I would recommend torroidal cores because of their high Q and self shielding from strong RF fields 14. Some slow motion drive on the capacitor helps to accurately peak up the RF. Also I am against any form of RF amplification because it is a potential cause of noise, non-linearity, and susceptibility to cross-modulation. There will be people who debate this but the top class commercial (as distinct from amateur) receivers are leaving them out and a surprising number are using diode ring mixers in the front end for the same reason. If a builder must use amplification then see ref 15 in which a cascode configuration of bi-polar transistors produces better linearity than cascoded FET's. Some sharpening of front end selectivity over the band can be obtained with two tuned circuits lightly coupled if it is felt desired. See Fig 4b. This is an experiment easily carried out in a module design.

MULTIBAND OPERATION

If an all-band VFO is used as a local oscillator then all that is needed is a switchable input tuned circuit. This, by using a 2 to 1 tuning ratio, could cover two bands at a time, thus halving the number of coils. However, a separate coil per band is recommended. Should a single band stable local oscillator have been made, it may be followed by a suitable multiplier chain to provide the correct frequency to the mixer as per Fig 7a.

An idea I would like to try is to use the local oscillator and switchable crystal oscillators to another diode ring mixer, the output of which is the same as the desired signal frequency see Fig 7b. This leads to the superhet arrangement by simply using one or more crystal locked converters ahead of the receiver making it a tunable IF. It is an easy approach because many shacks already have a converter sitting on a shelf just waiting for a receiver.

There should be enough information now for anyone to build a small portable outfit. This can become the basis of a QRP CW

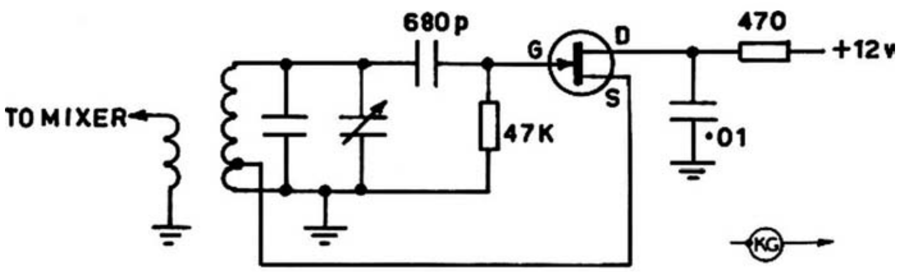


FIG. 5. F.E.T. OSCILLATOR

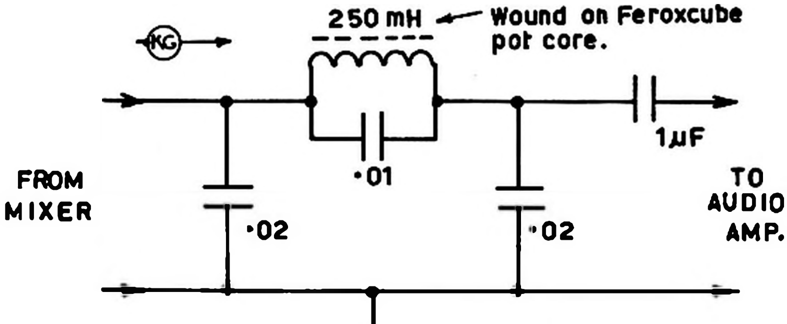


FIG.6. LOW PASS FILTER

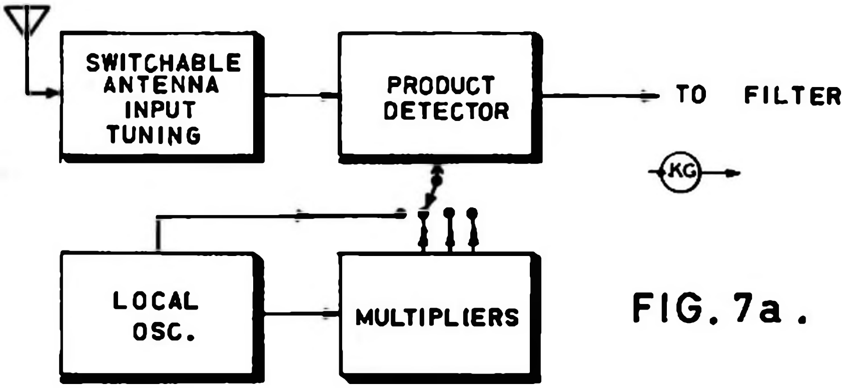


FIG. 7a.

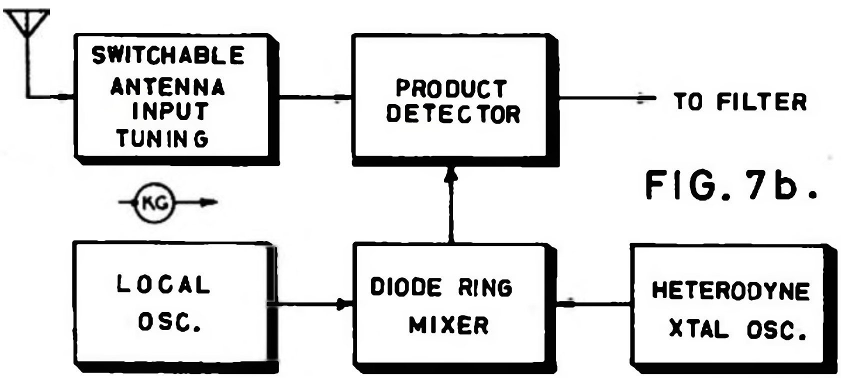


FIG. 7b.

Transceiver. The VFO is already there. All that needs doing is to add a buffer-driver stage and a PA. Key the buffer and the whole device works.

Now for a mention of CW before I conclude. If the receiver is to be built for CW only, then the filter can be designed differently. One or two filters in cascade tuned to 1 kHz would sharpen the signal greatly and take the place of the low pass filter, or its cut-off could be made about 1050 Hz and be followed by a high pass of 950 Hz, or the two combined.

For myself, I would leave the receiver as a SSB unit and switch a 1kHz peak filter in the audio chain. This could be passive or an active one. The latter would take less space and be more versatile.

That's it for now. At a later date I hope to write on a transceiver which will include receiver offset tuning, 16, virtually a necessity for such operation.

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CLUB/ZONE/DIVISION
NEWS

● The Publications Committee wishes to advise that the call on AR for space to print material is so great it is not possible to include a section devoted to Divisional, Zone or Club news.

● Arrangements were made with all Divisions that such news would appear in Divisional Bulletins if so required, and accepted by Divisional Bulletin Editors. Bulletins, when submitted, are carried as inserts in AR mailed to members of the Division concerned.

● It has been agreed however that AR should include an Events Diary to contain **very brief details** of forthcoming events. Items for this Diary **MUST** reach the Editor not later than the 1st of the month prior to publication.

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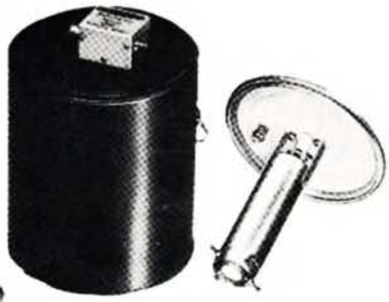

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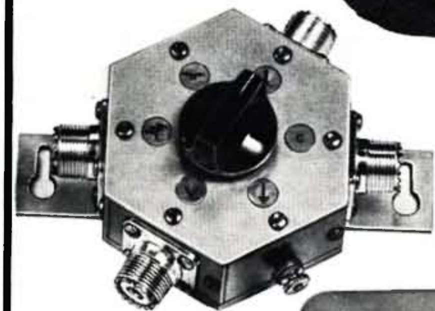

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HEATH
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the application of some *commercial kinks* to the FT 200

Maurie Evered VK3AVO
13 Sage Street, Oakleigh, 3166.

My early model FT200 was acquired in 1971 after I had previously used a Heathkit HX20 — HR20 combination. I was very happy with these but they were inferior to the FT200 with regard to selectivity, stability and the convenience of a transceiver. They did however have some advantages. Variation of the carrier level for CW operation, greater sensitivity on 15 and 10 metres (and I suspect even on 20 metres) and a delightfully smooth "S" meter movement. I have often likened the FT200 meter to a yo-yo the way it dances about. I will now describe how the application of some *"Commercial Kinks"* overcame these and other shortcomings in my FT200.

1. The substitution of a 10K ½ watt resistor for the RF choke L106 in the cathode circuit of the product detector V102a *(AR August 1972)*. This has removed the distortion from strong signals. I can now leave the RF gain control flat out even when Stan VK3AYF, my nearest Ham neighbour is operating.
2. The rewiring of switching to enable the AM Carrier Level Control to be operative in the CW position *(AR September 1972)*. This is a must if the 6JS6's are not to be overheated during prolonged CW operation. I consider this modification essential even if a fan is used to assist with the heating problem.
3. The connection of a 1000uF electrolytic capacitor across the S meter (not a 100uF as suggested in *AR December 1972;* this had virtually no effect in my case). This has resulted in a meter that is much easier to read particularly in the Receive and ALC positions.
4. The substitution of a 6GM6 for the 6BZ6 as the RF amplifier tube *AR December 1972.* This is a very useful modification and has greatly livened receiver performance on 20, 15 and 10 metres as judged by increased S meter readings on the crystal calibrator, and on local signals that I have noted before and after this modification. Previously the calibrator barely moved the S meter on 10 metres and only read S7 on 15 metres. Now it reads S8 on 10 metres and over S9 on 15 metres. I have copied 10 metre signals at readability 5 that I am sure would not have been detectable beforehand.

I have one last tip to pass on. If your FT200 suffers from intermittent **flat topping** and eventually from almost complete loss of output on all bands and modes, and if you are sure your driver and output stages are alright, watch for a defunct 6EJ7. This happened in my case. The location of this fault was revealed eventually by VK3OM's VTVM and RF probe. From all reports this mixer stage is usually trouble free and this type of fault can lead you a merry dance.

That concludes my remarks. I can only thank the author who brought these modifications to my notice in *AR* and say they have made a very good rig even better. ●

Maurie VK3AVO seated at his very neat station and using the FT200 modified as above.

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

TO PREVENT METAL FATIGUE IN BEAM ELEMENTS DUE TO WIND VIBRATION

Tie the ends of the elements to each other, using nylon fishing line. If the boom is made so that it projects beyond the furthest elements, the fishing line may then be "v'ed" in from the outer elements and the whole structure made rigid.

Pack the elements with sawdust; this tends to dampen out most of the vibrations without increasing the weight too much. The ends of the element should be plugged with wooden dowels or something similar.

Nylon or similar synthetic rope may be used to support vertical dural or aluminium poles carrying parasitic arrays. The supporting ropes of this type may pass between the elements without affecting the performance of the array as they have good insulating properties and are non-hygroscopic.

DRILLING GLASS

Another method of drilling holes in glass is by using triangular files in place of twist drills. Old files are broken up into suitable lengths. The pieces are ground at the narrowest ends and on the flat surfaces until one has a sharp three-cornered point.

Drilling is done in the normal way, but the glass should be reversed to keep the sides parallel in the finished hole. This should be done as soon as the point breaks through the bottom—this will ensure a neatly finished hole. The method was, and may be still, used in the glass trade. The lubricant, and/or cooling fluid, is water.

CLEANING AND KEEPING THE IRON CLEAN

A very useful item for this is that popular article of the kitchen, the pot scraper, which is usually made of steel wool.

Two or three are tucked into a small tin. The tin is then screwed to a piece of timber for support. The iron is inserted into the tin, a couple of twists and the iron is clean. Probably best done while the iron is hot.

BINDING MAGAZINES

Magazines may be bound into tidy volumes by the use of Cellophane (Scotch) Tape. One copy is placed face downwards, the other face upwards. With the backs edge to edge, place two or three strips of tape across the copies. Reverse the copies and repeat the process. Each succeeding copy is bound to its preceding copy in a similar manner. In this way one has a neat volume at the end of the year. An index can be drawn up from the contents page of each copy. Cheap, but handy!

These items originally appeared in AR, May 1954. Twenty years later they are still of interest. ●

jaunt to Johor

DAVID RANKIN 9V1RH-VK3QV
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Pasir Panjant,
Singapore 5.

And so it came to pass that on the third attempt we made it.
third attempt!!!
well!
made it!!!

All good radio amateurs have more than a passing acquaintance with "Murphy" and his infamous law (no — not Senator Murphy this time). And everyone knows of course that "third time is lucky". The first attempt failed when two of our proposed party finished up with unexpected family commitments involving celebrations for the Chinese 7th month — the Devil Month. The second attempt never even got to the planning stage as our primary host was not going to be available. The third attempt was, of course, as in all good fairy stories, successful and so 7 a.m. on the 19th August we set forth from Singapore.

"We" consisted of Ebbey 9V1QG, Frank 9V1QG, Tan 9V1OD and David VK3QV 9V1RH. All of us are active members of the Council of the Singapore Amateur Radio Transmitting Society (SARTS) and the plan started out as a visit to Muar on the west coast of the state of Johor, West Malayasia. This plan in turn had arisen from an invitation from "Ray" 9M2TR to VK3QV when ragchewing on the air. None of the SARTS gang had met Ray and so it was decided to journey forth from Singapore through Johor up as far as Malacca to visit John 9M2GV as well. Unfortunately John had been ill and thus the journey was shortened to go only as far as Muar which is just south of the Johor-Malacca border and some 125 miles from Singapore.

Enroute to Muar we passed through the town of Batu Pahat and since the sun was high and hot it was decided to stop off for a short period and slake our thirst. Somebody then realised that Dr Ho 9M2DK lived locally. A glass of coke, a phone call and a short car journey later found the four of us in Kit 9M2DK's shack having a quick chat with Karel 9V1RO (VK6KE) on 7MHz. Kit and his charming xyl Ann pressed us to stay for lunch but learning that we were expected at 9M2TR, Kit suggested that we return to Singapore via Batu Pahat when perhaps we could all make a "small" side journey to Labis to visit 9M2SS. All agreed and 4.30 pm was the agreed ETA back at Batu Pahat.

Pressing on to Muar we finally made it half an hour late and despite the TH6 100' up we did not locate Ray's QTH straight away. Strangely enough, we later found that there were only three amateurs in Muar and that they all lived within ½ mile of each other. We had easily found the 9M2GA and 9M2DW QTH's but not 9M2TR. Murphy again!

Ray turned out to be His Highness Tunku Abdul Rahman, the son of Tunku Temangong of Johor Bahru, perhaps better known in Amateur circles as 9M2JB. Ray spent some of his schooling years in Perth and thus has a particular interest in Australian Amateurs. His contacts with Ray and Joan Beavers VK3BRB and VK3BJB respectively have already been the subject of Australiawide publicity in magazines (non Amateur) and ABC radio. Amongst the visitors at Tunku Ray's QTH was Tan 9M2DW one of the Old Timers of amateur radio in Malayasia.

After a luncheon of typical Malay dishes, discussion turned to topics of amateur interest. The 9M2TR shack was investigated and a great deal of attention centered on the magnificent locally built 100' tower. It was planted right in the middle of a rose garden. Ray's xyl Jackie must be very understanding as the roses got short shift when the tower was under construction.

Time was getting on and so after a quick visit to Tan 9M2DW's shack to see the gear and impressive aerial array, the SARTS gang took off to return to Batu Pahat and the 9M2DK QTH. Since we left Muar late, it was not to be unexpected that we arrived at Kit's place half an hour late. One does not drive at "the ton" on Johor roads. Nevertheless, life is of such a pace in this Region that half an hour one way or the other is "a small matter". Changing from our somewhat warm station wagon to the luxurious comfort of an air-conditioned Mercedes-Benz we were soon on our way again with 9V1RH operating as 9M2DK-Mobile. The FT-101 plus centre-loaded whip did a good job on 7MHz and a number of the 9M2 gang around the Penang area were worked. We also kept in contact with 9M2SS at Labis. The "short" side journey turned out to be a one hour jaunt of 50 miles — not much for a VK but quite a distance for the 9V1 boys.

Sangat, 9M2SS lived on a large plantation in a very, very quiet radio location. There was enough space for a number of rhombics, Vee beams, or other exotic curtain arrays but Sangat had none of these. The visitors agreed that this was a great pity and recommended to Sangat that he remedy the situation. 9V1RH even suggested he try a Beverage antenna for some 160 metre work.

Since it was now dusk and any hope of getting back to Singapore by 8 pm had evaporated, the 9M2 hospitality went into action once again. Sangat's xyl conjured up a meal as if by magic and a group of five visiting amateurs, 9M2DK's little daughter Happy, a neighbouring plantation manager and his wife, plus Sangat's family sat down to dinner around 8 pm.

Sangat was very sorry to see us go but the SARTS group had to return to Batu Pahat to pick up the station wagon before moving on to Singapore. We left Labis around 9.15 pm said our goodbyes to Kit at BP and started on the long way back to 9V1.

And so it was that around half past midnight four very tired but happy 9V1's crossed the causeway into Singapore, pleased to have

Batu Pahat — The shack of 9M2DK
L. to R. — Tan 9V1OD; David 9V1RH/VK3QV (on mic.) Ebbey 9V1QG; Kit 9M2DK.

A small "hamfest" at Muar
L. to R.—Back: Tan 9M2DW; Tunku Ray 9M2TR; Tan 9V1OD
Front: Ebbey 9V1QG; Frank 9V1OK; David 9V1RH/VK3QV

met in person so many of their fellow Amateurs in southern 9M2 land. Their hospitality was as spontaneous as it was overwhelming and any Amateur visiting the area would no doubt be made to feel as welcome as the four 9V1's were.

A word of warning though — allow about one day longer to your planned stay in the area. Once those 9M2 boys get hold of you you'll find that you will need the extra time. They don't want to let you go too soon. ●

Muar—The antenna farm at 9M2TR. That TH6DX atop the 100' tower adds punch to Tunku Raya signal.

Muar—The 9M2TR shack with 9M2TR himself logging and 9V1RH supervising.

a series mode crystal oscillator

Ron Cook VK3AFW

Reprinted from the Victorian VHFer, August, 1972

An excellent circuit for series mode crystal oscillators is shown in Fig 1. This circuit was probably first developed by the Pye Crystal Division some years ago. It is reasonably tolerant of transistor parameter variations, mistuning and "high" loss or low activity crystals. Its similarity to the Colpitts circuit is quite evident.

I have used the following component values for crystals in the 70 to 80 MHz region:-

R1 = R2 = 6.8k	RE = 2.2k
C1 = 33pF	C2 = 10pF

L — set so that circuit oscillates on nominal crystal frequency with crystal replaced by a wire link.

Total current drain is 4mA.

Output can be taken on the fundamental from the emitter via an L network. Alternatively harmonic output may be extracted by a tuned circuit in the collector lead.

For use in the 40 to 50MHz region and with any transistor with an Ft of at least 150MHz, C1 should be 100 pF and C2 15 pF. Note that the largest capacitor is across the base-emitter terminals.

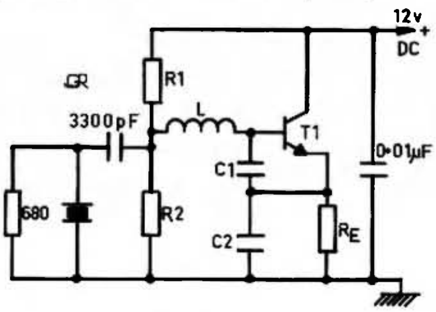


Fig.1 T1 - 2N918

These values have been calculated so that variations in the transistor's parameter (as do occur from device to device or with respect to termperature) are swamped out to a reasonable degree. The ratio of the values of C1 and C2 is such that it provides "matching" between the tuned circuit and the transistor input impedance and the resistance RE. Proper constraint on the ratio of the two capacitances is the minimum h.f. current gain of the transistor. In the values 100pF and 15 pF this is 7. That is, if the current gain exceeds 7 the circuit will oscillate. Lowering the value of RE increases the Gm of the transistor for R1, R2 fixed, but requires that C2 be increased. Thus the value of C2 exceeds that of C1. The minimum gain requirement of the transistor becomes easier to obtain in this circuit, i.e. lots of current feedback if C1 is reduced to retain a sensible value for L as C2 is increased. However, the stability of the output frequency suffers.

Tuned circuit design parameters

$$\text{crystal} = \frac{1}{\sqrt{L - \frac{C1 \times C2}{C1 + C2}}}$$

$$\text{Effective tapping point} = \frac{C1 + C2}{C1}$$

The crystal should be shorted by a few hundred ohms to ensure that it operates in its series mode. If the bias values are as recommended an additional shunt resistor is required.

The interesting point about this type of circuit is that the crystal behaves like a resistance of 10 to 50 ohms at several sharply defined frequencies (3rd, 5th, 7th harmonics). The tuned circuit selects the appropriate frequency. The tendency to drift higher is counteracted by the crystal appearing inductive on the high side of its resistance resonant frequency. It can be seen that an added inductance would pull the frequency lower and back to resonance. A similar capacitive effect stops the oscillator going low. If the circuit were to get very far off frequency the increase in the size of the impedance of the crystal would stop the circuit oscillating.

If you need a trouble free oscillator for a signal source or injection chain, a band edge marker, a transmitter master oscillator, or just want to see if that crystal of yours will overtone on its 7th harmonic, then try this circuit. ●

an AR special

a review of the FT101B

With the possible exception of the FT200 the Yaesu FT101 is the best known and most popular transceiver available on the Amateur market at the present time. Although the 101 has been available now for almost four years, no technical review has so far been presented in any of the popular amateur publications.

With the recent introduction of the FT101B, we obtained a sample from Bail Electronics in order to fully evaluate the new model, firstly in its own right and also in comparison with several aspects of performance of the earlier models.

TECHNICAL FEATURES. The FT101B, like its predecessors, is a six band transceiver with full coverage of all amateur bands from 160 to 10 metres including the 11 metre band. Except for the transmitter final and driver stages, all circuits are transistorized and composed of computer type plug-in modules. Both 240-115 volt AC and 12 volt DC power supplies are built in giving universal operation. Selectable upper and lower sideband, CW and AM modes are provided. An optional 600 Hz filter is available for CW operation. The transceiver includes as standard, VOX, break-in CW with side-tone, 25 and 100 kHz calibrators, noise blanker, and WWV reception on 10 MHz. A small speaker is also built in.

Externally the 101B differs but little from the earlier models. A panel light is now included to indicate when the internal VFO is operating, and a second light gives a warning when the clarifier is switched on, thus avoiding off-frequency operation. Both of these indicators are in fact light emitting diodes operating from the DC supply of the associated circuit.

An optional feature on earlier models, the blower fan for the final compartment is now included as a standard feature.

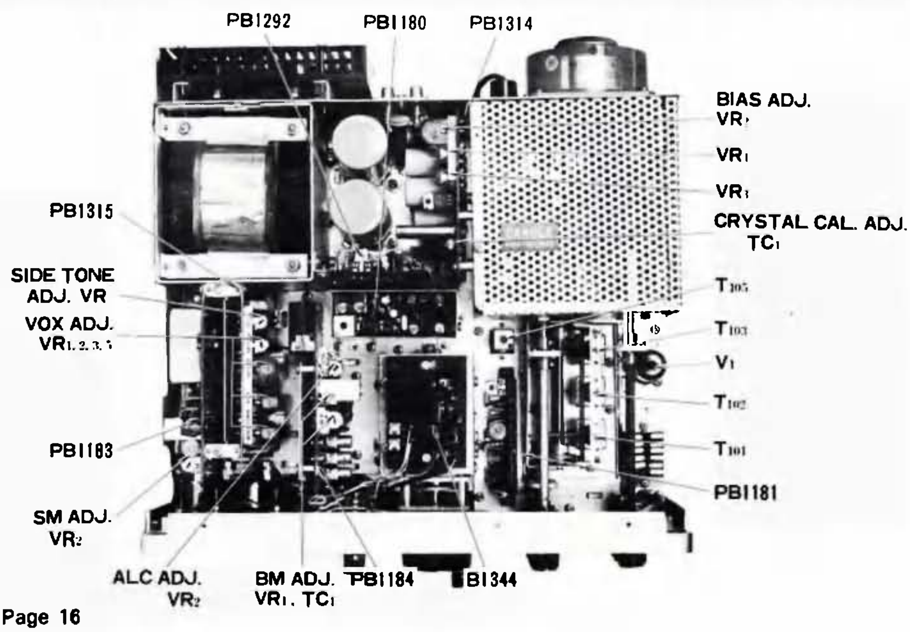
Transmitter driver and receiver front-end circuits are tuned with a permeability system very similar to that used by the Collins Company in their famous 75A and 75S receivers.

Padder capacitors are selected with the band switch to give the appropriate L-C ratio for the frequency in use. It would in fact be possible to tune to any frequency within the overall range to provide operation on commercial bands.

Several 101's are known to be in current use on these frequencies.

Several important changes have been made to components and layout in the new 101B. Whilst the circuit of the receiver front end remains the same, several components have been changed including the RF and second mixer transistors. These are now 3SK40M. Unfortunately no details are available on these at the time of writing. However, as we shall see later, they have improved the front end characteristics of the receiver to a marked extent.

A new sideband filter, with eight poles has replaced the six pole unit previously used, and a new noise blanker, now removed to the rear of the VFO on its own plug in board, has been included.



THE FT101B ON THE AIR. Having experienced the front end overload and cross modulation on earlier 101's, the first test was to put the receiver on to 80 metres when plenty of locals were active. Try as I could, no cross modulation was heard. The previous model 101 was not happy with signals over S9 and use of the RF attenuator and RF gain was needed to restore the received audio to normal. All of this has been overcome and at no time was the attenuator needed.

In order to test the action of the new noise blanker, the 101B was installed on a speed boat powered with a large outboard motor. As any amateur who is also a boating enthusiast knows, these motors produce as much RF output as they produce horse power output. With the 101B tuned to the ten metre band and connected to a resonant whip for that band, the noise was running about 10dB over S9 on the meter. On switching in the blanker the noise dropped to S2 and allowed an S4 signal to be copied perfectly. Cross modulation with the blanker in operation was minimal, no doubt helped by the improved selectivity of the new filter.

Received audio using the internal speaker was reasonable considering it is mounted under the set and facing down. However a large external speaker is recommended for good quality reception. Unfortunately we did not have the opportunity to test the matching Yaesu speaker.

A much appreciated feature on these transceivers is a small dial light set into the main dial escutcheon immediately above the kilo Hertz dial. For night mobile operation and also for home use this light is a boon. Just why Yaesu have not incorporated this idea into their other rigs is hard to say.

Transmitter tune-up is quite straight forward and follows the usual procedure for present day rigs. After a short familiarisation period, the transmitter could be tuned spot on while talking just by watching the output

A top view of the FT101B with the case removed

indicator or scope pattern. VOX operation has been improved with a longer delay time available. The microphone supplied with the 101B is a high impedance dynamic of the push to talk type. Although not tested separately, on-air reports indicated excellent quality.

Under test, we obtained the following figures from the 101B.

The receiver sensitivity was measured at 14.2 MHz. At .5 microvolt input from a Marconi TF 995A-5 signal generator terminated with a 50 ohm load a signal to noise ratio of 18 dB was achieved.

The 'S' meter was also checked at 14.2 MHz.

S1 . . .	1.5uv	S8	25uv.
S2 . . .	2.0uv	S9	100uv.
S3 . . .	2.5uv	S9 plus 10dB	300uv.
S4 . . .	3.5uv	S9 plus 20dB	800uv.
S5 . . .	5.0uv	S9 plus 30dB	2.5mV.
S6 . . .	8.0uv	S9 plus 40dB	10mV.
S7 . . .	12.5uv	S9 plus 60dB	50mV.

The input required to produce an S9 signal was checked on each band.

160 metres	100uv.
80 metres	100uv.
40 metres	100uv.
20 metres	100uv.
15 metres	50uv.
11 and 10 metres	100uv.

The RF attenuator rated at 20 dB attenuation was measured at 18 dB.

VFO drift, specified at less than 100Hz per half hour, did not, in fact, exceed this figure over several hours operation.

Dial backlash was measured at just 50 Hz and the dial re-setability at about 150 Hz. As the 1kHz increments are rather closely spaced and the dial drive, whilst very smooth in operation, has a slightly spongy feel, it was not possible to set the dial better than the above figure. The dial lined up at each 100kHz point within the limits mentioned.

The response of the filter was measured as follows:-

300Hz...-6dB	1900Hz...-1dB
500Hz...-2dB	2000Hz...0dB
1000Hz...0dB	2200Hz...-2dB
1300Hz... +2dB	2500Hz...0dB
1700Hz...0dB	2700Hz...-6B

These are excellent figures and account for the very good audio on both transmit and receive. Outside the above, the response dropped off rapidly and slightly exceeded the makers figures. In use the receiver displayed no pop-ups at all outside the selectivity curve.

Transmitter output under CW conditions was measured at 14.2 MHz using a Swan ●M1500 RF power meter. 125 watts under steady carrier conditions was indicated with about 10 per cent more output under peak sideband conditions. In-so-far as output is not specified by the makers, this figure appears reasonable based on the specified power input.

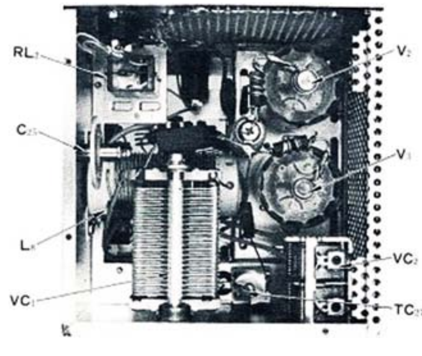
Checked from band to band using a Heathkit SB 610 monitorscope ·, the output appeared to vary less than 10 per cent except on 160 metres where the output was down by 30 watts under steady carrier conditions.

Wave form on the scope with SSB output was excellent even with the ALC pushed somewhat above the recommended reading.

Here in Victoria, quite a few 101's are in use on the 160 metre band and as most of the activity is on AM, a good number of these are used in the AM mode. As received on an AM receiver the 101 has very much better audio than the usual run of sideband transceivers with 'single sideband AM'. This is because the AM from a 101 is actually double sideband.

No figures were taken of the actual audio response but suffice to say the quality is very good.

A separate AM modulator is provided and the output of this is fed directly to the transmitter first mixer, bypassing the sideband filter.



FINAL AMPLIFIER COMPARTMENT

INSTRUCTION MANUAL. In the main this is well written, with a few notable exceptions. The operation of the VFO and clarifier indicator lights do not rate a mention at all. The actual frequency coverage of each band is not stated. Perhaps in most cases this is self evident but the specifications state coverage from 1.8 MHz whereas the actual coverage is from 1.5 MHz. This could prove embarrassing if transmission was attempted on the high end of the Broadcast band.

The manual includes a very complete description of each plug-in module complete with a clear photograph showing all components. Basic alignment instructions and a full schematic diagram are provided.

In all, a manual that will give the 101B owner a clear idea of how his set works, and possibly enable him to clear simple faults if they occur.

The FT101B used in this review was provided by Bail Electronics Service, 60 Shannon Street, Box Hill North, to whom all enquiries should be directed. The present price is $579.

The published specifications are as follows:-

Frequency Range	1.8-30 MHz amateur bands (160 thru 10m) 26.9-27.5 MHz (CB) 10.10.5 MHz (WWV)
Type of Emission	USB or LSB (selectable)
Power Input	SSB 260 Watts PEP
	CW 180 Watts 50 per cent duty cycle
	AM 80 Watts (slightly lower on 10 meters)
Sideband Suppression	50 dB at 1000 Hz
Spurious Radiation	Down 40 dB or more
Transmitter Frequency Response	300Hz 2700Hz $\pm$ 3dB
Distortion Products	Down 30 dB or more
Antenna Output Impedance	50-75 ohm unbalanced
Frequency Stability	Less than 100 Hz drift in any 30 minute period
Sensitivity	0.3 uV S-N 10 dB
Selectivity	(2.4 KHz at 6 dB) SSB, AM, (4.5 KHz at 60 db)SSB, AM. (600 Hz at 6 dB) CW (1.2 KHz at 60 dB)CW
Audio Output	3 Watts
Power Consumption	AC Receive 35 Watts Transmit 300 Watts Max. DC 12V Standby 0.5 Amp. Transmit 20 Amps. Max.
Dimensions	13 ½' wide, 6" high, 11 ½' deep
Weight	Approx. 30 Pounds.

VK3OM.

Afterthoughts

Page 5, JULY 1973, AR

Murphy struck again on page-18 of January 1974 issue of AR.

Component values for Fig. 1 are as follows:-

R1	**150K**
R2	**10K**
R3	**5.6K**
R4	**270ohm**
R5	**5.6K**
R6	**1.5K**
R7	**6.8K**
RV1	**22K trimpot**
Q1	**2N3565**
Q2	**2N4249**
Q3	**2N4249**
Q4	**RL20**

AMEND YOUR COPY NOW!!

award hunting - or the paper chase

Alan Shawsmith VK4SS
35 Whynot Street, West End, 4101

Award programmes and the consequent Hunting of Certificates began to mushroom around fifteen years ago and have, despite some criticism by a section of the fraternity, been responsible for a tremendous upsurge in activity on the bands.

It might be true to say that no single incentive, except DXing, has done more to put into positive effect the maxim — USE OR LOSE. This value should be borne in mind by those who see no merit in the pursuit.

No reasonable person would put the 'paper chase', diverse and varied as it is, among AR's top priorities or offer it as any reason or justification for our survival. But to say that such programmes are only a waste of time, IRCs or dollars, is to display the mentality of a synic — one who knows the price of everything but the value of nothing.

In the minds of some the word HUNTING, as in AHC and CHC, seems to infer chasing wall paper certificates simply for their own sake. Without getting into the area of semantics I would agree that a more suitable word might be chosen. But what is a more fitting word? In an effort to do this and add status and discernment to their activities one club of German Hams have picked themselves the elegant phrase — DIG. Diploma Interest Group.

However, the fact is that most Hams ARE rather choosey as to what they want for wall decorations and as the natural order of selection progresses, will continue to be more so. There are of course compulsives in the ranks but these types exist in every other human activity outside of AR as well.

Another 'rag' that's chewed over with some argument is the worthiness or otherwise of this or that award. The critics claim the market is flooded with certificates of minor consequence. Here they have a point up to a point. It is true that there are too many trivial 'pieces of paper' in circulation. But again this same situation applies all over. There are second grade diplomas, certificates etc, issued for all sorts of achievements from a variety of places, such as colleges, universities, business houses and so on. Just as the cream comes to the top so too will inferior awards find their own level — at the bottom.

However, one must be practical and realistic. Awards that are seemingly beyond attainment within a reasonable time dissuade rather than entice. In this way the humble certificate has its place, especially for the beginner.

In an effort to maintain a standard and balance, Award Hunters Club International has classified the market into OFFICIAL and NON-OFFICIAL AWARDS. The former are mostly those issued by IARU member societies and consequently acceptable to this Organization. Membership in AHC requires that an applicant possesses a minimum of ten OFFICIAL awards. However it is not to be taken that all NON-OFFICIAL awards are

Al, VK4SS, author of this and many other articles published in AR.

regarded as inferior by AHC. (Anyone wanting a list can have same by writing to VK4SS. OCEANIA SEC. AHC and enclosing a 9" x 6" SAE.)

It is well to keep in mind that the merit of a particular award is often hard to assess. For an individual Ham it can have a very subjective and personal value. For example, the ORIENT award or trophy would be a pushover for a JA but for a QRP Sth. American using the lower bands, it might represent the apex of attainment and be proudly pinned to the shack wall.

Another comment that continually crops up is that too many certificates are only in circulation because their sponsors seek a fast buck. This is said by those who have little or no knowledge of the 'paper chase.' Of course there are such awards in existence. It would be strange if AR was pure in this regard but they are really very much in the minority.

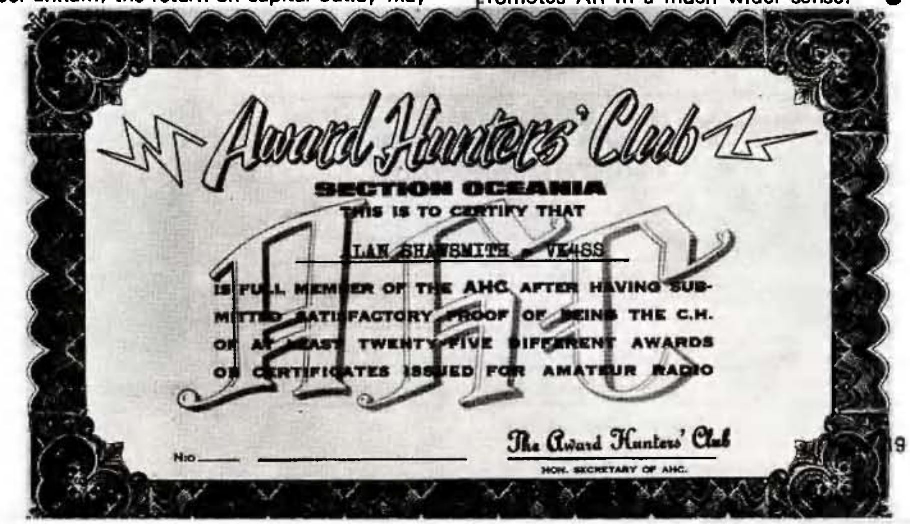
Printing costs are now no longer peanuts for anything that has quality, color and design. If a certificate, diploma etc. has merit and is difficult to obtain (say about 50 issued per annum) the return on capital outlay may not be recouped for many years. Hardly a fast buck. Add to this the rising cost in postage and other associated correspondence and the law of diminishing returns is soon evident. However awards issued for special events, National days or centenaries that attract a large number of applicants in a short time can be financially profitable for obvious reasons.

There are now supposed to be over one thousand awards, certificates diplomas, trophies etc. available throughout Hamdom. (Final figures are hard to come by). This means competition has become a new scene altogether. Creators of new awards must now come up with that something EXTRA in quality, merit and individuality. Awards also need a National flavor and IARU acceptance if possible. This can't always be done but even so the humble private club certificate is improved by an uplift. The single and simple criteria — work five members — is beginning to sound like a worn '78' and old hat. A few added requirements, such as multiband operation, dual mode, points for DX etc. help raise the status.

The 'paper chase' continues to draw ever more participation. One reason for its popularity is because it satisfies and provides an outlet for a still persistent atavistic urge that modern living tends to frustrate and suppress. The big event in the lives of our primordial ancestors was the hunt, the chase and the capture.

Call at a DXers shack. See his beam slowly turning, searching; then go inside and watch him crouched in front of the receiver, eyes glued to the dial as if to bore a hole in it and hand on key or mike. Sublimed and civilized by modern society it may be but he is nevertheless acting out the irristible hunting hang-up bestowed on him by his forebears half a million years ago!!!!

Award Hunting is more than a self-interest fun game. This description sells it short. No activity is an island unto itself. Everything has some spin-off. The 'paper chase' demonstrates skill and achievement, regenerates on-air activity thus opening the way to many other contacts and interests and promotes AR in a much wider sense. ●



modifications to Sakura model TR-65 circuit tester (multi-meter)

C. P. Daw VK2AGJ
"Woodlands", Wombat, N.S.W., 2595.

A common problem with numerous commercial multimeters is their sensitivity to stray RF fields on other than the AC voltage ranges. This is particularly annoying when trouble shooting on transmitters and TV receivers. VK2AGJ describes here a simple modification to overcome the problem in at least one such meter.

I found this instrument, in original state, of very limited use since it was prone to false readings where there was any RF present. My first thoughts were that bypassing or incorporation of RF chokes might help but this did not work.

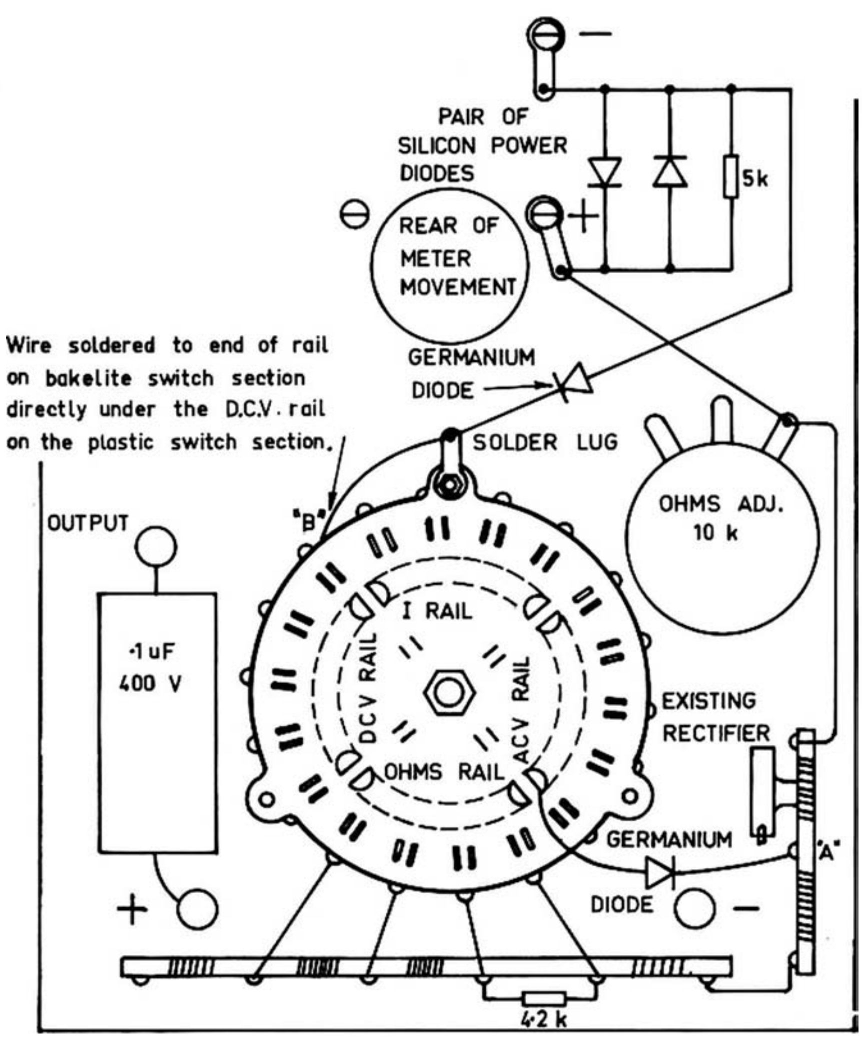
Examination of the circuit indicated the problem was caused by the AC rectifier being permanently connected across the meter movement on all ranges. The next idea was to incorporate a switch to disconnect the rectifier for all but the AC ranges. I investigated fitting a switch potentiometer (switch for switching rectifier and potentiometer for ohms) in place of ohms adjust but abandoned the thought since a switch potentiometer of suitable physical size was not available at the time.

Careful examination of the range switch in the instrument revealed that there were three unused segments (corresponding to the second segment used on the ohms range). A little thought indicated the segment opposite the AC volt "rail" could be used to switch the rectifier in and out of the circuit provided the original selenium rectifier was replaced with two individual diodes. I replaced the rectifier with two OA85's (OA79, OA81, OA90, OA91, OA95 would do) and the accuracy of the AC ranges did not seem to be affected by the change.

The next problem was gaining access to the appropriate segment of the switch. Care is necessary in removing the two switch mounting screws since they have been locked with paint. Remove the selector knob. Some components have to be unsoldered from the switch and the switch eased up until a small soldering iron can be got to the appropriate segment where it bends over on the opposite side of bakelite to where the switch wiper travels. (Side closest to front panel). Solder a flexible lead of appropriate length to this point. The switch is now re-assembled. An anchor point is required where the other end of the new lead joins one of the diodes. I provided this with a solder lug under one of the switch bolts (note these bolts are interconnected with the other two via the switch frame).

Disconnect the original rectifier and install two germanium diodes as shown in diagram. I also installed a pair of silicon power diodes connected in opposite directions across the movement for overload protection. The switch position may need adjusting (mounting holes are slotted for this) so the knob lines up with the range indications.

This modification has eliminated the RF problem and may be adaptable to other makes of meters which are similarly affected.



Resistor strip "A" centre terminal originally soldered to lower rectifier terminal. Unsolder and bend terminals so they do not touch. Strip is left supported on its connecting leads. Wire from centre terminals of rectifier and end of AC volt rail removed. Germanium diode wired from AC volt rail with polarity shown to centre of resistor strip "A". At point "B" wire has to be soldered to end of rail on front panel side of bakelite switch section since slider of switch has to slide unimpeded on other side.

ZR CALL SIGNS

The Aug. '73 issue of *Radio ZS* carries a letter from their PMG authorising the issue of restricted licences to anyone who, "except that he did not pass the morse test, would have qualified for the issue of an amateur licence." Such licences will be issued in the ZR-series and communications are restricted to 144MHz or higher. They will not be permitted to operate through satellites if part of the communications link operates below 144MHz. Any ZR licensee can convert to the full ZS call on passing the morse test but will have to use CW below 144MHz for his first year as a ZS in the same way that all other ZS licensees have to qualify before using telephony.

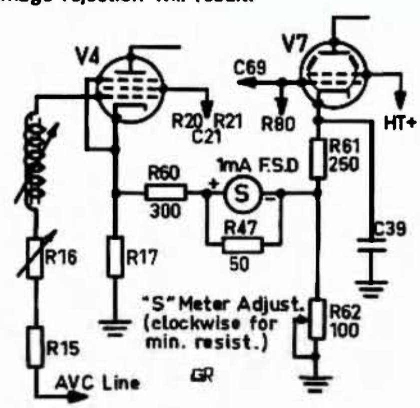
Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

THE AR7 (Part three).
This month a few simple modifications for your AR7.
The first was described by Gordon Bowen in a series on the AR7 published in AR back in 1957.

AN ANTENNA TRIMMER FOR THE AR7. Drill a hole in the front panel, at the same level as the noise limiter control but on the left hand side of the tuning dial, to take a small variable capacitor. Any type will do here, but it should have a maximum value of 100 to 150pf to be able to accommodate the change across the tuning range. Connect this across the coil, not across the gang, and when re-aligning these stages set the trimmer to about half capacity. You will now be able to keep the RF stage peaked at all frequencies throughout the tuning range with a definite improvement in sensitivity.

A further improvement in both gain and sensitivity can be made by substituting a modern tube in place of the original 6U7G. Back in 1957, Gordon Bowen suggested using an RL7 or EF54. However, today, other types come to mind like the 6EH7 which has a Gm of 11000. A word of warning — leave the 6U7G in the second RF stage. As the tuned circuits associated with this stage have been designed to match the high impedance input of the 6U7, a better 'Q' and hence better image rejection will result.

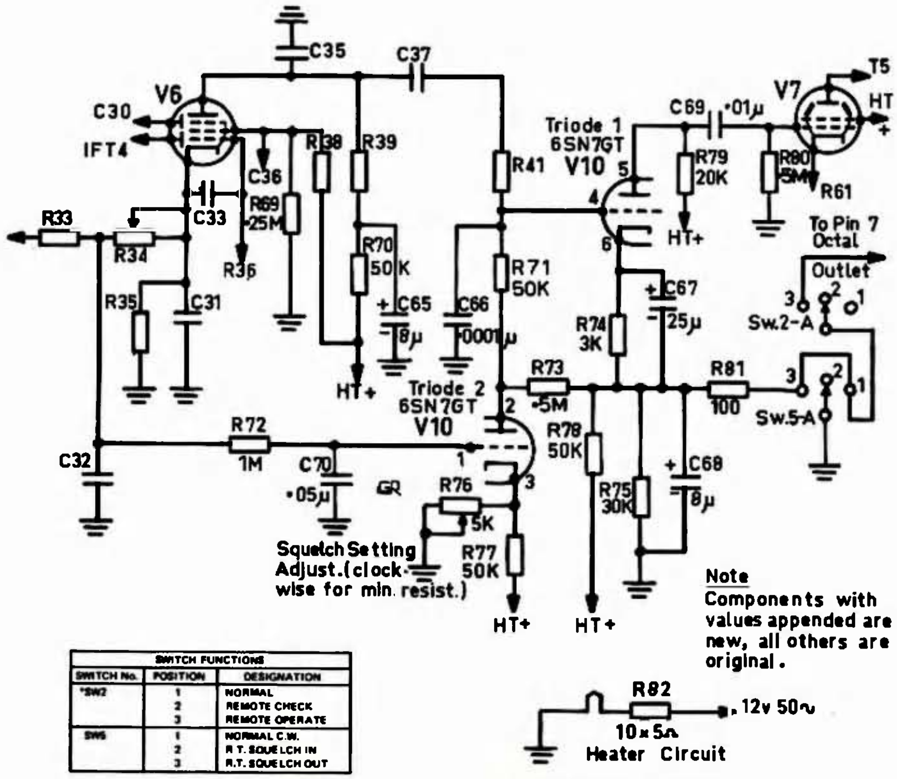


"S" METER

POWER SUPPLY. If the original power supply using the pair of 6X5GT valves is still intact, the high tension supply is very stable and there is no need for a voltage regulator. However if your AR7 has a typical "ham" built power supply a voltage regulator should be included to stabilise the oscillator HT to 100 volts.

IMPROVED BFO. Better BFO stability can be obtained by modifying the original to the circuit shown.

One half of a twin triode 6C8G tube is used in a series electron-coupled Hartley circuit as the beat frequency oscillator. Control of the BFO is achieved by means of a reactance tube using one half of a twin triode 6SN7GT tube connected across the tuned circuit of the BFO.

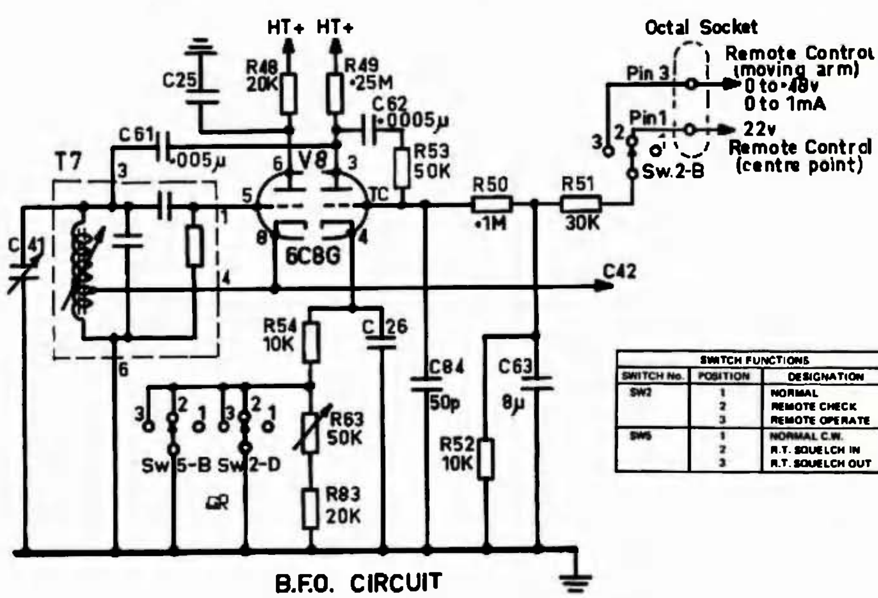


SWITCH FUNCTIONS		
SWITCH No.	POSITION	DESIGNATION
SW2	1	NORMAL
	2	REMOTE CHECK
	3	REMOTE OPERATE
SW5	1	NORMAL C.W.
	2	R.T. SQUELCH IN
	3	R.T. SQUELCH OUT

SQUELCH CIRCUIT

The effective shunt reactance thus added is dependent upon the grid-cathode potential of the reactance tube and so the frequency of the BFO may be varied by changing the voltage applied to a control line which feeds a voltage divider in the grid circuit of the reactance tube. A certain negative voltage on the control line will result in the BFO operating at 455 kHz, giving zero beat on the CW signal; an increase or decrease in voltage causes the BFO frequency to shift, with corresponding change in beat note.

Provision is made for operation of the receiver under normal conditions, i.e., full manual control. For "normal CW" (i.e., both SW2 and SW5 set at position 1) additional resistance (R63 and R83) is inserted in the cathode of the reactance tube to give a grid bias equivalent to that present when on zero beat with remote control. For all other conditions, including "normal R.T." operation this cathode resistance is shorted out. When "normal R.T." is used, there is also no external voltage applied to the reactance tube grid (the BFO control line being opened at SW2B), so this tube draws large current and BFO is rendered ineffective, its output being greatly reduced and frequency shift increased



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B.F.O. CIRCUIT

so that the resultant beat note is beyond audibility.

No doubt many AR7's in use today are serving as IF strips for VHF converters or perhaps for HF net operation on 160 metres or other bands. Therefore the inclusion of a squelch circuit could be of great value. One half of a 6SN7 is used.

The rectified carrier appears across R33 and R34. This is applied to the grid of triode 2 of V10 through an RC circuit. The cathode of triode 2 is set by a potentiometer located in the former "Noise Limiter" position. This control is set so that an increase in the signal gives additional negative grid bias on triode 2 sufficient to cut off the plate current. This plate current flows through R73 which appears also in the grid circuit of triode 1. Triode 1 is an audio amplifier connected between the 6G8G (V6) and the 6V6G (V7). In the normal "no-signal" condition, triode 2 draws plate current and biases to cut off triode 1. An incoming signal removes this bias and the signal is delivered to the output circuit.

Provision has been made for local or remote control of squelch operation as required. For in-out switching of squelch, the junction of R75 and R78 is taken, via R81 to SW5A, and also to pin 7 of octal outlet, via SW2A. When this point is earthed (either locally by setting SW5 at position 1 or 3, or remotely after SW2 is set at position 3), triode 2 of V10 cannot draw plate current to cause cut-off condition in triode 1 of V10 and so silencing occurs. R81 reduces rate of discharge of C68.

Remote in-out switching of squelch is obtained by earthing pin 7 via the control line.

That concludes this series on the AR7. However, if you have any ideas that you have tried and proved, do not forget to let me know. When it comes to modifications and improvements, the subject is never closed.

QSP

EMP

"Ever hear of it?" asks WINJM in Sept. '73 QST Emergency Services column. "It stands for Electromagnetic Pulse, and is a phenomenon which results from a nuclear burst. Basically EMP has an effect similar to lightning but is not the same thing as it is caused by sudden release of nuclear energy. The EMP effect of a high altitude burst can extend thousands of miles beyond any of its other effects, possibly causing burnouts in unprotected communications equipment over such an area. EMP could wipe out much of our communications, especially our amateur communications just when it is most needed. Any piece of radio equipment using an antenna over four feet long is subject to burnout by EMP. So there you have it, a threat to communications that most of us never knew existed. Nothing is more susceptible to EMP (and lightning too, for that matter) than a repeater."

AUSTRALIAN STANDARDS.

The Standards Association of Australia has been busy lately on a number of revised and new standards affecting radio and similar components and accessories. A.S. 1042 (revises A.S. C42-1964 metrically), deals with electrical meters, definitions, classifications, permissible errors and reference conditions, variations, markings and so on. It extends to accuracy concepts as well as shunts and so on. Another, AS1127 Part 4, deals with dimensions of loudspeakers to facilitate rationalization and mechanical interchangeability. In continuation of AS1099 is another series of standard tests including two water-bath methods which obviously do not refer to the cooling of linear finals. Earlier standards published this year include AS1381 on fixed capacitors and amendment 5 to the Wiring Rules.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

Just received a list of active Intruder Watch observers in the USA — 525.

There are 15 active in VK. Pity we cannot get more to take an active interest in this crucial activity. It doesn't take a lot of time, nor does it take much energy — just report when you hear and identify an Intruder. There are plenty in our bands. The identification tape has been played over the different State Sunday morning broadcasts quite recently and, if you require it, it could be played as often as necessary. Any Member wanting a copy can obtain one from me by submitting a blank reel or cassette. How about it? In the December issue of "QST" is a story by W1NF about Intruder Watching. It is good reading and well worth while your study. Since the summary displayed in the January issue the following are some stations that have been reported. —

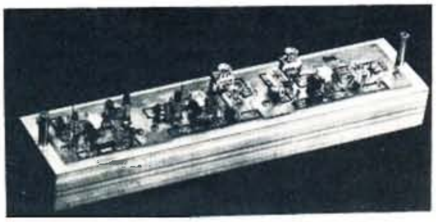
14000-14200	A2	Jammer — a whizzing sound spreading across the band
14010	A1	F7A calling TBO
14103	A1	TBO calling F7A
14023	A1	XBP sending calls only.
14039	A1	PBJ sending calls only.
14075	A1	OUY calling ALT
14079	A1	WUF sending calls only
14100	A1	PJN calling BRA.
14122	A1	KLW using continental morse
14133	A1	SPH sending Vs and calls spreading from 14128 to 14138.
14268	A1	NDT-NPO-NPN calling GMV.
14293-14298	F1	RTTY stations signing HMB22, HMD7, HMD8, HMY26 in Korea and ZEO66 in Hong Kong. Read-outs have been submitted.
7019	A1	HMF21, HMR56, HME28, HMK71 signing "freq 11230-7015-13780-9404 Pyongyang

Keep these sort of reports coming in!!

VHF ENTHUSIASTS—

30 Watts at 150MHz from 12.6V Supply

Did you see the review in Electronics Australia? In January's issue, Jim Rowe gave a full treatment to Dick's VHF Amp and it came through with flying colours.
Contrary to rumour, the price won't be going up just because we're famous, but there's bound to be a lot of demand for this Superkit so place your order now!



3 STAGE KIT

Full instructions are included (we hope also to supply reprints of E.A. article). Power transistors, circuit boards, special trimmers, etc. (All P & P 50c)

7W stage using 2N5589 complete kit	$11.50
15W stage using 2N5590 complete kit	$13.50
30W stage using 2N5591 complete kit	$17.50
Circuit boards each stage (state which)	$1.50
Single board for 3 stages	$4.20
300mW in 30 Watt out	$37.50

COMPLETE KIT SAVES YOU $5.00

Transistors available separately. Will withstand severe VSWR. Low inductance stripline package. Isolated stud. Over 4.4db power gain.

2N5589	$6.50
2N5590	$7.75
2N5591	$9.85
	Set for $22.50

Full data in our catalogue or sent with your order if requested.

KITS FOR THE AMATEUR — FANTASTIC VALUE — PROFESSIONAL RESULTS — SPECIALLY SELECTED

Here are our three popular digital kits for the serious amateur. Most enquiries show that customers don't believe we can supply a complete kit at such a low price. We do it by concentrating on a few good kits rather than heaps of mediocre ones. So read on . . .

A REAL LIVE WORKING 200MHz COUNTER FOR ONLY $135

The circuit was in Electronics Australia in December. Fully solid state with latest MSI ICs and LED readout. Uses 23 ICs so that it is straightforward and quick to construct and very economical. Like the article, our kit is in two parts: Basic 4½ decade, 20MHz counter complete with crystal and handsome painted metal case **$118** (P & P $2.00) or complete with 200MHz prescaler for only **$135** (P & P $2.00).

THROW YOUR MULTITESTER AWAY AND BUILD A 3½ DIGIT VOLTMETER

This one has been very popular since E.A. featured it in October. Uses the fantastic Analog Devices digital panelmeter (also available separately for **$102**). Max error is only plus or minus 0.05% plus 1 digit. Ranges from 200mV to 20kV and 20 ohm to 200k. Full kit for this beauty is only **$145.** (P & P $1.50).

EAT THE CUCKOO FOR LUNCH AND BUILD YOUR OWN DIGITAL CLOCK

We don't have to tell you the advantages of a digital clock do we? Has been a popular kit since it was in E.A. last September. Uses a special offer pack from Sperry/National consisting of 24 pin IC clock chip and Sperry flat readout which can be read from 40 feet away. Our kit also includes 13 transistors, 2 PC boards, etc., in fact everything but a case, since there are so many different ways to build it, all for **$49.00.** If you're really quick we have about 10 of the special offer IC/Readout packs left at **$28.75** (Both P & P 75c).

BOOK SECTION EXPANDING

In addition to a wide range of Howard Sams and ARRL books which we are importing, we can now offer an excellent selection of McGraw-Hill books for both professional and amateur. Ask for our booklist.

DSE

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S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph. 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152	Ph. 60 4379

good quality cw from the 122

R. D. Champness VK3UG
44 Rathmullen Road, Boronia.

The 122 transceiver has been the subject of many modifications since its release on the surplus market, soon after the end of WW2. The 122 is not much heard of in these days of the super dooper extra special signal exhalers called SSB transceivers. You will hear my 122 underneath the S-9 splatter occasionally, and putting out quite a respectable CW signal, even if at times the CW ability of the operator could be in doubt.

The quality of the CW signal from an unmodified 122 on 80 metres is far from T9 and on 40 metres it is in the region of T3 to 4. This rather perturbed me so I set about improving the stability of the transmitter frequency during keying. The biggest problem is the fact that the VFO is keyed on and off whenever the morse key is used. If the VFO could be left operating whilst only the 807 output was being keyed I might have some success at getting rid of the severe "chirp".

I worked along these lines and came up with quite a simple modification. The additional parts consist of 2 — 400PIV diodes (or higher voltage) and one 5.6k ohm ½ watt resistor, a few inches of hook up wire, some insulation tape, and patience. You will need to consult the set circuit, and figure 1 shows the particular section to be modified, in its unmodified condition. Figure 2 shows the modification.

The actual surgery takes place on the front of the first tag board immediately behind the mode change switch. With the set turned upside down you will see three red wires terminating onto one lug along with one end of R18A. Two of the red wires are lifted off this tie point — but which two? Lift off all red wires to start with. Then check with an ohm meter between each red wire and the end of the resistor R18A. The mode switch must be in the R-T or MCW position. One wire will show about 5000 ohms when tested this way. This wire, which is the only one which should show continuity, is rewired to the solder lug tie point. A diode is now wired from the tie point to the other two red wires. The other diode is wired with a resistor in series to the transmitter HT supply which is probably most easily picked off on the metering switch from the H.T.S. position.

Your set is now modified and should perform quite satisfactorily on CW, providing you have put tape and insulating sleeves over the newly added components. The 122 is not exactly the easiest of sets to work on as the components are crammed in. If you can fit a tag strip in all to the good, but I did not think it was necessary.

How does this modification work? When the transceiver is in the transmit condition HT is supplied to contact 21 relay No. 2. This is supplied via D2 and R100 to the VFO but is blocked from the PA by D1. This is the transmitter section switched on but not transmitting. Now when the morse key is pressed Relay 2 will operate closing contacts 21 and 22. HT is supplied to the PA and the VFO via D1 (mostly). As soon as the key is released the PA is cut off again but the VFO continues to operate until the transceiver timing circuit changes the set over to receive. When this occurs there is no HT supplied to the transmitter HT line and the VFO is off. Carefully looking at this circuit it will become

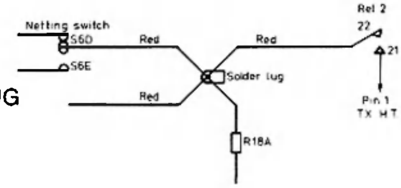


FIG 1 - UNMODIFIED CIRCUIT OF 122

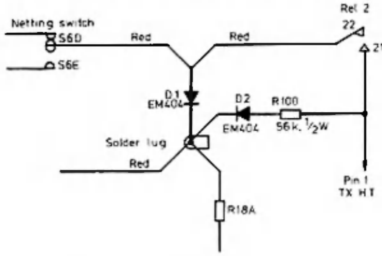
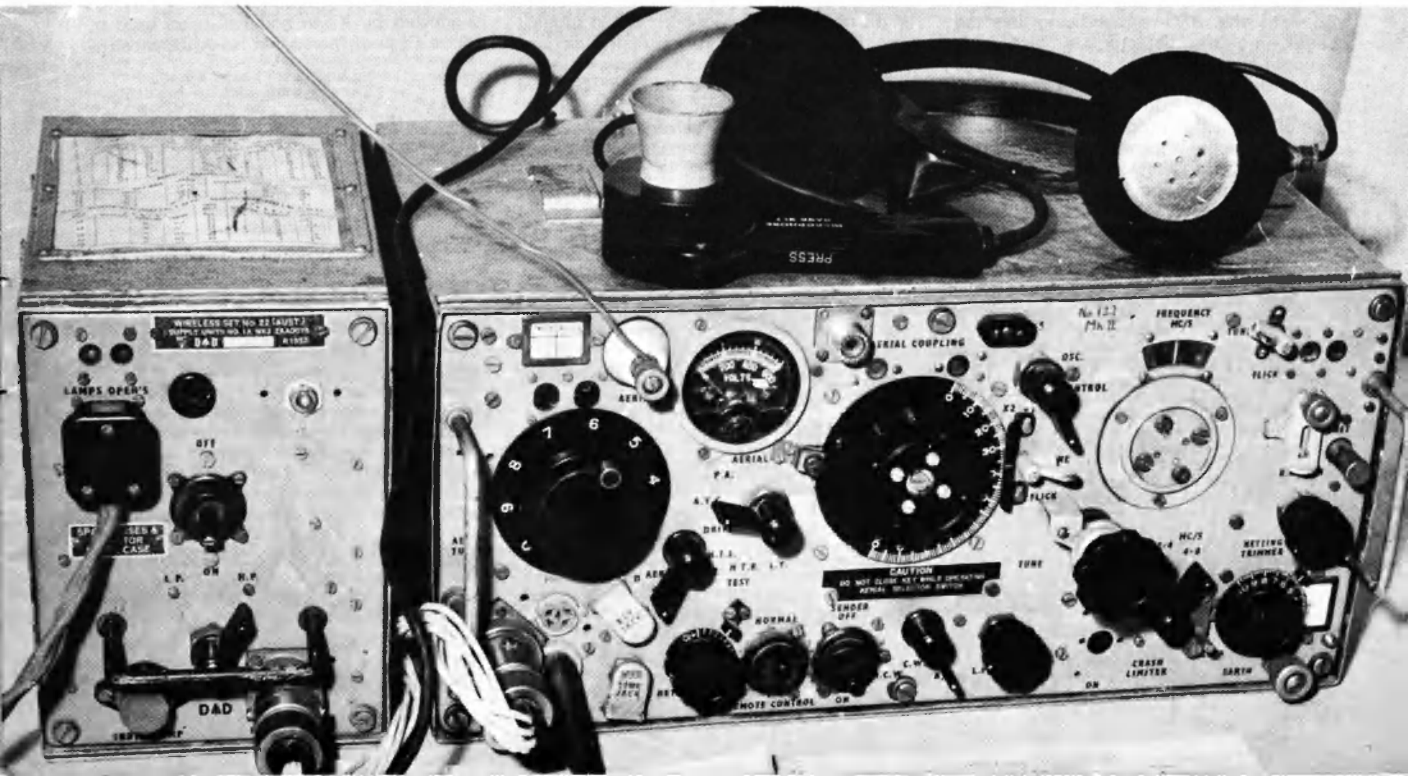


FIG 2 - MODIFIED CIRCUIT OF 122

obvious that diode D2 doesn't do anything!!! Consider, though, contacts S6D and S6E which are part of the netting circuit. Contacts S6E connect back to the receiver HT and provide enough voltage for the VFO to give a satisfactory netting signal level. S6D isolates the rest of the transmitter when this takes place. So that additional loading on this line does not take place, diode D2 isolates the VFO from the main transmitter HT line. That about wraps up this simple but effective modification.

I have further thoughts on modifying the wiring to the mode switch so that when I switch to MCW position I still transmit phone and receive SSB. It would be much easier than changing over the mode switch when going from AM transmit to SSB receive. ●



Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

PRODUCT DETECTORS FOR YOUR RECEIVER

A product Detector is used to resolve single sideband transmissions and morse code transmissions of the A1 type mode. Many of the older sets have a BFO and inject the output of it into the diode detector or rely on stray coupling into the IF to produce a "Beat Frequency" with the incoming morse signal. I deliberately said morse signal, because most of the earlier sets were designed before SSB became at all well known. The ratio of the BFO and incoming signal was not set at any particular level. Use of the receiver RF control was necessary and AVC or the later AGC could not be used as the BFO signal got straight into the IF channel of the receiver. There it was rectified like any other signal so causing, in most cases, a large AGC bias voltage to be developed, which de-sensitized the receiver. A very decided disadvantage. It would be most convenient if the BFO signal could be kept out of the main IF channel so that the strength of the incoming signal controlled the gain of the set and hence the level of the audio output on both CW and SSB. The relative level of BFO signal, or as it is more commonly called Carrier Insertion Oscillator signal, to input signal should be about 10 units of Carrier Injection Level to 1 Level of input signal, for best intelligibility.

It is not at all easy to obtain anywhere near this optimum level of signal difference for SSB with the BFO signal being injected straight into the detector. In fact it is downright cumbersome to handle if fading is about or signals are weak or too strong. Now enter the Product Detector. The Product Detector, if shielded properly and electrically adjusted correctly, will easily out-perform the earlier BFO-diode detector arrangement. In the circuit shown using the 6BE6 valve the operation of the valve is similar to its operation when used as frequency converter in any ordinary receiver.

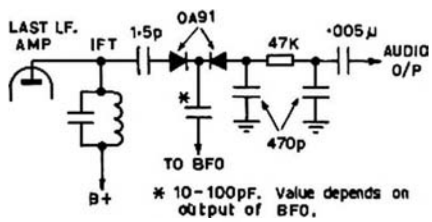
The valve in fact acts like an electronic gate. The carrier oscillator section uses the 1st grid, cathode and screen grid as the three terminals of the oscillator. The SSB or CW signal is applied to the 2nd grid and the plate current of the valve is controlled by the combined efforts of the signals applied to the two input grids. When they are in phase the plate current will show either a peak or null greater than if the signals are out of phase with one another (180 degrees phase difference). If, say, your Carrier Insertion Oscillator is set at 455kHz and the Single Sideband Spectrum is from 455.3kHz to 458kHz. The Sideband Spectrum has a frequency difference from the Insertion Oscillator of 300Hz to 3,000Hz. The output from the product detector contains this audio spectrum, plus the two RF signals, the local oscillator and the frequency converted signal frequency which is now at IF frequency. The plate circuit of the 6BE6 is however only suitable for audio frequencies, and as such only passes the 300 to 3000 Hz range of frequencies that are produced in the Product Detector. Looking at the inputs to the 6BE6 you will notice that they are all RF circuits and the output is the normal audio style circuit. Only audio is fed out of the stage after the low pass filter which consists of two 0.001uF capacitors and one 10k ohm resistor.

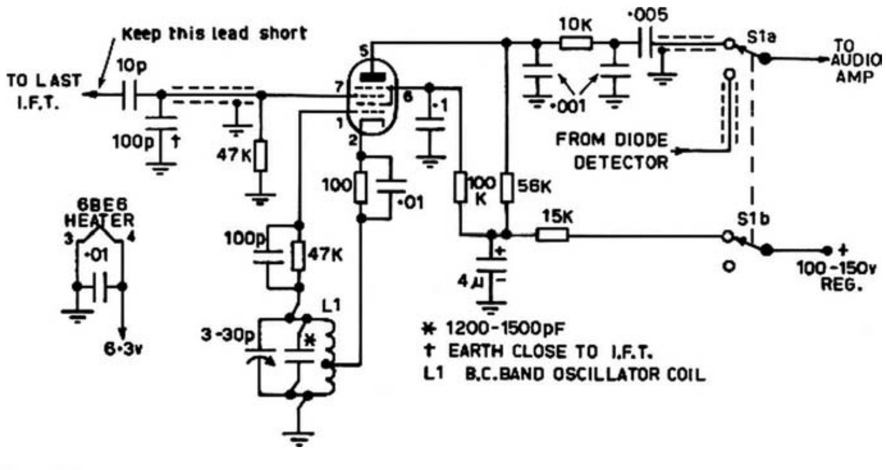
The construction of this Product Detector is not unduly hard. If you are converting an old domestic mantel set for SSB reception I would recommend that this unit be built separately to the receiver unless you have a reasonable amount of room inside. If you are converting an old diode injection BFO style receiver you can either build the unit into the receiver or externally if shielding of the Carrier Insertion Oscillator section of the Product Detector appears to be a problem. I would stress that bottling the CIO up is most desirable so that its output can have no effect on the receiver AGC network. I would suggest that the unit be built in one of the die-cast boxes readily available from advertisers in AR or some other similar shielded box. The valve itself will be mounted out of the box so it will be necessary to have a valve shield over the valve so that little RF escapes from the valve envelope.

There are 4 leads plus an earth coming out of the shielded box. The shield braids should go to an earth lug just inside the box. The HT line should have the 15k ohm resistor mounted just alongside the hole that the HT lead goes out of. The heater lead of the valve should have a 0.01uF or similar capacitor to ground where it goes out of the box too. Very little energy should escape to cause trouble. The shielded leads should only be earthed as shown and desirably the cables can be fairly thin audio coaxial cable with a plastic outer sheath. The only components of particular note are the coil-capacitor arrangement. The coil is a normal local oscillator coil out of a typical mantel receiver using a 6BE6 converter. To get it down to 455kHz it is necessary to shunt it with about 1200 to 1500pf. The trimmer capacitor is just to do fine tuning on SSB signals and tune for USB or LSB.

It isn't too hard to adjust this unit. Tune in an SSB station and slowly adjust the coil slug until the signal is resolved. The small trimmer should be at half capacity when this is being done. If the signal cannot be resolved alter the value of the 1200 to 1500pf capacitor a hundred or so pf until it resolves SSB signals. If still no joy, make sure that the CIO is in fact working. To do this, lift off the earthy end of the 47k ohm resistor going to pin 1 of the 6BE6. The earthy end is the coil end. Place a 1ma meter in series with this lead with the positive probe going to earth. A reading of about 0.2 to 0.3ma should be read. Incidentally this end of the resistor doesn't have to attach to about a volt is measured. If all of these seem okay make sure you have wired the coil in correctly so that positive feedback does occur in the oscillator circuit.

Kevin Plew of Drouin supplied me with the information on this Product Detector which he has used in his communications receiver successfully for some time now. This circuit has been around for a while, but Kevin's idea using the old BC set local oscillator coil saves trying to buy a hard to get 455kHz oscillator coil. The following Product Detector was also suggested by Kevin and has been used by Albert Cash of Morwell in his AR88 receiver.





Thank you to Kevin and Albert for the information supplied, which is most gratefully received.

A very simple method of modification to almost any receiver for the resolution of SSB signals follows. It consists of two OA91 diodes or similar, a few capacitors and resistors, plus a small tagboard if it is made in the same way as I made it. This would be a simple project for a beginner in electronics. It would give a lot of satisfaction once completed as it works well. I have this in my AR88D and I can sit back and enjoy armchair copy on SSB without having to chase it around with the BFO. The receiver RF gain needs no adjustment compared to copying SSB with the AM detector and the BFO. This circuit has been published quite a few times in amateur radio magazines — so it *is not new. It is a good exercise for a newcomer to radio.*

Your own ideas about switching from AM detection to Product Detector can be worked out yourself. One other point. If the AGC decay time is too fast and causes pumping, a 1uF capacitor across the AGC line should cure that. Try it — it is easy.

To switch to AM one of the diodes could be shorted by a switch. Good shielding is still necessary with this circuit if operation as Albert describes it, is to be achieved. Next month — equipment layout ●

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.

10 kHz DEVIATION FOR AMATEUR F.M ?

In frequency modulation, the modulation index is defined as

M - peak deviation from carrier frequency / modulating frequency

For amateur purposes it is standard practice to use a peak deviation of 15 kHz requiring a bandwidth of 30 kHz. For a maximum modulating frequency of 3 kHz, the modulation index is M-15 - 5.
modulation index is M - 3

Under these conditions the amplitudes of the various sidebands produced are shown in the following table.

ORDER OF SIDEBAND	AMPLITUDE	POWER
0 (Carrier)	-.1776	3.154
1	-.3276	10.732
2	.0466	.217
3	.3648	13.308
4	.3912	15.3
5	.2611	6.817
6	.131	1.716
7	.0534	.285
8	.01841	.0339
9	.00552	.003

The power is obtained by squaring the amplitudes and in this case multiplying by an arbitrary factor of 100 to make the figures look reasonable.

I now make the proposition that for a voice communication, all sidebands less than 20 db (a factor of 100 in power) below the sideband of largest power can be neglected. On this basis for M-5 all sidebands out to and including the seventh are significant. This would require a receiver bandwidth of 42 kHz.

I now make the proposition that for a voice c9ommunication, all sidebands less than 20 dB (a factor of 100 in power) below the sideband of largest power can be neglected. On this basis for M5 all sidebands out to and including the seventh are significant. This would require a receiver bandwidth of 42 kHz.

If instead of using M-5 we consider the case of M-3 the amplitudes are as follows:

ORDER OF SIDEBAND	AMPLITUDE	POWER
0	.2601	6.765
1	.3391	11.499
2	.4861	23.629
3	.3091	9.554
4	.1320	1.742
5	.0430	.1849
6	.0114	.0129

For M-3 all sidebands out to and including the fourth are significant, this would require a receiver bandwidth of 24 kHz. So to include all significant sidebands in a 30 kHz receiver bandwidth, we have M somewhere between 3 and 4. This would correspond to a peak deviation in the range 9-12 kHz rather than 15 kHz.

It should be obvious to any F.M. operator who has listened to a weak highly deviated (+ 15kHz) signal that contains a large amount of sibilants that some of the signal is extending beyond the 30 kHz bandwidth of his receiver. (Peak limiters aren't perfect either.)

I would therefore strongly advocate the use of 10 kHz rather than 15 kHz deviation in the amateur F.M. service. (Not to mention the number of narrow band receivers showing up of recent times).

73,
ROSS DANNECKER VK4ZFD

The Editor,
Dear Sir,

Like the rest of the community, the amateur service is experiencing the pangs of rapid change, and with the imminent revamping of the Wireless Telegraphy and Broadcasting and Television Acts the service will be subjected to close scrutiny — going back to the basics of our existence.

If justification of amateur radio as a going concern is necessary, the old hackneyed cliches concerning our role in emergencies and the past triumphs in communications pioneering should be put in moth-balls. The amateur service as a worthwhile pursuit can be well equated with the new look at leisure activities by governmental and community organisations. Whilst these days amateurs make no worthwhile contributions to the science of communications, the enhancement of individual knowledge and the international goodwill generated is clearly understood. It is indeed unfortunate, however, that the Post Office has used the proposed novice licence to placate the extreme political pressures promulgated by *citizen band* (i.e. pirate) operators. The Post Office's move may only serve to confuse the ideals and intentions of the service to further the cause.

There are difficult times ahead: the introduction of color television poses special threats in respect to electromagnetic compatibility and the lack of control over standards for stereo and electronic organ equipment (particularly) makes co-existence with neighbours an increasing dilemma.

There is an urgent need to co-operate with consumer organisations in establishing proper standards for this equipment and the WIA would also do well to establish technical parameters for amateur commercial gear and publicly condemn equipments which fail to meet the specifications. In an age of amateur *black boxes* we have and should enforce — equal rights with the $700 color TV user to *do your own thing*: any future legislation should homologate this precept.

Now that the visual pollution pilgrimage has finally reached the cerebral crevices of municipal councillors, most applications are being subjected (at least in Melbourne) to greater scrutiny. Amendments to the uniform building regulations in this state, the increasing rate of application refusals and the recent *public nuisance* litigation here are all blatant signs of changing community attitudes and total ignorance to amateur radio.

Over the next few months our bands will receive close inspection, particularly from commercial spectrum users. Amateur frequencies were measured by one national publication recently in terms of dollars per hertz — totalling up to a very impressive bill!

We must be careful to avoid the past mistake of applying for bands of such magnitude that they could not be realistically utilised in the near future. This tends to draw undue attention to the service and destroys the credibility of the Wireless Institute as a responsible body representing the interests of amateur radio in this country.

To avoid self destruction we must vitalise some of the good old maxims (such as *populate or perish*), encourage greater institute membership and participation, and present a stronger political lobby. More importantly, we must preconise the amateur service with emphasis on the municipal arena.

Good public relations and unity are essential ingredients in facing the new epoch.

Russell Kelly, VK3NT.

The Editor,
Dear Sir,

With the question of FM broadcasting in Australia subject to yet another inquiry I am reluctant to comment at this stage, however it is necessary to correct a wrong impression that could be gained from a report by John Adcock VK3ACA on a lecture delivered by Mr J. M. Dixon of the Australian Broadcasting Control Board. (August A.R.)

After comment on the operation of the experimental FM stations from 1947-1961 it was suggested that an inquiry recommended suspension of the transmissions due to an almost total lack of interest.

True the transmitters closed down without much appearance of public interest, however those who had supported the introduction of FM up to the time of the 1957-58 inquiry had been told in no uncertain terms that there was no future in continuing to advocate its introduction, then the Huxley Committee decided to transfer the FM broadcast band to television.

A study of the transcript of that early inquiry will reveal that there was considerable support for the introduction of FM. It will also show the almost vehement opposition from certain of the interested parties, even though the substance of these submissions has since been proved wrong, at that time the Control Board was swayed and decided against FM. That there was considerable interest at that time and also that the interest continued till such time as a further inquiry began is indicated in the Control Board report titled FM Broadcasting which was issued in June 1972 and recommended the introduction of a FM service. I feel that the report in AR would appear unfair to those who have advocated the introduction of FM broadcasting for so long, particularly as several of the early supporters were members of the WIA.

Allen Fountain, VK2YAH.

The Editor,
Dear Sir,

Congratulations for the improved standard of AR. I like:
i the quality of the paper
ii the clarity of circuit diagrams
iii the general coverage articles.

I have just received my January 1974 copy of AR and liked it so much that I felt prompted to write and express my sentiments.

Graeme Scott, VK3ZIP. ●

Magazine Index

With Syd Clark, VK3ASC

AMATEUR RADIO NEWS SERVICE BULLETIN. September 1973.
Aimed at improving the standard of Amateur Radio publications it provides a forum wherein Editors and others interested in such publications can air their views.

BREAK-IN. October 1973.
A Morse Code Generator: Home Built Coaxial Relay: Tune-Up with no Carrier Radiated: A Transistorised BC221 VHF Adaptor: Regional Civil Defence Communications Seminar.

CQ TV September 1973.
Circuit Notebook No. 14: 70cm Absorption Wavemeter: A 70cm Transmitter from Germany: Integrated Circuits Part 13.

HAM RADIO. September 1973.
220 MHz RF Power Amplifier for VHF FM: Solid State I.F. Sweep Generator: RF Speech Processor for Single Sideband: Coax Dehumidifier: One Crystal Frequency-Synthesizer for Two-Metre FM: Low Power VHF Dummy Load: Vertical Monopole Log Periodic Antennas for 40 & 80 Metres: Noise Reduction for CW Reception: Two-Capacitor Transmission-Line Matching System: Vari-Q Filter.

RADIO ZS. September 1973.
An Expanded Voltmeter: DF Transmitter De ZS2D: Taking the Gee Whiz out of Logics. The move to speaking and writing Afrikaans over the last few years means that "ZS" now means less to speakers of English.

VHF COMMUNICATIONS. August 1973.
FM Transceiver with Multichannel Synthesizer: Adjusting the Operating Point of Field Effect Transistors: A 10:1 Prescaler and Preamplifier with an Upper Frequency Limit of 250 MHz for Use with Frequency Counters: Receive Converter 432 MHz-28MHz, Matching the Transmit Converter DJ6ZZ 002: Notes on the 28MHz-432MHz Transmit Converter DJ6ZZ 006: An Integrated Receiver System for AM, FM, SSB and CW. Part 3 Carrier Oscillator: Oscar 6 Operations Summary: Miniature Receive Converter for 432 MHz-144 MHz for Portable operation and DF-Hunts: TV Pattern Generator.

NZART AMATEUR RADIO "CALL BOOK" 1973.
Commences with a short article by Tom Clarkson, ZL2AZ briefly covering Amateur Radio over the last 50 years. Then lists Callsigns and names and addresses of all New Zealand Amateurs. The balance of the 124 pages is crammed chock full of information for amateurs, Country Prefixes, International Callsign allocations, Small ships calling and working frequencies, Time Signals, Commercial Advertisements etc.

This offering begins 1974 and I would like to thank readers of "AR" for expressions of appreciation and words of encouragement offered to the writer during the year. My job is a pleasant way of doing a little to assist in the dissemination of information to Amateurs in VK. I will do my best to answer any queries which are raised by readers who should enclose a SAE with their query. Happy 1974 to all. VK3ASC. ●

VHF UHF

an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VKO	52.160	VKORSG Macquarie Island
	53.100	VKOMA Mawson
	53.200	VKOGR Casey
VK3	144.700	VK3RTG Vermont.
VK4	52.600	VK4WI-2 Townsville
	144.400	VK4WI-1 Mt Mowbullan.
VK5	53.000	VK5VF Mt Lofty
	144.800	VK5VF Mt Lofty
VK6	52.006	VK6VF Bickley
	52.350	VK6RTU Kalgoorlie
	52.900	VK6RTT Carnarvon
	144.500	VK6RTW Albany
VK7	144.900	VK7RTX Devonport
VK8	52.200	VK8VF Darwin
ZL1	145.100	ZL1VHF Auckland
ZL2	145.200	ZL2VHF Wellington
	145.250	ZL2VHP Palmerston North
ZL3	145.300	ZL3VHF Christchurch
ZL4	145.400	ZL4VHF Dunedin
JA	52.500	JA1IGY Japan.

Presumably the VK1 beacon still awaits the PMG licence, so we cannot include it yet, and we are still waiting for the VK2 beacon. Leigh VK6WA writes from Morley with some news of the VK6 beacons. He advises an overhaul was given the old VK6VF 6 metre beacon, the old keyer being an optical-mechanical-electrical type stripped and cleaned. The transmitter produced 15 watts after replacement of sundry components, and commenced running again on 17th December into a horizontally polarised turnstile antenna about 16 feet above ground, which at Bickley is about 1000 feet a.s.l.

The 144 MHz beacon has died of old age, and should be put to rest in a quiet field to push up daisies — so says Leigh! The new solid state beacons are coming on slowly, and once the DX season is over no doubt the tempo of reconstruction will quicken. Danny VK6ZFF and Peter VK6ZDY are concerned with the new construction.

52 MHz AND THE DX

By the time everyone reads this the DX season will mostly be over, and all will be busy preparing their logs for submission to the Federal Contest Manager as their entry for the Ross Hull Memorial Contest. There were some very good scores being aired around. Some were very cagey about their high scores, whispering them just loudly enough into the SSB rig for the other end of the contact to hear and with hopes of no one else! Looks like Kerry VK5SU at Ceduna gets the large end of the bone this year, having kept it after being challenged by Wally VK5-ZWW. The nerve of some guys!

I am sure most would agree it was a good DX season. Conditions were certainly not so consistently good as some years, but when the bands really got going there was plenty to work from all areas. Many contacts were made after the main DX had passed on due to the increased use of SSB, higher power, better receivers and antennas. SSB stations appeared to outnumber the AM stations, and no doubt will continue to do so. The boys on the FM nets were having a ball too, and several CW stations were noted.

In VK5 the 6 metre band opened to DX on 23 days of December, and possibly more if someone was around to be on the air. Probably the best days were 15, 22, 23, 30 and 31st. VK1 was worked on 4 days, VK2 on 11, VK3 on 7, VK4 on 17, VK6 on 12, VK7 on 9 and VK8 on 4 days. One should not be too concerned with the differences between the days worked in different areas because for a contact to take place there have to be operators at both ends, and sometimes only one end is available to go on the air. Nevertheless, it is interesting to note the number of times VK6 was available, and from the number of stations worked in VK6 it indicates quite a bit of renewed interest over there. It was not uncommon for VK5 to hear VK6 and VK2 or VK4 swapping numbers, so there was plenty of evidence of across-the-continent contacts. There were many occasions when back scatter contacts were made this year. More than usual I would venture to suggest. Perhaps the better equipment makes this possible, and the SSB type receiver probably handles the fluttery type of signal better, with the improved AGC system.

Probably the best overall days were 22nd and 23rd December with big short skip openings to VK3, which immediately gave the reminder to have a look on 2 metres. Some did, and the results are tabulated below in the 144 MHz news. 30th and 31st December were probably the best days for sheer coverage of the whole continent and New Zealand. What fantastic days they were! Many stations worked all States except for VK9, which appears to have been non-existent this year, plus four ZL districts. Wally VK5-ZWW was running up contacts at the rate of 40 about every 3 hours! Rod VK2ZQJ was worked here at the end of the month with a tremendous signal — in fact it seemed so broad I felt almost compelled to mention it, but on looking at the S meter decided otherwise. It is sometimes difficult to keep a signal narrow which sends the meter needle over to the stop!

It would be possible to go on and on about 6 metre openings. There is really so much of interest, but most of those who read these columns would no doubt be using the 6 metre band and be aware of most of the news, so perhaps I will leave 6 metres there for the moment.

144 MHz AND THE DX

Well, it did happen! 144 MHz openings across a large portion of Australia. There is a saying, "All things come to those who wait." Some of you will recall after last year's DX season I mentioned in these notes that you should get your 2 metre gear in order as I thought 1973 would be a year for some good 2 metre tropo openings, and continuing into 1974, and possibly 1975. Yes, it was printed in AR. Now I have waited nearly 12 months to have this dig. My friends in VK2 (yes, VK2) remarked on my comment — not directly of course, but Mike VK2AM noted on page 15 of "6 UP" for March 1973 that "*. . . This band was watched carefully this season as Es is expected to improve over the coming years. (Oh yeah . . . according to whose theory? . . . Ed)*" Of course the Editor is my friend Roger Harrison VK2ZTB, and I could certainly see the spear pointed at me!! Anyway, that's now one up against his duckhouse, and I'm tipping he will need another duckhouse after the 1974 season! Enough said, back to the news.

As 144 MHz openings of the Es type don't feature too often in these pages, I believe the following resume of openings as provided for me by Bob VK5-MM are worthy of inclusion for your reading.

Saturday, 22-12-73: VK3AMK and VK3ZAZ worked VK4. VK1VP worked VK4EN, VK4ZAZ on Ch. B. VK1-MP worked VK4ZAZ Ch. B. VK2ZRH copied VK5SU, and worked crossband to 6 metres but no direct contact. VK5ZDY worked VK2ZRH at 1315. VK2GX to VK4EN on 146 MHz. Both VK2ZRH and VK2GX copied VK5VF. I

Sunday, 23-12. VK5SU worked VK2ZRH. VK5SU heard by VK2CG and VK1MP. VK5DK in Mt Gambier heard VK4ZAA and VK2ASI on Ch. B, moved down to low end of band and worked VK4FE at 1250.

At the same time VK5NC worked VK2ASI on Ch. B.

Thursday, 28-12. VK3ADT-P worked by VK5's.

Sunday, 30-12. VK4ZBB worked VK2ZBP on 146 VK4ZDI and VK4ZEL worked VK3AMK. VK5MC worked VK4ZEL.

Tuesday, 1-1-74. VK5 beacon heard by VK2ZRH. VK5SU heard by VK2ZRH. VK5RO and VK5ZWW worked VK2ZRH. VK2ZQJ heard VK5ZWW, VK5RO heard VK2ZQJ but said he was too strong to resolve successfully! VK5SU worked VK1VP, VK1MP and VK2AM. VK1VP heard VK5VF.

The above gives a reasonable summary of what took place. No doubt there were many other contacts made, but it does indicate that the observant stations get the rewards, and the fact that these contacts extended over a period of 11 days with a total of 5 openings is quite interesting, as most times in the past perhaps two such openings would be about the limit. (Please correct me someone!) Anyway, all this leads up to the fact that as a result of such wide coverages on 2 metres, more interest will be shown in that band, and more stations will no doubt take the air next year, with the possibility of even greater things to come. So let's all be in it. Remember, when the skip shortens, the MUF rises, and even the old telly can be a useful monitor on such occasions. When you can see stations on Channel 3, 4 or 5, have a look at 2 metres!

432-1296 MHz

Now while all the exotic 144 MHz stations were being worked, our friend Ron VK3AKC was not mowing the lawns. He and Kevin VK7ZAH worked each other on 1296 MHz on 27, 28 and 29 December, each contact being worth 250 points for the Ross Hull Contest! For good measure they also had contacts from time to time on 432 and 144 MHz. Good work gents. Thanks to VK7WI and VK7ZGJ for info.

GENERAL NEWS

Steve VK3ZAZ passes on some Central Victorian news, and mentions the large number of backscatter signals he can hear in the Learmonth area where he lives, 300 miles from Canberra and Adelaide. In addition to equipment mentioned last month, he now runs two 3 el. stacked verticals on 52.525, and an 88 metre leg rhombic fixed on N.E. Australia 32 degrees tilt, 16 degrees beam, gain approx. 12 dB, terminated and unidirectional. The rhombic is used for all his scatter contacts. His listings of stations coincides generally with those here, so it is difficult to know how much to include. I agree with him however, that if you look amongst the strong stations there is plenty of DX to be worked from other areas using the scatter techniques. Thanks Steve.

Leith VK6WA has some further information in his letter mentioned earlier in the beacon news, and this concerns his operations as an amateur in England where he operated as G4CLP during the last three months. He took a hand-held rig and had quite a few contacts on 144.480 FM net. He reports the channel is extremely active around the London area. 144.6 is used as a "natter" net, causing a considerable amount of wrath to be incurred by the RTTY operators who use the channel as a national RTTY net!

GB3PI the repeater in Cambridge also is quite active and uses standard 600 kHz spacing with 1750 Hz tone burst access. Leigh also worked quite a bit of tuneable on 2 and this is something like 40 metres in VK2 or 3. The QRM has to be heard to be believed during a contest. Also a conglomeration of SSB stations to be heard on 145.41. Most of the operation on 2 metres is AM, with many using transistor VFO's. He even tried his hand at operating on 4 metres! Thanks so much for writing Leigh, I wish more would pass on this sort of news.

I expect as time progresses we will hear how the various VHF DXpeditions got along this year. Bob VK3AOT appeared to be having greater success than he did in 1971, when he was plagued by alternator troubles and boiling radiators! Mike VK3ASQ and company were to be on Mt Cowley with 52, 144, 432 and 1296 MHz gear. The Mt Gambier boys were also going out. The weather was pleasant anyway, and plenty of contacts should have been available. I am currently threatening to go out myself next year!

Perhaps in closing, a summary of the DX situation There certainly has been some help from the FM nets on 146 MHz this year in warning some operators of openings from other areas. This represents one way to keep an ear on the other band when operating on 52 MHz. More operators were heard trying it on 2 metres than other years. Surely this indicates there is a lot of 2 metre equipment around. Could it not be used more often during the remainder of the year? Best pointers to a rising MUF are still the short skip stations with very strong signals, and more operators are realising this. Finally, a good season all round, generally with very good co-operation. Some extremely pleasant and interesting contacts, and some very nice courtesies being extended to others from time to time. In all, VHF DX this year has been very pleasant and I am certainly looking forward to the same period next season.

Closing with the thought for the month: "The only suitable gift for the man who has everything is your deepest sympathy."

The Voice in the Hills.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY.1974

By the time you read this the Field Day will be upon us and your good intentions of some time ago will be put to the test, unless you are well equipped to get out in the field at very short notice. Of course, if the situation is past redemption, you can still support the cause by giving numbers from your home QTH to keep the field stations busy, and **send in your log.**

Again I draw your attention to the opportunity for the VHF operators with a section of their own.

Also for the opportunity for portable field stations, HF, to make a second contact with any station after four hours have elapsed. I selected four hours to give the 24 hour stations the advantage as we all know how the late comer in contests so often gets it easy. Of course the six hour stations have their chance for additional contacts with the same station. Tell me what you think of the idea. This applies to the HF operator but the VHF men have the two hour rule as usual. That is a contact with the same station after each two hours.

The New Zealanders Field Day Contest is on the same week-end, Saturday 9th from 1500 hours to midnight, ZL time I guess, and Sunday 10th from 0600 hours to 1500 hours.

They use 80 and 40 metres only, phone and CW. ZLs may have a phone and CW contact within the hour if there is another contact-station between. Each hour means even hours as 1600-1700, 1700-1800, etc. ZLs will add their Branch number to the RST and serial. Their contest is primarily a Branch effort.

I hope that we can bolster each other's efforts.

By the way, I see no reason why, before you go out in the field or after you return, you should not take part in the contest as a home station as well as a field station.

ROSS HULL VHF-UHF MEMORIAL CONTEST. 1973-1974.

This contest will now be history. Make it good historically by sending in your log to help achieve our 200 logs. You still have time. Here, Dec. 29th, there have been reports of good openings to Nth Qld, VK3 and VK5 on 6 metres and also VK3 on 2 metres. I have not been able to crack it myself.

What did you plot on last month's chart for the Ross Hull?

Don't forget to include your comments on the distance scoring table for 1974-1975 Ross Hull. 1974 will be a big metric year.

ARRL TEN METER CONTEST

This was a poor contest for me. How did you fare?

I heard KZ5JM working VK4 and SU but could not break him. A VK5 came through very strongly at 2305 but was too quick for me. Even JAs were too weak for me, although there were a few around the next weekend. Just the luck of the game.

CONTEST CALENDAR.

February

2nd & 3rd ARRL International DX competition phone.
16th & 17th ARRL International DX competition CW
9th & 10th Our John Moyle Memorial National Field Day. (Refer December Amateur Radio).
9th & 10th World SSTV Contest.
24th Central Coast ARC Field Day.

March

2nd & 3rd ARRL DX phone
9th & 10th World Wide VHF Activity.
16th & 17th ARRL DX CW.
23rd to 25th BARTG RTTY Contest.

SOME RD CONTEST COMMENTS THAT WILL INTEREST YOU.

VK5II. An article What the other chap thinks, Pix on the trophy and some details of members who passed on in the services. A few stamps with your log for Legacy. 4 stamps from each entry would keep a legacy ward for a year. A code with each report to indicate type of war service.

VK3III. Asked about RTTY contacts. I count as a contact. Also asked about VHF contacts beyond state boundaries. I would agree to count as a HF contact. Federal Council may comment.

VK5II. ". . . however a great contest, loads of fun and I really appreciated the HF boys that made an appearance on the VHF bands to help those with limited licences."

VK5EF. "This is my 21st consecutive contest". (Who can beat that?)

VK4!!1. "An extremely enjoyable contest . . . let us do it again next weekend." (I could not take it . . . but there is the Ross Hull!)

VK9!I. ". . . the 1973 event is the best I have known."

VK2!I. "The contest lived up to its name of the FRIENDLY CONTEST and I was able to break off for a couple of rag-chews."

VK2HZ. "I have been active in every RD Contest, except when in hospital, since its inception."

VK2II. "I have now operated in RD contests from VK9, VK7, VK5, and now VK2. The contest from VK2 is surely a lot harder in that each contact is the result of active hunting, yet much to my surprise this year's score is the highest that I have made. In reflection I am surprised that the score tables have been adjusted so well that operators in each state could end up with similar scores." (Also refers to lack of support for CW and suggests that scoring for VHF be equivalent to HF on a **time expended basis —**).

VK2II. (Approaching 71 years of age) ". . . did not stay up for the full 24 hours . . . Some of the fellows really put some effort into the contest . . . real dedicated effort and they deserve to get somewhere." (I wonder how many others appreciate the value of high contest scores to the Amateur movement?).

VK6II. ". . . unfortunately due to shift work I was not able to put in more than 2 hours. However I suppose every little helps." (Thanks OM, it certainly does).

VK7II. ". . . have been a licence holder since 1938 . . . first time I have taken part . . . despite the hectic conditions on the bands it was truly a great experience and to me a revelation of the great spirit of Amateur Radio, thanks to the high standards of the WIA and the journal Amateur Radio."

VK3II. "Enjoyed very much taking part . . . many call signs I have not heard for some time . . . good operating procedures and manners in the CW section . . . would hope that even a portion of the activity around would continue."

VK4!!. ". . . But there is another skill interesting to the communicator. . . . That is of course cross mode CW-SSB, SSB-CW. Double the points for crossmode operation. . . . Finally reverting to the minority of non-members who support the contest . . . surely a small roneo batch of results could be graciously distributed .

Who knows, someone may respond with grace and dignity and become a WIA member and supporter.

Have you found or do you know someone not in the last contest that would enjoy our next contest?

Make sure you bring another into the 1974 RD Contest.

Now about our goal for 1973?

I make it 718 listed logs plus a late log I seem to have mislaid . . . we won't quibble over one log let us have credit for **719 logs for the 1973 contest.** That means we only need another 81 logs to get our 800 up next contest!!

WORLD SSTV CONTEST

Two periods: 1500-2200 GMT Saturday Feb 9th
0700-1400 GMT Sunday Feb 10th.

4th annual SSTV contest sponsored by "C Q Electronica" of Italy.

Contacts by SSTV only. Any band 3.5 thru 28 MHz.

Exchange: Picture, signal report, and QSO number starting with 001.

Scoring: One point for contacts on each band except 28 MHz worth 2 points. Score 5 multiplier points for each continent worked and 2 points for each DXCC country on each band. In addition W9, W0 and VE call areas may be counted as a multiplier.

Final score: Total QSO points by the sum of the multiplier from each band.

Awards: Free subs to the three high scoring stations as well as to SWLs (picture).

Usual summary sheet etc.

Logs to Prof. Franco Fanti, via A. Dallolio n 19,40139 Bologna, Italy by March 20th 1974.

FRENCH DX CONTEST

Phone, February 23-24th, 1400 GMT Saturday to 2200 GMT Sunday.

Contest activity is not confined to the French continental stations.

You can also work French DUF countries and the following prefixes:- HB, LX, ON, 9Q, 9U, 9X, and 4U1ITU.

Exchange: Usual RS and serial commencing with 001. French stations will include 2 figures indicating their department.

Scoring: Each QSO counts 3 points. You earn a multiplier of one for each French department (95), each Swiss Canton (22), each Belgium province (10), each DUF country, plus LX and 4U1ITU worked.

Final Score: Total QSO points by sum of multiplier from all bands.

Awards: Certificates to top scorers in each country.

Logs to: REF Traffic Manager,Lucien Aubry, F8TM rue Marceau 53, 91120 Palaiseau, France.

I missed the CW section which was on Jan 26th-27th. No closing date given.

BERU CW CONTEST—1974

TROPHY MEDALLIONS FOR VK ENTRANTS.

The 37th Annual BERU contest will be held from 1200 GMT on Saturday 9th March 1974 to 1200 GMT on Sunday 10th March 1974. CW only. 3.5 to 28 MHz. Eligible entrants are radio amateurs licensed to operate within the British Commonwealth Call Areas. (VK1 to 8, and Lord Howe (VK2), Willes (VK4), Christmas (VK9), Cocos (VK9), Norfolk (VK9), Papua (VK9), New Guinea (VK9), Heard (VK0), Macquarie (VK0) and Australian Antarctica (VK0), are all separate Contest Areas.)

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 decided on total VK entries divided by two, i.e., for 18 entries to 9th placing; for 23 entries to 12th placing. (The respective 1973 winners were VK3XB and VK6RV.)

SCORING. 5 points for contact, plus 20 bonus points for 1st, 2nd and 3rd contact with each other call area. (G-GM-GI etc count as one call area.)

LOGS. Separate logs are required for each band. Each band log should be separately totalled, and should include at the end a check list of call areas worked on the band. Details in logs to include Date, GMT, station worked, number sent, number received, bonus points, contact points, claimed total score. Also required is a declaration that the station was operated within the spirit and rules of the contest, also details of equipment used.

ENTRIES to be sent to A. V. Davies, 41 Gainsborough Road, Tilgate, Crawley, Sussex, RH10 5LD England. (By airmail, please!) closing date 13th May 1974.

20 Years Ago

with Ron Fisher VK3OM

FEBRUARY 1954. Welcome to our Royal Guests! Editorial for February 1954 extended a welcome to The Queen and Prince Philip on their first visit to Australia, and what a memorable visit it was. Several excellent technical articles were featured. A. Havyatt G3IFS-VK2AET described the operation and construction of 'Skeleton Slots'. These antennas originated in the United Kingdom during the war and became very popular during the post war years with amateurs and commercial manufacturers. However they only enjoyed limited popularity here in Australia.

Chris Cullinan was at it again with "Let's Listen". This was a self contained CW-Phone monitor. In the phone position, a diode detector was coupled into an audio output tube while for CW the diode output was used to power an audio oscillator. A very simple but effective idea. As a bonus, the unit could also be used as a code practice oscillator.

"The Complete Amateur". Tom Athey an ex-instructor for the Queensland Division Classes, commenced his series on the construction of a complete amateur station. Part one started with a general run down on the expected requirements plus a description of the VFO unit.

"A Treatise On Practical Modern Recording Tape". Mr. G. W. Steane told the story of how tape was made and why it was made in that particular way. I wonder how many can remember the old paper base recording tape. Things have progressed quite a bit in the tape recording field.

A 'Trade Review' was not a usual inclusion in AR of those days. However one on the Eddystone "700" communications receiver made interesting reading. I have not heard mention of this receiver either before or since this review was published. Although no price was quoted it was obviously in the high price bracket.

With a high level of amateur activity coming from the Antarctic regions, Hans Albrecht, VK3AHH, filled a need with his story "Antarctica". A short history and geographical description was followed with a list of personnel and a run down on the radio gear in use.

Ionospheric Predictions

with Howard Rider, VK3ZJY February, 74

This month's predictions from information supplied by the Ionospheric Prediction Service Division indicate point to point band openings for at least 50 per cent of the month.

Times quoted are GMT.

28MHz		
VK2 to JA		0100-0800
VK3 to VK9		0500
VK4 to KH6		2300-0900
VK5 to JA		0200-0800
VK6 to JA		0300-1000
VK7 to VK9		0500-0600
21MHz		
VK2 to SU		0500-1000
G (SP)		0800-0900
KH6		2100-0900
VE3		2000-2400
PY		2400-0100
VK3 to UA		0500-1000
W6		2100-0300
JA		2200-0900
ZS		0800-1000
KH6		2100-0900
VK4 to UA		0500-1000
KH6		2100-1000
JA		2200-1200
SU		0500-1000
VK5 to W6		2200-0300
JA		2400-1100
9G1 (SP)		0700-1000
9G1 (LP)	0800-0900	2200-0300
VK6 to W6		2400-0300
PY		1000-1100
ZS		0600-1200
VK7 to G (SP)		0800-1600
G (LP)		0900-1300
VK9		2100-1000
14MHz		
VK2 to SU	1000-1700	2100-2400
G (SP)		0700-1700
G (LP)	0800-1300	2000-2100
VK0		2000-1200
VE3 (SP)	1400-1700	1900-2000
VE3 (LP)	1400-1600	2100-2400
VK3 to UA		0700-1500
W6	0400-0500	1600-2000
PY		2000-1300
ZS	0500-0600	1200-1500
KH6	0400-1400	1900-2100
ZL		1900-1500
VK4 to W1		1300-2000
G (SP)		0700-1700
G (LP)	0800-1200	1900-2100
VK5 to W6	1600-1700	2000-2100
JA	0600-1300	2100-2400
9G1 (SP)	1400-1600	2200-0200
9G1 (LP)	0800-0900	2200-0300
UA		0700-1600
VK6 to W6	1600-1800	2100-2200
PY	2300-0400	0600-1200
ZS	1200-1300	0300
KH6	0600-1400	1800
VK7 to G (SP)		0800-1600
G (LP)		0900-1300
VK9		2000-1800
W1		1300-1500
7MHz		
VK2 to UA		0700-1500
W6	0400-0500	1600-2000
PY		1900-1500
VK3 to G (SP)		1500-2100
G (LP)		0800
VK0		2400-2400
VK4 to KH6	0400-1300	1800-2100
VK5 to ZS		1600-2100
VK6 to W1		1000-1300
VK7 to SU		1300-2100

Hamads

* Eight lines free to all W.I.A. members.
* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
* QTHR means that the advertiser's name and address are correct in the current Australian Call-book.

WANTED

Linear Amp 20/15/10. Also borrow or buy Ham Radio Sept. '70 and Jan '71. VK2BOA. QTHR.

Facsimile Machine Muirhead or similar. Any condition for experimental Satellite work. VK2AAK. QTHR Ph.: (043) 76-1261.

Manual and technical information etc., for Hammarlund Super Pro Communications RX to buy or borrow for copying. A. Greenwood, 83 Cox Street, Port Fairy, 3284, Vic.

Eddystone Model 898 dial or similar type.
Pye 9-0 A crystal filter. Please send price and details to VK3ZIP. QTHR.

HRO Plug in bandspread coil boxes for 21 and 28MHz. VK2QC. QTHR.

6C6 and 6D6 Tubes cheap for SWL. R. Edwards, L60181. 30 Panton Crescent, Karinyup, 6018, W.A.

WANTED TO SWAP

ONE only Creed 7B page printer, one AMR300 HF communications RX excel. cond., 1-R20 AWA (1968) HF communications RX Xtl locked and spares for the above. Valves, etc., for either a Hammarlund SP600JX. RX, Hallicrafter SX73 or Collins 75A2, or 75A3 or Drake 2B or RA17. For info contact L5134, H. M. Leopold, 9 Hyland Avenue, Darlington, S.A. 5047. Ph.: (08) 296-4250.

FOR SALE

Ex. US Army FM transceiver, 30 to 76MHz, 20 CH per MHz, all solid state, 12-15V DC. Any Offers? For further information contact Mr. B. F. Henna, 12 Ash Street, Morwell, 3840 or phone (051) 34-4275.

Homebrew transceiver, hybrid circuitry with 2E26 final. Works only on 14MHz at present. Homebrew triband quad. Purchaser to remove. Estate of late VK4BM. Offers to Mrs. Mead, 8 Cross Street, Mitchelton, Qld, 4053.

AWA MR3A Carphone, 3/12 final, 3 channel, $25. **Pye** Mk3, 6M $12. VK3YAZ. QTHR. (03) 25-2689.

AWA MR6A FM Carphone, Ch. A, B, 1 and 4. Fet pre amp. service manual and circuit diagram $70. ONO. Eric Gray, VK3ZSB, 15 Catalina Avenue, Ashburton, 3147. Ph.: Bus. (03) 630-5656, AH 25-3249

2m AM Tx 6146 final. Geloso VFO front end plus 1 Xtl inbuilt screen mod.
6m AM Tx 6BW6 final 2xtls inbuilt screen mod.
Weston LM50 6m TX-RX. 6146 final (50W) 2 X 807 mod. Dynamic mike has MCW and CW also. Inbuilt BFO for CW-SSB. RX turntable. TX Xtl cont. What offers? VK2AFF. QTHR. Ph.: DAPTO 61-4287.

Television Sets, Ex trade-in. Sell for cost price, average $7.50 each. Suitable for experimenting or parts, some may be working. Apply 19 Benwerrin Avenue, Baulkham Hills, 2153.

Swan 250 6M (50-54MHz) transceiver with Swan 210 external VFO 240V supply handbook. 200 watts PEP input. Excellent performer. Price $300 ONO. VK3ZGP. QTHR. (03) 359-1357. evenings.

Yaesu FTDX400 TRX excellent cond., with fan, CW filter, noise blanker, 27MHz fitted and 160 metre kit $400. H. J. Smit. VK2BHS. QTHR. Ph.: (047) 51-3524

Heath Kit HW7 CW QRP transceiver only 4 months use, reason for sale, going SSB. Price only $85. VK5NQ. Flat 83, Block G. Woomera, S.A., 5720.

Hy-Gain TH3 JNR Beam on the ground, complete with instructions, $50. VK3LC. QTHR. Ph.: (03) 50-2566.

Complete Tx stn 80-2m comprising—80-10 RF 813 deck 150W Geloso VFO; 2m RF deck QQE03-12 driver to QQE06-40 final xtl-locked on 144.123MHz; both units from common PSU/modulator. Pye base stn 6m-Tx/Rx xtl on 53.032. 2m convertor ECC2000 front end, xtl controlled. Complete stn for $195. VK3TK. Graham Clements, 12 Whitty St., Sunshine Ph.: AH (03) 311-2363.

Yaesu Model FL200B transmitter, 5 band, SSB/AM/CW, 240W, excellent condition with original packing and manual. Offers to VK6DG, c/o P.O. Box 65, Carnarvon, W.A., 6701.

Hy-Gain 14AVQ trap vertical antenna, 40 to 10 metres. Perfect condition with instruction book $30. Harry VK3ASI. QTHR. Ph.: (052) 9-9866 Bus.

Webster Bandspanner whip antenna-Best offer. Kinnear. Ph.: (03) 787-3360.

Silent Keys

Mr. A. HARTLEY, VK2VY
Mr. R. R. ANDERSON, VK3UR
Mr. W. J. MEAD, VK4BM
Mr. W. R. PHIPPS, VK6WP
Mr. C. N. (Newl) KRAUS, W1BCR

OBITUARY

Friday 23rd November saw the passing of W. R. (Bill) PHIPPS, VK6WP. He was aged 75 years and was a Life Member of the VK6 Division, having been elected to this position on July 19th 1965.

Bill had been an amateur operator since about 1919 and was closely associated with radio broadcasting since its inception in Western Australia. Together with the late Wally Coxon VK6AG, Bill Phipps helped to establish 6WF when it was originally owned by Westralian Farmers Co-operative. (Now an ABC station). With the transmitter operative, it was necessary to have receivers, and Bill was in charge of the manufacture of the "Mulgaphone" receiver.

His amateur activities were originally conducted in the 200 metre band with broadcasts of music, but with the coming of commercial radio this practice was discontinued.

Bill was a foundation member of a radio club formed by Mr Vincent Mathews which met in the premises of Stotts Business College. Other members included such old timers as Hal (Tinny) McKail, Arthur Sibley, Jim Austin VK6SA, Mal Urqhart, Bert Congdon. From the humble beginning of this club, later emanated the Subiaco Radio Society and the WA Division of the WIA.

Although not active over the last few years in the amateur world, Bill still carried on his business in Victoria Park, and was well liked and respected throughout the trade. It could be truly said that Bill Phipps was one of the pioneers of radio in Western Australia and radio is much the poorer with his passing.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

The following awards are available to licensed amateurs and shortwave listeners (on a "heard basis"). Contacts on and after 15th May 1952 are valid. Do not send QSL cards. A list of contacts should be certified by the Awards Manager. The fee for each award is five IRCs. The address for applications is R. C. Paraguayo, Awards Manager, Post Box 512, Asuncion, Paraguay.

DIPLOMA SOUTH AMERICA

Rules:

Contacts have to be made with ITU Zones 12, 13, 14, 15, 16 and 73 (S. America). A contact with ZP (Paraguay) is obligatory.

Requirements:

Class A 28 countries in 6 ITU Zones.
Class B 20 countries in 5 ITU Zones
Class C 16 countries in 4 ITU Zones.

Countries List: ITU Zone —

12 FY, HC, HC8, HK, OA, PJ, PZ, 8R, 9Y4, YV, YV0.
13 PY (North of 16 degrees 13 minutes South) PY0 (Fernando de Noronha).
14 CE (North of 40 degrees South) CE0Z, CP, ZP, CX, LU (North of 40 degrees South)
15 PY (South of 16 degrees 13 minutes South), PY0 (St Peter and Paul).
16 CI (South of 40 degrees South), VP8 (Falkland Is), LU (South of 40 degrees South).
73 VP8-LU-Z (South Georgia), VP8-LU-Z (South Orkney), VP8-LU-Z (South Sandwich) VP8-LU-Z-CE9-AN-AZ)

DIPLOMA PARAGUAY

Stations require five confirmed contacts with stations in Paraguay.

SATELLITE "1000" AWARD. Congratulations to VK7LZ upon being the second VK station to qualify for this Award. He was issued with Award No. 168 on 29th November. Congratulations also go to VK6HI on qualifying for Award No. 169 on 11th December. ●

amateur radio

MARCH, 1974

- FT 101 MODIFICATIONS
- MODIFYING THE MTR13
- 2 METRE BAND PLAN
- ATTENUATOR NETWORKS
- 2 METRE RTTY AUTOSTART
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JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

Model TE-22D

SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7. 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving.
Printed Circuit for uniform Characteristics.
Low Distortion
Dimensions: 140 x 215 x 170mm
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Price $49.50
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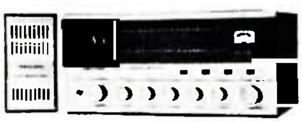
DX150B REALISTIC with SEPARATE SPEAKER



The popular REALISTIC DX150B which has gone from strength to strength with amateurs, short-wave and broadcast listeners alike, now has a further improvement. A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells if current fails or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical band-spread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

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GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz. **Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.**

- Field Effect Transistors in RF Mixer and Oscillator Stages.
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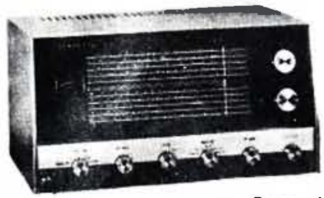

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P & P $2.00

Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration facility: **$210.00. 100kHz Xtal Extra $10.75.** P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402

This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

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TRIO 3" OSCILLISCOPE DC — 1.5 MHz MODEL CO-1303A

SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
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- Calibrated electrical bandspread.
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- 2 Microvolt sensitivity for 10 db S/N ratio.

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RF SIGNAL GENERATOR — Model TE-20D

SPECIFICATIONS

Dial has 7 separate band TE-20D covers 120kHz — 500MHz (6 Fundamental Bands & 1 Harmonic Band)
Freq. Accuracy: +or—2%
Audio Output: to 8 volt
Internal Modulate: 400Hz approx.
Tube: 12BH7A, 6AR5
Power Source: 105-125V, 220-240V AC 50/60Hz. 12 watts

TE-20D employs a Xtal socket and can be used as below.
a.—Self-Calibration
b.—Marker Generator
Small size-Space Saving.
Printed Circuit for a uniform characteristics.
Dimensions: 140v215x170mm
Weight: 2.8kg.

Price $47.00. p & p $2.00

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Ericaton Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50** Tested. p&p 75c
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Standard 2 Circuit Phone Plug PMG Type 30c
PMG Type Counters, 4 digit, 48 Volt operation 50c
PMG Type Telephone Plug & Socket, round type. PMG Type Phone Plug & Socket, standard Ericson Type White Plastic 95c per pair
PMG Type Telephone Extension Bells, 48V $2.00
230 Volt RVB Horn Tested $7.50

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amateur radio

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CONTENTS

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FRONT COVER

Caught with meters on the 'hop' on 20 SSB during the National Field Day is John Battrick, VK3OR, using VK3ZA's TX.
John was one of the party of Executive & VK3 Council members who manned VK3WIA/P Point Nepean, Vic.
Contact was made with all States, ACT & PNG. Operations were conducted on 160, 80, 40, 20 & 2 Metres.

QSP

As I write this, the John Moyle National Memorial Field Day has just closed—the generators have stopped and the atmosphere—audibly and RF wise—has quietened down once more.

My own estimate of portable station activity during the NFD was that the numbers semed to be lower than in previous years—others in our party at VK3WIA/P felt the same. Analysis of the logs will, in due course, tell whether we were right or wrong.

The more portable mobile stations on air the better, in terms of a good Field Day, and this was a good one; but I suppose a few more or less from year to year is of no consequence—Or is it?

Recent devastating floods in Queensland and New South Wales point-up the fact that tragedy can strike at any time and in many ways and a Field Day—even once a year—can be helpful because we take down our portable gear, dust it off and work in make-shift fashion as we may have to do in any emergency.

Radio amateurs can and do provide a valuable National asset for those charged with planning to cope with disasters.

Over the years, WICEN and individual amateurs have given communication assistance in numerous ways in most States.

Is WICEN dead? Need amateurs be concerned with the need to operate in emergencies? Two common questions, often heard in the light of the vast improvements in Police, Civil Defence, Fire Fighting and other authorities communication facilities.

Speaking with Colonel George Warfe, Director of Civil Defence in Victoria, he told me:

"Our HF, VHF and more recently UHF comms are excellent, as are those of many other Authorities in this State.

"WICEN not needed? Rubbish!

"Keeping in mind the role of WICEN in Victoria—to provide a back-up to PMG facilities—and the PMG are co-ordinators of communications in the State Disaster Plan—we are extremely lucky in this State that we have not needed to call on the facilities of WICEN.

"We are fully conscious of their value and their capacities and those of amateurs in general.

"The fact that amateurs have not been called upon is no reflection in any way—we've been extremely lucky".

By the time you read this, the Minister for Defence, will have presented to Cabinet a paper on the establishment of a National organisation to handle co-ordination of support for disasters.

The value of the Amateur Service and its 6000 members throughout Australia, is not unknown in either State or Australian Government circles and a letter has gone forward to the Minister for Defence re-iterating the capacity and willingness of Amateurs to be included in any ultimate National Plan.

Field days are a lot of fun and the name of the game is to get into the field, communicate and come back satisfied, weary and, hopefully, a little wiser.

Remember, too, that the NFD isn't restricted to field and mobile stations.

See you on the bands next time?

John McL. Bennett
VK3ZA

REMINDER

With EDP address labelling for AR now in operation the computer has been so programmed that address labels will not be printed for unfinancials at the time of printing labels for March AR (VK3, 6 and 7) or April AR (VK2, 4 and 5). The input data for these labels has to be finalised two weeks earlier. No missing issues can be sent out except against pre-payment of 70 cents per issue.

MARCONI COMMEMORATION

Marconi was born at Bologna on 25 April, 1874. During the month of April 1974 many meetings will take place at the Villa Griffone and the Marconi Foundation assigned to the amateurs the last weekend of March 1974.

The commemorative station I14FGM (Fondazione Guglielmo Marconi) will be particularly active from 29 March to the end of April. On 25 April, the station will be open for 24 hours and at 0815 GMT (hour of birth) a short commemorative message will be radiated by I14FGM to all amateurs.

A special commemorative QSL will confirm all the QSO's which take place on 25 April.

An international amateur meeting organised by the ARI branch section of Bologna will take place on 30 - 31 March, 1974.

Please address enquiries to:

Comitato Celebrazioni Marconiane,
Postbox 3113,
BOLOGNA 40100,
ITALY.

REPEATERS IN ITALY, ISRAEL and EUROPE

IARU Region I News of Dec. '73 observes that 2m FM in Italy in the past 3 years claims nearly 1000 users and mentions that 29 experimental repeaters await PTT licensing whilst others cover Southern Italy in part and almost the whole of the Northern areas. In Israel an FM repeater is expected to be activated shortly from the Jerusalem Mountains and the report quotes there are about 50 FM 1 W stations and 5 medium power CW/AM stations on 2m in this country. The list of 2m repeaters in Europe includes 2 in Czechoslovakia, 13 in Denmark well over 100 in West Germany, 1 in Holland, 21 in Sweden and 1 in Jordan with proposals for 34 in Norway and 9 in Belgium. Austria (8) and Switzerland (also 8) use 70 cm repeaters exclusively.

SYMPOSIUM ON SATELLITE COMMUNICATIONS FOR AUSTRALIA

A symposium on "Satellite Communications for Australia" will be held in Melbourne on May 27th-29th, 1974. Sponsored by the Radio Research Board the symposium is being organised by the Australian Post Office Research Laboratories.

Its objective is to bring together all those with a technical interest in the subject, at a time when Australia is investigating the use of a satellite communication system in the national telecommunication network.

There will be four sequential sessions, covering satellite communication systems, antennas, hardware, and propagation and digital techniques. Both review and research papers, from Universities, Institutes of Technology, Industry, and Government Departments will be included. Printed copies of all papers will be distributed to those attending. Two of the papers to be presented, in fact, are on the OSCAR programme.

Further details of the symposium, and registration forms can be obtained from:

Senior Assistant Director-General,
A.P.O. Research Laboratories,
59 Little Collins Street,
MELBOURNE, VIC. 3000

There is no charge for attending the symposium, but registration forms should be returned by April 30th, 1974.

WARC—MM TELECOMS

IARU Region 1 News for Dec. '73 contains a note which emphasises the continued need to exercise vigilance.

"The World Administrative Radio Conference for Maritime Mobile Telecommunications will open in Geneva on 22nd April, 1974. The IARU is an organisation invited to participate in the conferences of the ITU without incurring costs for attendance and services. The Region 1 Division will, on this occasion, undertake the representation of the IARU. SP5FM and G2BVN are expected to attend with OH5NW also to be present, if required.

It is not expected that the agenda of this conference will contain matters of importance to the amateur service but this cannot be taken for granted and it is essential that the representatives of the amateur service shall be alert."

UHF TVI—G-LAND

Ian Jackson G30HX in an article in Radio Communication Dec. '73 writes—

"Sometimes it may be difficult to cure the TVI. Technically, a cure is always possible but there may be limits to which the TV set owner, dealer or manufacturer may feel obliged to go.

It must be realised that if transmissions then cause TVI continue, unco-operative neighbours are unlikely to become more understanding and they take steps (including legal action) to make you stop transmissions. It is preferable to ask the neighbour to complain officially to the Post Office, who will then support the amateur when his station is proved to be free from fault, and may be instrumental in bringing about a cure.

An RSGB member who is threatened with any action to restrict his transmissions is strongly advised to notify the RSGB Interference Committee."

FOXHUNTING CHAMPIONSHIPS

IARU Region 1 held their foxhunting championships on HF (80m) and VHF (2m) at Komlo 200km south of Budapest last August. "The equipment used in the contest included automatically controlled transmitters with a central control station and radio links from the control point to every fox. This was assisted by excellent organisation and contributed to a most successful event."

ENDING OF AR IN YA

"By order of the Minister of Communications of the Republic of Afghanistan on 18 August, 1973, all amateur radio activity in Afghanistan has been ended, and equipment used for that purpose sequestered by the Ministry." Members of the camel-drivers Club will be well aware of the situation.

VHF-UHF.

Dick, K2MGA in the Editorial to CQ Magazine for December '73 wrote "The lust for amateur v.h.f's and u.h.f's that we're now seeing is only the beginning of what is likely to come, and future attacks on these frequencies are going to be extremely difficult to repel, if they can be repelled at all. Unreasoned prophecies of doom? We don't think so. The fear for the future of the 10-160 metre bands which drew such attention in the '50's and '60's will seem tame by comparison to what's to come in the '70's . . . commercial services express no doubts whatsoever that amateurs could be usurped from the u.h.f's without the slightest bit of trouble!"

experiments in modulation and audio part one

J. A. Adcock, VK3ACA
P.O. Box 106, Preston, 3072

This is the first of four articles in a series. They are not construction articles but describe the novel techniques used by the author over recent years to process audio and to produce various types of modulation.

Some of the circuits discussed have problems which remain to be solved. Perhaps you have the answer. If not, your imagination still cannot fail to be titillated.

PREAMBLE

For many years I have been intrigued by the possibility of compressing the spectrum required by the human voice. About 5 years ago I thought of some methods of doing this but at the time I had no idea how to go about it. However, as time went on suitable analogue integrated circuits becama readily available, and so my experiments were able to proceed. During the development of this idea a number of off-shoots became apparent. These are also described in the following articles Many of these ideas I believe are entirely new. They could have been developed before, but I have no knowledge of them. If anyone knows of these systems being described elsewhere, I would be pleased to hear about it.

None of the systems have been fully developed, but they have all been tried out. Anyone attempting these experiments should have a thorough understanding of the wave forms to be expected in any part of the circuits. A CRO and a variable frequency sine wave generator are essential.

Details necessary to construct the units are not given in most cases, but if any interest is shown in the systems, I will be happy to provide more details.

All the necessary circuitry for the analogue elements may be obtained from the application sheets provided by the makers of the UA795 and the UA741.

A DOUBLE SIDEBAND SUPPRESSED CARRIER TRANSMITTER

(Stage 1, System 1)

This method uses a single ended class C final with high level plate and screen modulation. The block diagram of the system is shown in Fig 1, Fig 2A represents the wave form of the original audio and Fig 2B the envelope of an AM signal for comparison. Fig 2C is the RF envelope of a DSBSC signal. Note that between each zero crossing of the modulating wave there is a corresponding "pocket" of RF energy. At the instant of zero crossing of the audio waveform, the RF signal changes phase by 180°. This is indicated by the plus and minus signs in Fig 2C.

In this system the balanced modulator is hard limiting, and produces a wave form as shown in Fig 2E. This is the frequency component of the signal divorced from the amplitude component.

(Actually, in this circuit the limiting is produced by the grid action of the class C stage following the balanced modulator.—Technical Editor).

The relative phase excursions of the signal are shown in Fig 2F. The amplitude component of the DSBSC signal is that of a full wave recified pattern of the original audio shown in Fig 2D. When waveform 2E is amplitude modulated by waveform 2D, the resultant signal is a DSBSC as shown in Fig 2C. This system makes

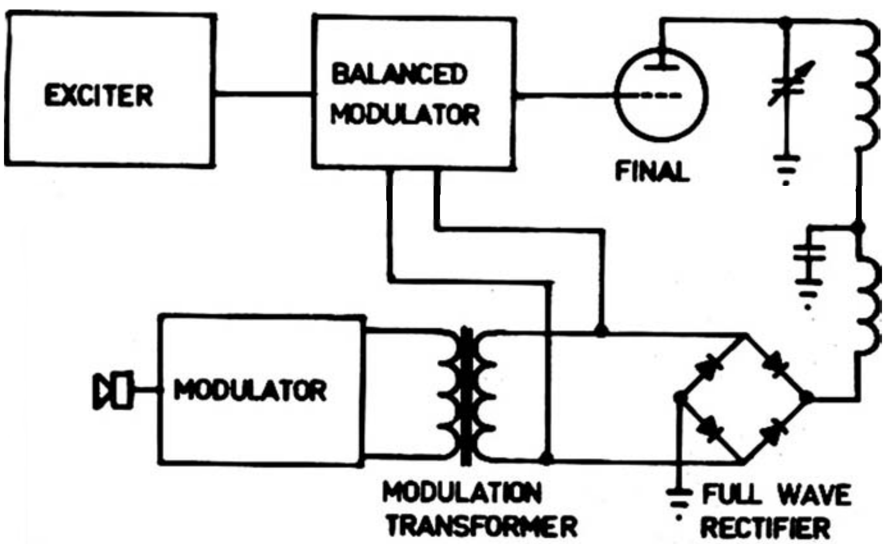


FIG 1 DSBSC TRANSMITTER

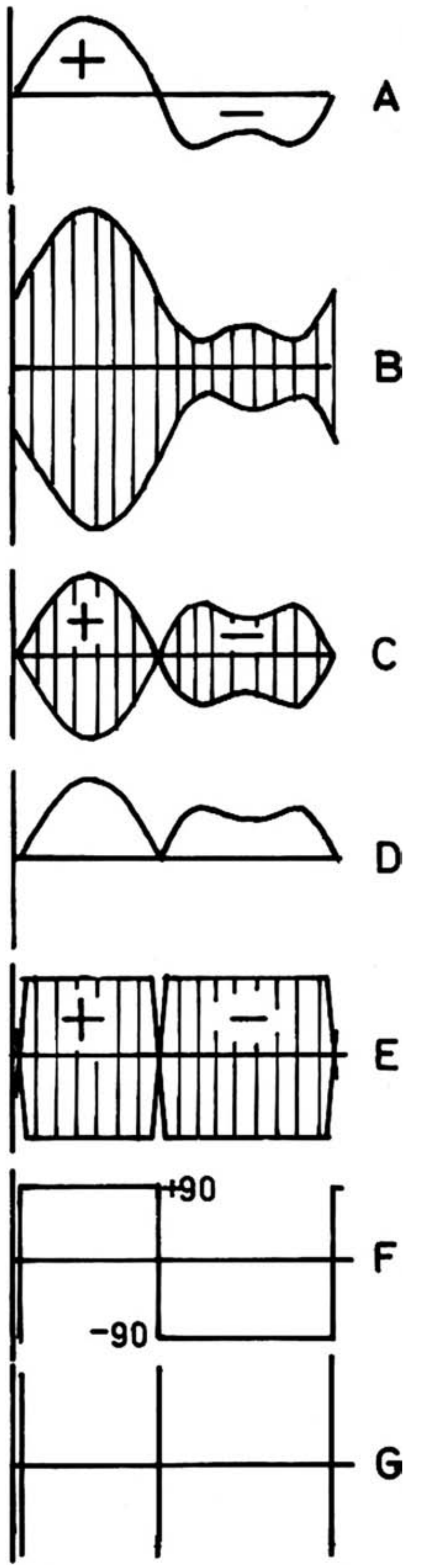


FIG 2 DSB WAVE FORMS

use of a concept in which the frequency component is separately modulated from the amplitude component. The same concept will be referred to again under system 4.

A suggested method of connecting the balanced modulator so that it is modulated with the same audio as the final is shown in Fig 3. The final could alternatively be screen modulated, although this results in a loss of efficiency.

The advantages claimed for this system over other high level modulation systems are:—

(1) Although it is a little more complicated than the final amplifier balanced modulation system, it makes better utilisation of the final tube. In the final balanced modulator method, two tubes must be used, and each is operating for only half the time.

(2) With this method a single ended final or a push-pull stage with a common screen can be used.

The system described has been tried out by the author and it is intended to make it a permanent adjunct to the 2 metre transmitter.

(A transmitting system similar to this was produced by at least one manufacturer prior to 1957. It is sometimes referred to as the Envelope Elimination and Restoration System.—Technical Editor)

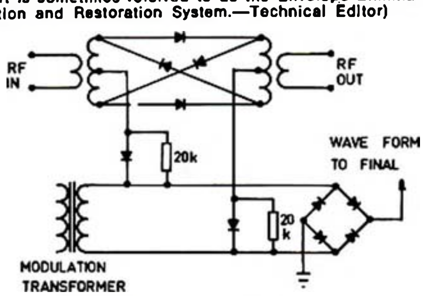


FIG 3 BALANCED MODULATOR

DOUBLE SIDE BAND SUPPRESSED CARRIER DETECTOR

(Stage 1, System 2)

Because this device was the first development in the current series of experiments, the main part of the circuit is shown in complete detail. Fig 4 shows the block diagram of the system.

Fig 2G is a graph of the frequency devi-

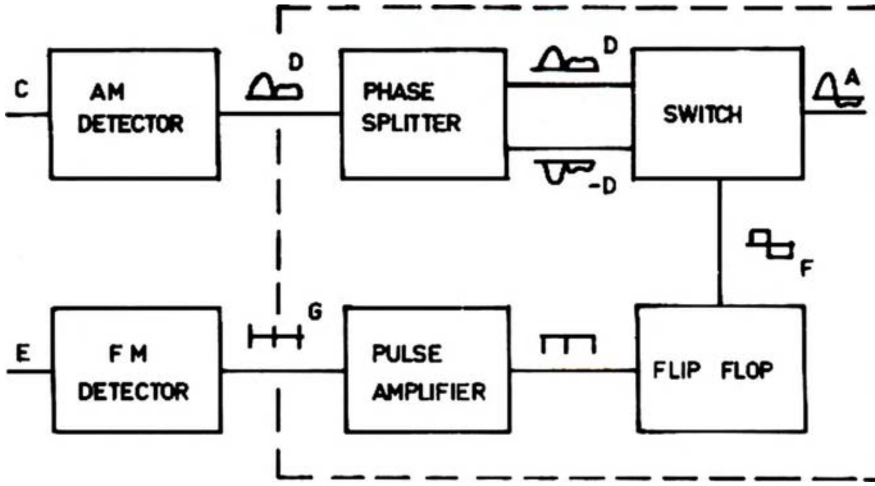


FIG 4 WAVE FORM RESTORER

ation curve of the DSBSC envelope of Fig 2C. Since the frequency of the signal does not show any deviation. At each reversal of phase, there is, in effect an infinite excursion of Frequency causing a pulse as shown in Fig 2G. The curve in Fig 2G is actually the differential coefficient of 2F. The diagram for Fig 4 shows the output from the AM detector equivalent to 2D, and the output from the FM discriminator equivalent to 2G. The pulses from the FM detector are amplified and made negative for triggering the flip-flop. The signal from the AM detector is fed into the phase splitter such that, with zero signal input, the output for both phases are of equal DC level; also the output from the AM detector must contain the DC component from the envelope. That is, the whole circuit must be DC coupled.

THIS IS MOST IMPORTANT!

The output from the flip-flop produced a curve equivalent to Fig 2F. The switch restores the wave from to that of Fig 2A by selecting each alternate half cycle from the phase splitter, switch, flip-flop and pulse amplifier is shown in Fig 5. This unit is here-after referred to as the wave form restorer.

The system differs from the carrier injected and phase locked system, in that all signal processing is carried out after detection—**no local oscillator is used.**

It is not claimed that this system is any better than the phase locked system. The author has not had time to analyse the signal to noise ratio performance, but it is suggested that it is the same as the carrier injected method. There may be some advantages in less circuit complexity. This system has been used in receiving DSB by the author.

(to be continued)

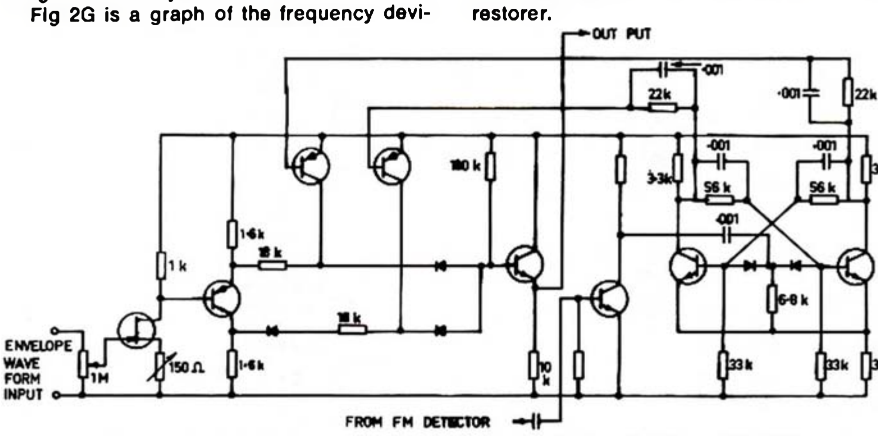


FIG 5 CIRCUIT OF WAVE FORM RESTORER

long delayed cosmic echoes – or galactic dx

Alan Shawsmith VK4SS
35 Whynot Street, West End, 4101

On the 15th Oct. '73, scientists in the city of Gorky, U.S.S.R. reported the reception of strange and unusual RF pulses from the direction of outer space. No frequencies were given but the signals were said to arrive at very regular intervals. The interpretation of this, is that they could be artificially produced from another civilization.

Reports such as these (there have been many before), stimulate curiosity in the still unsolved mystery of LDEs. Is there life beyond our solar system? Out in space, there exists a million, million stars in maybe a million, million galaxies. So, it is only natural to ask the question. Are we the result of a freak chemical accident and consequently, unique upon this tiny planet Earth? Or by the law of probability, does life exist on countless other stars? Opinion is now to the latter supposition. If this is so, why then have we not been contacted or visited before, because other civilizations, if they exist, may be far more advanced than our own crude society. The barrier that isolates us, even in our own galaxy, is that of space-time and is measured in some cases in thousands of light years. Also, our small planet suffers the added disadvantage, that we are located colloquially, 'out in the sticks'.

If we imagine the cluster of towns along the East coast of Australia as the denser planets of the Milky Way, then our little Earth would be somewhere 'back of Bourke'. With the lures of Sydney and the Gold Coast near at hand, galactic spacemen are not likely to put us on the visiting priority list. However, it is not entirely out of the question. It has also been pointed out that the first commonsense move by an intending space visitor, might be to despatch an unmanned probe to sound us out and look us over. Now a new theory has been put forward to show that such a probe could be the possible origin of Long Delayed 'Cosmic' Echoes. This eerie and uncanny phenomenon manifests itself by the echoing back of RF transmission, after a delay of anything between 3 - 30 seconds: 8 seconds being about average.

Try to imagine this situation yourself. You call CQ 20mx DX, 3 x 3: no reply: the band seems quiet: then, half a minute later, your 3 x 3 call begins coming back, loud and clear and IN YOUR OWN FIST. Is that enough to send you to the Bar for a 'stiffener'!!?

W6ADP describes his experience thus:- *"I was calling ON4AU on 28 and switched over to listen and heard, on my own frequency, 'ON4AU de W6ADP K' — was very weird and never will forget it. Signal sounded like it was coming a long way but was S6 or so."*

In the past, some researchers have said that LDEs could simply be a figment of imagination. This theory was never accepted, even though it is recognized that the paranoid personality is prone to hear non-existent sounds. The healthy mind too, can play tricks, when that person is in an acute state of fatigue or strain. It would be true to say that some reports of echoes received, have been due to mistaken identity or imagination.

Other theories are that LDEs are spurious signals generated in the Transmitter, or are signals naturally delayed and amplified in the atmosphere. Attempts are being made at this moment, to prove or disprove these theories.

The first cosmic echoes were logged in the European summer of 1927. On the 11th Oct 1928 (note this date in relation to the Russian report), a large number of echoes were received on 31.4 metres HF in Oslo, Norway, near noon, with delay times between 3 - 15 seconds (most about 8 seconds) . . . during the same night, 120 echoes were observed at Eindhoven . . . in 1930, echoes were reported in Indochina. In 1934, more than 70 echoes were observed between 30th May and 8th July."

Authentic amateur reports on these strange echoes commenced in 1932 and have continued in 1965, 1967 and 1968 and 1969, on many different HF bands.

W6QYT, of the Radio Science Laboratory at Stanford University USA, has said that an active amateur might expect to encounter echoes, on the law of averages, once per year. The research team at this lab say that the echoes are likely to be strong and not distorted (no Doppler effect). Anyone hearing this phenomenon, should log the time and make a careful description of the observed effect and post same to W6QYT. • W6QYT says that amateurs may hear the effect but not recognize it as a true echo, so listen carefully.

Mr. Duncan Lunan, Graduate in English & Philosophy. Student in Physics A Astronomy—and a successful writer. Author of MAN & THE STARS.

To return to the theory or a possible space probe from outer space. At a recent meeting of the British Interplanetary Society, a young Scottish graduate, Duncan Leunan, advanced a theory, so fantastic and exciting, that if it's true, "Star Trek", "Dr Who" and "Lost in Space" will seem like old-fashioned history, in comparison.

For Mr Lunan is sure that he has stumbled across proof that there is an unmanned spacecraft circling the moon and that it was sent up by the people of a dying star, Epsilon Bootis, 13000 years ago.

The very responsible British Interplanetary Society is so impressed with his documented hypothesis, that it is about to mount a major scientific experiment, to try to re-establish contact with the space probe.

A full explanation of Mr Lunan's hypothesis is not possible within the confines of this article but here are some of his comments:-

— while researching, I came across a record of experiment done by a group of scientists in 1927-29, about radio signals beamed out into space and a set of peculiar echoes which kept coming back. These echoes didn't repeat the original signals, but returned one of different length and at different intervals, like 3, 5 and up to 20 seconds. I reasoned that, if a space probe was trying to establish contact with us, the first thing they would probably do, would be to plot their position. This seemed the key to the puzzle that had stumped the experts for so long, so I plotted the signals in the shape of a graph. (This graph which clarifies Mr Lunan's remarks, can be had from the magazine *"SPACEFLIGHT"*, 12 Bessborough Gardens, London.)

He continues, *They formed an instantly recognisable stellar constellation, that of Bootis the herdsman, just to the left of the Plough. I translated all the other sets of signals into graphs and they show an enormous amount of detailed information, including by mathematical deduction, the star Epsilon Bootis. We know this star has been dying for years, because of expansion and overheating. So I think the inhabitants sent out a spacecraft to try and contact other planets to which they might travel, or who could help.*

Mr Lunan feels that if the radio experiments in the 1920's had continued, they would have resulted in a further series of messages from the probe.

That's what we're trying to pick up now. At this moment, highly sensitive and powerful equipment is being assembled in England to beam out a radio signal hoping to re-establish contact.

• or to **A. T. Lawton, C-o Golde, 13 Gastonbridge Rd, Shepparton, Middlesex, England.**

Sceptics of the above theory will point out that the problem of sending a probe as a means of communication is one of being able to attain sufficient interstellar speed. A successful launch could only be made from a twin star gravitational vortex. Epsilon Bootis is such a system.

The station now being set up in England will be known as GOLDE — Ground Observation of LDEs. The transmitter has a Moonbounce aerial set up, equatorially mounted. It will transmit 1kW on a 33 degree bandwidth, aiming at the equalateral points in the Moon's orbit. The fqs are in the 2 metre band (the reason for this choice of fq will be given later). The Main receiver is a product of EMI Limited; extremely sensitive and with a very sophisticated satellite tracking aerial, altazimuth mounted, 9½ degrees beamwidth with remote control. The timing mechanism of the eqpt is sensitive down to millions of a second.

Mr Duncan Lunan elaborates further —

Besides the question of the probe in space the GOLDE station hopes to settle the question of spurious signals generated in the transmitter and-or solve the mystery of delayed and amplified signals in the atmosphere. This is where overseas stations can play a part, particularly a set up in Australia. If we get a sufficiently long baseline to show by triangulation that the 'echoes' are coming from the Moon Equilateral points — then we're almost there.

Natural reflection, inside or outside the atmosphere, is ruled out by the recorded intensities of the 1920's signals. They were up to one-third the intensity of the outgoing pulse, after a 3 seconds' delay, and likewise on all other times noted up to 30 seconds. In other words, the inverse square law is totally defied, whether the echoes were being reflected round and round the Earth or from a string of objects in space spread at exactly one light second intervals. (UFOs — saucers, or what??) However many professional men refuse to accept this point — Sir Bernard Lovell has spoken with great finality. He considers the 'echoes' the result of multiple reflection around the Earth. There are others who consider the theory of evenly spaced 'natural' objects more plausible than a space probe. To disprove this it will be necessary to show that any received 'echoes' do not come from objects in the Moon Equilateral points. This is where the hyper-accurate timing will play its part at the main receiver, ***AT GOLDE STATION.***

Mr Lunan makes further comment. This time on the choice of fqs.

Two metres was chosen, simply because of the QRM situation on other bands. The original echo channels of 31.4 and 25 metres are now saturated with man-made interference from morse and telex stations. A programme, commenced after WW2, was a failure due to this and a team at Stanford in California encountered great difficulty. Another point is that the ionosphere is ordinarily capable of great interference at those wavelengths.

The 1920's echoes were heard ***ONLY*** *when the ionosphere was quiet, particularly in April and October.* (My log shows the bands were quiet on 15th Oct. '73 — the date pulses were received in USSR. — VK4SS)

The Stanford research team investigating naturally amplified and delayed 'echoes', produced by interaction between radio waves and physical plasma waves in the upper atmosphere, showed that these too were audible when the bands were quiet. But these 'echoes' are isolated, not in sequences and show both time compression and frequency shift. It's the ***absence*** *of the two latter conditions plus that of inverse-square-law diminution and the* ***substitution*** *of dashes in the 'echoes' for dots sent out, that convince many that the 1920's echoes could be artificial.*

Echoes of this apparent nature and characteristics ***do*** *still continue to this present day, over a great range of wavebands, but* ***not*** *now on the original channels where man-made QRM has reached a high level.*

No one until now has beamed signals straight at the Moon Equilateral points. This will be done by GOLDE station in England and it is hoped will help determine the origin of these types of echoes. There's reason, both in the signal patterns and in the dates and times of the 1920's results, to suppose that the probe itself may be in the leading equilateral point, with a relay unit in the trailing point. If the echoes are natural from atmospheric, it will not make any difference where the GOLDE aerials are pointing, but if they are coming from the equilateral points, then it should make a tremendous difference.

The theory that some of the LDEs are artificially produced and from an unmanned space probe is an exciting and romantic one, to say the least. If proof of the probe's existence can be established, then the burning question that has fevered the mind of star gazing Earthman — 'are we alone the only race or are there others out in space' — will have been answered.

Duncan Lunan expects both criticism and cynicism. He will get it. However, even if his hypothesis does seem, on the face of it, a long-shot theory, it is well to keep in mind that Earthmen are now in the embryo stage of planning and developing a space probe programme which may one day see unmanned vehicles journeying to parts of our galaxy, including Epsilon Bootis. ●

zener diodes from transistors

Rick Matthews VK5ZFQ

Reprinted from the South Australian Journal. June, 1972.

Nearly all the Zener diodes now available are made by exactly the same process as the base-emitter junctions of silicon planar transistors and some manufacturers have even been using below specification transistors for Zeners.

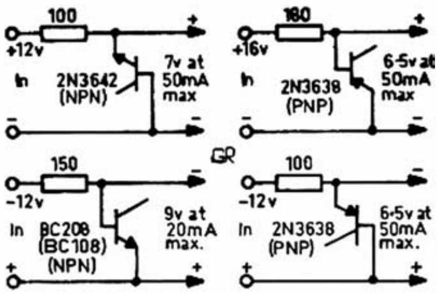
The table shows some of the transistors commonly available, listed with their average characteristics. If you wish to use other silicon planar transistors, then apply the manufacturers' rule of thumb and derate the maximum power dissipation to 2-3rd of the transistor's rated maximum. The minimum Zener current is usually set to about 5mA to ensure proper zenering.

The voltage range may seem a bit restricted but it is fortunately very close to the *zero temperature coefficient* region and is in the most popular range for voltage references. Of course, higher voltages can be obtained by using two or more Zeners in series, and you get good voltage temperature — stability yet still **PAY LESS** than for a normal Zener diode. Sometimes you can get an extra 0.5V by using the collector to emitter connection. However, some transistors (such as the 3N3642) exhibit *negative resistance* and will oscillate, so be careful.

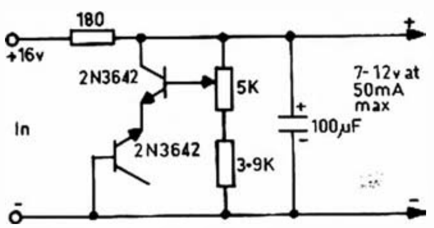
The dynamic resistance measures the quality of the Zener diode. The ideal Zener diode would have zero ohms dynamic resistance and would have the same voltage across it over its full current range. However, all Zener diodes act like ideal Zener diodes in series with a resistor equal to the dynamic resistance. From this aspect, you can see that the 2N3638 makes a very good Zener diode.

The circuits all show standard voltage regulators using transistor Zener diodes for voltage references. I have shown 12 and 16 volt inputs as they are commonly encountered in automotive and 12V AC rectified circuits. The first 4 circuits may be used to test the zener voltage of a transistor before using it elsewhere. The first 5 circuits are shunt regulators and are a bit wasteful in terms of power and limited in output voltage. The last three circuits, Nos. 6, 7 & 8 are series regulators which are more complex, but offer higher output currents.

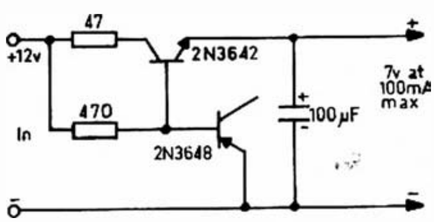
TRANSISTOR	ZENER VOLTAGE	DYNAMIC RESISTANCE	MAXIMUM CURRENT	MAXIMUM POWER DISSIPATION
BC208-BC108	9	20 ohms	22mA	200mW
2N3642	7	6 ohms	70mA	500mW
2N3693	7	12 ohms	30mA	200mW
2N3563	6.5	15 ohms	30mA	200mW
2N3638	6.5	2 ohms	75mA	500mW
2N706	6.5	5 ohms	30mA	200mW



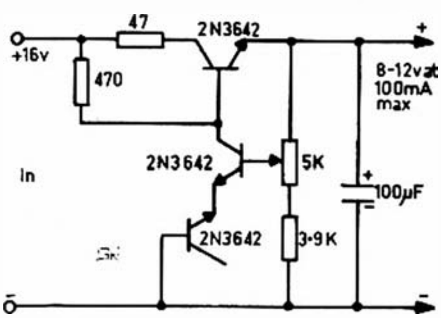
CIRCUITS 1 to 4 (SHUNT)



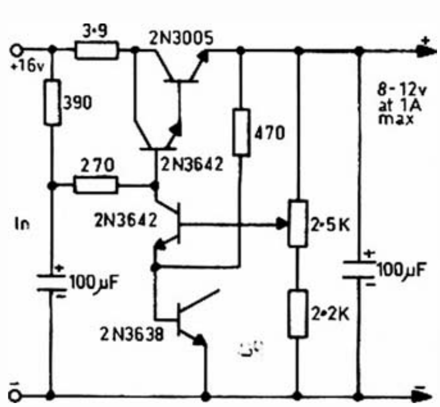
CIRCUIT 5 (SHUNT)



CIRCUIT 6 (SERIES)



CIRCUIT 7 (SERIES)



CIRCUIT 8 (SERIES)

2 metre RTTY Autostart

Ken Kelly VK4MJ
285 Monaco Street, Surfers Paradise, Qld., 4217

Interest in RTTY is increasing in VK4, and several operators on the Gold Coast are commencing regular traffic on 2 metres with stations in Brisbane. It was desired to run an auto-start net, so that messages could be sent in the absence of the receiving operator, who could in turn reply at a later time, possibly when the first operator had left his shack.

There is nothing new about the circuitry in this little unit, as it was taken direct from the manufacturer's data sheets. However it has been established that it works reliably, and is about the simplest system that can be devised to meet the purpose.

The unit consists of a NE567 phase locked loop IC, which is designed as a tone decoder, and is connected across the speaker voice coil leads of the VHF receiver. The PLL is tuned by means of a tab-pot to the desired frequency, in this case 2125Hz which is the RTTY mark tone, which closes a relay when this tone is received. When the tone is switched off, the relay drops out promptly. The relay contacts are used to turn on the mains supply to the RTTY machine and terminal unit, and this commences immediately to print any teletype message which may be sent. The band width of the decoder is sufficiently wide that it will not drop out when the space tone is received, as this is only 170Hz higher than the mark tone. However any speech which may come up on the channel is ignored by the decoder, and it does not operate.

The circuit diagram Fig 1 shows the connections for the IC. The pin numbers are the same for either the top hat or the V package, the latter being an 8 pin DIP. The centre frequency is given by the formula

$$F_o = \frac{1.0}{R1\ C1}$$

F_o in kHz
R1 in k ohms
C1 in uF

The optimum value for R1 is quoted as around 4000 ohms. Suitable values were found to be a 5K trim pot, and for C1 0.13mF. (0.1 and 0.033 in parallel). C2 is the low pass

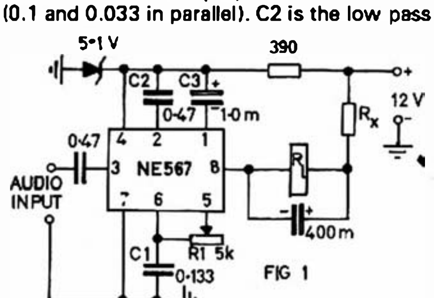


FIG 1

filter capacitor and a value of 0.47 mF was used. C3 was fixed at 1.0mF, and may be increased if objectionable false outputs are found just outside the capture range.

It should be noted that the voltage on the IC should be about 5 volts for its phase-lock portion, but that the output drive connection, pin 8, is rated at a little over 12 volts, and may be used up to 100mA. It will be necessary to find a relay which will work well at 12 volts and about 80mA. Such a relay will probably have a coil resistance of about 120 ohms. Rx in the diagram is used to limit the current somewhat, and with the relay used in the prototype, is a 40 ohm half watt value. Note that the 12 volt supply is reduced by a 5.1 volt zener diode through a 390 ohm resistor, for the phase-lock section of the IC.

ADJUSTMENT

Place a current meter in series with the 12 volt supply to the relay, and switch on. There should be no current flowing, or at the most about one mA.

Now apply a tone of 2125Hz to the input terminals. Probably some current will be registered on the meter. Adjust R1 for maximum reading. If the maximum appears to be going over 100mA, increase Rx until the maximum value obtainable by adjusting R1 is just under 100mA. If on the other hand you are not able to obtain enough current to operate the relay, Rx should be decreased, or even eliminated, provided that the current never exceeds 100mA. The relay chosen should of course be fitted with contacts which are suitably insulated for application of the 240 volt AC to be controlled, and also of sufficient contact area for the current to be used in the AC circuit.

Now check and ascertain that when the tone is changed to the space frequency, 2295Hz, that the relay still holds in. If it does not, retune R1 using a frequency of about 2160Hz and you will find that the problem will be solved.

For full information on the use of this IC as a tone decoder, the reader is referred to the Data sheet issued by Signetics, and also an article entitled "Need a tone decoder?" which appeared in "Electronic Design" October 14, 1971, page 66.

QSP

COMMUNICATION'S SATELLITE ANIK-1

Canada's first domestic communication's system is based on what is claimed to be the world's first synchronous domestic communications satellite launched in Nov. 1972. ANIK-1 carries 12 transpanders each for one RF channel capable of handling one colour TV channel or up to 960 one-way voice channels in the frequency bands of 6GHz for the up-links and 4GHz for the down-links. *ITU Telecommunications Journal Jan. '73.*

Legislation.

The Australian national laws concerning the use of radio frequency spectrum are the Wireless Telegraphy Act and the Broadcasting and Television Act. The former is administered by the Postmaster-General; the latter by the Minister for the Media (Australian Broadcasting Control Board). The radio frequency spectrum management is in the hands of the International Frequency Registration Board (IFRB) which is an organ of the International Telecommunication Union (I.T.U.). Australia is a member of the I.T.U. and of its governing body and representation is through the Department APO News Nov. '73.

modifying the Vinten MTR 13 for 2 metres

D. M. Rosenfield VK3ADM
5 Lygon Street, South Caulfield, 3162.

In recent years a number of MTR13 units have become available, to amateurs in VK3 especially. This article should enable anyone purchasing one of these units to modify it for operation on 2 metres.

GENERAL DESCRIPTION

The Vinten MTR13 comprises a complete FM transmitter, receiver, and power supply on one chassis. It is designed to be used in the 156 — 174 MHz band at 60 kHz channel spacing. Individual metering sockets are incorporated for performance checking.

POWER SUPPLY

The power supply consists of 2 germanium power transistors in a push-pull DC current switching circuit, in association with a toroidal power transformer, HT is rectified by 4 diodes in a full wave bridge. A fixed bias voltage is obtained from a separate winding which uses one diode as a half wave rectifier.

The unit is designed to work from either a 6, 12 or 24 volt DC supply negative or positive earth system.

Current Drain, 12 volts.
Receive — 2.4 Amps.
Stand by — 4.5 Amps
Transmit — 7 Amps

Voltages.

Major HT		300v at 80 mA.
Minor HT		150v at 50 mA.
Bias	−25v &	8v DC at 5 mA

WARNING. Before applying any power to the unit, check voltage and polarity.

TRANSMITTER. Frequencies listed below are for 146.0 MHz chan. B

The transmitter employs 10 separate stages, consisting of a crystal oscillator V13, 4055.5 kHz Phase modulator V14, Buffer V15 4055.5 kHz 1st Doubler V16 81110.0 kHz 1st Tripler V17 24333.0 kHz 2nd Tripler V18 72999.0 kHz 2nd Doubler V19 146.0 MHz. PA V20 146.0 MHz. Microphone Amplifier V21 and limiter amplifier V22.

The microphone used is a 2K ohm rocking armature type.

TRANSMITTER CRYSTAL SPECIFICATION

Frequency crystal = $\frac{\text{Freq. carrier}}{36}$

Style D, .002 percent, 0 degrees to + 60 degrees C, 30pf.

MODIFYING AND TUNING THE TRANSMITTER.

Step 1. Remove the RFC from the centre tap of the original tank coil L11 and remove the tank coil from the PA tuning capacitor C121. Wind 4 turns of 16 gauge tinned copper wire, on a ⅝" diameter former, with a ⅜" space in the centre. Leave ¾" leads at each end of the coil. Overall length of the PA tank coil should be 1" with ⅛" spacing between the turns refer Fig 1.

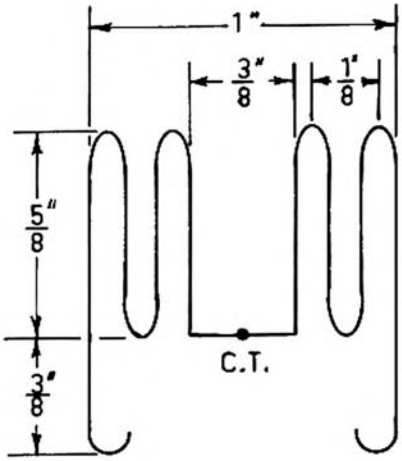


FIG 1 CONSTRUCTION OF P.A. COIL

Bend the ends of the coil leads around C121 which should leave ⅜" straight lead to the coil. Resolder the coil to C121 and solder the RFC to the centre tap.

Step 2. Fit a 6.8 pf 300V disc ceramic capacitor across the primary of V18 plate coil (pins 1 & 2 on transformer 164).

This completes the modifications to the transmitter, all that is required now is to realign every stage.

WARNING. The PA tank coil L11 has 300 volts applied at all times, even in the receive condition.

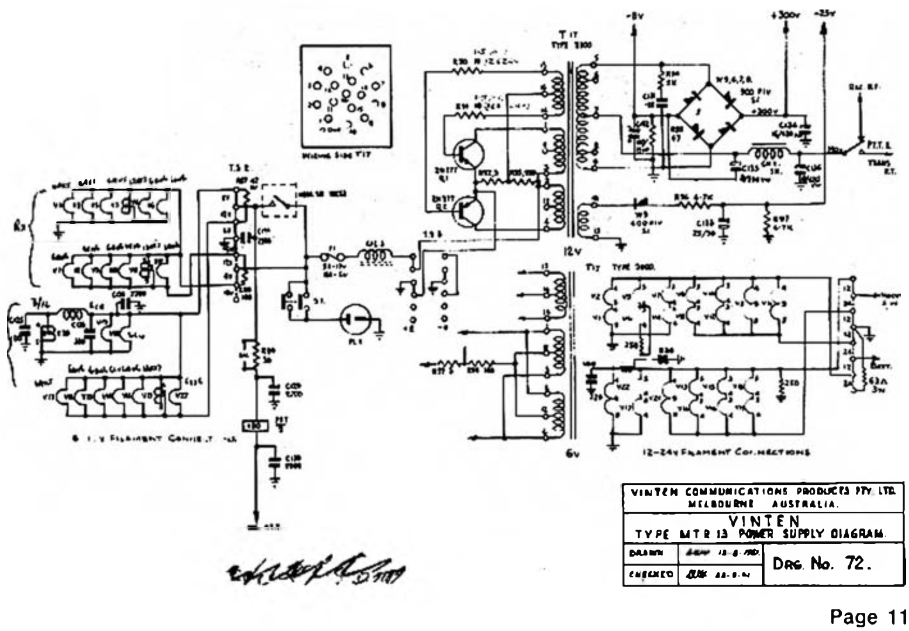
ALL TEST SOCKET READINGS ARE GIVEN FOR A 1000 OHMS PER VOLT METER.

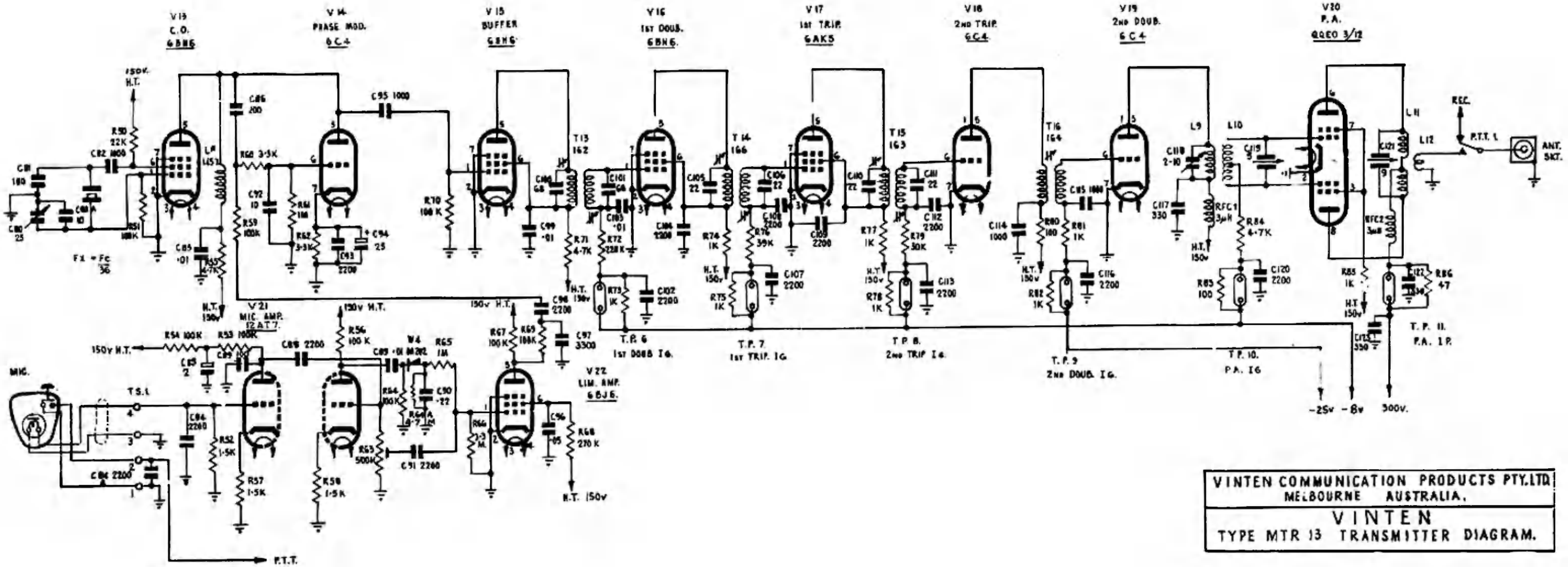
Switch on the unit, allow normal warm up, plug your 2 metre crystal into socket XL2.

All Vinten transformers have a locking ring on top of the slug which requires a special tool to loosen and align the slug. They can possibly be purchased from Plessey Electronics but a screwdriver can be used with care.

Place a 0-1 mA meter in test socket TP6, loosen locking rings on top and bottom of the 162 transformer depress P.T.T. button, screw top slug into the coil till a maximum reading is obtained. Then screw the bottom slug into the coil till a maximum reading is obtained, lock the bottom slug and then give the top slug a final adjustment for maximum reading, making sure that the slugs do not move when locked. When the No 162 transformer is tuned the meter should read approx 400 uA at TP6. If any test point readings are more than 25 per cent lower than those stated, change the valve and retune the stage in question.

Plug the meter in test socket TP7 screw in the top and bottom slugs on transformer 166 and peak them to give a reading of approx. 1.2mA, lock both slugs and plug the meter in TP8 and realign transformer 163 in the same way to give a reading of approx. 1.8 mA and lock both slugs. Plug the meter in TP9 and realign the top slug in transformer No. 164 (there is no bottom slug) for a reading of 2—3 mA, lock the top slug. Plug the meter in TP10 and adjust C118 and C119 to peak at approx. 2—3 mA. It may be necessary to "squeeze up" L9 and L10 in some sets if they don't quite make frequency. Plug a 50 ohm non inductive dummy load into the antenna socket, and plug a meter in TP11, tune C121 (PA tank condenser) for a dip at approx 60





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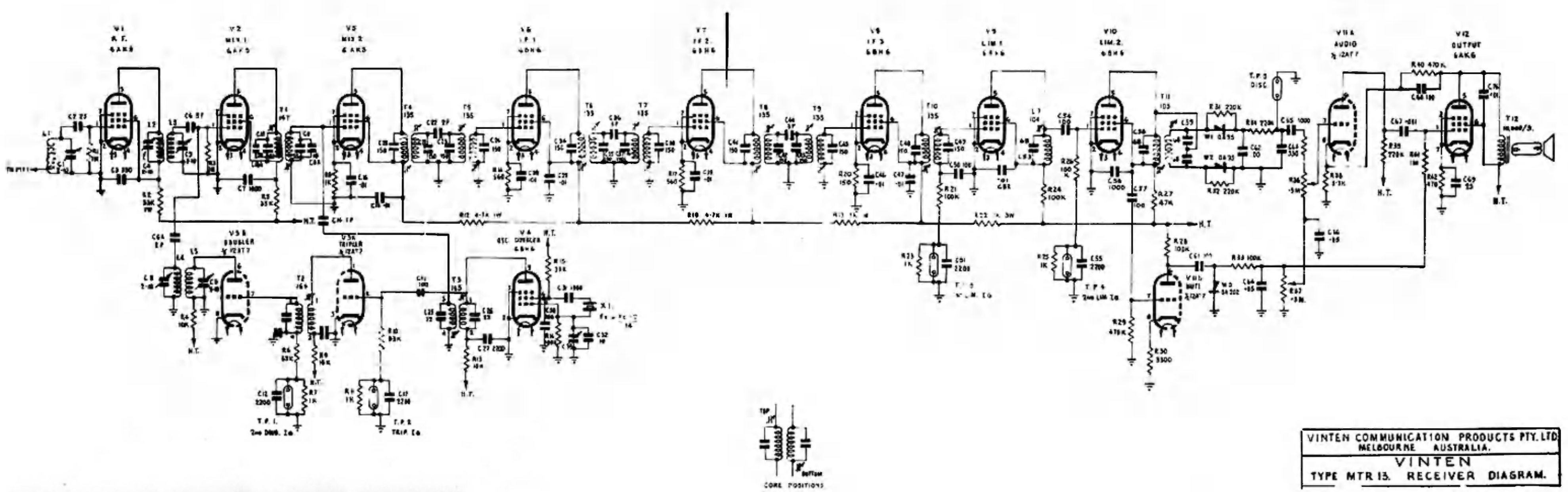
VINTEN
TYPE MTR 13 TRANSMITTER DIAGRAM.



VINTEN COMMUNICATION PRODUCTS PTY. LTD.
MELBOURNE AUSTRALIA.

VINTEN
TYPE MTR 13. RECEIVER DIAGRAM.

mA — 70 mA, the power output should be 10 — 13 watts.

To alter the crystal frequency adjust the trimmer C80 in the carrier oscillator V13. Frequency checks can be made with the P.M.G. monitoring station or another amateur station with frequency monitoring facilities.

When setting the deviation level remove the mic. input lead from the terminal strip on the chassis, couple a deviation monitor to the PA tube, connect an audio generator set at 1kHz into 600 ohm at —35dB into the mic. input terminals on the chassis, and adjust R63 in the grid of V21B for approx 13 kHz peak deviation. If the necessary equipment is not available an on-air check with another station is the only simple way out.

MTR13 RECEIVEP

The receiver is a double conversion 12 valve superhet using a single crystal for both converter frequencies. (Frequencies listed below are for approx. 146.0 MHz.)

V1. R.F amplifier 146.0 MHz V2. 1st mixer, input frequencies, 146.0 MHz & 123.5 MHz output frequency 22.5 MHz. V3B Doubler. input frequency 61.7 MHz output frequency 123.5 MHz V3A. Tripler, input frequency 20.6 MHz output frequency 61.7 MHz V4. oscillator-doubler. input frequency 10285.7 kHz output frequency 20.6 MHz.

V5. 2nd mixer. input frequency 22.5 MHz output frequency 2MHz.

The I.F. amplifiers V6, V7, V8 are all tuned to 2MHz while the limiters, V9 & V10 are on 4MHz.

V11A is the first audio amp. & V12 is the audio output amp, leaving V11B as the mute or squelch amplifier.

Detection is accomplished by the 2 diodes W1 and W2 in conjunction with T11 in a Foster-Seeley discriminator circuit. Audio frequency output is approximately 1 watt.

RECEIVER CRYSTAL FORMULA:-

$$\text{Frequency Crystal} = \frac{\text{Frequency Carrier} - 2}{14}$$

Style D, .002 per cent, 0 to + 60 degrees C. 30pf.

MODIFYING THE MTR13 RECEIVER

STEP 1. Remove C10 and C11A pf capacitors from the base of the 167 transformer and replace with 20 pf.

STEP 2. Fit a 4.7 pf between pins 1 & 3 of the No. 7 transformer.

STEP 3. fit a 10 pf capacitor between pins 1 & 2 of the 164 transformer. *All capacitors are 300VW disc ceramic.*

This completes the receiver mods now to the realignment:-

Plug in the 2 metre receiver crystal in socket X1, plug an 0—1mA meter in test socket TP2, loosen locking ring and adjust top slug on trans. No. 165 to peak at approx. 500-600 uA and re-tighten ring.

Loosen locking ring on the bottom slug and realign for a dip in the meter reading, lock the slug at the minimum reading.

Plug the meter in TP1 and adjust the single slug at the top of transformer 164 to peak at approx 300 — 400uA, relock the ring.

Screw all the front end Philips type trimmers about ½ way in, plug a 0—1mA metre in TP3 and plug a 50 uA—0—50μA meter with a 100k resistor in series with one lead into TP5.

The next step is to feed a signal on the carrier frequency into the aerial socket and peak the Receiver front end trimmers, and the top and bottom slugs of T1 for a maximum reading on the limiter meter TP3. When aligning the receiver by the limiter meter, feed just enough signal in to give a reading of 300 μA which is approx. half saturation. If a VHF type signal generator is not available there is a very handy device in "AR" December 1970 by Ron Higginbotham VK3RN for aligning carphone receivers.

Provided the mods have been carried out properly and the IF is aligned on 2MHz and the valves in the receiver have reasonable emission, a signal of approx .3μV will open the mute, and a quieting ratio of 22dB for 1μV is not difficult to obtain.

2MHz IF ALIGNMENT

Realigning of the 2MHz IF channel should only be undertaken if it is suspected that previous misalignment has occurred, or if the locking rings have loosened.

Critically coupled transformers are employed which must be individually loaded when being aligned to achieve the symmetrical narrow band response desired.

Procedure

Equipment Required. A 2 MHz (preferably crystal locked) signal generator with variable attenuator and low leakage.

Plug the 0—1mA meter into TP3 and connect the sig gen between pin 1 of V8 and earth. Connect a 10K ohm damping resistor mounted on small alligator clips between terminals 1 & 2 of T10. Unlock top and bottom cores of T10 and tune for Maximum, adjusting the output of the sig gen to avoid Saturation. Repeat this procedure through V7, V6 and V5 connecting the damping resistor across terminals 1 & 2 of each transformer as it is aligned, and re-locking the cores immediately after individual transformer alignment. Ensure that the cores are tuned to the first maximum peak from the outer ends of the formers.

Sensitivity readings at 2MHz:-

Stage	Signal Level	Meter Reading TP3
V5	1mV	80μA
V6	1mV	200μA
V7	10mV	180μA
V8	100mV	70uA

The first limiter (TP3) current will vary with different valves and supply voltage. Little effect on performance will be experienced if the readings are 20 per cent below those listed.

2nd LIMITER ALIGNMENT

The 2nd limiter is tuned to 4MHz and may be aligned when the 2MHz alignment is completed.

Plug a 0—1mA meter into TP4. Reduce input at 2MHz to V4 so that the stage does not saturate and adjust L7 104 for maximum. Approx sensitivity for 100 μV into V4 gives 100 — 150μA in TP4. The linear operating section is very short at this stage and is intended to saturate on small signal inputs.

Discriminator alignment

The discriminator stage may be adjusted after the 2MHz IF and 2nd limiter stages are adjusted.

Apply 1mV at 2MHz to V5 and adjust the secondary **TOP CORE** of T11 103 with a 50μA —0—50μA meter in TP5 until the meter deflects to one side. Adjust the primary **BOTTOM CORE** for maximum deflection. Tune secondary through zero until the meter deflects to a maximum on the other side. Note the two readings and if unequal adjust the primary until they are equal.

Finally lock the primary core and adjust the secondary for zero DC output on meter and lock. Remove the 2MHz signal and observe the discriminator meter, it should not deflect more than 4uA approx. from the zero reading.

If the deflection is more than 4μA with no signal input then the IF may possibly be off frequency. Repeat complete alignment procedure until the desired results are obtained. ●

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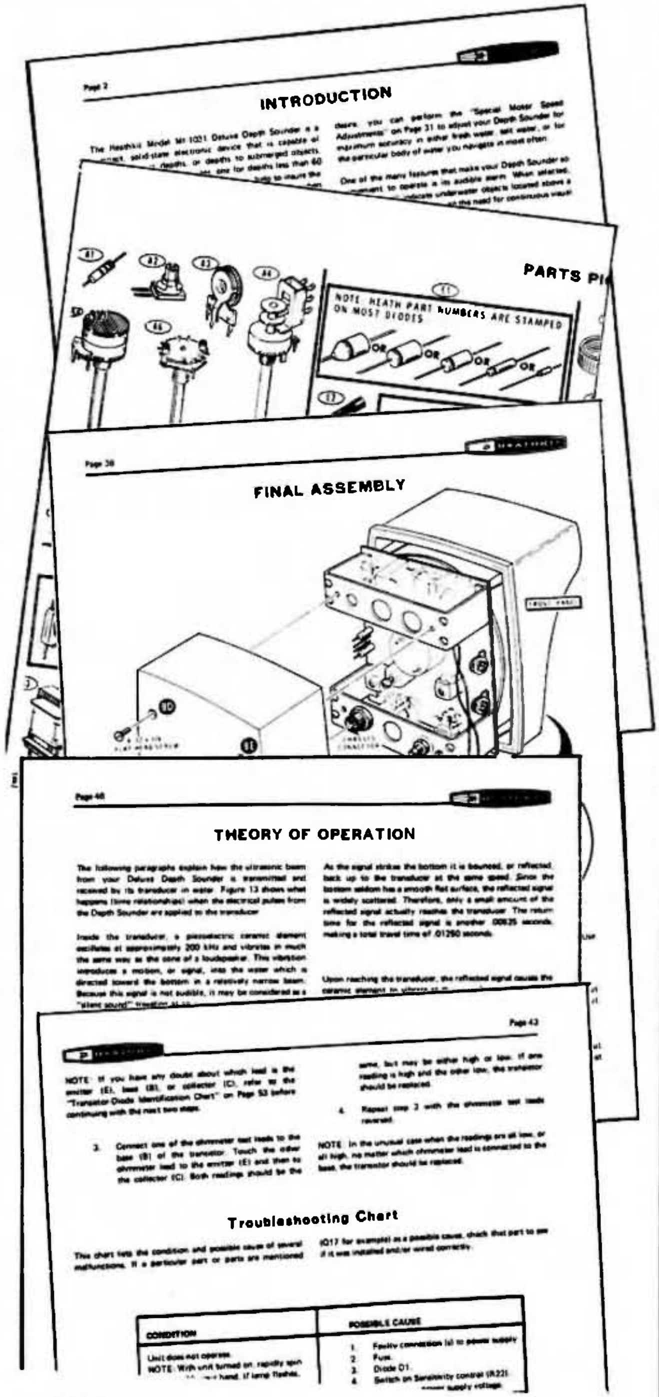

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FT101 Modifications

PHIL ZEID, 9M2CP
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Penang, Malaysia.

FT 101 owners have experienced varying degrees of interference from spurious signals. These are primarily the result of intermodulation products present when high gain antenna systems are used under good conditions of propagation. The problem varies with location and with proximity to strong local transmitters on frequencies in and outside the amateur bands. It also varies with the band in use. Sometimes it is so severe that it is not recognised. For example, in this area many listeners to 7MHz consider the band unusable evenings and nights because of the high level of hash *S7 to S9*. In many cases this hash is the result of severe intermodulation and distortion products!

On other bands, notably 14MHz, the spurious signals sometimes show up as jingle bells, or so called teletype, or regions of heterodyne interference and hash.

Such problems are to a certain extent universal. Perhaps because the FT101 is such a sensitive receiver and so widely used its performance in this respect has been widely publicised.

There is no way of getting something for nothing. To obtain optimum performance costs money and lots of it. In the most expensive and well designed receivers a compromise is made on front-end sensitivity and noise factor. After all, under good propagation conditions on the HF bands a 2 to 3 dB noise factor is, in most cases, of no value.

With the above in mind the following modifications to the FT101 are suggested. They may be applicable to other receivers. Each modification is based on sound design precepts and if all are carried out should result in a receiver with as good reception characteristics as you could wish for, within the limits imposed by the general basic design. In addition flexibility of control is built-in and will enable operating levels to be set to optimum under almost any of the variable adverse conditions likely to be experienced by the individual operator.

Good strong adjacent signal handling capabilities can be built into a receiver by paying attention to 4 main design points. Each point is considered separately and it is shown how each may be incorporated into the FT101.

1. Use as linear a device as is practicable in the RF and mixer stages.

The choice of suitable devices here, is limited in practice, by the available over-all gain of the set and also costs.

Most of the trouble has been determined as originating in the second receiver mixer and to a much lesser extent in the first RF, in the writer's set (serial No. 20049). A compromise choice is to replace the second and, for another good reason, the first RF FET's with an RCA 40673. The former may be mounted under the mixer P.C. board after removing the original. Remember if this is done then the pin numbering underneath is reversed. The other advantage of using these FET's is that they have built-in diode protection.

These changes have been carried out by many with varying degrees of success. So if you do not like playing around in sets and changing FET's do not bother with this modification but leave it till last in case it oroves unnecessary.

2. Provide a variable attenuator so that only the minimum required attenuation at the input can be applied.

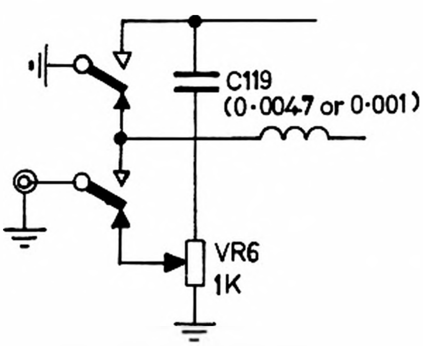
It would be most advantageous to have such a control on the front panel. You may put one there if you wish but remember to shield the leads to prevent damaging RF pick-up when on transmit. This requires cutting a hole in the front panel.

An alternative method (the one used at 9M2CP) is to use the so called "power output" pot, VR6, which has a control projecting out of the rear of the receiver. This is in an awkward position but the results from its use fully justify any inconvenience experienced. In actual fact it is not used too frequently.

Obtain a small skeleton pre-set pot of 1 K ohm and solder one of the outer legs to the chassis in the vicinity of VR6. This is to become a substitute for VR6. Unsolder the two lead wires from VR6 and replace them in their **corresponding** position on the small pre-set pot. Tune up and adjust for required sensitivity of reading with the meter switch to P.O.

VR6 is now free to be used as the variable attenuator. If necessary loosen and rotate it so that its terminals are facing the antenna relay. You may have to flatten the locking pin to do this.

DIAGRAM A



CONTINUOUSLY VARIABLE ATTENUATOR

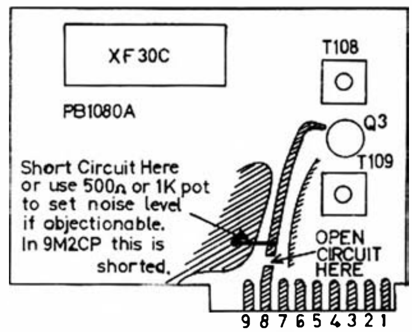
Now remove the one end of C119 (4700pF) and R48 (220 ohms) from the common antenna relay pin. In the writer's set this pin is at the far left hand side of the relay when the set is upside down with the front nearest to you. R48 is not used and may be removed. Preferably replace C119 with a 1000 pF, 200V working condenser. It is not essential however. Join the free end of C119 to the nearest **outer** connection on VR6. Earth the other outer connection of VR6 to chassis. Connect the empty antenna relay pin to the centre arm of the pot and the job is done. The circuit will now be as in Diagram A.

This control will allow you to knock out spurii without undue loss of signal or sensitivity yet return the set to original condition if required.

3. Utilise maximum front-end selectivity available

Tune up the receiver circuits so that they peak at the same spot as the transmitter circuit. This is important. If it is not done you will not obtain maximum selectivity and unwanted-signal-rejection of which the set is capable. This may be the cause of the variable performance reported by some owners.

DIAGRAM B SEPARATING RF GAIN CONTROL FROM IF



4. Use only the gain required for good signal-to-noise ratio in the RF stage and rely on maximum gain after these stages

Inspection of the circuit diagram will show that the RF gain control also controls the IC and Transistor on the IF module PB 1080A. The IF can be isolated from this control and run at full gain by open circuiting the thin copper strip that runs out at pin 8 and joining it to earth (the copper laminate) on the IC side of the break. If, in some receivers, this leaves you with too much noise and an objectionable receiver hiss you can replace the short with a by-passed skeleton pot of 1Kohm and pre-set it to the desired level. At 9M2CP a short is used. Diagram B shows the final circuit. This arrangement allows independent gain control of the RF stage as distinct from incoming signal attenuation. This flexibility can be most useful under varying local adverse conditions.

These modifications have resulted in a receiver which is as good a performer as one could desire. All controls are smooth in operation and effective in reducing any spurious signals. The audio quality has improved and background noise is reduced. Full sensitivity can be obtained whenever conditions allow its use.

I am most pleased with these modifications and hope they will prove effective in overcoming the problems experienced at various individual locations. ●

Ferguson Low Height Power Transformers

A review by the AR technical staff

This review is based on a series of tests on two transformers, types PF3759 and PF3760 supplied by the Manufacturer. The transformers in this series will be of interest to the amateur requiring a power supply for solid state equipment.

They are designed for connecting to 240 volts 50Hz, single phase supply and are nominally rated 40VA. Dimensionally they are identical, with height limited to 1½", width 2⅜", length 4 5/16". and mounting centres 23/32" by 3 27/32".

General purpose Transformers types PF3759 and PF3760 are provided with two identical secondary windings with a tap on each. This permits series or parallel operation.

Series Connections: Eight values of voltage from each Transformer may be obtained by adding windings, using part of windings, adding windings to part of windings or adding part of windings to part of windings. With the use of these series connections the maximum continuous current is limited by the value listed under the heading "40 volt-amperes"

Parallel Connections: Three values of Voltage may be obtained from each Transformer at a current value of twice that listed under the heading, "40VA" by paralleling the windings in part or in full.

The special purpose Transformer, type PF3761, is designed for use with intergrated circuit regulators and other semiconductor components. The 15 volts windings may be series or parallel connected as required.

Each Transformer is fitted with round pin terminations and supplied with a set of six leads and a link with shrouded repcepticles. These Transformers comply with the requirements of Australian Standard C126, where applicable, with respect to insulation and winding construction.

When tested all voltages were found to be a little lower than the nominal. None were more than 7% below the values quoted in the tabulation.

The two 15V windings of the PF3759 were connected in series and a load drawing 1.35A connected for regulation and temperature rise tests. For the PF3760 the two 25V windings were connected in parallel and loaded to 1.6A The regulation was found to be satisfactory for both units although the load voltages fell away fairly quickly when the load was increased much beyond the rated figure.

The transformers were allowed to run at rated current. After 15 minutes they were too hot to hold in the hand. The air temperatnre at the time was 26 degrees C. In most situations under which they are likely to be used, they would have the advantage of connection to a good heatsink in the form of a chassis. For these tests the transformers were lying on a wooden bench with no special provisions for cooling. After several hours of continuous running at full load the temperature appeared to have risen no further. A check on the resistance of the windings followed by a few sums indicated that the "hot spot" temperature was about 80 degrees C. This is satisfatcory for the type E insudation used and means that the transformer will operate safely at full load in ambient temperatures up to 40° C.

Some constructors will appreciate the convenience afforded by the pin and socket connections. The low profile of these transformers is also an obvious advantage. The variety of voltage available at quite reasonable currents, coupled with a price of around $8.00 including sales tax, makes these transformers a very attractive proposition.

The tabulation sets out against type numbers the nominal rating and the voltage obtained at various loads when windings are connected in series, 240 volts being applied to the primary winding.

TYPE NO.	NOMINAL RATING	NO LOAD	10VA	20VA	30VA	40VA	50VA*
General Purpose							
PF3752	0-6V-7.5 at 20VA	18.3V	17.7V	16.8V	16.0V	15.0V	13.9V
	0-6V-7.5 at 20VA	(nil)	(0.56A)	(1.19A)	(1.88A)	(2.67A)	(3.60A)
PF3759	0-12V-15V at 20VA	36.2	34.7V	33.0V	31.0V	29.0V	26.7V
	0-12V-15V at 20VA	(nil)	(0.29A)	(0.61A)	(0.97A)	(1.38A)	(1.87A)
PF3760	0-20V-25V at 20VA	61.2	58.8V	56.0V	53.2V	50.2V	48.0V
	0-20V-25V at 20VA	(nil)	(0.17A)	(0.36A)	(0.56A)	(0.80A)	(1.04A)

All windings in series. Approximate current in amps shown in brackets.

*** Intermittent rating only**

Special Purpose
PF3761

0.15 at 7.5VA	(0.50A)	
0-15V at 7.5VA	(0.50A)	NO LOAD VALUE 10·9V
0. 9V at 27VA	(3.00A)	

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

DX Listener's Century Award

1. This award is available to shortwave listeners.
2. Confirmations dated from November 1945 are valid.
3. Applicants should submit a list, certified by the Awards Manager, to Mr C. R. Emary, G5GH, "Westbury End", Finmere, Buckinghamshire, England.
4. The fee, which must accompany the application, is 35p or 8 IRC.

Requirements: Confirmations are required from 100 of the countries listed in the RSGB Countries List. Stickers are available for each additional 25 countries.
Countries List: The RSGB Countries List is used for this award.

R-6-K Award

1. This award is available to licensed amateurs and shortwave listeners (on a "heard" basis)
2. Contacts on and after 7th May 1962 are valid.
3. QSL cards must be submitted to the sponsor along with a list giving full details of the contacts.
4. The award is issued in three classes:
   First class for ALL contacts on 3.5MHz
   Second class for contacts on any bands
   Third class for contacts on any bands
5. The fee for the award is 1 Rouble or 14 IRC, which covers return postage on the cards.
6. The address for applications is: Central Radio Club, Box 88, Moscow, USSR.

Requirements: One contact with each of Europe, Africa, Asia, North America, South America and Oceania plus three contacts with the European part of USSR and three contacts with the Asiatic part of USSR — a total of 12 contacts.

Alterations to DXCC List

Announcement is hereby made of one deletion and two additions to the ARRL countries list. The deletion is the present listing of Germany. The additions are the Federal Republic of Germany and the German Democratic Republic.

DXCC credits for the two new listings may be claimed for contacts made with these countries on or after 18th September 1973. Contacts made with stations therein before 18th September 1973 will be creditable toward the German listing only. Contacts made 18th September 1973 and after with stations located in West Berlin will be credited toward the Federal Republic of Germany listing. Stations located in East Berlin will be credited toward the German Democratic Republic listing.

REPAIR AND MAINTENANCE

"There are not too many shops in the U.S. or overseas which specialise in the repair of amateur radio equipment" writes W6QLV in Q. and A. for CQ Magazine December 1973. "The component that fails most often is still the vacuum tube, followed by diodes, resistors, capacitors, relays, transistors, I.C's, power transformers, pots, slide switches, etc., in that order. Before an amateur ships his set out for service he should check for the simple causes of trouble first. I maintain that the active amateur should be able to shoot his own trouble in the equipment he uses."

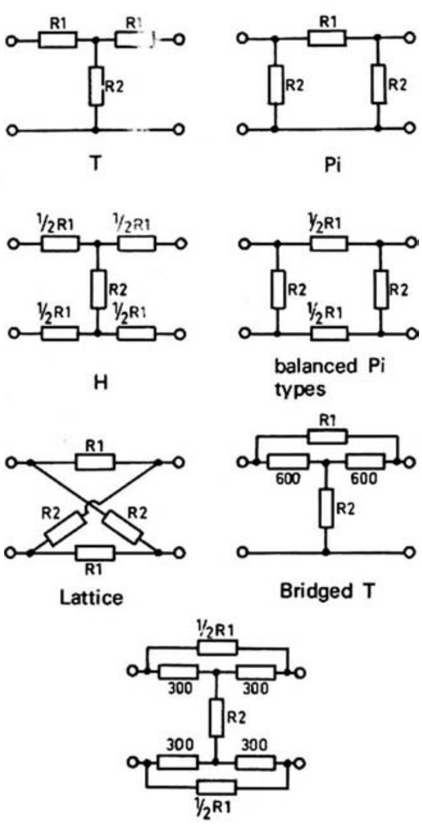
attenuator networks

C. A. Cullinan VK3AXU

6 Adrian Street, Colac, Vic., 3250

The author provides a comprehensive table giving design details for seven different attentuator network configurations. Applications of these attenuators include impedance matching, interstage isolation, gain measurement and gain reduction.

At times it is necessary to insert into a circuit a number of resistances to introduce a definite number of dB. loss. These resistances may be connected in various ways and are known as attenuator networks. (They are frequently referred to as "pads" or simply attenuators.)



balanced Bridged T

	T and H types		Pi and balanced Pi types		Lattice types		Bridged T and balanced Bridged T types	
Voltage loss in dB	R1 ohms	R2 ohms	R1 ohms	R2 ohms	R1 ohms	R2 ohms	R1 ohms	R2 ohms
0.1	3.58	50,204	7.20	100,500	3.58	100,500	7.2	50,000
0.2	6.82	26,280	13.70	57,380	6.82	57,380	13.8	26,086
0.3	10.32	17,460	20.55	34,900	10.32	34,900	21.0	17,143
0.4	13.79	13,068	27.50	26,100	13.79	26,100	28.2	12,766
0.5	17.20	10,464	34.40	20,920	17.20	20,920	35.4	10,169
0.6	20.9	8,640	41.7	17,230	20.9	17,230	43.2	8,333
0.7	24.2	7,428	48.5	14,880	24.2	14,880	50.4	7,143
0.8	27.5	6,540	55.05	13,100	27.5	13,100	57.6	6,250
0.9	31.02	5,787	62.3	11,600	31.02	11,600	65.4	5,504
1.0	34.5	5,208	68.6	10,440	34.5	10,440	73.2	4,918
1.5	51.8	3,452	104.3	6,950	51.8	6,950	113.4	3,174
2.0	68.8	2,582	139.4	5,232	68.8	5,232	155.4	2,316
2.5	85.9	2,053	175.4	4,195	85.9	4,195	200.4	1,796
3.0	102.7	1,703	212.5	3,505	102.7	3,505	247.8	1,452
3.5	119.2	1,448	258.0	3,021	119.2	3,021	297.6	1,209
4.0	135.8	1,249	287.5	2,651	135.8	2,651	351.0	1,025
4.5	152.2	1,109	324.6	2,365	152.2	2,365	407.4	883.7
5.0	168.1	987.6	364.5	2,141	168.1	2,141	466.8	771.2
5.5	184.0	886.8	405.9	1,956	184.0	1,956	530.4	678.7
6.0	199.3	803.4	447.5	1,807	199.3	1,807	597.0	603.0
6.5	214.6	730.8	492.6	1,679	214.6	1,679	667.8	539.8
7.0	229.7	685.2	537.0	1,569	229.7	1,569	743.4	484.3
7.5	244.2	615.6	584.7	1,475	244.2	1,475	822.6	437.6
8.0	258.4	567.6	634.2	1,393	258.4	1,393	907.2	396.8
8.5	272.3	525.0	685.5	1,322	272.3	1,322	996.6	361.2
9.0	285.8	487.2	738.9	1,260	285.8	1,260	1,091	329.9
9.5	298.9	453.0	794.4	1,204	298.9	1,204	1,191	302.2
10.0	312.0	421.6	854.1	1,154	312.0	1,154	1,297	277.5
11.0	336.1	367.4	979.8	1,071	336.1	1,071	1,529	235.5
12.0	359.1	321.7	1,119	1,002	359.1	1,002	1,788	201.3
13.0	380.5	282.8	1,273	946.1	380.5	946.1	2,080	173.1
14.0	400.4	249.4	1,443	899.1	400.4	899.1	2,407	149.6
15.0	418.8	220.4	1,632	859.6	418.8	859.6	2,773	129.8
16.0	435.8	195.1	1,847	826.0	835.8	826.0	3,186	113.0
17.0	451.5	172.9	2,083	797.3	451.5	797.3	3,648	98.68
18.0	465.8	152.5	2,344	772.8	465.8	772.8	4,166	86.4
19.0	479.0	136.4	2,670	751.7	479.0	751.7	4,748	75.8
20.0	490.0	121.2	2,970	733.3	490.4	733.3	5,400	66.66
22.0	511.7	95.9	3,753	703.6	511.7	703.6	6,954	51.72
24.0	528.8	76.0	4,737	680.8	528.8	680.8	8,910	40.4
26.0	542.7	60.3	5,985	663.4	542.7	663.4	11,370	31.66
28.0	554.1	47.8	7,550	649.7	554.1	649.7	14,472	24.87
30.0	563.0	37.99	9,500	639.2	563.2	639.2	18,372	19.58
32.0	570.6	30.16	11,930	630.9	570.6	630.9	23,286	15.46
34.0	576.5	23.95	15,000	624.4	576.5	624.4	29,472	12.21
36.0	581.1	18.98	18,960	619.3	581.1	619.3	37,260	9.66
38.0	585.1	15.11	23,820	615.3	585.1	615.3	47,058	7.65
40.0	588.1	12.0	30,000	612.1	588.1	612.1	59,400	6.06

Sometimes an attenuator is used to provide isolation between two circuits to prevent one circuit whose impedance varies with frequency from affecting the other circuit, the loss of the attenuator being part of the price paid for the isolation which is obtained. Also it is possible to use attenuators, under certain circumstances, for wide-band impedance transformation. Again there is a price paid because of the loss, although sometimes this can be used to advantage. For instance a gain measuring attenuator constructed by the author can be adjusted in ½ dB. steps up to 60 dB. loss (600 ohms in and out) plus 600 ohms to 50 ohms with 20 dB loss.

Of the attenuator types shown in the following tables all have constant 600 ohm input and output impedances, however three are unbalanced and four are balanced types. For wide-band use the resistors should be non-inductive. The balanced types are preferable to the unbalanced types if the circuits permit their use. Also it is not desirable to use more than 40 dB attentuation in a single attenuator if flat frequency response is required. For use at radio frequencies great care must be taken to keep leads short and capacitances to ground should be balanced.

All except the bridged T types may be used at other impedances by multiplying all values by Z-600 where Z is the desired impedance.

(Note that resistance values should be kept within 1 per cent of the tabulated value to keep attenuation within about 0.1 dB of nominal value . . . . . Ed.) ●

Modifications to the R390A/URR

part two

JOHN WEIR, VK3ZRV
221 St. Helena Road
Greensborougt, 3088

I must begin this part of my article with an apology for the discontinuity and a small explanation.
The changing of QTH in my case was a rather drawn out affair, which meant all the gear had to be stored, causing quite a deal of disruption to the modification plan.
Now things have settled down, and the initial hurly burly of unpacking and finding everything again has been overcome, I hope to be able to complete the series started in July, 1973, in concurrent additions of AR.

In the first part of the article I spoke of changing the RF Amp V201 from a 6DC6 to a 6GM6. This I have done with quite good results. When the R390A is correctly aligned, the makers specifications state as follows:—

AM SENSITIVITY at 10 db S/N plus N Ratio

750 kHz	4uV max
6 MHz	4uV max
14 MHz	4uV max
20 MHz	5uV max
26 MHz	5uV max
30 MHz	5uV max

CW SENSITIVITY at 10 db S/N plus N Ratio

ALL Bands	1uV max

To be able to find just what difference the modifications made I aligned my receiver equal to or slightly better than the above figures. The circuit for the RF amplifier in its original state is shown in Fig 1.

A straight swap of the 6GM6 for the 6DC6 proved rather disastrous, and had me thinking for a while until I had a closer look at voltages on the valve and read the maker's specifications. The result was that the screen voltage for the 6GM6 was far too high, the gain of the receiver was up, but so was the noise; out of all proportion. After some more reading and a bit of trial and error the circuit as shown in Fig 2 was evolved and no marks are claimed for originality. With this circuit installed, another re-alignment was carried out, and it was found that the maker's specifications were bettered by about 6db across the board. For those who cannot obtain 6GM6's, you should note that a 6BZ6 with the circuit as shown in Fig 2 is also better than the original, but not as good as the 6GM6. A further point to note is that a 6EH7 is a 9 pin version of a 6GM6 but there could be a problem making it fit into the available space.

The next problem to overcome is the tuning rate of the kHz control which is too high for easy resolving of SSB (100kHz per knob revolution). A bit of thought produced the tuning knob from an R1155 receiver. This is a two speed knob with a direct and (after modification) a 15:1 reduction. This knob was fitted to the receiver and now there are two tuning rates, one at 100kHz per revolution, the other at

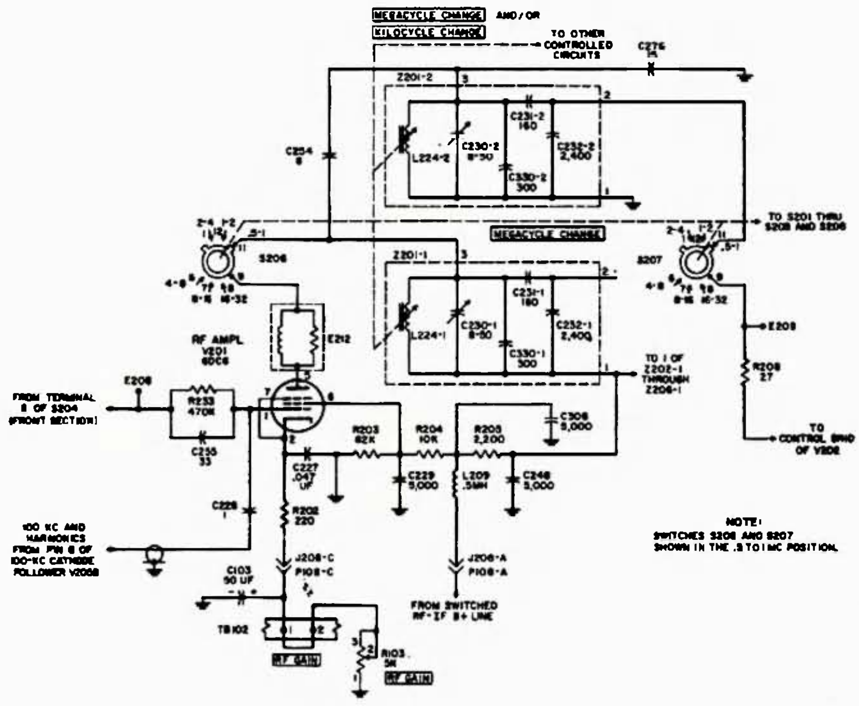


Figure 1. Rf amplifier V201, schematic diagram.

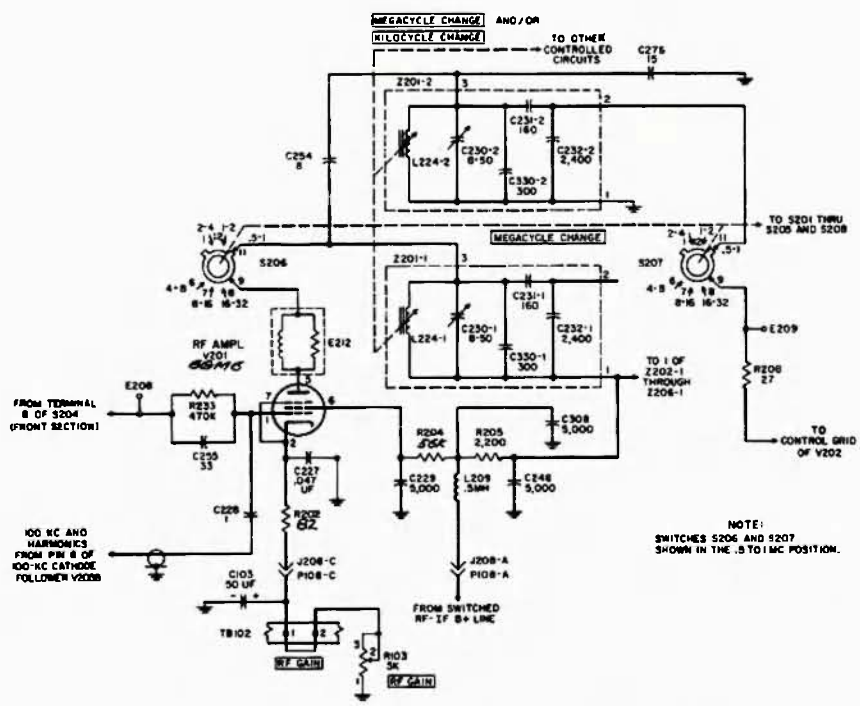
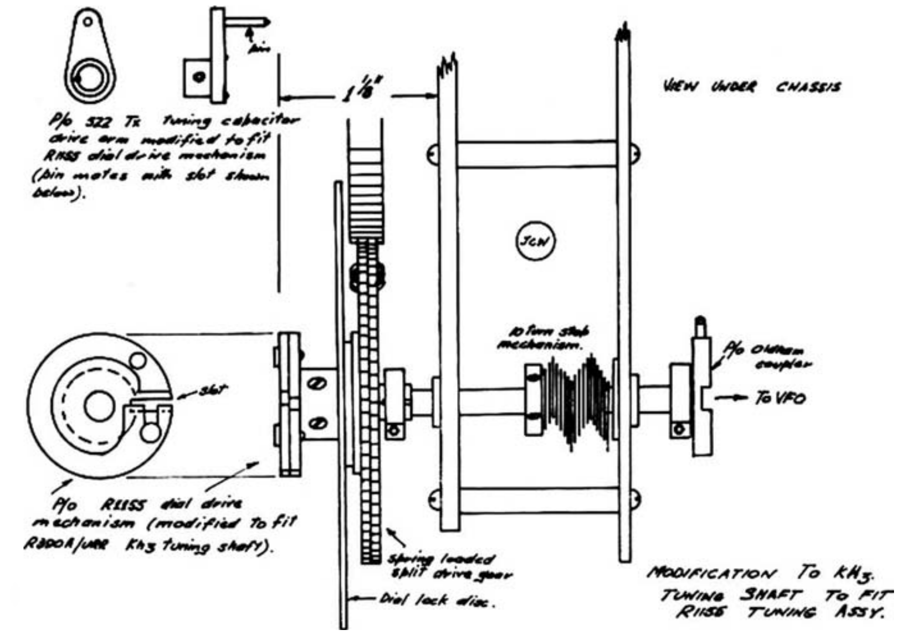
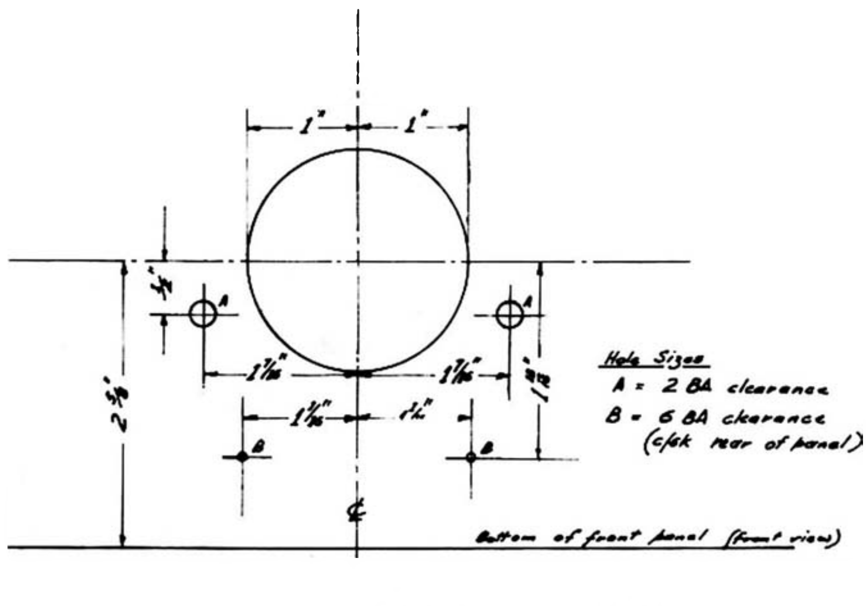


Figure 2. Rf amplifier V201, schematic diagram. (modified)





FRONT PANEL DRILLING DIAGRAM (Fig 4)

approximately 6.5kHz per revolution. I have attempted to show in Figs 3 and 4 as much detail as possible as to how this was done, and the drilling template for the style of knob used. I say this because information recently received leads me to believe that there were a number of different style knobs used on the R1155, and there could be some minor changes in the measurements.

Finally, for this part of my article, I will be only too happy to answer personally any queries via an eyeball QSO or an SAE to my QTH. To those whose enquiries I have answered in the past, I hope the answers were those required. If not, please write again.

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

It is with some pleasure that the section welcomes Fred, VK4RF, as the new co-ordinator for Queensland. Fred has been at CW for 37 years, he tells me; thanks for your help Fred.

I used up my quota of operating time at Christmas on the WICEN Exercise, and so did not participate in the Ross Hull. A little bird has told me that there were at least 15 stations, representing all states, heard using CW. This is very encouraging, and justified the efforts of the Key Section to get the CW section back into the contest — especially if they all put in their logs.

I have had a letter from Jon, VK6TU, in response to my comment about morse practice in this column a few months ago. Jon has a couple of one-hour cassettes at 6 and 8 WPM. Anyone interested should send a cassette plus 50 cents (to cover postage), or he will provide a cassette for you for $2.00 all round. A letter in Dec 1973 AR from ZL2BFR also advertises CW tapes. On air, the Western Suburbs Club is running CW on 160M, and of course VK2BWI appears night after night on 3535kHz at 1930 Eastern. Let me again pay tribute to the small hard-working band of blokes who run these sessions; it's a great service you do. There does seem to be plenty of opportunity for practice.

We have received an application from a SWL for membership which is embarrassing only to the extent that although it has been our intention to provide a SWL — award, no details have yet been worked out. We'll fix you up in time, though, IRA.

EMERGENCIES AND ACCIDENTS

In the October 1973 issue of Radio ZS under the heading "Public Participation in combat of crime" correspondence was printed which showed that Radio Amateurs could volunteer for enrolment in a special auxiliary service of the South African Police known as Wachthuis Radio Reserve. Permission was granted for amateurs to pass messages regarding emergencies or crime for onward transmission to the Police. "The purpose of the introduction of Radio Amateurs is to obtain a wider and more efficient communication system for internal security and the combat and prevention of crime."

DRINKING DRIVERS

ZL1HV writing in Break-In November 1973 draws attention to a "fit to drive" ignition lock for cars, recently developed in Europe. It is based on the critical Flicker Factor, the point at which a light changes from steady to pulsing. A pre-punched card programmes the unit and after inserting it in the ignition lock the driver uses an eyepiece to test himself. Three failures to stop the unit at the correct frequency between 20 and 70 Hz results in a 'lock-out' and the car cannot be started. Unfortunately we all know many drivers who will stop at the pub and leave the ignition switched on.

RTTY.

The very first issue of "Keybaud" issued by AARTG (Australian Amateur Radio Teleprinter Group) of Box 16, Morley, W.A. 6062 lists the Australian RTTY standards for the new RTTY man as speed 45.45 bauds shift 170Hz on 3.54, 3.59, 7.04, 7.09, 14.09, 21.09 and 28.09. MHz with 45.45-50 bauds and 170 and 850Hz shift on 146.600MHz (channel 52). A wealth of other information is also in this first issue of the quarterly magazine as well as listing the AARTG net on Mondays 12.00z 3.59kHz.

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

EQUIPMENT LAYOUT and DESIGN

Part 1

How often do you hear someone say that the piece of equipment they have just built from someone else's circuitry and ideas doesn't work? Have you designed something yourself that hasn't worked as it should have? These are the problems that beset virtually all newcomers to electronics.

If you are a genuine experimenter and don't just build things from kits, you will need to know how to stay out of trouble with your component layout and initial design. As a newcomer you cannot be expected to be able to know all the pitfalls straight away. If you have done quite a bit of conscientious study of the fundamentals as I indicated in January's issue you will more readily pick the important points on which a successful design is brought to operational condition.

If you are going to design your own equipment, whether it be a simple power supply or a multiband SSB transceiver, you will first need to sit down with pencil and paper and physically design the circuit working out component values, voltage ratings, current ratings, making allowance for component value spread and possible variations in mains voltage. I would suggest that you consult the various books and magazines that are available for circuit suggestions, general component values and the like. Here is one often overlooked parameter. Never run, for example, a 1 watt resistor at 1 watt unless you have very good ventilation around it. Underneath an unventilated chassis is not the coolest spot. Likewise, capacitors should be chosen with a voltage rating that makes allowance for both DC (and RF/AF voltages which may be superimposed) and then some. When using diodes, whether they are valves or semiconductors, make sure that the Peak Inverse Voltage rating is at least 3 times the DC output of the rectifier diode. It is simple little things like this that can spoil a project.

Make sure that you drill holes in the chassis, if you are using one, so that air can flow through the whole unit. Air should be able to flow in through holes in the bottom or sides of the equipment and the heated air should be able to escape through the top of the case. If the metal work is to form part of shielding systems for RF, these holes must be reasonably small of the order of about ⅛" diameter. You will need to drill quite a few as small holes do not let much air through.

In these times an additional decision must be made—solid state—valved—or hybrid? Think particularly what you want your piece of equipment to do. There are some jobs where valves are still the best, and others where transistors are better. In some cases a combination of valves and transistors may well give the best results. I would say that it is becoming rare for a piece of equipment to be designed exclusively with valves. Hybrid designs using valves and semi-conductors are very common, and the percentage of semi-conductors in equipment is rising. There are a number of people who use equipment consisting only of semi-conductor active devices. Whatever you decide to use in your equipment use the devices which give the best performance consistent with cost, availability and power source. If the power source is a 12 volt battery perhaps the equipment should be mostly transistorised or exclusively so. If the power source is 240V AC, valves could still be a good decision.

Wherever possible use common garden-variety components, those which are easy to obtain and relatively cheap. With the component crisis at the moment, and the proliferation of types of devices to use, it pays to be sure the item bought can be replaced should something go wrong with the equipment once it is built. This is particularly so for the newcomer. The more advanced experimenter can more easily work out substitutions. Occasionally the purchase of a rather exotic component at relatively high cost can far outway the cost and complexity of the circuitry using more conventional circuitry.

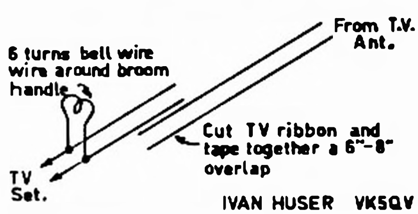
CONCLUSION

Think carefully about what you want to build before you build it. Design the equipment to do what you want. In the process you may find some features difficult to incorporate so perhaps another piece of equipment should be designed to do that job. You may need to design and redesign on paper this particular project until a successful design is reached. Check that you are not over-rating any of the components. Once the design is finalised, then comes the laying out of the equipment which will be covered in next month's column. ●

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

SIMPLE HIGH-PASS FILTER
(keeps HF signals out of TV sets)



IVAN HUSER VK5QV

MICROPHONE INPUT TO AWA CARPHONE

After trying several mic pre-amps in my MR20A carphone with unacceptable results (hum, etc) a simple answer was suggested by a junior member of our group.

Audio from a rocking armature insert was fed directly into the carbon microphone transformer, with one side grounded. This resulted in adequate deviation with some reserve in the deviation control. This idea is applicable to all AWA sets using carbon microphone transformers.

Jim, VK2ZVJ

ROOF TOP ARCHERY

A curious title, but nevertheless relevant.

The problem was to raise a 40m dipole beyond two chimneys some 10m apart, over a slate roof. The only ladder available just being capable of reaching the spouting. Because of the slate roof, throwing a weighted line was not very practical.

The solution was to rig up a crude bow and an arrow of thin dowelling with a nylon fishing line attached.

A few practice shots on the ground confirmed the range and reasonable directivity. Then, up on the kitchen roof, and "ZING"—there was the line beyond the two chimneys. The dipole was attached, hauled across, and minutes later we were on the air.

J. R. Dunne, VK3AXQ

DRILLING BOOMS FOR YAGIS

When constructing Yagi aerials, it is often difficult to get all the elements in line, mainly because of difficulty in marking and drilling the holes in line along the boom.

A simple method is to lay the boom on flat ground or a path, with another tube of similar dimensions alongside, both held firmly together by hand or preferably with G-clamps. Then run the back of a hacksaw blade along the top surfaces, scoring both pipes, thus leaving a straight line along the top, which can be centre punched. It is suggested that a V-block be used for drilling.

Allan Hyslop, VK3ZNB
George Francis, VK3ASV

THE TRUTH ABOUT THE BANDS

Those SWL's using the SW bands of a 2 or 3 band portable receiver which is calibrated in metres would have found, for example, that the 40m band isn't 40m on the dial, it is really 42m!

Here is a table of the metre equivalents for the boundary frequencies of the major HF bands.

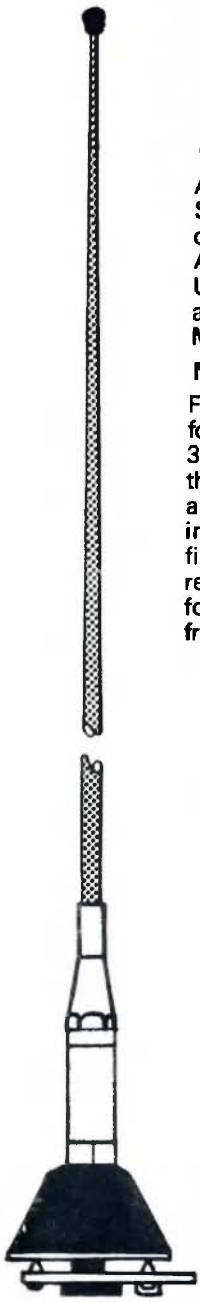
F in MHz	METRES
1.8	166.6667
2.0	150.0000
3.5	85.71429
3.7	81.08108
7.0	42.85714
7.1	42.25352
14.0	21.42857
14.35	20.90592
21.0	14.28571
21.45	13.98601
28.0	10.71429
29.7	10.10101

It is hoped that this table will help SWL's and HAM's alike.

Thanks to Miniwaft, WA Uni's computer system.

Robin Edwards, L60181 ●

SCALAR ANTENNAS



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Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

For the past few months I have been playing with two metre FM transceivers of various types and I must admit that I am fascinated. This month I will relate some of my modifications to the AWA MR6a.

Operating the MR6a from AC. It seems that when many Amateurs think about AC operation of their carphones, they automatically think of heavy duty regulated 12 volt DC power supplies. However this can be difficult and it is often better to run the unit from a standard AC supply with voltage output equivalent to that required by the particular transceiver. Although this description applies to the MR6a, no doubt it could be adapted to almost any valve type transceiver. The MR6a requires about 300 volts for the transmitter final stage and 150 volts for the transmitter driver stages and receiver.

I happened to have an A&R voltage doubler type transformer with 125 volts output at 125 milliamps capacity at the doubled voltage output. As the MR6a has plenty of filtering built in, very little is needed in the power supply. I found that the two series 100 mfd doubler capacitors were all that was required. The only non-standard requirement is that the negative return for the high tension must be insulated above earth.

Another possibility for a power transformer is an old 115/240 volt step-down unit provided it is double wound and not an auto winding. A separate filament transformer would be needed. The twelve pin power connector on the MR6a chassis is now modified so that both the AC supply and a 12 volt DC source can be used.

Remove the link between pin one and pin ten.

Remove the green and black connections to pins eleven and twelve.

Solder both of these to the now vacant pin one. We now have pins ten, eleven and twelve clear. Connect pin ten to the negative line in the MR6a.

A good place to do this is at the negative end of C106 a 25mfd electrolytic. You should be able to measure 470 ohms to ground from this point.

Pin eleven of the power socket is now connected to the positive side of C111. This is located above the chassis right beside the final tube. Pin twelve is connected to the positive end of C112 24 mfd, or to the positive point on the PA metering socket.

This completes the modifications to the MR6a. The AC supply is connected as follows: HT negitive to pin 10. 150 volts to pin eleven. 300 volts to pin twelve. 12.6 volts AC to pin four with the earth return to pin two.

The twelve volt DC connections remain the same except that the bridge between pins 10, 11 and 12 on the female socket must be removed.

A Rocking Armature Microphone with the MR6a.

The MR6a article in September, 1973 AR must have applied to a different model to mine as neither the 12AU7 or the microphone transformer were in my set. Instead the carbon mike was fed directly into the grid of a triode-connected 6AU6. As the rocking armature microphone requires more gain the 6AU6 is rewired as a pentode.

Replace the 6AU6 plate load resistor R61 100k ohms with one of 470k ohms. Cut the connection pins 5 and 6 on the 6AU6 socket and wire a 1 meg resistor from pin 6 to the HT tie point. Bypass pin 6 to ground with a .02 disc ceramic capacitor. The coupling capacitor from pin 5, a 470 pf, should be changed to a .01 mfd to improve the audio response. Remove the 1k resistor across the microphone input. Remove the two paralleled 33k ohm resistors R54 and R56 which were used to feed operating voltage to the carbon microphone.

A three pin DIN socket was fitted to the side of the front panel as an input connector and a right angle DIN plug wired to the new microphone.

If you find a little more microphone gain is needed increase R64 82k ohms to 1meg ohm.

With these modifications your MR6a will be a versatile and smooth sounding rig. ●

WIA 2m BAND PLAN

As announced briefly in Oct '73 AR (p4) there is now in existence an Australia-wide WIA 2m band plan to include simplex and repeater channels.

Channel Numbering System:

Official encouragement is given to rounding off all the existing 2m band FM net frequencies to the nearest 50kHz. Channels shall be numbered on a numerical basis beginning with Channel 0 as 144.000MHz and that Channels O to 20 be allocated at a future date (i.e. 144.000 to 145.000MHz).

To assist in identifying Channels with frequencies the following short table may be useful:—

Freq: MHz	Channel No.
145.500	30
145.750	35
145.850	37
145.950	39
146.000	40
146.500	50
147.000	60
147.500	70

2m FM Repeater Frequencies:

Input MHz	Channel	Output MHz	Channel	
146.100	42	146.700	54	(1)
146.200	44	146.800	54	(2)
146.300	46	146.900	58	(3)
146.400	48	147.000	60	(4)

The following **secondary** channels were designated for future use:—

Input MHz	Channel	Output MHz	Channel
146.150	43	146.750	55
146.250	45	146.850	57
146.350	47	146.950	59

It was agreed that repeater channels 42/54, 44/56, 46/58 and 48/60 should be available for use as soon as possible after approval by the PMG Department. It was also agreed that the change-over to the new frequencies would be carried out as soon as appropriate.

National 2m FM Simplex Channels—

The following are adopted:—

Freq.	Channel	Remarks
146.450	49	
146.500	50	National calling frequency
146.550	51	
146.600	52	National RTTY channel
146.650	53	

PMG Department.

The Controller, Regulatory and Licensing in letter RB4/4/29 of 27-11-1973 advised inter alia, "the Department has no objection in principle to the use of the frequencies listed (the new repeater input and output frequencies — Ed). Each proposal, of course, will be examined in relation to adjacent services at the proposal site, and the expected growth rate of radio services in the area concerned. Special conditions in relation to the equipment characteristics and operational procedures will be set by the Department in each case. The Department is in sympathy with efforts to standardise the frequencies used for WIA repeaters."

Previous Frequencies.

The WIA 2m band plan, as shown, will lead to the discontinuance of frequencies previously in use throughout Australia.

Channel 1 - 146.1MHz in / 145.6 out

Channel 4 - 146.4MHz in / 145.9 out

Simplex Ch. B - 146.000MHz, Ch. A - 145.854MHz and Ch. C 146.146MHz

Unused repeater Channels 2 and 3.

All are for plus or minus 15kHz deviation.

The Satellite 'window' on 2m extends from 145.825 to 146.000MHz.

Present Indications

At the time of writing there is a dearth of definite news about future plans. The Victorian Division announced early in Dec. that applications had been made to their Radio Supt., to introduce new repeater callsigns and changes of channel allocations from 2-3-1974. Applications were stated to have been lodged for Mt. Dandenong and Mt. William repeaters Ch. 42/54, Mt. Tassie repeater Ch. 44/56 and Ch. 48/60 repeaters for Mt. Anakie and Mildura. All their repeaters will be using an FSK CW identification. It is understood that the Adelaide repeater Ch 42/54 will be put into use before or by 1st March, 1974. In Tasmania it is believed that the Mt. Barrow (North East) repeater will change to the new frequencies on 2nd March and that the Mt. Wellington (Hobart) repeater for Ch 42/54 may become operational soon thereafter.

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

VK0	VK0RSG, Macquarie Island.		52.160
	VK0MA, Mawson		53.100
	VK0GR, Casey.		53.200
VK2	VK2WI Sydney. x		52.450
	VK2WI, Sydney. x		144.600
VK3	VK3RTG, Vermont.		144.700
VK4	VK4WI-2 Townsville.		52.600
	VK4WI-1, Mt Mowbullan.		144.400
VK5	VK5VF, Mt Lofty.		53.000
	VK5VF, Mt Lofty.		144.800
VK6	VK6VF, Bickley.		52.006
	VK6RTU, Kalgoorlie.		52.350
	VK6RTT, Carnarvon.		52.900
	VK6RTW, Albany.		144.500
VK7	VK7RTX, Devonport.		144.900
VK8	VK8VF, Darwin.		52.200
VK9	VK9GA, Goroka. x		52.001
ZL1	ZL1VHF, Auckland.		145.100
ZL2	ZL2VHF, Wellington.		145.200
	ZL2VHP, Palmerston North.		145.250
ZL3	ZL3VHF, Christchurch.		145.300
ZL4	ZL4VHF, Dunedin.		145.400
JA	JA1IGY, Tokyo.		52.500

x — denotes new listing.

Additionally to the above, there is a cluster of beacons around 50.100, HL9WI in Korea, 3D3AA Fiji, 5W1AR West Samoa, CEOTS Easter Island, FO8DR French Oceania, ZK1AA Cook Island. Also KH6EQI Hawaii is on 50.104, KX6HK Marshall Islands 50.110 and WB6KAP California spasmodically on 50.013. There are plenty of beacons to look for if you want to start. With the coming of the equinoxial period soon, it might pay to tune further than the first 100kHz of 52MHz.

The VK2 beacons are listed this month after a long wait. Although no direct word of their operation has come my way, it appears they have both been heard with some consistency in Canberra, which seems to be reasonable for recording purposes. We also welcome the listing of the Goroka, Niugini, beacon VK9GA near the 52MHz band-edge.

We now appear to have a very good Australia wide coverage of beacons, and hopefully we look forward to VK1 getting the necessary licence for their beacon sometime in 1974. I have been hinting about the lack of licence for this one for some time. When it is granted, I hope to receive from the Canberra boys a nice bottle of sparkling mardi gras so I might drink a toast to the last VK call area to have its beacon. Thanks in advance chaps!

52MHZ AND THE DX

As always, the conclusion of the Ross Hull Contest saw most of the activity ended on 6 metres. Certainly band conditions do tend to drop off fairly rapidly as January progresses, but I don't believe it finishes as rapidly as band occupancy might seem to indicate. The foul weather which has persisted over a great portion of Australia for the last three weeks in January was enough to make anyone close down. I think too of the losses which must surely have been suffered by many of the amateurs in Queensland, in some cases whole shacks must have disappeared. Can those living in the south and other areas not worried by floods do anything to help? Equipment is scarce, but maybe there are surplus parts lying around. If someone in VK4 was prepared to co-ordinate requests and distribution, I am sure there would be fellow amateurs prepared to assist in some way.

While on the 6 metre scene, I have received a very interesting letter from Geoff VK3AMK, and as its contents are so relevant to the "DX season" through which we have passed, that I can do no better than to record his views for all to read, with a few comments of my own at the end.

"We have just had one of, if not the best, summer "DX seasons" for many years. Several things arose during this season which I feel could be discussed through your page in "A.R.", which is the only natural forum for VHF in this country.

"The first matter concerns the claim by some AM operators that people using SSB are unwilling to talk to AM stations. The situation has now been reached where virtually all serious DX operators are using SSB. This mode has proved itself beyond doubt on both HF and VHF. In my opinion the problem with the remaining AM stations is (a) most lack VFO control, and (b) the stability and percentage of modulation in many cases could be improved.

"I would say that there are virtually no stations operating SSB that **WON'T** talk to AM stations, but vast numbers who find they are **UNABLE** to talk to them. By using transceivers, most SSB stations now are VFO controlled and operate on the same frequency as the station they are working. Often a rare station such as a VK9 (P29) or VK0 or ZL's will have dozens of replies to a "CQ" and naturally stays on the one frequency until all callers have been worked. If an AM station operating crystal locked is calling 200kHz up the band, the DX station cannot be expected to leave the other callers and start tuning. Almost all SSB stations listen on their own frequency before tuning, and very often are called on that frequency before tuning. It is surely not beyond the capabilities of those holding Amateur licences to build a VFO, by using a VFO to operate on the frequency of the calling station the AM operator has an equal chance to work DX.

"One reason that I personally have difficulty in working AM stations is, the often unbelievable instability of the signal (drift and FM) and poor modulation. Many of these stations come up year after year with the same fault. One in particular drifts anything up to 20kHz. A VR tube or Zener diode in the oscillator circuit, plus about 15 minutes of their time would probably improve stability. What happens ofcourse is that the SSB station zeros to the AM signal and then follows it up the band and comes back often on top of another QSO up or down the band, the AM station wondering where the SSB operator has got to.

"Even a slight amount of FM makes copy difficult on an SSB receiver, but how many AM operators seem to worry? Residual hum on the carrier does not help matters either, especially when signals are weak or suffering deep QSB. By far the greatest problem is lack of modulation. One rare station in particular has to be almost S9 here to be really readable, even on a good receiver with AM facilities. Very few SSB transceivers have any provision for adequate reception of AM other than in the exulted carrier condition, unless there is plenty of modulation. The usual 2.1kHz filter makes copy really difficult, but given a **GOOD AM SIGNAL** there is **NO** problem. By "good" I mean, no drift or FM, adequately modulated. Anyone who doubts this should have a listen to Lance VK4ZAZ sometime, if his signal cannot be copied on an SSB receiver, the receiver is faulty!

"Many times I have VFO'd on to an AM stations frequency, listened to a long "CQ" and then heard "VK . . . tuning from band edge up." Often when the station is operating on 52.3 or 52.4MHz. Very few SSB stations have the luxury of external VFO's to call and listen on two frequencies. I have even heard AM stations call then tune almost everywhere other than their own frequency and go QRT without being aware of someone calling repeatedly on their frequency, this may seem an extreme example, but it does happen.

"Other AM stations operating with a single crystal pick band edge or plus or minus a kHz or two as "their" frequency. Others operate on known calling frequencies such as 52.050 or 52.100MHz either unaware or not caring about QRM. A few years ago many Melbourne stations spent about an hour trying to call a ZL1 near band edge while a VK4 operating mobile in Melbourne on AM cruised around calling CQ crystal locked on the ZL1's frequency. When called by the SSB stations and asked if he could QSY or QRT for awhile the mobile simply replied "sorry I can't copy SSB" and went on calling CQ ad infinitum!

"One of the myths still believed by many is the "DX season" (especially on 6m.). Certainly there is a peak but there is also a "Winter season" etc, too. A rereading of the VHF notes in October 1973 "A.R." may help convince the non-believers. A study of the lower TV channels (Ch. 0 and Ch. 2 especially) throughout the year will prove most enlightening. Winter conditions on 6m. are often very good but rarely is there anyone around to take advantage of it. Many people start looking for 6m. DX around the early part of December but over recent years the band has opened any time after the beginning of October, in fact during November 1973 all call areas of VK and ZL1 - 4 were heard-worked from VK3.

"Two metre DX is something which seems likely to produce more contacts over greater distances in coming years. During the summer of 1973 - 74 there were numerous openings on both tropo and Es. At least three different openings from Melbourne to VK4 were worked on sporadic E (Es) and one to VK6 on tropo. These were all as a result of mere chance or trying 2m because 6m was reasonably good. With relatively few active 2m stations outside the capital cities, it makes one wonder how much could be done with a little effort and thought. I worked VK4ZAA, VK4ZDI, VK4ZEL and VK4ZNC in Brisbane plus VK4ZAZ Rockhampton on Es, and VK6KJ and VK6WG Albany on tropo. VK5SU worked VK1 and VK2 on 2m, and ZL1QI reported hearing the VK5VF beacon at Tauranga on 1-12-73 at 0830Z. Finally, one of the most heartening features was surely the appearance of no less than thirteen ZLs on 6m during the summer, including all call areas . . . Geoff. VK3AMK."

Many thanks for your letter Geoff, there are plenty of facts and pertinent points raised in those comments. They need not be a cause for any arguments, if they hit home rather hard on some people's shoulders, then maybe some corrective action can be undertaken before the end of the year. I would like to add a comment regarding the level of modulation. Some station operators like to mention they are running 100 watts input. The books tell you 50 watts will modulate an AM transmitter of that power adequately. Such modulators might give 50 watts of audio at the plates of the output tubes, but losses occur in the modulation transformer and elsewhere, so the final output may be quite a bit below 40 watts. Stations with modulators with a capability of about half the RF power output would do well to reduce the input power to the final equal to that of the modulator output, and see what a difference this makes. If the modulator has been properly constructed to include a high level clipper and negative cycle loading, the high audio level will not spread your signal to the detriment of others.

On this latter point, when I used AM on VHF I used to run 100 watts of RF and 120 watts of audio through a high level clipper. I never had trouble being copied by SSB or AM stations, and received no complaints of a broad signal. Finally, on the question of reducing input power, I carried out an experiment some years ago on 20 metres. I reduced my AM input power to 50 watts, loaded the signal up with 100 watts of audio, and promptly worked a station in Canada who gave me an SSB report of 5 x 9! I have a QSL card to prove it. The high audio level overshadowed the carrier and the signal sounded just like sideband. However, I don't suggest you try this unless you are sure your speech clipper is working properly!

REPEATER NEWS:

From 2nd March, all Victorian repeaters will be changed over to the new frequencies. Opportunity to re-assess the interference being caused due to geographical separation and the increased popularity of the devices has been taken during the changeover, and from the same date two channels which are now operating on "4" will change to channel "2". The simplex 2m FM channels now in operation in VK3 are channel 50 (146.50), channel 51 (146.55) and channel B which is being phased out.

Mt Dandenong, VK3RML to operate on CH.1 from 2-3-74. Mt Anakie (Geelong), VK3RGL, Ch. 4; Mt Tassie (Latrobe Valley) VK3RLV, Ch. 2; and Mt Alexandra (Bendigo) VK3RBO, Ch. 2. In addition approval is being sought for new repeaters at Mt William (Grampians) VK3RMW, Ch.1; Mildura VK3RMA, Ch.4; and Mt Macedon VK3RMM Ch. 3. Application has been made to the Australian Post Office to issue a new range of more meaningful callsigns, and if granted, the callsigns listed above will be those in use. Thanks to Russell Kelly, VK3NT, Federal Councillor for passing on this repeater information.

VHF CALLING FREQUENCIES:

Confusion seems to be dying down somewhat, but observations on both 6 and 2 metres during December and January indicate most 6 metre stations preferred 52.050 and 2 metres 144.100. The choices are O.K. with me and most others I guess as long as those needing calling frequencies know them. The only thought I might add about the use of 52.100 as some advocate, is that it is located on a 100kHz check point for the crystal calibrator in most transceivers, and as such may be a little more accurate when dealing with M-S contacts and even for running the receiver in the shack. Anyone prepared to write their thoughts?

I guess there has not been a lot of news this time, but you got plenty last month.

Closing with the thought for the month:- "In the courtroom of our conscience, we call only witnesses for the defence."

The Voice in the Hills.

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Transistor package offer, 2N5589, 2N5590, 2N5591 for **$22.50**

All P & P 50 cents

Data sheets on transistors available separately 10 cents (P & P 20 cents). The prototype shown here was built by Dick Smith himself. It worked despite a few short circuits. If he can get one going anyone can!!

Now Jim Rowe has built one (see Electronics Australia, Jan 74, p56-59). Quote "I can confidently give the Dick Smith '2 metre PA Superkit' a clean bill of health. Not only does it deliver the power output claimed, but it also seems quite stable and free from nasty side emissions."

As a result of all this praise, we won't put the price up—yet!!

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M25 Fibreglass 148-175MHz 5/8th wave 3db gain with integral base load coil **$13.80**

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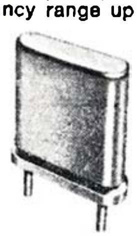

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Impedance ratio 1 : 1. 75 ohms (nominal) unbalanced to 75 ohms (nominal) balanced. 3 to 30MHz. For use at centre of a dipole antenna with co-axial feed line or at transmitter end with 75 ohm (nominal) flat transmission line. Belling & Lee L734-P connecting plug supplied.
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PRICE: $10.00

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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,

The note entitled "USA Repeaters" at the bottom of page 7 of the December 1973 issue of **Amateur Radio** may tend to mislead its readers as to the state of relations between the Federal Communications Commission and U.S. amateurs. Prose Walker, the "... chief of the FCC division responsible for amateur operations ..." is a long-time active amateur himself, W4BW. The source from which you lifted his alleged remark is none too reliable, to say the least. W4BW's views on the future of amateur radio are more accurately reflected in **QST** articles such as the one beginning on page 75 of the August 1973 issue. Here you'll find such phrases as this:

"... perhaps we can hope that in the future it may be possible to either **expand** existing HF amateur bands or even **obtain some additional ones** at appropriate locations in the spectrum."

ARRL and the FCC have some major differences of opinion, but we don't for a moment think that W4BW has anything but the best interests of the amateur service at heart. We're deeply distressed to see expressions to the contrary repeated in **Amateur Radio**.

David Sumner, K1ZND,
Assistant Secretary for
Membership Services,
ARRL.

Editor,
Dear Sir,

THE AMATEUR OPERATOR

In this day and age of sophisticated equipment satellites etc. it is easy to forget the primary skill of our hobby.

RADIO OPERATING.

I have heard plenty of derogatory remarks about "appliance OPERATORS" but I would rather hear a good **OPERATOR** on the air than a "**LID**" as the W's call them, irrespective of the man's skill with a soldering iron.

I was issued with a licence to **OPERATE** an Amateur Radio Station and conduct experiments within the terms of that licence.

Over the years I have built and **OPERATED** my own station; **OPERATED** "appliance's," experimented with antennas, and built test equipment. In short I have "had a go" at most of the technical side of our hobby.

There is no doubt in my mind that such things as antenna experiments could occupy one's hobby time for life, and such experiments would require one to **OPERATE.**

When you boil it down, most of us want to get on the air, we want to test our equipment, our antennas, exchange ideas with other amateurs, and, sometimes just chew the rag.

Most of us also want to give the Amateur a good image in the eyes of the public, P.M.G., and the world.

OUR IMAGE IS A WORD PICTURE PAINTED BY OPERATORS.

The listener cannot tell who built the equipment.

To encourage operating skills we have various contests sponsored by amateur organizations throughout the world. It is significant that the contests cater for CW and PHONE as separate sections. Both modes require **OPERATING** skills of a high order to achieve a high score.

In VK we have the R.D. contest every August which is an excellent test of **OPERATING** skill. It is billed as a friendly contest and a good **OPERATOR** can make two contacts every three minutes (early in the contest), and still be friendly until he meets the "**LID**" who gives a 5-9 report then asks for 3 or 4 repeats.

What about VHF repeater operation? I think it is time the WIA laid down some "gentlemen's rules" and also clarified call sign exchange procedure on VHF.

A FEW COMPLAINTS

Calling and answering procedure is clearly laid down and yet I heard a WIA callback where the "operator" said — VK3WI TO VK3MNO

Don't think I don't appreciate the work of the broadcast volunteers, but surely the operation of the OFFICIAL STATION should be above reproach.

At a WICEN exercise I was told that date time groups were given in local time as GMT was "too hard" for the "operator" to work out.

I hope I haven't hurt anyone's feelings with my criticism. It is offered in the belief that we should pay more attention to our **OPERATING** skills and procedures. Perhaps the odd paragraph in AR each month headed "**OPERATING HINTS**" would help as a lot of our newer Amateurs may not be aware of correct procedures and their importance in the overall image created.

O.K. chaps let the soldering iron cool off for a few minutes and look closely at your knowledge of correct **OPERATING** procedure.

Whatever the band, mode, and type of equipment you use, make sure your **OPERATING** is at least as good as your equipment.

WE hold an Amateur **OPERATOR'S** certificate of Proficiency, so we should all be proficient **OPERATORS.**

M. N. O'Burtill.

Editor,
Dear Sir,

CO NIHON

During the past twelve months there has developed a noticeable awareness among hams of making an effort to speak Japanese on the air. After all, Japan is Australia's largest export market and, as a consequence, is to some extent responsible for that speed boat or extra car in the driveway. So why not get with it and learn a little about the other chap's way of life and speech. Who are we to dictate that the other fellow up there in Japan should have to speak our language exclusively and so avoid the necessity of making any effort to learn something of his mode of speech.

When first listening to the JA hams dashing off a QSO among themselves, the whole idea of communicating in their language would appear to be well nigh impossible. But is it? By comparison with 'schoolboy' French it is a pushover. First of all, there are no genders to worry about such as a male or female table. It's simply a table — full stop. For another thing there are basically only two verb tenses — present and past, with only two irregular verbs in the entire language. There is also none of this 'cough' 'dough' 'through' confusion we have in English.

If you are prepared to make the effort to say a few phrases in Japanese, the chap the other end will invariably tack 'san' on to your handle when he replies. This is considered a very polite form of greeting and decidedly more friendly than the usual 'Bill-Joe' technique.

Before you rush off and invest in an English-Japanese dictionary — don't. If you do, you will only hold up the QSO while you rifle through the pages and end up with a single word which won't contribute very much towards intelligent conversation. In the early stages of learning a foreign language, it is important to grasp how they put phrases and short sentences together. 'Good morning' 'good afternoon' and 'good night' make a simple starting point. The well worn ham conversation piece of referring to the weather and temperature makes a good introduction to simple phrasing and later on a complete sentence.

The next step could be ten minutes spent in learning to count from one to ten. You would then be in a position to reel off his R-S report in straight Japanese and become an instant success with Toshi in Tokyo. If your contact replies in Japanese you will have the advantage of a fluent Japanese language teacher without the inconvenience of attending a language class.

If you are still interested in the foregoing, then you might like to take advantage of the fact that the Hitachi Company of Tokyo produce three excellent booklets (17c-m x 11c-m) entitled 'Let's Learn Japanese' which deal with everyday conversational Japanese. As an added attraction, these booklets are completely free and you don't even need a s.a.s.e. — at least that was the position two years ago.

R. B. Monfries,
VK5RB.

Dear Sir,

I am much interested in corresponding with an Australian boy. Would you please send me the name and address of a boy so that I may write to him? If his hobby is amateur radio, I will be overjoyed.

I am—

Name: Noriyuki Amano
Age: 15
Address: 2896 Niikura, Wako-shi, Saituma-ken, Japan 351.
Hobbies: Amateur radio and reading.

I would appreciate it if you would answer to my letter soon.

Yours truly,
Noriyuki Amano

You and DX

160 METRES DX POSSIBILITIES

Here is a list of sunrise times.

The low sunspot numbers should help to make this Equinox season a good one. **All VK's are requested to operate from 1825 to 1835kHz.** This will help to minimize the QRM at both ends of the path. W1BB, W1HGT and other active W-VE 160 metre ops believe this should make for many additional QSO's.

Scheds will be held on 1802 to 1806 from 30 minutes before until 30 minutes after the following sunrise times (GMT):

March 2	1118
March 3	1116
March 9	1106
March 10	1105
March 16	1054
March 17	1053
March 23	1042
March 24	1041
March 30	1030
March 31	1028

Again we will be QSX for VK's from 1825 to 1835kHz. Maybe CU on 160??

Ralph — W1HGT

USSR AMATEUR PREFIXES

Individual stations licensed up to the end of 1969 still use prefixes in the series UA, UB, UC, etc. Stations licensed from 1970 onwards and club stations are using prefixes in the UK series. The following list is presented to aid identification of stations using the UK prefix.

UK1 (except UK1N)	UA1-6
UK1N	UN1
UK2A	UC2
UK2B	UP2
UK2C	UC2
UK2F	UA1-6
UK2G	UQ2
UK21, L, O	UC2
UK2P	UP2
UK2Q	UQ2
UK2R	UR2
UK2S	UC2
UK2T	UR2
UK2W	UC2
UK3	UA1-6
UK4	UA1-6
UK5 (except UK50)	UB5
UK50	UO5
UK6A, B	UA1-6
UK6C, D	UD6
UK6E	UA1-6
UK6F	UF6
UK6G	UG6
UK6H, I, J	UA1-6
UK6K	UD6
UK6L, M, N	UA1-6
UK60	UF6
UK6P	UA1-6
UK6Q	UF6
UK6R, S, T, U	UA1-6
UK6V	UF6
UK6W, X, Y, Z	UA1-6
UK7	UL7
UK8A, C, D	UI8
UK8E	UH8
UK8F, G	UI8
UK8H	UH8
UK8I	UI8
UK8J	UJ8
JK8L	UI8
UK8M, N	UM8
UK8O	UI8
UK8P, Q	UM8
UK8R, S	UJ8
UK8T, U	UI8
UK8W, Y	UH8
UK8Z	UI8
UK9	UA9
UK0	UA0

Peter Nesbit
VK3APN

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

I have just been reading the Intruder Watch article by Art Ericson W1NF in "QST" January 1974 issue and recommend it to Members. If I may quote from it — Footnote 1 — "Although we have grown accustomed to using the word 'intruder' in a rather free and easy fashion, legally we are concerned with the stations that are causing harmful interference. No. 115 of the Radio Regulations, Geneva 1959, states, "Administrations of the Members and associate Members of the Union shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations given in this Chapter or the other provisions of these regulations except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the provisions of the Convention and of these Regulations." Thus, the intruder must be causing harmful interference to be the subject of a complaint. Or, to put it another way, it is perfectly okay for any station of any service to operate in the amateur bands, provided that no harmful interference is caused and no complaints are received."

The above philosophy, to me is reading the Regulations literally, and so when Intruders are observed in our bands it is up to Amateurs to cause them to be "causing harmful interference". What say? The other quote — "Table 1 — What are Intruders? —

1800-2000kHz	— Broadcasting. Any US or Canadian non-amateur, except Loran.
3500-3900kHz	— Broadcasting. Any US or Canadian non-amateur.
7000-7100kHz	— Any non-amateur station.
7100-7300kHz	— Western Hemisphere Broadcasting. Any non-amateur station other than broadcasting.
14000-14250kHz	— Any non-amateur station.
14250-14350kHz	— Any non-amateur station except fixed stations in the USSR.
21000-21450kHz	— Any non-amateur station.
28000-29700kHz	— Any non-amateur station.

Because of complaints the Japanese fishing boat QRM in the 3.5MHz band has been quiet until recently. Unfortunately they are re-appearing again and also in the 7MHz band. Reports would be appreciated.

(Alf. Chandler. VK3LC)
Federal Intruder Watch
Co-ordinator

Historical Section wants old mags, papers, articles, photos, drawings—up to W.W.2—for copying or as donations. Please write VK3ZS, QTHR or WIA Executive office.

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN November 1973.

Solid State Lamp: SSB V AM: BDB Transceiver: An Introduction to Binary Logic: A Secondary Frequency Standard.

SHORTWAVE MAGAZINE. October 1973.

Proper Use of Transistors: Indicator for Change-Over: Another Two-Metre Converter: Pye Cambridge Transmitter Conversion for Two Metres: Note on the QRO Two-Metre Linear.

RADIO COMMUNICATION November 1973.

The G2DAF Mark 2 Receiver: Oscar 7 and its Capabilities: Toneburst Generator Using IC's: 80 M Twilight Operation.

RADIO COMMUNICATION December 1973.

The G2DAF Mark 2 Receiver: Gains and Losses in HF aerials: UHF Television Interference: The G3XGP Digital Frequency Meter. Corrections & Modifications: An Integrated Circuit Speech Compressor, Modification: 160M DX from Suburban Sites: Changes to the 2M, 70 CM and 23 CM Band Plans: Amateur Radio — The Preservation of its Right to Operate.

RADIO ZS October 1973.

Apollo Space Flight Communications: VHF Antenna Systems & Random Paths: Forty Years Minus Three: The Design of Simple Mains Transformers: FM for the Masses: Aerials and Common Sense: Beam for Two.

RADIO ZS: November 1973.

Using the Plessey SL600 Series Integrated Circuits in Transceivers: Tuning the VHF & UHF Spectrum: QRZ . . at Fort Beaufort: Meteorites for the Astronomer and the Radio Amateur: FM with Deviations.

CQ December 1973.

An Audible Meter for the Blind: Whither DX? Happiness is Visiting a Ham: QRP: Measuring Power Output: Means v Ends in Amateur Radio: Novice Shack: Square Dipole Antennas for 21 & 28MHz: SSTV: Logic Controlled Audio-SSTV Switching: Antennas: A New Design, Theory & Construction Column.

QST November 1973.

The Rollerless Ultimate: A Homemade VOX Accessory: A Single-Band Pre-amp to Improve SSB Transceivers: The Log-Periodic Dipole Array: A TTL Message Generator for RTTY & CW: A Crystal-Correlation Test Oscillator: Some Frequently Asked Questions & Their Answers: A 7MHz Vertical Parasitic Array: A Heterodyne Exciter for 432MHz.

73 October 1973.

Frequency Measuring Equipment at Microwave Frequencies: Build a Complete Receiver Front End with RCA CA3102E IC: Instant Replay for Your Tape Recorder: 2KW PEP Building Block Linear: Yet Another RF Watt-meter: Meter Legerdemain: Europe's First and Highest DX Repeater: A Balanced Dipole Antenna: Digital "HI" Generator: A Three-Stage Oscillating Ring Counter with Indicating Shift Register: Frequency Multiplication the Easy Way:

73 November 1973.

Getting Started on 450MHz: Getting Started on Amateur Television: NI-CAD Life saver: Heath GR-110 VHF Scanning Monitor: Autopatch Inter-connection the Legal Way: Frequency Aperture Modulation: Versatile Test Equipment Range Extender: A Power Supply for Small FM Rigs: A Radiating Loading Coil: Peak-Notch IC Audio Filter.

E M C

It is intended that September AR will be an EMC Issue . . .

Any articles on Interference and EMC generally will be gratefully received.

Dead line — 30th June

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638
Brisbane, Qld., 4001.

GRAPHS . . . and REMEMBRANCE DAY

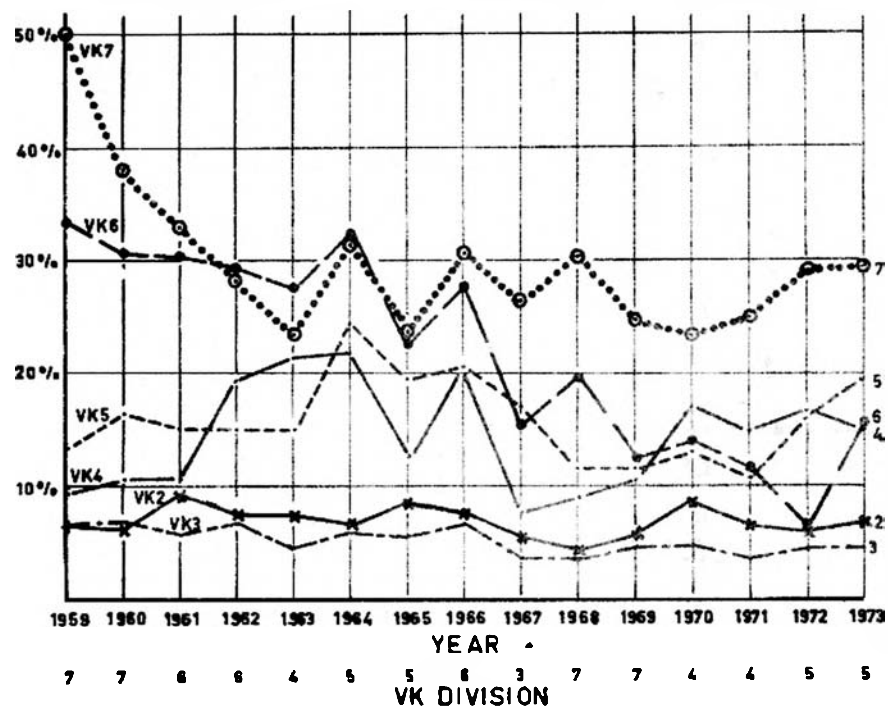
I, as also ye Ed, was disappointed with the graph reproduction in January Amateur Radio, as there was a real message there. Have another look at the graph . . . I am sure that we can do a lot better in contests.

Have a look at this month's graph . . . DIVISION PARTICIPATION RATE. The vertical percentage scale is participation in RD Contests.

The horizontal scale is the year of the contest and also the winner for that year is shown on the bottom line. RD contests. What can you make of it???? It could influence your ideas on improved rules!!

Note that the states with the largest number of amateurs, VKs 2 & 3, have not varied much over the years, are reasonably close together, and have lowest participation rate.

The states with next greatest amateur population, VKs 4 & 5, including VKs 8 & 9, have the next highest rates and these rates vary quite a lot.



VK6 after winning in 1966, fell back and fell to an all-time low in 1972 . . . but is on the way up again . . . greatest improvement in 1973 . . . at its present rate will soon be challenging VK7. VK7, the state with the lowest amateur population seems to be able to stay on top. I guess that the smaller states, amateur population wise, are easier to organise . . . except VK6 with their vast space? VK4 and 5 seem to be dependent on someone to organise??? or what?? Why have VKs 2 & 3 remained so steady?? VK3 has so much Federal work to do . . . VK2 has such a large area?? Not easy to provide rules for all is it? Think it over. Make sure that you tell your Federal Councillor what you want of contests. They meet next month.

CONTEST CALENDAR.

March

2nd and 3rd. ARRL DX phone contest. See Jan "AR".
9th and 10th. RSGB, BERU. See Feb "AR".
9th and 10th. YL-OM CW.A W-K-VE contest where YLs contact the OMs.
9th and 10th. World wide VHF activity.
9th and 11th. Virginia QSO party.
16th and 17th. ARRL DX CW contest. See Jan "AR".
23rd to 25th. BARTG RTTY contest.
23rd to 31st. IARC Propagation phone.
30th and 31st. CQ WW WPX SSB Contest. Don't miss this.

April.

At this time I do not have any details but these contests should be on. If you have details please advise.
7th. RSGB 80m Low power
7th - 8th ? . . . SP DX phone
? Bermuda phone.
? PACC DX
? WAEDC RTTY

BARTG Spring RTTY Contest.

I have details and on receipt of an SAE will forward you a copy in time for the contest. Send SAE to my home QTH.

CQ World Wide WPX SSB Contest.

0000 GMT Saturday 30th to Sunday 31st. Only 30 hours of the 48 for single ops stations. 18 hours of non-operating time may be taken in up to 5 periods and must be indicated in the log. All bands 1.8 through 28MHz but 2 way SSB only.
Sections. SINGLE OP. All band or Single band.
Sections. MULTI OP. All bands.
REPORTS. Usual RS and serial.
Scoring. 3 points on 14, 21, 28MHz. 6 points on 1.8, 3.5 and 7MHz between stations in different continents.
Scoring. 1 and 2 points respect between stations in the same continent but not in the same country.
Stations in the same country for prefix multiplier only.
Multiplier, by the number of prefixes, counted once only in the contest. VK1, VK2, etc. count as a prefix as do W1, W2 etc.
Final score. total QSO points x prefixes total.
One contact per station per band.
Certificates to highest scorers in each section in each country and each VK call area.
Logs. All times GMT. Show 18 hour non-operating time. Separate sheet for each band. Enter prefix multiplier the first time contacted only. Send prefix check list. Usual summary sheet and declaration.
All logs to CQ WPX SSB Contest Committee.
14 Vandeventer Ave., Port Washington. L1. NY, 11050, USA.
I would think the closing date — May 1st.

IARC Propagation Contest.

March 23rd 0001 GMT to March 31st 2400 GMT. PHONE
Single band, all band, mobile and SWL, single op only.
Exchange, RS and Zone.
Scoring. One point per contact and a multiplier of one for each zone and IARC country contacted on each band. Your own zone counts for multiplier only.
The same station may be contacted as many times as desired but contacts must last more than 6 minutes or a fraction thereof. Each may be credited as a separate QSO and must be logged separately.
Use separate log sheets for each band and mode. GMT only. Logs and enquiries to L. M. Rundlett, K4ZA. 2001 Eye St. NW. Washington. DC 20006.

YL-OM Contest.

1800 GMT Saturday 9th to 1800 GMT Sunday 10th. CW only.
All bands. Exchange Serial No. RST and country.
Logs to Christine Haycock, WB2YBA, 361 Roseville Ave, Newark, NJ.07107, by April 30th.
Certificates to the highest scorer in VK.

Virginia QSO Party.

1800 GMT Saturday March 9th to 0200 GMT Monday March 11th.
The same station, Virginian I presume? may be contacted on each band and mode.
Exchange. QSO number. RS-RST and QTH.
One point per QSO. Multiplier, the number of Virginian's.
Frequencies. CW 60kHz from low end of each band. Phone. 3930, 7230, 14285, 21375. 28575. Even hours.
Certificates to highest scorers in each country.
Usual summary etc.
Logs by 15th April to Don Wiles, W4IML, 3801 Lomond Drive, Manassas, VA, 22110, USA.

AUSTRALIA and WORLD WIDE MOBILE CONTEST.

Syd, VK2SG, suggests a world wide mobile contest with provision for VHF operators.

To my mind a mobile-mobile contest is a must and I have wondered why there is not such a contest. Possible publicity may not be good from the safety angle but this could be overcome with a no-drive-operate rule.

One of my ambitions is to work mobile-mobile DX and perhaps you have that yen too? A contest would be one way of achieving that ambition.

Of course we don't just say "let's have a contest" and it is on. If the contest is to have WIA backing, Federal Council would have to review their responsibilities, and they are not inconsiderable, in the matter. The load on the Federal Contest Manager of that time would also have to be considered . . . but some could possibly be "farmed out".

I will let you see Syd's proposed rules next month for your comment.

HAVE YOU??

Have you forgotten to include your comments on the metrication of the Ross Hull VHF contest scoring distance table? If so get in touch with your Federal Councillor and give him your comments . . . Federal Council will meet at Easter but don't wait until then to give him your ideas.

A recent comment, in person, was to the effect that the Ross Hull contest was spread over too long a period?? What think you?

John Moyle Memorial National Field Day.

The way the weather is behaving in VK4 land, we will need boats to get out. Which brings up the question? Could a mobile marine become a field station??

BERU 1974

A reminder that this contest (CW) runs from 1200z 9th March to 1200z 10th March.

Details on Page 29, February AR.

Trophy medallions to VK winner and middle placing (1973 — VK3XB & VK6RV)

Ionospheric Predictions

with Howard Rider, VK3ZJY March, '74

This month's predictions from information supplied by the Ionospheric Prediction Service Division indicate point to point band openings for at least 50% of the month. Times quoted are G.M.T.

28MHz		
VK2 to KH6		0100 - 0600
VK3 to VK9		0100 - 0700
VK4 to KH6		2100 - 0700
VK5 to VK9		0100 - 0700
VK6 to SU		0700
VK7 to VK9		0100 - 0700
21MHz		
VK2 to ZL		0200 - 0300
SU		0400 - 0900
ZS		0500 - 0900
UA		0400 - 0900
VK9		2100 - 0800
VK3 to KH6		2100 - 0800
G (SP)		0700 - 1000
VE3 (SP)		2100 - 2400
VK9		2100 - 0900
ZL		2200 - 0800
VK4 to SU		0400 - 0900
KH6		2100 - 1000
VK0		2300 - 0900
W1		2000 - 2400
VK5 to JA		2200 - 1000
UA		0400 - 1000
W6		2100 - 0300
ZS		0500 - 1000
VK6 to G (SP)		0700 - 1200
PY		1000
ZL		0100 - 0900
VK7 to JA		2200 - 0900
14MHz		
9G1 (SP)		0700 - 0800
W1		2100 - 2400
VK2 to G (SP)		0700 - 1800
G (LP)		0800 - 1200
SU		0400 - 0900
VK0		2100 - 1100
W1		2000 - 2400
ZL		2000 - 1100
VK3 to JA	0500 - 1700	2100 - 2400
VE3 (SP)	1300 - 1700	
VE3 (LP)	2200 - 0100	
VK9	2000 - 1700	
UA	0800 - 1800	
ZS	0400 - 0800	1000 - 1200
VK4 to W6	0400 - 0600	1900
VK0	2000 - 1300	
ZS	0400 - 0800	1000 - 160
JA	0500 - 1700	2100 - 2300
VK5 to		
KH6	0400 - 1300	2000 - 2100
PY	2200 - 0700	0900 - 1200
9G1 (SP)	2200 - 0300	0500 - 0600
9G1 (LP)	0700 - 1100	1600 - 1700
VK6 to		
PY	2300 - 0600	0800 - 1300
UA	0900 - 1800	
W1	1300 - 1800	2200 - 2300
ZL	2200 - 1200	
VK7 to		
G (SP)	0900 - 1600	
SU	1100 - 1300	
VK0	0200 - 0800	
W6	0300 - 0600	1900
7MHz		
VK2 to		
G (SP)		1600 - 2000
W6		0700 - 1500
VK3 to		
JA		0900 - 2000
9G1 (SP)		1800 - 2100
VK4 to		
VK0		0600 - 2100
PY		0800 - 0900
VK5 to		
KH6		0800 - 1700
VE3 (SP)		0800 - 1300
VK6 to		
ZL		0900 - 2000
SU		1500 - 2300
VK7 to		
VK9		0800 - 2100
UA		1400 - 2100

Hamads

* Eight lines free to all W.I.A. members.
* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150 Toorak, Vic., 3142.
* QTHR means that the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

GONSET GSB-100 100 W PEP SSB/CW xmtr 80-10m good condx w/spare 6DQ5 final tube $200.
Phillips EL3542 tape recorder w/accessories, good condx $75. You pay freight. VK4ZV, QTHR. Ph. (072) 82 2951. AH (072) 80 2697 bus.

Winch up Tower, 42 feet, in excellent condition, and one Stolle type 201G rotator, new. W. Ryan, 6 Olive Court, Nambour, Qld., 4560.

B & W low pass 4 section filter, 2kW rating;
B & W six position coaxial antenna switch, 2 kW rating which earths all unused connectors;
DM-28 Jap dynamic microphone with desk stand, particularly suited for SSB;
Penwood 24 hour revolving digital clock.
All in as new condition; going cheap as surplus to requirements. Roth Jones, 1 Albert Road, Melbourne, 3004.

Yaesu FT101 160-10m Transceiver, 240 and 12.6V power delivered new August '73. Absolutely unmarked, little used, complete with original packing, correct English Manual, unused connectors, etc. $475 cash. VK5IK, QTHR, Ph. Eudunda 252.

Yaesu FT200 Transceiver, complete with PSU and all crystals for 10 metres. Current model only 18 months old. $295.00. VK1JL. QTHR.

Trio TR2E AM 144-148 Mc transceiver tunable or crystal locked. 1 xtl. MIC. handbook, good condition. $150 ONO. VK2BGP. QTHR
Ph.: (02) 648-4547 (Bus.).

WANTED

Rotator CDR HAM-M or High Gain 400, beam. TH6DXX Balun BN86.

Alternator Honda E800 or similar. Please state condition & price. VK3AXA. QTHR. Ph: (059) 42 7248

Crank-up Tower, Hills 60 ft. or similar. VK3ARW. QTHR (02) 44 7582

Handbook or loan of copy, for Marconi TF801-A sig. gen. VK3YAZ, QTHR, (03) 25 2689.

Receiver. BC348. BC224 or R1155. L. T. Swain. VK2CS. QTHR. Ph.: (049) 59 1629

20 Years Ago

with Ron Fisher VK3OM

MARCH 1954

Here at last—the first edition of the Australian Radio Amateur Call Book. A full page advertisement in March, 1954 Amateur Radio announced its arrival. I wonder how many can remember the cover with its collection of "WI" QSL cards from each State of Australia plus VK9WI. The price? Forty Five cents or as we knew it then, four and six pence.

The Call Book has been an "in" part of Australian Amateur Radio ever since.

DX highlights for March reports that Fanning Island now has amateur activity with the call sign of VR3D. This was the beginning of a very active few years for Fanning with Ray Baty VR3A commencing operation a year or so later. Reo de Oro and Cocos Island were also showing signs of life at this time. DX Band conditions were reported as poor and erratic. On VHF, things were better with good interstate openings on six metres.

Mention was made last month of the proposed VK7WI operation from the Hobart Science Exhibition. A full report appeared. Because of the high electrical noise level in the Hall, a remote receiver complete with remote tuning was used—just as well they had AM in those days, SSB would be hard to resolve with an up/down stop switch.

'A one metre Superheterodyne', R Porter VK5PU showed how to convert the ASB4 receiver to cover this band.

The ASB4 was a disposals radar receiver easily obtainable at that time. The second part of G. W. Steane's "Recording Tape" series discussed azimuth adjustment, recording heads and frequency response. Also in its second part was Tom Athey's "Complete Amateur" with details of the crystal oscillator and multiplier stages.

A simple and effective "S" Meter. Indeed it was just a 50 to 200 micro-amp meter used to read the voltage on the AGC line. A half meg potentiometer was used to adjust the sensitivity of the circuit. D. Beadel VK9DB, wrote up the idea.

Two advertisements are worth referring to, first, Mullard listed their new range of Subminiature valves. They came in either 6.3 volt or 1.25 volt filament types. I believe these tubes were used to some extent in Military gear—but they didn't find any application in Amateur equipment that I know of. In another advertisement I noted 12AT7 valves priced at $3.25. Well, perhaps things are not so bad after all.

Silent Keys

Mr. F. E. BENTLEY	VK6MZ
Mr. M. F. HIDER	VK5SWL
Mr. J. H. POWER	VK3AFP
Mr. A. HARTLEY	VK2VY
Mr. R. E. STACEY	VK4RS

OBITUARY

C. NEWTON KRAUS W1BCR

Many VK amateurs will be saddened to learn of the sudden passing of W1BCR, C. Newton Kraus, at his Toulsset Point, Rhode Island, home on 18 December, 1973.

Newt's 20 metre signal on 14258kHz was possibly the most consistent S9 plus signal received from U.S.A. over a very long period. Some of the VK regulars have recorded over 1000 QSO's with Newt but he was equally concerned to exchange reports and ragchew with an operator making his first contact.

Newt was in his late 60's and lived alone in a typical timber shingled two storey Rhode Island cottage set on a headland about 50 feet overlooking the sea. Amateur radio was his major interest and his sleeping habits were often regulated by the prevailing DX conditions. He had been licensed and active for over 50 years.

The outstanding signal in Australia from W1BCR, but due in no small part to a very efficient Vee beam. This antenna with legs over 500 feet long was directed on Sydney and extended from a 40ft pole at the shack over the water to terminate on piles driven into the sea bed. The exciter (Collins) receiver (Collins) and a miscellany of logs, station records, mementos and curios occupied the living room while the ample liniar (a modified broadcast transmitter) was housed in an adjacent room directly under the antenna termination.

An individual card record was maintained for every contact made and was updated after each QSO. Newt not only knew who you were and your equipment history but through a remarkable collection of maps he was able, in many cases, to pinpoint your precise QTH. I recall him instructing a VK operator on the preferred route to another QTH.

Having never visited Australia Newt's knowledge of Australia and Australians was remarkable and was evidence of the intense reading that was a part of his life and that was so apparent to those of us who have been privileged to meet him personally.

Outside amateur radio activity Newt was actively involved in US Navy associations, cooking (Australian roast lamb was a favourite) and the care for and preservation of bird life around his QTH.

Newt will be sadly missed by many operators, particularly Australians. His passing, too, will be a deep personal loss for Paul (W1FX) who maintained a close personal association.

I. W. Jay, VK3ZB

MARCH, 1974

VOL. 42, No. 3

amateur radio

APRIL, 1974

- IS AMATEUR RADIO NECESSARY?
- BRISBANE VALLEY FLOOD DISASTER
- ADDITIONAL BAND COVERAGE FOR THE HEATHKIT HW32A
- BROAD BAND TRAVELLING WAVE DIPOLE
- SOME THOUGHTS ON THE G5RV
- ROSS HULL CONTEST 1974 RESULTS

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

NEW STATIONS, OCT., 1973 (continued)

N.S.W.

2ZJS—J. Drinkwater, 28 Busby Rd., Busby 2168.
2ZKW—G. C. Watson, 6 Porter Ave., E. Maitland 2323.
2ZNG—A. R. Marjoram, 53 Kentucky St., Armidale 2350.
2ZUE/T—B. P. K. Smart, 4 Byron Ave., St. Ives 2075.
2YBK—G. B. Cooke, 11 Joffre St., S. Hurstville 2221.
2YBL—T. Lightfoot, 13 Hunts Av., Eastwood 2122.
2YBP—D. B. Poulton, 114 Copeland Rd., Beecroft 2119.
2YBV—J. E. Vincent, L.2 Vincent Rd., Kurrajong 2758.
2YBX/T—G. A. Crapp, C/- 55 St. Johns Ave., Gordon 2072.

A.C.T.

VK1CA—Commonwealth Dept. of Education, Canberra Tech. College Constitution Ave. 2601.
1CB—J. W. Bisset, 40 Quiros St., Red Hill 2603.
1CO—A. Huisman, 46 Somerset St., Duffy 2611.
1ZAG—I. J. Dalwood, Gowrie Pvt. Hotel, Northbourne Ave., Braddon 2601.
1ZAH—J. F. Davis, 37 Ingamells St., Garran 2605.
1ZAJ—I. W. Jones, 35 Hawker St., Torrens 2607.
1ZMV—M. R. Valevicius, 13 De Chair St., Deakin 2600.

VICTORIA

VK3DM—J. W. Golding, 15 Myamyn St., Malvern 3144.
3RJ—R. E. Jones, 23 Lundale St., Box Hill 3128.
3WU—A. C. Greening, 57 Glen St., Glenroy 3046.
3AMM—A. C. Edwards, 384 Glenferrie Rd., Malvern 3144.
3APP—R.A.A.F. Laverton Radio Club, R.A.A.F. Base, Laverton 3028.
3BHG—Van Galen G. W. (Nominee H. Reid), 13 Clivedon Crt., Leopold 3221.
3BPC—St. Paul College Radio Club, Grey St., Traralgon 3844.
3ZEV—I. C. Batty, 81 Liddiard St., Hawthorn 3122.
3ZQI—G. R. Wambach, 8 Hurra Crt., Oak Park 3046.

QUEENSLAND

VK4QQ—I. S. Graham. Station: Dakenba Rd., Mt. Murchison. Postal: P.O. Box 507, Biloela 4715.
4UE—C. V. Higgins, 26 Fulham Rd., Pimlico, Townsville 4810.
4VI—K. C. Parker, 27 Oxley St., Edge Hill, Cairns 4870.
4EN—R. J. Kerle, 32 Evan St., Mackay 4740.
4OQ—L. H. Ferris, 32 Arthur St., N. Cairns 4870.
4ZSA—A. M. Salmons, 84 Bellicent Rd., Bracken Ridge 4017.
4RA—R. J. Rush, 21 Angelina St., MacGregor 4109.
4VE—A. Christopher, 21 Keenan St., Margate 4019.

SOUTH AUSTRALIA

VK5GW—G. J. Whiteside, 12 Warwick St., Enfield 5085.
5PV—P. M. M. Van Der Velden, 5 James St., Reynella 5161.
5SL—P. Lawson, 1 Doreen St., Prospect 5082.
5VX—R. J. Dindschaid, 5 Wallace St., East Glenelg 5045.
5ZFR—N. F. Francis, 17 Mortimer Rd., Berri 5343.

WESTERN AUSTRALIA

VK6ZKV—D. R. Schofield, 8 Tyre Ave., Riverton 6155.
6SL—S. Magazinovic, 35/61 Wright St., Highgate 6000.

TASMANIA

VK7BE—E. J. Bartkus, 15 Olga St., Strathgordon 7458.
7ZBB—B. E. Baynes, 847 Huon Rd., Fern Tree 7101.
7ZBH—M. B. Hooper, 65 Riawena Rd., Montagu Bay 7018.
7ZDA—D. A. Apted, 65 Brougham St., Launceston 7250.
7ZDG—G. D. Noble, 32A King St., Bellerive 7018.
7ZJJ—J. Jongbloed, 5 Eden Pl., Howrah 7018.
7ZWW—M. R. Wilson, 11 George Town Rd., Newnham 7250.

NORTHERN TERRITORY

VK8BW—G. B. Widnall, 113 Smith St., Alyangula 5798.

CHANGE OF ADDRESS

VICTORIA

VK3EE—F. V. Hughes, 29 Avondale Rd., Morwell 3840.
3FJ—C. R. Nelson, 29 Grace St., Bendigo 3500.
3IM—T. J. Hunt, 20 Raven's Crt., Crescent, Mount Eliza 3930.
3LK—R. J. Elliott, Princes Hwy., Heathmere 3305.
3NZ—N. D. White, 59 Charles St., Ascot Vale 3032.
3PS—E. Salamy, 61 Verdon St., Warrnambool 3280.
3SS—K. V. Scott, Postal Address: 405 Princes Hwy., Noble Park 3174.
3AEA—E. C. Rowse, Unit 4, 24 Lemark St., Clayton 3124.
3AWN—W. N. Newham, 75 Cooloongatta Rd., Camberwell 3168.
3CIF—P. B. Dodd, 1306 Glenhuntly Rd., Glenhuntly 3163.
3YDD—W. Yunker, 757 Glenferrie Rd., Hawthorn 3122.
3ZHL—S. J. Heath, 15 Sandhurst Cres., Bundoora 3083.
3ZKA—K. J. Schache, 18 Rosella Ave., Boronia 3155.
3ZRK—R. Kreymborg, 6 Patyah St., Diamond Creek 3089.
3ZZV—G. Falls, 6 Leeds Pl., Campbellfield 3061.

QUEENSLAND

VK4HG—H. J. Hicks, Tate Rd., Tolga 4882.
4JD—J. M. Wright, "Red Marley", Central Ave., Eagle Heights 4271.
4KL—P. D. Cox, Karrs Lne., Nambour 4560.
4KV—M J. Y. McCartney, 21 Fairweather St., Yorkeys Knob 4870.
4MA—A E. Morrison, Johnston St. M.S. 2116 Goodna 4300.
4OG—Gold Coast Radio Club, Station: Cnr. Hillcrest Pde. & Paradise Ave., Miami. Postal: P.O. Box 588, Southport.
4OP—R. K. Pietrala, 3 Brahms St., Strathpine 4500.
4HK/T—K. F. Hoffman, 10 Druce St., Toowoomba (TV experiments) 4350.
4ZK—R. M. Feenaghty. Postal: P.O. Box 63, St. Lucia 4067.
4ZCL—G. J. Castledine, 10 Park Rd., Ferny Hills 4055.
4ZWO—T. W. Mitchell, 18 Laurier St., Annerley 4103.

SOUTH AUSTRALIA

VK5BQ—B. C. Cleworth, 13 Coronation St., Campbelltown 5074.
5VP—E. J. V. Willis, 7 Garra Ave., Modbury 5092.
5ZFF—M. Hanna, 59 MacKinnon Pde., North Adelaide 5006.
5ZKJ—B. F. Brockhouse, 4 Maple Ave., Felixstow 5070.
5ZRT—R. Battilana, 4 Dee St., Windsor Gdns. 5082.

WESTERN AUSTRALIA

VK6PR/T—R. T. Fisher, 51 Milton St., Glendalough 6016.
6TW—T. S. Long, 24 Hynes Rd., Dalkeith 6009.
6MR—M. P. Ryan, 6/31 Market St., Guildford 6055.
6RX—A. W. Clowes, 39(A) North Beach Rd., Balcatta 6021.
6ED—E. F. Davies, 32 Dorset St., Busselton 6280.
6RY—R. H. Latham, 22 Drew Rd., Ardross 6153.
6ZKL—R. P. Lockley, 22 Pembroke St., Bicton 6157.

TASMANIA

VK7BC—C. F. Beech. Station: Nobelius Dr., Legana. Postal: P.O. Box 146, Legana 7251.
7OH—A. J. O'Halloran, 4 Kirkland Ave., Glenorchy 7010.
7ZPA—P. M. Cox, 82 Hill St., West Hobart 7000.

NORTHERN TERRITORY

VK8KS—K. C. Smith, 66 Esplanade, Darwin 5790. P.O. Box 2099, Darwin, N.T. 5794.
8MC—B. A. McRae Postal only: Box 433 P.O., Tennant Creek 5700.
8MD—B. A. McRae. Postal only: Box 433 P.O., Tennant Creek 5700.

CANCELLED STATIONS

VICTORIA

VK3AGB—J. W. Goding. Now VK3DM.
3ARC—R.A.A.F Laverton Radio Club. Now VK3APP.
3AQV—W. T. Moffat. Transferred to Tasmania.
3AWW—R. F. Lopez. Transferred to N.S.W.
3BBD—A. K. Bothe. Not renewed.
3BED—P. Bennett. Not renewed.
3CEC—C. A. Cantor. Not renewed.
3YFV—A. J. Crane. Transferred to N.S.W.
3ZFV—R. H. Baker. Not renewed.
3ZMD—J. F. Davis. Not renewed.
3ZSR—A. C. Greening. Now VK3WU.

QUEENSLAND

VK4ZCY—C. V. Higgins. See VK4UE.
4ZAT—R. J. Kerle. See VK4EN.
4ZIS—I. S. Graham. See VK4QQ.
4DD—J. Rooks. Moved to Sydney.
4RI—R. H. Gordon. Left address.
4SA—S. J. Armstrong. Deceased.
4ZBA—A. Christopher. Now Unrestricted (see above).
4ZRU—R. J. Rush. Now Unrestricted (see above).

SOUTH AUSTRALIA

VK5EV—J. J. Mount. See new station VK5EV.
5HY—A. F. Cotton. Deceased, previously incorrectly advised as VH5NY.
5UP—R. L. Parnell. Not renewed.
5ZJG—G. J. Whiteside. See new station VK5GW.
5ZOS—O. G. Schmidt. Transferred to Victoria.
5ZSL—P. Lawson. See new station VK5SL.
5ZWG—G. N. Philpott. Not renewed.

TASMANIA

VK7ZAJ—P J. Edwards, 28 Bain Rerr., Launceston 7250 (Non-payment of renewal fee).

NORTHERN TERRITORY

VK8PV—P. M. M. Van Der Velden. Transferred to South Australia.

PAPUA NEW GUINEA

VK9KA—O. S. Dahl. Station: Lot 6, Sect. 80 Gordon's Estate, Port Moresby. Postal: P.O. Box 5645, Boroko.

NEW CALL SIGNS

NOVEMBER, 1973

VICTORIA

VK3GJ—K. A. Palliser, 3/30 Cootamundra Crescent, Blackburn, 3130
VK3FH—D. D. Paine, 15 Thumes Street Frankston, 3199.
VK3NO—A. J. Oxnam, 7 Munro Street, Macleod, 3085.
VK3VO—R. C. Lile, 592 Parke Street, Carlton North, 3054.
VK3WC—C. R. Nelson, 29 Grace Street, Bendigo, 3550.
VK3WL—R. A. Jones, 9 Norge Street, Sunshine, 3020
VK3ANL—Altona North Technical School, (nominee: R. T. Ayton). Millers Road, Altona, 3025.
VK3AQW—L. Woolf, 388 Alma Road, Caulfield, 3161.
VK3BHB—J. C. Buckley, 1/6 Carmichael Street, West Footscray, 3012.
VK3CCD—L. A. Davies, 39 Delbridge Street, North Fitzroy, 3068.
VK3YHH—T. D. Dowle, Sundowner's Caravan Park, 870 Princes Highway, Springvale, 3171.
VK3YSK—D. E. Ditchfield, 89 Wellington Street, Windsor, 3181.
VK3ZBT—B. D. Hackett, 20 Templewood Avenue, Noble Park, 3174.
VK3ZFS—J. Somerville, 24 Peachey Street Casterton, 3311.
VK3ZGB—C. E. Benson, 1/95 Aitken Street, Williamstown, 3016.
VK3ZNO—A. N. Chantler, 9 York Street, Sale, 3850.
VK3ZOM—D. G. Marshall, 18 Ronley Street, Blackburn, 3130.
VK3ZRJ—R. J. McCauley, 28 Black Street, Watsonia, 3087.
VK3ZRR—R. A. J. Reynolds, 38 Bellett Street, Camberwell, 3124.
VK3ZVH—J. B. Ellis, 28 Maclise Street, Castlemaine, 3450.

QUEENSLAND

VK4EN—R. L. Reseck, 119 Kate Street, Indooroopilly, 4068.
VK4UI—R. J. Williams, 20 Nerang Coast Road, Miami Keys, Broadbeach, 4217.
VK4VT—O. S. Dahl, Station: Palmvilla, Coquetta Road, Innisfail, 4860.
Postal: P.O. Box 103, Innisfail. 4860.
VK4XE—P. T. Ament, 38 Range Street, Toowoomba, 4350.
VK4XU—A. R. Kruger, 14 Crown Strat, Wynnum, 4178.
VK4YE—R. H. Kyle, Station: Permanent Mobile, Postal: P.O. Box 20, Leyburn, 4361.
VK4WIG—Gold Coast Radio Club, Station: Cnr. Hilcrest Parade & Paradise Avenue, Miami, 4220.
Postal: P.O. Box 588, Southport, 4215.
VK4ZPW—W. Spring, Station: 25 Alma Stret, Paddington, 4064.
Postal: P.O. Box 127, North Quay, 4000
VK4ZTC—A. J. Crane, 50 Park Terrace, Sherwood, 4075.

SOUTH AUSTRALIA

VK5DL—A. R. Dexter, Unit 1/58 Princes Road, Torrens Park, 5062.
VK5GO—G. P. Summers, 27 Barbara Road, Salisbury East, 5109.
VK5VK—W. R. Franzi, 195 Riversdale Road, American Beach, K.I. (Postal: 7 Short Avenue, Glenelg East), 5045.
VK5ZBP—B. G. Pierce, 17 Littler Drive, Fairview Park, 5126.
VK5ZMH—M. J. Harat, 5 Mira Street, Gepps Cross, 5094.

WESTERN AUSTRALIA

VK6PF—F. A. Parsonage, Lot 99 Abbott Way, Swan View, 6056.
VK6QR—D. M. Maley, 12 Venn Street, Peppermint Grove, 6011.
VK6GS—G. W. Smith, 2 Urban Street, Wagin, 6315.
VK5ZHS—H. F. Skipworth, Station: 21 Dorothea Street, Kalgoorlie, 6430.
Postal: P.O. Box 111, Kalgoorlie, 6430.
VK6ZKT—K. T. Kenny, 134 Petra Street, Bicton, 6157.
VK6ZEQ—A. W. Pike, 6 Latham Street, Alfred Cove, 6154.

TASMANIA

VK7TM—W. T. Moffat, 7 Shannuk Drive, West Hobart.

NORTHERN TERRITORY

VK8JT—T. S. H. Jones, 4947 Radford Court, Nightcliff, 5792.

T.P.N.G.

VK9BG—Lt. B. M. Gabb, Station: EMQ 16, Murray Barracks.
Postal: P.O. Box 696, Boroko.
VK9GB—G. L. Bell, Station: D.C.A. Single Mens' Quarters, Kone.
Postal: P.O. Box 3623, Port Moresby.
VK9ZBF—H. D. Francis, Station: Morehead W.D. PNG.
Postal: C/- Digicon (Aust.) Ltd., P.O. Box 3279, Port Moresby.

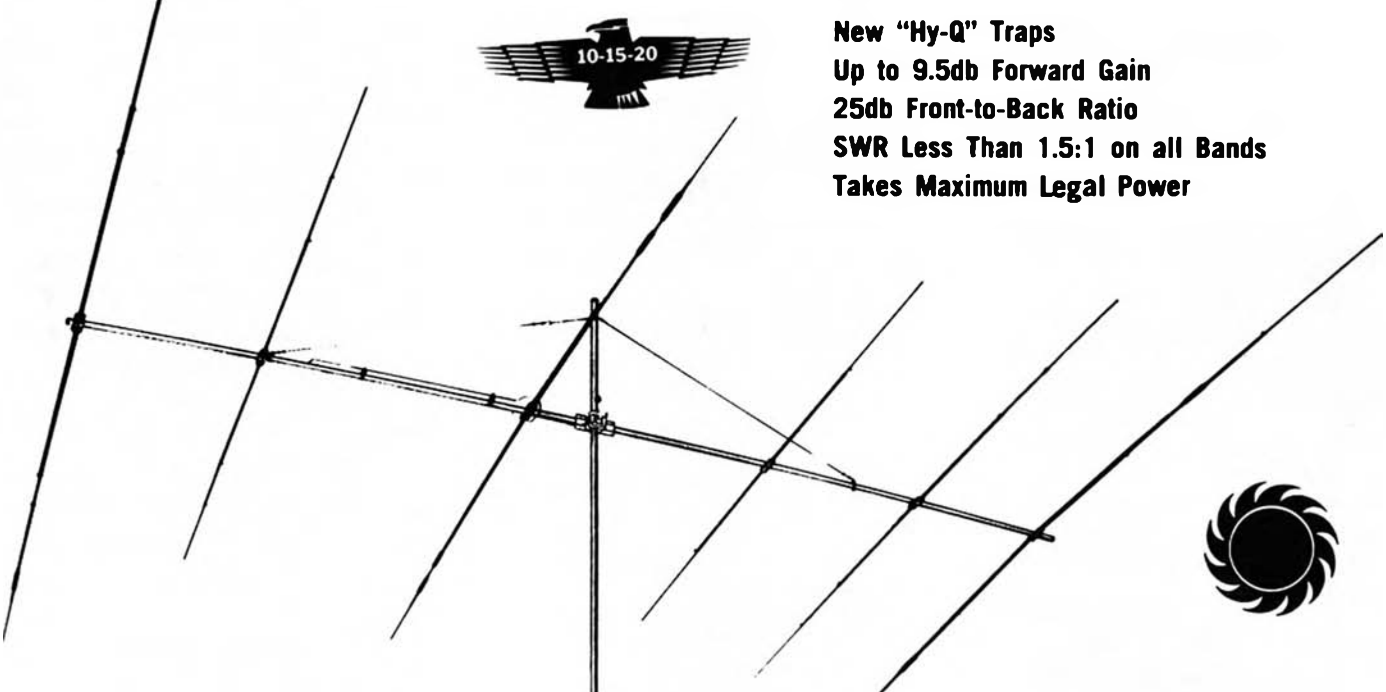
CHANGE OF ADDRESS

VICTORIA

VK3UW—Captain R. B. Wallace, 1 Strathmerton Street, Reservoir, 3073.
VK3VE—L. D. Hayward, 64 Hansworth Street, Mulgrave, 3170.
VK3YZ—A. McKeown, 3 The Esplanade, Ocean Grove, 3226.
VK3ADV—B. D. Alexander, Alexander Road, Skipton, 3361.
VK3AHJ—R. J. Harrison, 7 Kathleen Street, Pascoe Vale South, 3044.
VK3ANE—Youth Radio Club Scheme of Victoria, 204 Churchill Avenue, Braybrook, 3019.
VK3BBN—J. Rotenberg, 11/495 Royal Parade, Parkville, 3052.
VK3BFL/T—H. H. Chittock, 11 Little Myers Street, Gelong, 3220.
VK3YBO—W. A. Wright, 10/103 York Street, Sale, 3850.
VK3YCW—A. White, 6/574 Glenferie Road, Hawthorn., 3122.

hy-gain NEW SUPER THUNDERBIRD TRIBANDER BEAMS from BAIL ELECTRONICS

ALL NEW 6-Element SUPER THUNDERBIRD DX



New "Hy-Q" Traps
Up to 9.5db Forward Gain
25db Front-to-Back Ratio
SWR Less Than 1.5:1 on all Bands
Takes Maximum Legal Power

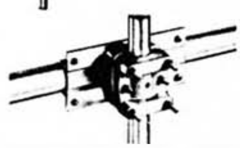
The New Super Thunderbird TH6DXX offers the ultimate in tribander performance and mechanical reliability for 10, 15 and 20 meters...is superb on DX and other long haul contacts. Separate Hy-Q traps, featuring large diameter coils that develop an exceptionally favorable L/C ratio and very high Q, provide peak performance on each band whether working phone or CW. Exclusive Hy-Gain Beta Match, factory pre-tuned, insures maximum gain and F/B ratio without compromise. Feeds with 52 ohm coaxial cable...SWR less than 1.5:1 on all bands. Mechanically superior construction features taper swaged, slotted tubing—allows easy adjustment and readjustment. Taper swaged tubing permits larger diameter where it counts! And, less wind loading. Full circumference compression clamps are mechanically and electrically superior to self-tapping sheet metal screws. Large diameter, heavy gauge aluminum boom...heavy cast aluminum boom to mast clamp and heavy gauge machine formed element to boom brackets. A totally new dimension in Tri-Bander performance.

AVAILABLE NOW EX STOCK

BAIL ELECTRONIC SERVICES

60 Shannon St., Box Hill North, Vic., 3129.

Ph. 89-2213



Tilt-head, universal boom-to-mast bracket — all new, cast aluminum bracket accommodates masts from 1¼" x 2½". Allows easy tilting for installation, maintenance and tuning, provides mast feed thru for beam stacking.

Taper swaged, slotted tubing — new tubing on all elements allows easy adjustment and re-adjustment. Taper swaged to permit larger diameter tubing where it counts! And, less wind loading. Full circumference compression clamps are mech. and elec. superior to self-tapping sheet metal screws.

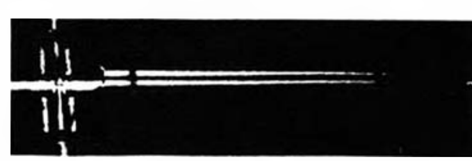
Extra heavy gauge, machine formed **element-to-boom brackets**, with plastic sleeves used only for insulation. Bracket design allows full mechanical support.

ELECTRICAL SPECIFICATIONS

Frequency Range	20, 15 and 10 Meters
Gain	8.7db (average)
Front-to-Back Ratio	25db
Maximum Power Input	1 kw AM; 2 kw P.E.P.
VSWR (at resonance)	1.5:1
Impedance	50 ohms

MECHANICAL SPECIFICATIONS

Longest Element	31.1 ft.
Boom Length	24 ft.
Turning Radius	20 ft.
Wind Load at 80 MPH	156 lbs.
Maximum Wind Survival	100 MPH
Net Weight	61.5 lbs.
Mast Diameter	1¼" to 2½"
Boom Diameter	2"
Surface Area	6.1 sq. ft.



Hy-Gain Beta Match — Advanced design from company that invented the Beta Match. Tapered impedance provides most efficient 3 band matching. Provides DC ground to eliminate precipitation static.

Qld. Rep.: **MITCHELL RADIO CO.**, 59 Albion Road, Albion, 4010, Telephone 57-6830
N.S.W. Rep.: **STEPHEN KUHL**, P.O. Box 56, Mascot, N.S.W., 2020 Telephone Day 667 1650 (AH 371 5445)
South Aust. Rep.: **FARMERS RADIO PTY. LTD.**, 257 Angas St., Adelaide, S.A., 5000. Telephone 23-1268
Western Aust. Rep.: **H. R. PRIDE**, 26 Lockhart Street, Como, W.A.. 6152. Telephone 60-4379

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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FRONT COVER

ROY, VK4ZQ and his well equipped station played an important part in the recent Brisbane Flood Disaster.
Full story on page 10

YAESU FRIOI

NEW! SOLID STATE RECEIVER

Following in the footsteps of the world famous FT-101B Transceiver the Yaesu Musen Co. Ltd. of Japan now present the FR-101, a brand new model with similar receiver technical data plus many additions e.g., 21 bands, RTTY, VHF, digit dial, selectable (CW) selectivity, squelch and etc. Housed in the attractive communication grey cabinet similar to the FT-101B.
Expected availability mid 1974

TECHNICAL DATA

Mode AM, SSB, CW, *RTTY, *FM
Frequency 1.8-2.0, 3.5-4.0, *4.0-4.5, *4.5-5.0
*5.0-5.5, *6.0-7.0, 7.0-7.5, *9.5-10.0
*11.5-12.0, 14.0-14.5, *15.0-15.5, *17.5-18.0
21.0-21.5, *21.5-22.0, *25.5-26.0, *26.0-27.0
*27.0-27.5. 28.0-28.5, 28.5-30.0
VHF 50-52 or52-54
144-146 or 146-148
Sensitivity SSW/CW -6db at S/N 10db
AM 0db at S/N 10db
FM 0db at 12db SINAND

Selectivity	CW	0.6kHz/6db	1.5kHz/60db
	SSB,RTTY	2.4kHz/6db	4kHz/50db
	AM	6kHz/6db	12kHz/50db
	FM	20kHz/6db	45kHz/50db

Spurious Response 60db or better
Internal Spurious Response 0db at antenna input
Audio output 3 Watt
Power 100 - 234 Volts
Size 340mm-150mm-290mm
Same as FT-101

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

QLD MITCHELL RADIO CO. 59 Albion Road Albion 4010 Ph 57 6830
NSW STEPHEN KUHL P.O. Box 56 Mascot 2020 Ph Day 667 1650 A.H. 371 5445
S.A. FARMERS RADIO PTY LTD 257 Angas Street Adelaide 5000 Ph 23 1268
W.A. H R PRIDE 26 Lockhart Street Como 6152 Ph 60 4379

QSP

In 1979 there is to be a World Administrative Conference of the ITU which will consider the whole radio frequency spectrum. At this conference Australia will only have one voice and one vote.

As you will no doubt have noticed there are many new independent countries who have gained membership of the ITU since the last conference which considered the whole frequency spectrum.

That conference was held in Geneva in 1959.

Those of you who have read Tom Clarkson's ZL2AZ's reports and articles on his experiences at the 1971 Space Conference will realise that there are many delegates who are unsympathetic to Amateur Radio.

In many cases this is due to a lack of knowledge as to what Amateur Radio is.

The question, **Can the WIA do anything?** has its answer in the Region III Association.

Members will remember that the World is divided into 3 regions for IARU purposes. Region 1 covers Europe and Africa, Region 2 the Americas and Region 3—our Region—most of Asia and all of Australasia.

Members will also remember the vital part played by the WIA in 1968 towards establishing the IARU Region 3 Association. The secretariat of the region is located in Australia and the present Secretary is Mr. David Rankin, VK3QV/9V1RH. Some of the countries apparently inimical towards amateur radio—as evidenced by the voting of their delegates—are, unfortunately, to be found in this region.

At the forthcoming Federal Convention the Federal Council will be asked to consider what it thinks the appropriate action the WIA can take, and to give careful consideration as to which proposals it will put forward at the plenary meeting of the Association proposed by the directors to be held in Hong Kong late this year or early next year.

DAVID WARDLAW, VK3ADW
Federal President

technical articles for ar

- preferably typewritten manuscript, but hand-written acceptable.
- double spaced, one inch margins, one side only of quarto or foolscap sheet.
- spelling and grammar entirely optional; editorial staff will polish.
- drawings made by AR staff from sketches submitted.
- good, clear, glossy photos welcomed with open arms. do not forget captions.
- send it **now** to:—
  P.O. Box 2611W,
  Melbourne, 3001.

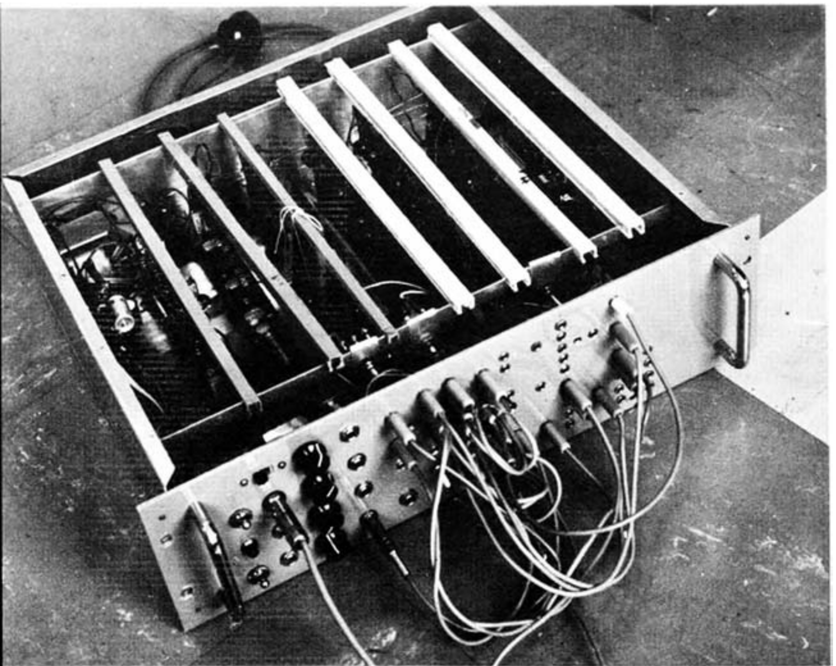
AR AWARDS

The Publications Committee announce the awards for the year 1973 as follows—

Higginbotham Award (worth $50) awarded to the South Australian Division for preparing the material for an issue of AR—Sept. '73.

Technical Award (worth $25) awarded to Tom Moffat, VK7TM, for his Discone contribution.

A.S.J.A. (Plaque and $10 cash) awarded to Syd Molen, VK2SG for his Las Balsas article in Dec., AR.



The complete equipment described in part two with the cover removed. Extreme left is the power supply; front left is a volume compressor: the rest of the units are described in the text.

Experiments in Modulation and Audio

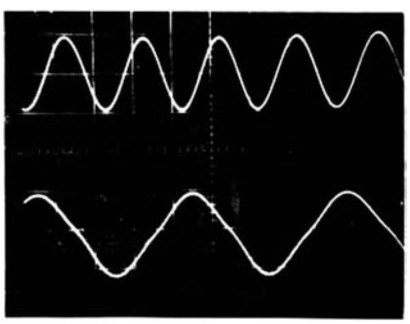
part two

J. A. ADCOCK, VK3ACA
P.O. Box 106,
Preston, 3072

Based on the experiments with DSB discussed last month the author develops his ideas further to produce 1.5kHz bandwidth AM. Interested! Well read on and don't let the maths scare you too much.

For stage 2 of the experiments, it was necessary to construct an analogue computer. The computer contained:—

1. A 90 degree phasing unit of the type used for SSB generation.
2. Two IC multipliers capable of being programmed as multipliers, squarers, square rooters or dividers.
3. Two units to perform the function $x^2 + y^2$.
4. Two inverting adders with adjustable constants.
5. Two differentiating circuits with a time constant of 50 micro-seconds.
6. One pulse generating circuit which produces negative pulses on each negative or positive going (but not both) zero crossings of the wave form.



PHOTOGRAPH 1.—OPERATION OF FREQUENCY HALVER
Horizontal scale. 1 Division 1ms
The black diagram is shown in fig 7. Input signal is a 500Hz sinusoidal signal and is shown on the upper trace . Output is the lower trace. The 1500Hz filter is also in circuit.

The multipliers used were uA795, and the operational amplifiers uA741. You can build any of the systems shown here by referring to the maker's application notes. There are also a number of other analogue units on the market at the present time which should perform just as well.

NARROW BAND MODULATION, System 3

The system to follow is a method of halving the frequency of an audio wave form, transmitting it in the halved frequency form, and restoring it to it's original form after the receiver detector. The method described effectively halves the number of zero crossings of the audio wave form. This does not necessarily mean that the spectrum of the audio wave form is actually halved, since higher order transients are still present. The purpose of the experiment is to see how much can be "shaved off" the original for the audio to remain intelligible. There is also the possibility of the signal actually being pushed through a filter with a maximum band pass of half the maximum frequency in the original audio.

The bandwidth of any phone signal can thus be reduced by half, and area band occupancy doubled. The cost is increased distortion due to the loss of transients and other components that do not cause zero crossings. This distortion need not sound worse than say, that produced by 15db of clipping.

As the operation is achieved by means of an analogue computer, it is necessary to resort to mathematics to describe its operation.

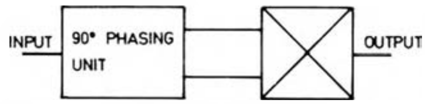


FIG 6 FREQUENCY DOUBLER

Let the audio being fed into the doubler be A sin O where A is the amplitude and O $= 2\pi ft$. Both A and f are variables and t represents elapsed time. The block diagram is shown in Fig 6.

The equation for the operation is

A sin O x A cos O = ½ A2 sin 2 O - (1)

A sin O and A cos O are taken as the outputs from the phasing unit.

Note that the amplitude of the output frequency is squared but the wave-form of the output is still sinusoidal for a sinusoidal input. This system has no practical use by itself unless it is used to restore a wave-form that has first been halved.

It should be pointed out, that in the trigonometric identities, it does not matter whether the answer is sine or cos, + or —, or whether the constant is ½ or 2. The wave form of the result is the only concern. These variations in amplitude can be restored by audio gain adjustments if necessary.

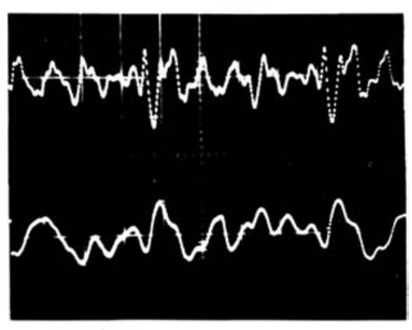
The process of frequency halving will now be described starting from the generally well-known identity

2 sin ²O = 1 — cos 2 O (2)

This function is reversed calling the input signal A cos O. Thus

$\pm\sqrt{}$(A—A cos O) = 2A sin ½ O (3)

Note ½ O represents half the frequency The A sin ½ O is what we want to finish up with. Despite the simplicity of this function, it is not possible to perform this operation mathematically without fur-



PHOTOGRAPH 2.—OPERATION OF FREQUENCY HALVER
Horizontal scale. 1 Division 2ms
Upper trace. Typical audio input. Lower trace, Half frequency audio output.

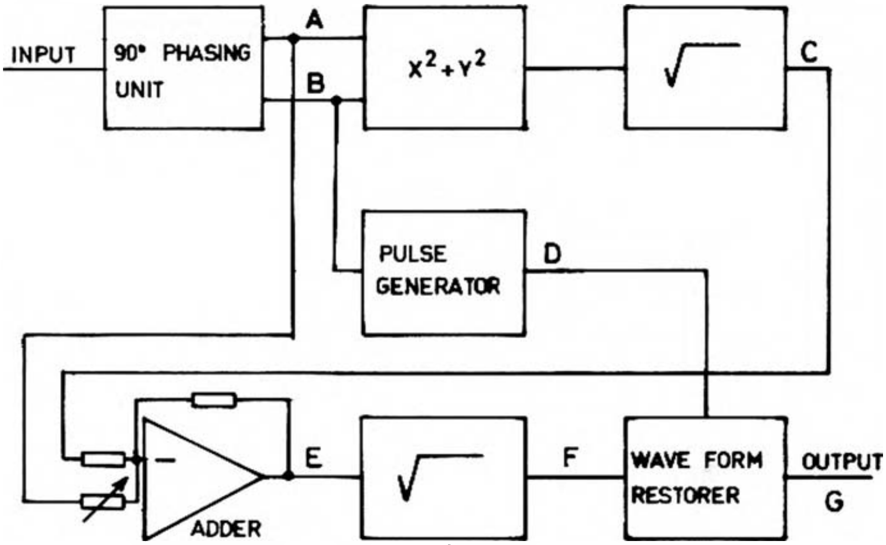


FIG 7 FREQUENCY HALVER

ther information, since the square root of a number has a positive or negative answer. To provide the positive or negative answer it is necessary to use the "wave form restorer" Figs 4 and 5. Also it is necessary to generate A, a voltage proportional to the amplitude of the wave form at the input.

$$A = \sqrt{(A \sin O)^2 + (A \cos O)^2} \quad (4)$$

This will be explained in more detail under systems 4 and 5. The block diagram of the whole system is shown in Fig 7.

Fig 8 shows the wave forms at each stage of the system. Figs 8A and 8B show the outputs from the phasing unit. Fig 8C is the output voltage proportional to the amplitude of the input signal from the function.

$\sqrt{(A^2 \sin^2 O + A^2 \cos^2 O.)}$

This is a DC voltage and in the case of a sine wave, is a constant value. On speech it will be the same as the output from an envelope detector tuned to an SSB signal, that is, DC but varying in amplitude at an audio rate. Fig 8E is the wave form of 8B added to 8C. Fig 8D shows the negative pulses required to trigger the flip-flop, derived in this case from the negative going zero crossings of the wave form 8A. Fig 8F shows the wave form of 8E after taking the square root in one sign only, namely

$+\sqrt{(A + A \cos O.)}$

Fig 8G shows the result after putting the signal through the wave form restorer of Fig 4 producing A sin ½ O. At the receiver end, by substituting A sin ½ O into equation—(1), the result is A sin O — the original expression! Thus we can theoritical.y divide or double the frequency of an audio signal.

That concludes the theoretical and idealistic description of the system. Now let us look at some hard cold facts.

The results so far have been interesting and even encouraging but far from perfect. The halved frequency audio has actually been transmitted by AM and received on AM using an SSB IF filter in the receiver with the signal tuned to the centre of the band pass. The system has also been tested both on and off the air using a 1.5kHz filter after the halver. It was found that some syllables came out clearly where as others suffer some kind of distortion.

It is the hope of the author that something worthwhile can be developed out of this system. The foregoing description of the system may encourage others to try methods along the same lines. For this reason, a brief description of the cause of the defects is given.

In the description, the speech wave form was considered to be a sine wave of continually varying frequency and amplitude. If it is considered to be a series of harmonics, one finds that, after processing, many components in the low frequency end of the spectrum, some zero frequency or DC components may be produced.

The phasing unit at the receiver in its present form cannot handle frequencies between 0 and 150Hz. Further, although the 90 degree phasing unit produces an accurate phase shift between the two outputs, there is an excessively large phase shift between the input and the output, due to other parts of the circuit. This varies with frequency. Thirdly, a large amount of distortion is produced at the zero crossings of the wave form. So far, methods of overcoming these defects directly have not been tried.

Surprisingly enough, if the signal at the receiver end is just squared instead of processed by the unit in Fig 6, most of the above problems are overcome. This will return the wave form to the form of Fig 8E — i.e. A + A sin O. The presence of + A does not add distortion. It is a DC signal and will not find its way through the audio sections of the receiver.

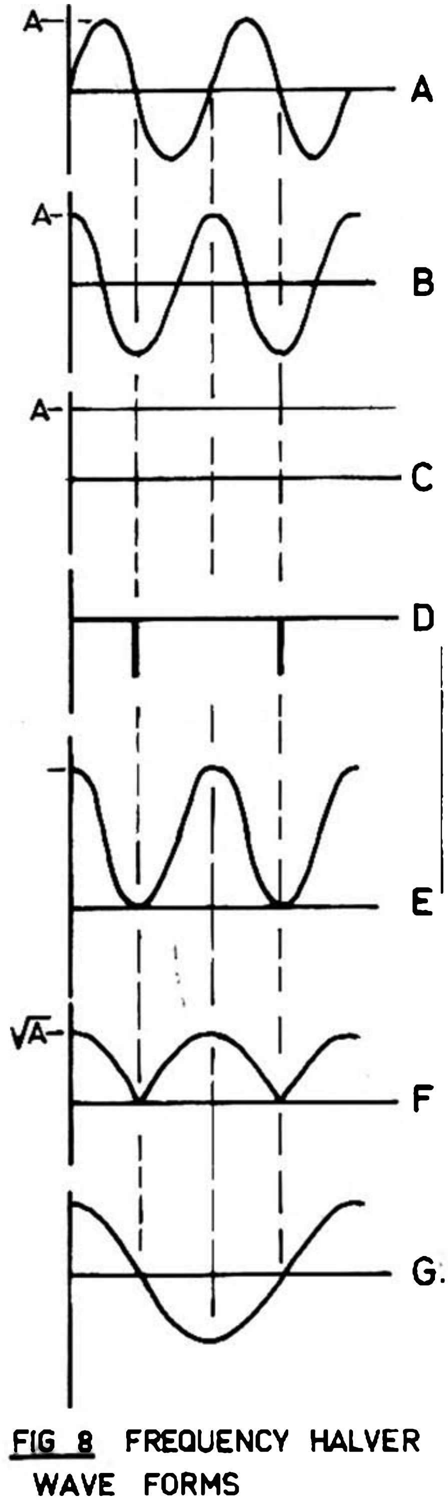


FIG 8 FREQUENCY HALVER WAVE FORMS

The main difficulty with the above method is that the signal would have to be transmitted by AM, with all stages DC coupled including modulator final. Unfortunately, so far, results of transmitting the system by SSB have been very poor. At the present time the author believes that many of the defects can be overcome.

(to be continued)

Brisbane Valley Flood Disaster

D. I. MARSHALL, VK4ZAF
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The worst floods this century swept down on the Brisbane-Ipswich area in late January. Damage has been estimated at more than $200 million. Some 13 750 homes and perhaps 30 000 people were directly affected. Ten people drowned. Amateur operators played an important part in rescue and relief operations. Here is an account of their effort pieced together from the memories and notes of those involved.

Heavy rain and cyclones are nothing new in Queensland in summer. But the past summer was exceptionally wet even before mid-January. By January 24, the ground in the Brisbane Valley was saturated. Then along came cyclone Wanda. Instead of passing off the coast east of Brisbane as expected, it crossed the coast and became a vast rain depression. Intense rain up to 50mm (or 2in.) an hour lashed South-East Queensland generally and the Brisbane Valley in particular on Friday night, January 25. This resulted in record flooding in some Brisbane creeks. Many houses in low lying suburbs were flooded and some dashed to pieces.

But worse was to come in the main Brisbane River Valley and rain was continuing to fall. The first waves of a huge flood struck the Ipswich area on Saturday, January 26, and floodwaters rose so quickly downstream between there and the Brisbane City area many people were caught in their homes.

By Sunday, a major disaster was imminent in Brisbane. In 1973, a Civil Defence officer had told a meeting of Brisbane amateurs their services would not be needed in future. So it was with surprise I heard a plea on commercial radio on Sunday afternoon around 2.30 for two-way operators to contact Civil Defence headquarters.

I contacted Roy VK4ZQ and Malcolm VK4ZEL on Channel B 146MHz and we decided to offer an amateur network we felt could be arranged quickly if required.

CD's three telephone lines were jammed. So I put an extra 12V battery, a few leads, a portable ground plane and a pullover into the car fitted with VK3 Carphone and a curly whip on the roof. I managed to dodge flooded areas to drive to CD HQ in the Valley.

In short, CD Signals welcomed our offer and gave me priority to park at their front door (getting bogged in grass churned to a quagmire by four and six wheel drive vehicles previously!) By 4 p.m. I had confirmed the need for a network with Roy. It is a tribute to all involved that so many other stations had realised the disaster situation and had been listening to the deliberations on Channel B. At first call then, some 14 stations offered their services immediately or on standby and others kept calling in to add to the net. Most were capable of going mobile.

It was decided I stay at CD HQ to relay to Roy VK4ZQ who would be the base from his location high at the southern suburb of Moorooka with line of sight to most flood areas. He used his modified MR20B with a PA for 80 watts to a two element vertical collinear some 30 ft. up. (This had been erected only two days. Roy's antennas and towers had been smashed in Brisbane's freak tornado in November!).

Malcolm VK4ZEL at Holland Park West re-erected a beam quickly and was the back-up for Roy. (They found later their 240v supply came from different sub-stations and telephones from different exchanges).

The first CD task was to set up relief centres at chosen schools in anticipation of evacuations.

This was no mean task since messages to open the schools had gone to caretakers only by commercial radio. Our operators found themselves advised to break in with as little damage as possible and to turn on power. It was hoped some CD people or volunteers would arrive.

George VK4GV went to the Brisbane State High School, South Brisbane, followed by Henry VK4ZHK and John VK4ZJM Ross VK4ZFD to Taringa police station and then the school, Stephen VK4ZSH and Graham VK2ZZV to Rosalie Convent, Norm VK4NP to Windsor School, Harry VK4ZHM to Ascot School, Royce VK4ZRH to Dutton Park Deaf School, Merv VK4ZMJ to Camp Hill School and Malcolm VK4ZEL checked Morningside School later.

Department approval to pass third party traffic was arranged by Eddie VK4OW and soon there were many messages about people, food, clothing and bedding.

At 5.15 p.m., an urgent call was made by Dave VK4HW at Mt. Crosby, some six miles north of Ipswich, the pumping and treatment works for the water supply for Brisbane and Ipswich and some surrounding areas. The works were in grave danger of flooding and contact with Brisbane City engineers in Brisbane had been lost. Roy arranged a phone patch and regular calls on this network to the Flood Control Centre became standard operation at all hours for several days.

Channel B traffic stopped immediately as operators realised the gravity of the situation. Men were working to keep intake motors going at the bottom of 90 ft. deep wells while floodwaters seeped through the concrete walls down onto them. Essential power to the station failed at one time. Warren VK4GT at Ipswich was the link with the Southern Electric Authority to get power restored before excessive damage was caused. Dave operated his Pye Overland from his car. The link also arranged for helicopter lifts of workmen and essential oil for bearings in subsequent days.

At 6 p.m. on Sunday, CD HQ advised that the situation was so serious that the amateur network might be required for 72 hours and reliefs should be arranged. This was done by Roy with a number of operators on standby and others manning schools not occupied released to go home.

At this time, contact was established with some of the major isolated flooded areas. Lew VK4ZLL was at Wacol, George VK4ZLG at Inala, John VK4ZXS at Gailes, Brian VK4CCR at Leichhardt, Ipswich, and Warren VK4GT and Wayne VK4ZN at Ipswich.

BELOW: LEW, VK4ZLL

LEFT: DON,VK4ZAF

So a very flexible network covering 20 miles of the Brisbane River Valley was set up entirely by amateurs under their control. More than half used transistorised units capable of long operation from battery supplies. In contrast, it seemed the CD network consisted of eight units, not all operating, a number of hand-held 27MHz units and access to Army back pack radios.

Amateur HF was considered not suitable for the restricted area.

Squally rain continued over the area and many operators got wet from above and also below as floodwaters continued to rise. I was tramping more mud on to my car carpets with every message. Ugh!

But thousands of people were having their homes inundated and covered so we couldn't complain. The CD emphasis was to save lives, not to worry about property and this was the priority at all times.

One exception was a request from Ray VK4ZBR to Henry VK4ZHK and John VK4ZJM (both students) to enter the South Brisbane Technical College. In a couple of hours, they shifted communications and test equipment worth $200,000 well above the eventual flood level.

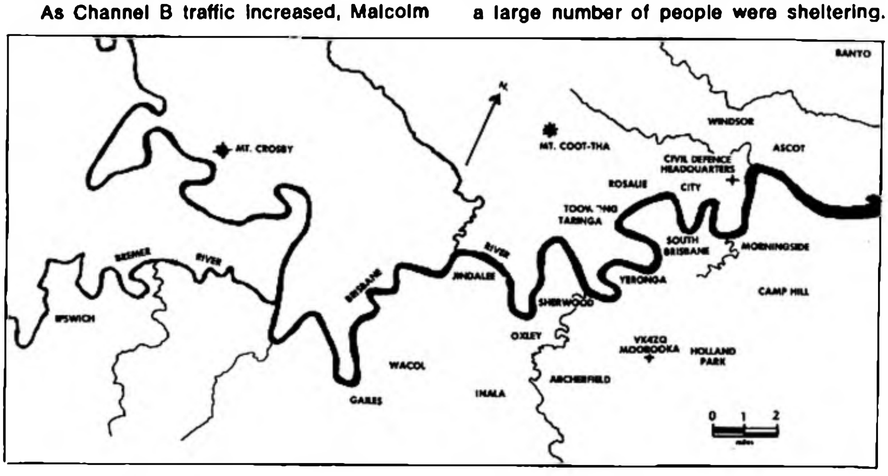
As Channel B traffic increased, Malcolm VK4ZEL set up a limited group on Channel A. Gary VK4ZGT came in from taking flood levels to CD HQ to receive Channel A, and Graham VK4ZTS took my place around 1 o'clock on Monday morning in my now very muddy car while I tried to sleep in the back of his car.

Malcolm VK4ZEL relieved Roy in the early a.m. and also took over as base several times when Roy called on his battery powered half watt unit to advise of mains power failures.

By Monday daylight (the Australia Day holiday!) the network was very busy in the confusion. The Brisbane River had reached 17 ft. at the port office gauge (normally 8 ft. on a king tide) and further rises were expected on tidal peaks.

At places like Goodna, the rise was 60 ft. People were still being evacuated and squally rain was continuing to add to the general discomfort.

Ray VK4ZBR and John VK4IE were active in the Sherwood area. Ray sat at the Sherwood police station when their phone and police receiver went out. He later went maritime mobile with John's hand-held unit to reach the Oxley school where a large number of people were sheltering.



One message sought permission to use a bulldozer to knock down panels of the school fence for an access for relief trucks. Permission was granted.

Paul VK4ZBV who earlier had been maritime mobile at Yeronga reported the needs for 30 derelicts and others evacuated to the Brisbane State High School. Harvey VK4ZHW and Tony VK4ZMA relieved Peter VK4ZWP and Stephen VK4ZHW at the Rosalie Convent relief centre where 60 people were being fed and housed.

George VK4ZLG, Lew VK4ZLL and John VK4ZXS were all active in their isolated areas, Lew on his modified Pye Victor becoming in effect the district CD organiser. At one stage, he reported leaking acetylene from a gas making plant under water. Then this mixed with fumes of petrol leaking from a flooded service station nearby! He also commandeered an Army personnel carrier to get 40 gallons of milk and 600 loaves of bread from the Wacol prison for distribution to the Wacol camp area, parts of Oxley and later parts of Jindalee.

Eddie VK4OW worked with CD rescue teams in the New Farm area as did David VK4ZF. Col VK4ZHN checked the needs of 200 people from the Pinkenba-Cribb Island area evacuated to the Banyo Seminary.

Continuously, there were demands on the movement of people, numbers, the despatch of food and clothing, reports of dangers like wires going under water, flood heights relative to well known spots and so on until details became a blur in the minds of the operators and but a piece of paper in the pile of message forms at CD HQ.

Certainly there were delays while decisions were made. But the network also carried first class advice on requests for things like soyabean milk and formula milk for babies in need. Then there were mattresses, what to do with extra food, requests for relief CD volunteers, etc. And so the hours passed, the river reaching 19 ft. around 1 p.m.

In the afternoon, Rod VK4RA at the Archerfield light aerodrome, George VK4ZLG at Inala, Lew VK4ZLL at Wacol and base Roy VK4ZQ co-ordinated to arrange for food drops from three light aircraft. The drops were successful.

Stephen VK4ZHW manned a boat for search and rescue work in the Milton area. Then came a call for help in the South Brisbane area on the opposite side of the river. Channel B was cleared and Stephen had key down to give all a broadcast of his swift crossing past the William Jolly Bridge to the southside. The river was flowing around 15 knots.

Alan VK4ZAW was also maritime mobile in the Fairfield-Yeronga areas. He was then recalled to Moorooka police station and got to the water again at Morningside.

The net continued to change as people went to work and others called in. Snow VK4NR called in from two relief centres at Salisbury and another at Sunnybank. Graham VK2ZZV mobile, Jack WA6MUT/VK4 on the ship Canada Bear in port, and Bruce VK3BM were visitors to offer their services.

While my relief Graham VK4ZTS slept at home, I had breaks from the microphone for CD supplied coffee and food thanks to Gary VK4ZGT. Somehow, Roy VK4ZQ managed to keep a tab on everyone. A run through of the net occasionally checked the details. There were never fewer than six on the air even in the middle of the night with another six or seven on standby.

By late Monday, the weather improved but the flood was rising.

Graham VK4ZTS relieved me at 7 p.m. when the traffic had eased. But Graham's turn was yet to come. He had to go mobile in the night to find two CD teams in the Toowong area. He found them but then came across 70 old bed-ridden people who had been evacuated to a church hall. There were no proper toilets and they were lying in wet beds. Graham co-ordinated their further evacuation to the Bardon Convent. He was relieved there by Ross VK4ZFD who had been working in his St. Lucia area.

During the night, CD signals section was moved to the cleared top floor of the two-storey CD HQ, formerly a school. My equipment was moved out of my car to a special cubicle. The curly whip ended up on a makeshift ground plane above an extension ladder on the roof. Direct communication with some distant stations resulted saving Roy relaying. CD message forms with carbons were then in use since it was realised some earlier messages had been lost in the CD HQ system.

The Brisbane River reached a peak of 21 ft. 7 ins. around 2 a.m.

In the morning, Ray VK4ZKI called in from the isolated Jindalee area after I sent Graham VK4ZTS home to bed. He endeavoured to clear some traffic to and from the area but authorities were non-co-operative as a result of some unfounded reports on commercial radio they thought had originated from amateurs.

With the river level falling, CD traffic eased. Gary VK4ZGT took over from me at 8.15 a.m. The net was disbanded at 4 p.m. when the sun was shining.

Roy continued to keep contact with Dave VK4HW for another two days. Fred VK4ZHF, Malcolm VK4ZEL, Alan VK4ZAW and Roy VK4ZQ using VK4YC, the call of the Yeronga Technical College, later operated on Channel B for nine days with department approval keeping contact among technical colleges. They co-ordinated flood equipment clean-ups as telephones were out.

BELOW: DAVE, VK4HW

In short, more than 50 operators gave their time equipment, experience and common sense in the best traditions of the amateur service. This was despite much personal inconvenience lack of food, sleep and dry clothes. It was a 48 hours we will remember, a 48 hours we would like to forget, and a 48 hours we hope will never come again to cause so much heartbreak to so many thousands of people.

A meeting of some of the operators involved considered the emergency net in retrospect. Fortunately, the disaster occurred on a holiday week-end when many operators were home and on the channel. It would be more difficult to arrange during the week. The arrangement used was considered the most effective, i.e., a relay station at CD headquarters and a favourably placed home base station. This enabled only essential traffic to be handled at CD HQ. The HQ is not well sited for VHF communication. A portable base station at Mt. Coot-tha with access to emergency power at one of the TV stations might be an alternative. Vertical polarisation was the key to success. All stations should have two channels at least. A number of multi-channel units on the air were fitted with only one crystal. The extra channel could be a repeater. Each station should find out which sub-station his power comes from and which exchange his telephone comes from. Many operators were fortunate phone communication continued during the flood. A list should be compiled of all operators owning trailer power boats from which they could work

Amateur operators were advantaged by operating their own equipment knowing its readiness, reliability and limits, working with familiar voices and calls within the amateur organisation yet providing communication for CD HQ. With our numbers, there was an operator in most flood affected areas who knew his area and worked there. Most worthy of praise is the fact not one equipment breakdown affected the net over the two days.

Amateurs were disadvantaged working with people who believed the hysterical reports on open line programmes broadcast on commercial radio without checking. Also some statements were made on information many hours old, e.g., 200 people needing rescue at Fairfield when they had reached safety.

Amateurs need some official identification pass for authorities like police so they can operate effectively in emergencies and also some identification of their mobiles There is also a need for authorities to appreciate the extent and reliability of amateur communication on VHF. Many professionals directly or indirectly connected with radio communication were involved and all operators were experienced on air as they operate the year round. An effort by local, State or Federal governments to assist amateurs purchase extra crystals and set up repeaters to be available in emergencies would be appreciated.

The following is a list of operators who took part or offered their services and were on standby during the emergency:

VK2ZZV, VK3BM, WA6MUT/VK4, VK4's GT, GV, HW, IE, IO, LS, NP, NR, OW, RA, ZF, ZN, ZQ, ZV, CCR, ZAA, ZAD, ZAF, ZAL, ZAW, ZBR, ZBV, ZCL, ZDC, ZDY, ZEL, ZFD, ZGT, ZHK, ZHM, ZHN, ZHW, ZJM, ZKI, ZLG, ZLL, ZMA, ZMJ, ZML, ZMV, ZNH, ZRH, ZSH, ZTS, ZWP, ZXS, ZZG. ●

Additional Band Coverage for the Heathkit HW32A

ROSS GREENAWAY, VK6DA
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Leederville, W.A., 6007.

The following is a simple, cheap, but very effective way to modify the Heathkit HW32A. The big disadvantage with the original model is that it covers only the American phone band—14 200 to 14 350kHz, leaving a very desirable portion of the band unworkable. Here's how to cover the rest of the band without altering calibration or delving too much into the innards or disfiguring the front panel.

Firstly purchase an additional crystal (18,122kHz). You will also need a slide switch (DPDT), a couple of nuts and bolts, a solder lug, and a bicycle spoke.

Unsolder the present crystal from the right hand front corner of the PC board. Drill and file a suitable hole in the right hand chassis end, making sure that the hole is of sufficient size to allow full movement of the switch slide, which will project through the chassis.

Before mounting the switch in position, bend the outside lugs at right angles as shown in Fig 3 and solder the two crystals into position. It is easier at this stage to connect two short lengths of wire to the centre lugs of the switch. These will be connected to the two holes in the PC board from which the original crystal was taken.

When mounting the switch to the chassis, clamp a solder lug beneath the head of the switch mounting screw nearest the front panel.

Take the bike spoke, Fig 2, and after allowing half an inch to protrude through the front panel, bend the unthreaded end to form an eye which should fit neatly around the slide portion of the switch. Take care in aligning the spoke along the outside of the chassis and drill a hole in the front panel so that the spoke is a neat sliding fit.

Little now remains except to slip the "eye" of the spoke over the part of the switch which protrudes through the chassis Fig 3. It is held in position by the solder lug (previously clamped under the mounting screw) which is bent at its outer end to allow the spoke to slide easily. The threaded end of the spoke which protrudes from the front panel is "decorated" with the spoke nipple or small knob from the junk box and the modification is complete.

The dial need not be interfered with as it is easy to interpolate or estimate counting backwards. 14 350 becomes 14 200 with the switch in the "additional band" position. If you are really keen, there is nothing to stop you adding a new set of figures, perhaps in a different colour. ●

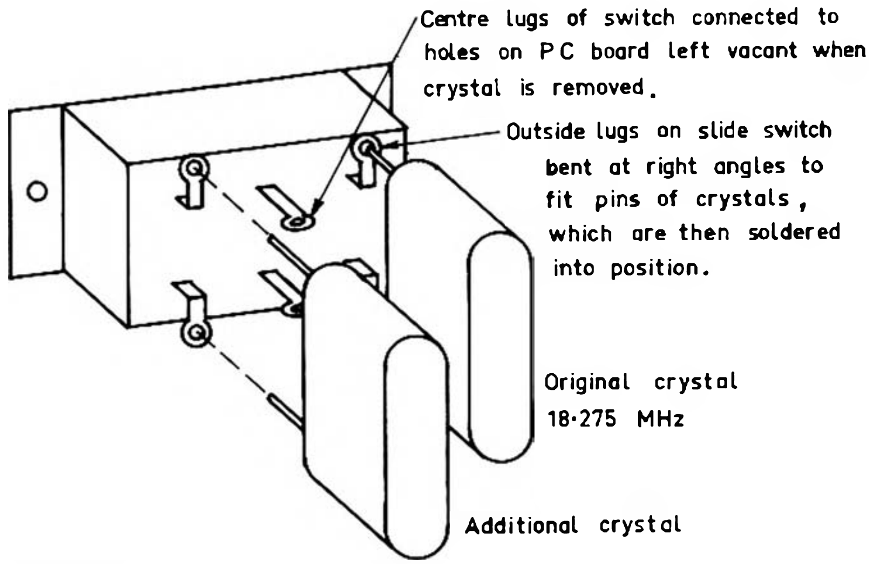


FIG 1 REAR VIEW OF SLIDE SWITCH

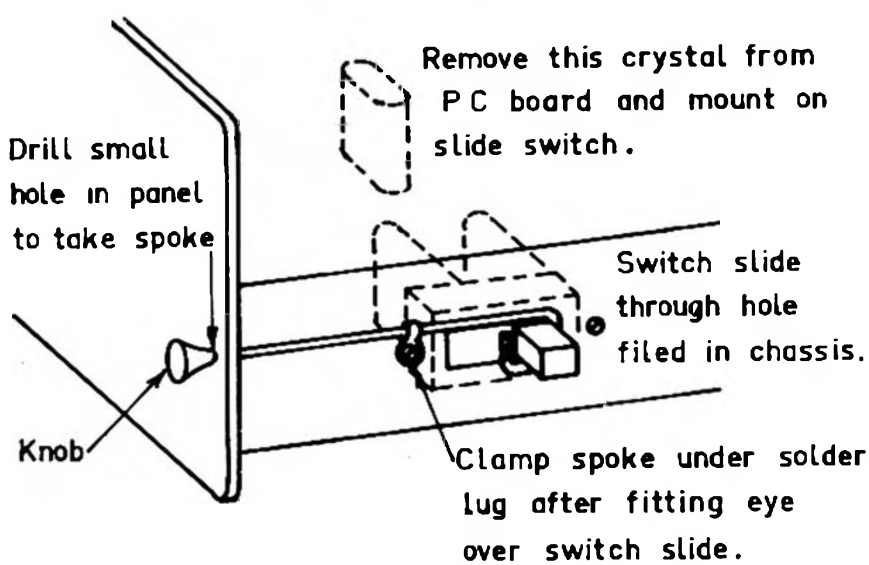


FIG 3 SHOWING MOUNTING OF SLIDE SWITCH AND CRYSTALS

FIG 2 SWITCH ROD - SEE TEXT

Some Thoughts on the G5RV

MAURIE EVERED, VK3AVO
13 Sage Street,
Oakleigh, 3166.

The theory of the G5RV antenna was discussed in detail by "The Man Himself" in AR January, 1973. This article, based on the author's experience, deals with some pratical aspects of its use.

A G5RV has been used at this QTH for over four years for both local and DX work on all bands from 160 metres to 2 metres. What follows is intended to help anyone who wishes to use this antenna. Much of the information given is not found in the usual texts but has been learned the hard way by many amateurs. Most of the methods used are not original but the result of helpful advice from many other VK's, particularly Vin, VK3AOV who suggested I try a G5RV after a coax fed multi dipole had proved disappointing on the higher HF bands. I will present the information under four headings.

CORRECTING THE POPULAR MISCONCEPTIONS

(a) The G5RV does not have to be used with its 102 ft length perfectly horizontal. It can be used in a sloping configuration, as it is at this QTH (see Fig 1) with no loss of efficiency (although some cancellation may occur if the angle of depression from the horizontal becomes too large.)

(b) The length of coax cable used does seem to be important. Most operators who successfully use the G5RV have been able to confine the length of coax to less than 30 ft. Conversely, greater lengths (more than 50 ft) may lead to poorer performance. This is an empirical finding arrived at after questioning many satisfied and dissatisfied users over a four year period. Despite the fact that if good quality coax is used losses should not be severe, at least on the lower frequencies.

(c) Often amateurs are heard to say that the G5RV is a compromise antenna and so must perform poorly in some respects. (No reasons are ever given, just the statement!) This is not so in practice. After all, the G5RV is no more a compromise than any other multiband antenna (even the mighty TH6!).

TUNING

This is probably the greatest bugbear in the use of the G5RV and the reason why many operators give it away as a bad job. They are faced initially with an SWR that is considered too high or a transmitter that will not load satisfactorily and, therefore assume that the only answer is in the use of an antenna tuning unit or the use of another type of antenna. I would not recommend the use of a tuning unit or the scrapping of the G5RV in these circumstances, and the method used to tune my particular antenna when it was first erected.

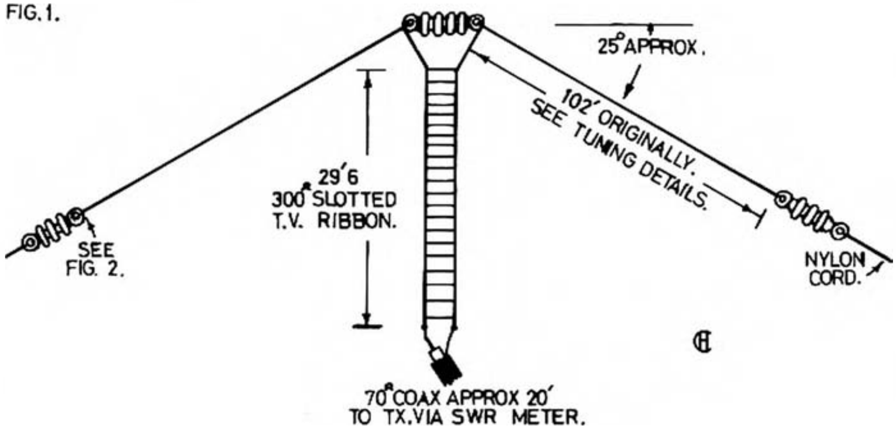
The antenna is tuned simply by shortening (but not by cutting) until an acceptable combination of SWR and satisfactory transmitter loading is achieved. This is done by pulling wire through each terminal insulator in turn and folding it back on the main wire (see Fig 2).

FIG. 2.

TUNING ADJUSTMENT.
(TAPE SECURELY WHEN FINALISED.)

Do this in steps of about six inches at a time and test after each adjustment. Concentrate first on the 20 metre band (say at 14 180 - 14 300kHz) and when it is satisfactory, test on the other HF bands. These will usually be found satisfactory but some further adjustments may be necessary for the best compromise on all bands. If you have a favourite band other than 20 metres adjust for the best SWR and loading on that band.

FIG. 1.



I obtained the following results:—

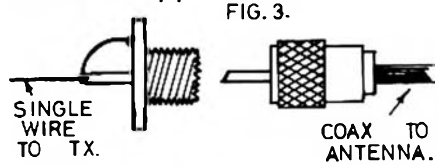
BAND	SWR
80 metres	1.3
40 metres	1.6
20 metres	1.0 - 1.1
15 metres	1.6
10 metres	4.0

With this method of tuning the full original length of wire is left in case the antenna configuration is changed, or in case you change QTH. Both could require checking and probable readjustment.

USE ON 160 METRES AS A LOADED VERTICAL

I was able to load the G5RV satisfactorily on 160 metres by simply joining the two conductors of the coax feeder and then running a single wire to the pi-out put of a small 10 watt AM Transmitter (See Fig 3). A buried earth wire was run to the nearest water pipe.

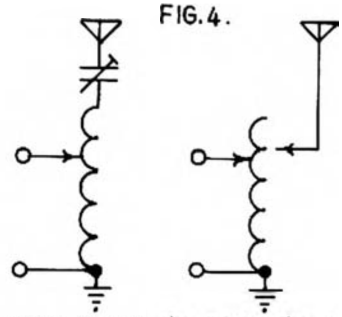
FIG. 3.



FEMALE AND MALE COAX CONNECTORS.
(ANY CONVENIENT TYPE.)

With this combination lots of local and interstate contacts were made. Strangely, in this case the addition of series inductance or capacitance had very little effect on performance. Nevertheless, some operators find it worthwhile to feed the antenna on this band via a series tuned circuit or to use a tapped inductor (See Fig 4).

FIG. 4.



Needless to say the better the earth system used the better any such vertical antenna will perform.

An elementary yet often overlooked point in resonating such an antenna was brought to my notice by Lin, VK3ARL who suggested first peaking whatever tuning arrangement is used by listening to a strong (but not overpowering) signal and watching the receiver S meter. Though the tuning position may not always coincide with that for best transmission it will be close enough to assist greatly in preliminary adjustments.

Opinions vary as to the best way of getting optium results on transmission. Antenna current measurements are fine provided that any tuning changes do not alter the impedance at the point of meter insertion. I used a simple field strength meter but any changes are best supported by a local amateur with a reliable S meter. Don, VK3ADP and Ron, VK3OM obliged on many occasions.

USE AT VHF

Although it is generally not considered a VHF antenna interesting effects can be obtained because the G5RV is several wavelengths long at these frequencies (particularly at two metres) and is bi-directional

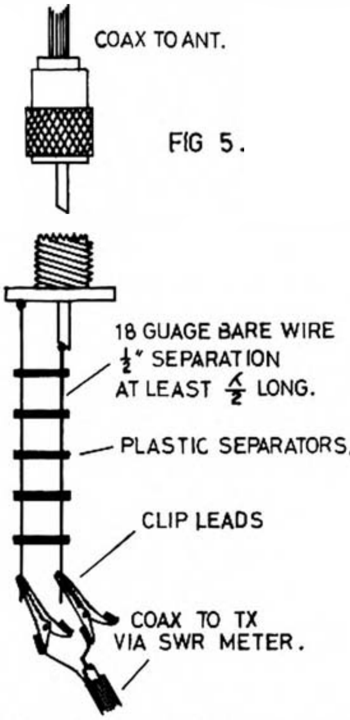


FIG 5.

off its ends. The antenna was fed as in Fig 5. Clip leads are slid up and down the parallel wires until a low impedance point is found. This gives a low SWR on the coax line to the transmitter. A tuning unit could of course be used but the method shown is very simple, very cheap, and most important, very effective.

Six metre testing was rather restricted but extensive tests were permormed on two metres on chanel B using an FT 2F-B. Very satisfactory results were obtained, stations being worked across the city when using the one watt output position.

Well, there it is. I would never claim that on 20, 15 or 10 metres a G5RV would equal or even approach the performance of a well adjusted quad or yagi, but I have tried quite a few wire antennas and, of these, I think the G5RV is out on its own for overall performance, size and ease of erection and adjustment. ●

A Success Story-Japanese Amateur Radio

By W. G. FRANCIS, VK3ASV
31 Donald Street, Morwell, Vic., 3840.

It is now over two years since the writer started to investigate the granting of Novice Licences in different countries around the World. He found that the United States of America had a total of all classes of amateur operators of 265 000 approximately and declining slightly, with Japan next with just over 150 000 and numbers climbing rapidly.

The sharp increase in the number of Japanese licences is attributed to the popularity of the all phone, all bands, low power, 4th class licence—and through the encouragement of training programs provided by large electrical companies and the Japanese Amateur Radio League.

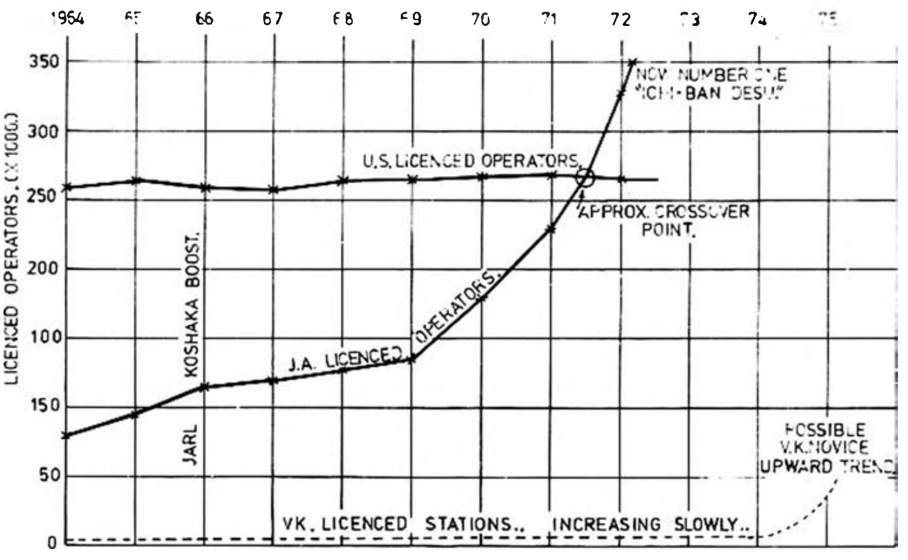
At that time, two years ago, it was not uncommon for the number of newly licenced amateurs to reach **8 000 per month** which is **1 500 more than the static amateur population of Australia.** It looked likely that at the rate of increase Japan would pass the United States in the number of licences amateur radio operators during 1972. Some amateurs here in Australia were sceptical that amateur radio would prove so popular in Japan.

The United States of America introduced Incentive Licensing in this general period, and it is thought that this has inhibited the expansion of amateur radio numbers in that country. The accompanying graph shows that in actual fact the Japanese did pass the Americans between 1972 and 1973 as predicted several years earlier. America has now a relatively stable amateur population of 250 000 and Japan has an approximate current amateur population of a third of a million — and steadily increasing. It should be noted that in Japan 86% of all licencees are Novices, whereas in the U.S.A. the Novices account for about 10%.

Up until May 1973 the MPT—Ministry of Post and Telecommunication of Japan—did not allow 2 metre FM repeaters or the transmitting of slow scan television. On May 10th the MPT started to grant SSTV permits on the HF bands. At least 25 amateurs have taken out permits.

The 15th National Convention of the JARL was held on the 27th May in the Kanto District. **It is interesting to note that Japan has no reciprocal licensing agreement with any country** and neither the JARL or the MPT are interested in such agreements at this time.

In 1971 there were 2 998 1st class operators, 12 237 2nd class operators, 21 253 CW novice operators, and 232 579 Phone only novice operators, totalling 269 067 operators, and 139 400 stations licenced. Not all amateurs own their own station because of the expense and consequently operate JARL or Company Radio Club Stations. ●



an a.r. special

The Belcom Liner 2 SSB Transceiver

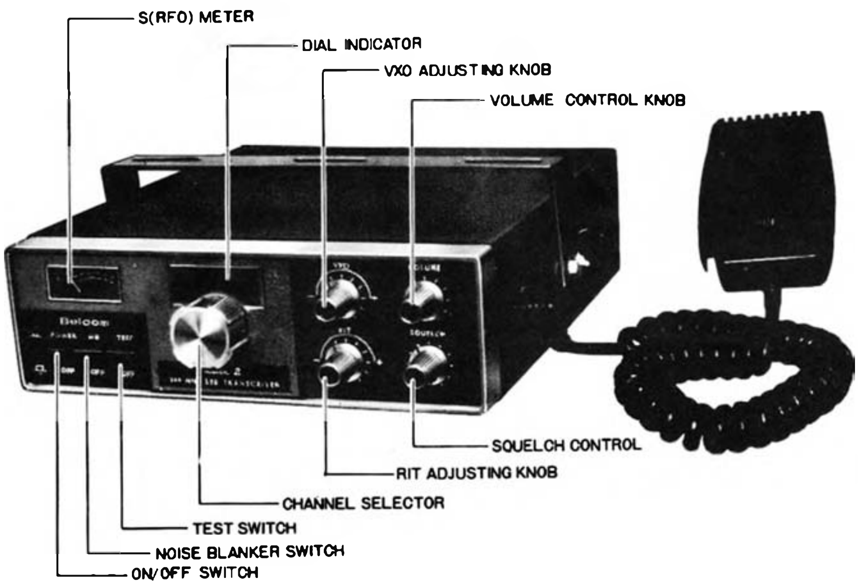
The **Belcom Liner 2** is a fully solid state SSB transceiver which, although designed and styled for use in a mobile configuration is also a very useful home station transceiver.

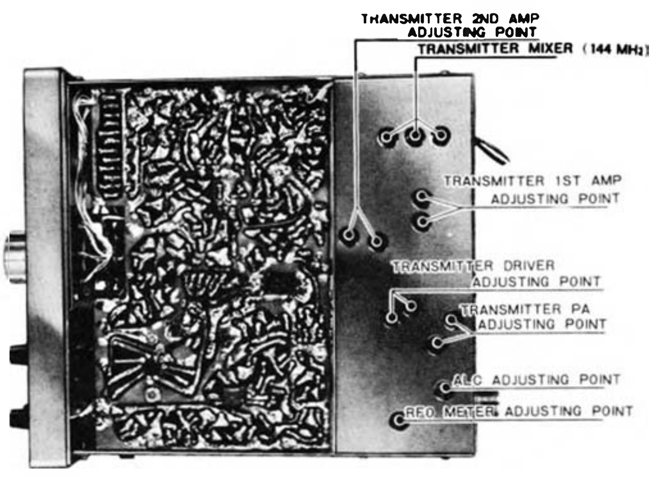
Covering any 240kHz segment of the 144MHz band, this unit is rated at 20 watts PEP input on SSB. The actual power output measured on a wattmeter is of the order of 6 to 7 watts, varying considerably with supply volts in the manner typical of solid state power stages. This power level is quite suitable as input to a high power amplifier.

The standard frequency range is 144.1 to 144.33MHz, but this is altered simply by inserting a different crystal in the 38MHz oscillator. Optional crystals supplied with the unit gave 240kHz bands starting at 144.0, 144.24, and 145.8MHz. This last band is one which covers the Oscar 6 uplink band 145.9 to 146.0MHz.

The main electrical feature of the unit is the method used to obtain continuous coverage over the 240kHz range, using switched crystals and a VXO.

Instead of using a VFO, two crystal oscillators are used in what the handbook calls a **synthesiser** circuit to produce a variable injection signal at around 20.21 MHz. One oscillator has a choice of 4 crystals separated by 10kHz and the other has a choice of 6 crystals separated by 40kHz. The 24 different combinations of these 10 crystals thus are able to provide 24 channels spaced 10kHz apart. The outputs of the two oscillators are mixed and the sum frequency is selected as the **synthesiser** output.





The synthesised 20MHz VFO and the SSB on 7.8MHz are then mixed to produce 28MHz SSB; this is then mixed with 115 MHz energy from a VXO on 38.5MHz to produce the final output on 144MHz. The VXO is capable of providing a shift of about 6kHz about each **channel** frequency, so effectively continuous coverage is possible.

Using the 39.1MHz crystal supplied as an option to give an operating band of 145.8 to 146.03MHz, a demonstration of Oscar 6 was arranged by the author for a meeting of the ACT Division of the WIA. Using this set **barefoot** and a 5 element beam it was easy to show that this power level is adequate to work through the satellite. Stations worked were in VK2, 3, 5 and 7 and ZL1. Later it was found that even using a simple quarter wave antenna it was quite easy to have contacts through Oscar 6 with this set.

Several VK1 stations have been worked using this set in the transceive mode. In addition, reports have been received from stations further afield. The receiver performance was found to be lacking in sensitivity, as the specification of 0.5 microvolt for 10 db S/N would indicate. (At this level most FM receivers are providing some 20 db of quieting). Lab tests indicate that the receiver has an overall noise figure of 12 db; in short—a good case for a **good** pre-amplifier.

The reason for the disappointing receiver performance specification is not obvious, but it may well be linked with the fact that this set is intended to be used in a mobile situation, where noise is probably the limiting factor. Whereas a noise blanker can be expected to effectively wipe out all noise from one main noise source, it is quite hopeless to try to remove a virtually constant background of the electrical noises that are present when operating mobile on VHF. Thus this receiver sensitivity may have been allowed to stay low deliberately.

OTHER FEATURES AND TEST RESULTS IN BRIEF

Meter provides S units on receive and output power on transmit. S meter readings are believeable, as it takes 75 microvolts to make it read S9 and you cannot make it reach full scale deflection (marked **S9 plus 30)**.

Noise Blanker is selected by a push button on the front panel: this was found to be very effective, even in a location at a traffic-lights intersection (lots of ignition noise).

Full carrier output for test purposes is provided by one of the push buttons on the front panel (used by the author to obtain CW with the mike button!).

Receiver Incremental Tuning which provides several kHz of offset from transmit frequency for the receiver only. Works well.

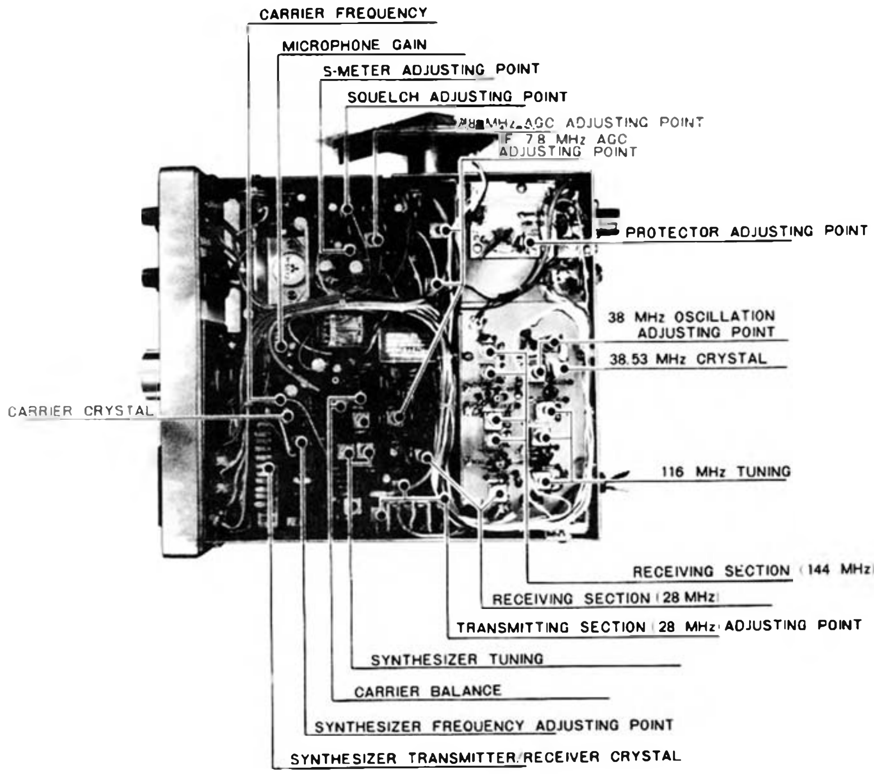
Squelch for fixed channel operation. Quite sensitive.

Calibration accuracy. The absolute frequency depends on the setting of the VXO control, but the frequency difference between **channels** was found to be within about 150Hz of the specified 10kHz.

Weight 3 kg, dimensions (WxHxD) 220 x 70 x 250 mm (8¼" x 2¾" x 10").

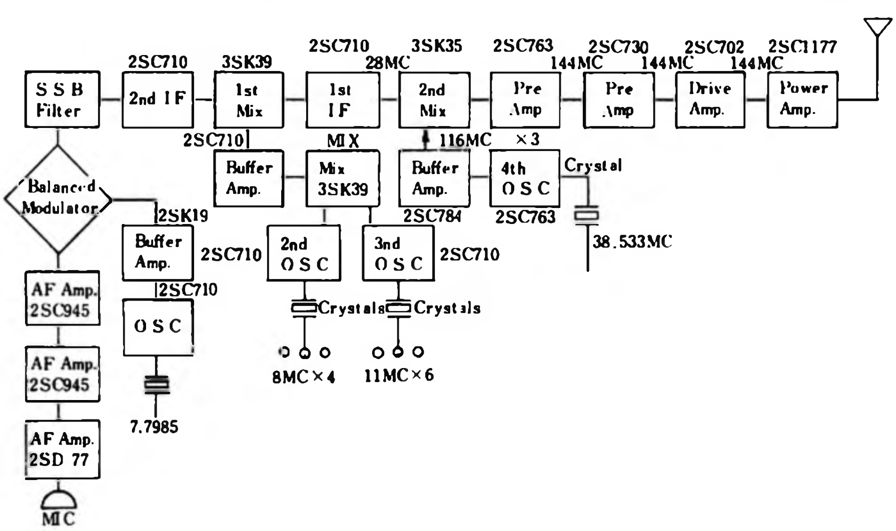
The Belcom Liner 2 uses 27 transistors, 6 FETs, 1 IC and 44 diodes. The input DC supply connector is polarised, and the line is fused, so that if the supply is wrongly connected for polarity, the reversed diode in the set will blow the fuse, protecting the active devices from damage. All controls were found to be easy to use and sensibly placed. For example, the (receiver audio) VOLUME control is the top right control, so that it falls easily to hand. Some mental gymnastics are needed to calculate the final frequency when first using a non-standard VXO crystal, but that is not too serious.

Examination of the circuit diagram reveals liberal use of double and even triple tuned circuits in mixer outputs. By all the indications, the claimed spurious suppression of 60 db is probably met. Certainly there were no outputs in the 144MHz band, other than the expected one, when testing the transmitter. The receiver was found to be a little worse, with a threshold effect occuring at about 1 millivolt: past this level there ware several **birdies** in the band. As not too many signals are that strong, that might not give any trouble. This problem may be caused by one of tha switching diodes (over 30 of them) causing distort-



ion or harmonics, and is one point to watch when installing a pre-amplifier. This problem is rarely, if ever, investigated when a pre-amplifier is installed in an FM **Carphone.** How many sets suddenly develop birdles when the pre-amp is added?

While evaluating this set, the costs of the various methods of getting onto the 144MHz band on SSB were compared. Assuming that one is keen enough to want permanent facilities on the band, the usual method used, namely an HF transceiver with a transverter to 144MHz would involve an outlay of at least the cost of the HF set, or between about $350 and $600. Compared to that is this set which provides instant 144MHz SSB at reasonable power level, and uses considerably less space in your shack; you also get mobile operation (fox hunts, field days, etc) as a bonus. With the popularity of VHF **tunable** operation on the increase, sets such as this one will become more widely used.



The set comes complete with 2 power leads, PTT mike, mike clip, mobile mounting bracket, English manual (very clear and informative) and spare fuses and dial lamps. The crystals needed for coverage outside the standard frequency range are also readily available form the dealer, Sideband Electronics Engineering, who supplied the set for this review. The price of the Belcom Liner 2 is $250.

SUMMARY

An excellent mobile SSB set, and ideal for the keen VHF operator to use as a driver for a high power amplifier; an easy way of getting onto the 2 metre satellite band with SSB. Pricewise, quite comparable to the **other method** of transceiving on 2m SSB on a dedicated equipment basis.

ACKNOWLEDGMENT

The assistance of Ed Penikis VK1VP in providing laboratory evaluation of this equipment is gratefully acknowledged.

VK1DA.

A Broad Band Travelling Wave Dipole

Dr. R. J. F. GUERTLER
and G. E. COLLYER
Antenna Engineering Aust. Pty. Ltd., Melb.

A dipole can be modified by inserting resistive loading networks so as to produce standing waves between the feedpoint and the networks. The authors have by adjustment of the networks and the dipole sections developed a travelling wave dipole whose VSWR is less than 2:1 from 3 to 15MHz and does not exceed 2.6 to 1 from 2.3 to at least 30MHz. This antenna can thus be used on 6 amateur bands and is an affective alternative to the well-known G5RV, the Windom, and the end fed Hertz.

The dipole was designed for short-haul HF communication systems and is supported in a horizontal position between two masts. The feed point impedance provides a good match to a 300 ohm balanced line, or may be matched to a 50 ohm coaxial line by means of a balun.

The antenna consists of four sections and is symmetrical. Firstly there is a 12.1m length of two wire line spaced 1.8m apart by means of two 25mm diameter aluminium tubes. The wire is 7 strands of 1.2mm diameter copper. A tapering section of 1.25m brings these wires together at the feed-point. At the other end of the open wire section there is a network which connects to another section of open wire line 6.4m long. The network consists of a 16uH indicator in parallel with a 330 ohm resistor and takes up a length of 0.45m. Overall the antenna is 40.6m long.

It was found that neither the value of the 330 ohm resistors nor that of the shunt inductors was very critical. The shunt inductor has a small effect on SWR at the lower frequency end. However, reduction of the resistance to 150 ohms caused the SWR to fluctuate considerably with frequency. The taper sections were required to reduce shunt capacity between the spreaders M and P. Reducing the length of this section produced an increase in SWR.

The construction details of the antenna are shown in Fig 1 and details of its performance are given in Figs 2 and 3.

The authors presented a paper on this antenna at the recent IREE convention held in August, 1973, in Melbourne. Further details are given in the Convention Digest which contains a two page synopsis of all papers presented. This digest is available from the offices of the IREE at a cost of $5 for non-members and $4 for members. Enquiries may be made by telephoning Melbourne 347-2627, or by writing to the IREE Melbourne Branch at 191 Royal Parade, Parkville, 3052.

The permission of the IREE and of the authors to publish this precis is gratefully acknowledged.

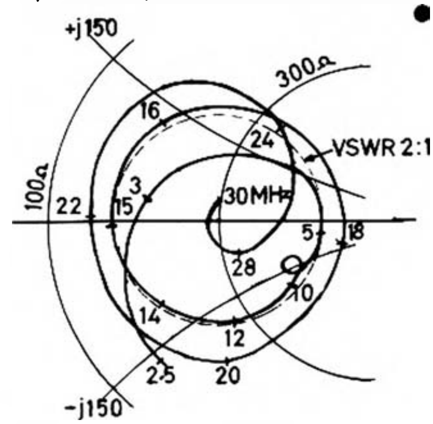


FIG 3 Smith Chart representation of VSWR vs Frequency

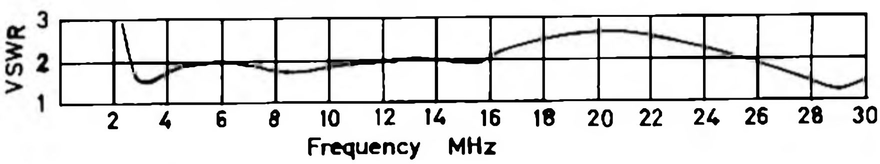
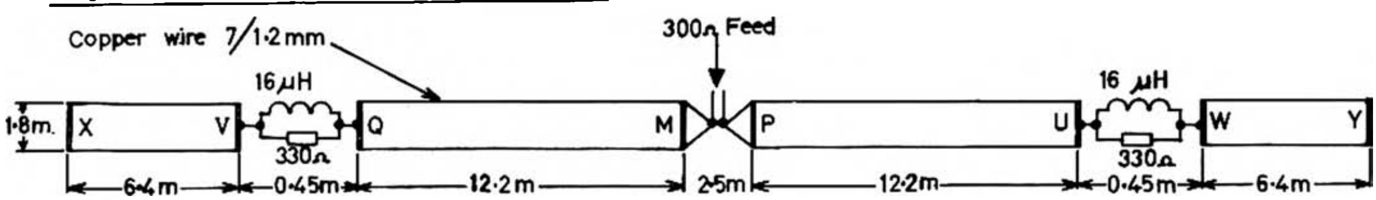


Fig 2 VSWR MAGNITUDE VS FREQUENCY



NOTE: X,V,Q,M,P,U,W,Y 25mm diameter aluminium tubes

Fig 1 CONSTRUCTION OF THE TRAVELLING WAVE DIPOLE

146 MHz PRE-AMP

Reprint—GARC Newsletter—November, 1972

This Pre-amp uses the inexpensive MPF121 Dual Gate FET. You will note that no neutralization is required and therefore it is very easy to construct and to get going.

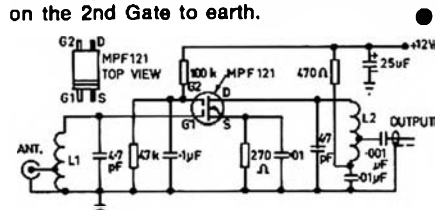
L1 approx, 4½T Tapped at 1½ from earth end.

L2 approx. 4½T Tapped at 2½ from 470 ohm end.

Both coils are wound on Neosid formers with slugs fitted.

TUNING UP

Use a weak signal and peak L1 & L2 for maximum Limiter voltage on an FM rig, or S meter on an AM rig. If there is any instability noted, shield L1 & L2, and place a small value (about 1 or 2 mfd electro or tantalum) of extra capacity across the .1mf on the 2nd Gate to earth.



Is Amateur Radio Necessary?

Reprint from the Australian EEB, February, 1973

A: Have another beer.
B: Don't mind if I do.
A: What are your thoughts on Repeaters?
B: All in favour of them. You fellows are squeezing into less and less space.
A: Well that's good isn't it? We're using the bands more efficiently.
B: Yes it certainly is good. There are a lot of other chaps who want that space, and it looks as though they ought to have it.
A: Oh?
B: You realise, say, that 80 metres is ideal for people doing work in the outback?
A: But why 80 m. Why not 81 m?
B: All right but they want 80 m, and the equipment is already commercially available.
A: But we have already got plenty of amateurs on 80; just listen to the QRM any week-end.
B: But how dead is it during the week? And what is to prevent you from doing all your operating with VHF repeaters? You could get nearly as much DX from a chain of repeaters as you get from 80 metres.
A: But that's not fair! A lot of blokes prefer to build HF equipment which is less critical of components and adjustments than is VHF gear.
B: Oh yes, and how many people do build their own any more?
A: Plenty; the amateur magazines are full of constructional articles.
B: Do you build?
A: Well no, but that's a special case; I've just got too much to do for the wife and my job.
B: It's not so special; when more people were constructing they were just as busy. But let's return to the original point. You chaps have already lost a large slice of 80 to commercials who do in fact use it constructively. You can hardly assert that most of amateur operation is constructive nowadays. Furthermore repeaters show that you can operate on much less space than you have been given. Why, for instance, should you have 4MHz on 2 metres when in fact you produce the most activity there from FM contacts using some 3MHz largely unoccupied.
A: But the low end is certainly occupied very heavily by AM, etc.
B: Sure, some 200-300kHz worth; that's heavy?
A: We have to plan for the future; more amateurs will need more frequencies.
B: The present channel spacing could be reduced, and more amateurs could be put into each channel.
A: This would turn amateur operation into one great net.
B: Isn't that the direction its going now?
A: How about individualists who don't want to be crowded in with the others?
B: Let's keep our priorities in mind. The important thing is not what amateurs want but what societies need.
A: I suppose that society "needs" space in 40 and 80 m while there is ample space available to them outside of our bands?
B: There is such space, but you must admit that the propaganda stations find a hand-picked audience already at hand in the amateur bands.
A: Amateurs are not intersted in propaganda!
B: Then why don't more of them jam the broadcasts of the Intruders? Only a tiny signal sitting on one of their frequencies can cause havoc.
A: Amateurs have more important things to do. The fact remains that the Intruders have no business being there; are you supporting their propaganda activity?
B: Certainly not. Arguments have in fact been advanced in favour of your having more space in 40 m, but this was opposed by the government of Infrabovia — with whom we are presumably on friendly terms. What more can be done?
A: At least we shouldn't lose the frequencies to which we are entitled.
B: Are you entitled to them?
A: Yes, we were given these frequencies by international agrement.
B: Modern tendencies toward band-sharing show that this agreement is no longer as valid.
A: But that's not fair!
B: So? What have amateurs done in recent times to justify their use of the bands?
A: Training new technical talent?
B: That's taken care of nicely by commercial and military training programmes.
A: Civil defence?
B: This is already handled very competently by governmental agencies.
A: Message handling?
B: Not significantly outside of North America, and look at the mess it has become over there. They are even phone patching commercial transactions now!
A: At least amateur radio provides a healthy hobby for a large number of people.
B: Have you listened to the bands recently?
A: Of course.
B: Do you call "healthy" the kind of obscenity, discourtesy, bad operating, and incompetent operating heard there?
A: That's only a noisy minority.
B: You can't convince the public of that.
A: (Smugly) Most of our operation is on SSB and the public can't receive that, so they don't matter.
B: The commercials can, and they do matter. And they want your frequencies. You have shown that with the aid of repeaters you can do with far smaller bands. You have shown by scanty use you need far fewer bands. And you have shown by incompetence and poor operating that you are jolly lucky to have any frequencies at all.
A: If you destroy radio you'll be destroying a large commercial enterprise.
B: Who's destroying radio? Only amateur radio; there is much commercial and service opportunity in other directions. Already component manufacturers are recognising this by largely ignoring amateur complaints about component scarcity. The big production goes where the big money is: in the entertainment and commercial communications markets.
A: (Gasp) I need another beer.
B: Me too. May I make a suggestion I hope you'll pass on to your mates. You'll have a better chance of keeping the bands if the intelligent majority accepts some responsibility for pulling the Clods back into line. This requires the individual responsibility, and that means you and your friends. If you do nothing, you'll get nothing.

UHF Dipper

EDWIN SCHOELL, VK5NZ

Reprinted from S.A. Journal, July 1971

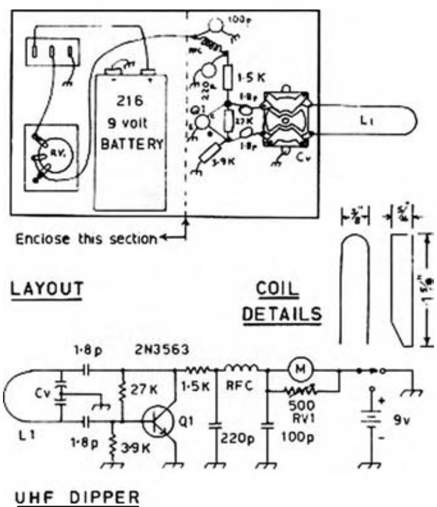
The problem of tuning up and debugging 432MHz equipment is made a lot simpler by the use of the tuned circuit dipper.

This device was developed three or four years ago when interest was generated in 432, and has been used for that length of time in the 5NZ shack. It has been used to tune up several convertors, varactor multipliers, filters, aerials, transmitters, etc., since then.

If built as drawn, operation will be free of spurious dips and peaks, and will cover 270 to 475MHz.

This device was built on a bent piece of tin-plate, with the active circuitry built under the end of the U-shaped channel which is 1" high and 2⅞" wide. The battery, meter, and switch are enclosed with an L-shaped cover.

The tuning capacitor is one of the butterfly type used for many years by TCA in 1649's, 1674's, etc., for grid tuning of 3/12's and 3/20's.



One hint:—If you are thinking of building an expanded/extended array, you will need something like this dipper for tuning the phasing lines and balun. Calibration is done using Lecher Lines and a ruler.

See Section 19.12, R.S.G.B. Handbook.

Switching the device off converts it into a crude but effective wavemeter. If it is left on, and brought near a transmitter or oscillator a very sharp resonance check can be made by watching for a **flick** as the oscillator **locks on** to the external signal.

PARTS LIST

L1—As per drawing, made out of tin-plate.
Q1—2N3563 Epoxy Transistor.
RFC—17 turns No. 30 BS Enamel, ⅛" diameter closewound.
M1—100 micro-ampere meter. (e.g. Phillips 100 micro-amp. l. vel meter).
RV1—500 ohm Trimpot or Tab-pot.
Resistors—¼ or ½ watt carbon.
Capacitors—Miniature creamics.
Cv—6.4 pf., Coded 82016/6EA, butterfly, ¾" x ⅝" ceramic insulation.

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

EQUIPMENT LAYOUT and DESIGN (Part 2)

Once the circuitry design has been finalised, either one of your own designs or one copied from a known good circuit, the important job of laying out the printed board or chassis must be undertaken. A good design on paper can easily turn into a *lemon* if due concern is not taken with the physical layout of the unit. Many a newcomer to electronics has become very discouraged when a new, perhaps expensive project in both time and money, fails to work at all well.

Why do many of the copies of known good designs fail to live up to expectations when you build them? Joe Blow's version down the street is so much better, you begin to wonder if you both built the equipment to the same circuit. Both are built from the same circuit, but the way that they were individually built supplies the answer, unless of course you were unlucky enough to get a few defective components. It is amazing the number of people who build some horrible device which refuses to work, who look at another device using the same design which does work well and cannot see anything different in the physical layout.

Usually the differences are very obvious — components of totally different characteristics or physical size have been used, or the layout bears no resemblance to the suggested original layout, inputs are located near outputs, there are earth loops in the wiring, or just that many of the wires do not go directly where they should and meander around the chassis.

If you look at someone else's equipment that works well you may get some idea on how a piece of equipment should be laid out so that various stages do not interfere with each other's operation. Each separate stage should not be interleaved with another. Each should be a separate entity, and should not be like a Siamese Twin — all mixed up together. However, once you know which circuits are compatible with one another — in other words, will work quite effectively intermingled with one another — you will know a lot about design both theoretically and practically. As a newcomer you will not necessarily know which are and which are not compatible, so keep each stage separated. Each stage of a piece of equipment should have its input and output as removed from each other as much as practical.

For example some people mount valve sockets so that the input signal wiring must cross over the socket, which means it goes very near to the output lug and wire on the socket. In each case the lead may have to be twice as long as it should be, and additionally the coupling between input and output may be so great that oscillation at some frequency occurs. If oscillation does not occur the characteristics of the stage may be so altered that the intended performance of the stage is never achieved, no matter what the newcomer may try. In some high gain valve stages a shield may have to be soldered across the valve socket isolating the input and output to prevent oscillation. This is likely to be necessary if, for instance, a 6EH7 is used as a 455kHz IF amplifier. This shield is earthed and connecting to the centre spigot.

Now having sorted out the problem of wiring a single stage, we move onto the laying out of several stages. Wherever possible each stage of a piece of equipment should be laid out in a straight line so that the input of the first stage is as far removed as possible from the output of the last stage. It is rather impractical however to lay out a 20 valve or transistor receiver in a straight line. The set would be rather long and thin, and who likes their receiver to measure 3' x 3" x 3"? This is where the knowledge of which stages of a piece of equipment are compatible with others becomes important. Consider a conventional valved receiver. The following stages are reasonably compatible with one another — RF or IF and Mixer stages can be placed near the power supply or audio output. They are all handling the flow of electrons in different ways. Succeeding IF stages should not be intermingled and should be laid out in a straight line along the chassis if possible. The second detector, whether an envelope or product detector, should be kept away from the audio output or the power supply and also the front end of the IF strip. The low level audio stages should not be near the power supply or audio output. The audio output can be placed close to the power supply as long as the power transformer and audio output transformer are well separated or are orientated such that the output transformer picks up no hum from the power transformer by direct magnetic coupling. All the filtering in the world will not remove the hum out of the audio if magnetic coupling is involved.

Low level audio stages and second detectors of receivers are very susceptible to hum due to direct pick up from heater leads or due to inadequate filtering of the high tension line. Keep the heater leads away from these sensitive audio or detector circuits. If insufficient filtering is the problem instal another R-C decoupling filter network to make the HT supply to the stage as near pure DC as possible.

Decoupling of various stages from one another is quite important. The heater lines, the HT lines, AGC line, audio negative feedback line and any other line which is common to more than one stage must be *decoupled*. Decoupling is purely a method of making any line common to more than one stage *clean* of any extraneous *signals*. For instance the AGC line should have pure DC applied to it — there should be no RF or Audio component at all upon it otherwise its performance will be degraded and the receiver may oscillate. The HT line should be as near to pure DC as possible. If the receiver local oscillator and the audio output stage are connected to the same point in the power supply it could be that the violent swings in current drawn by the output stage could cause the voltage to vary sufficiently to detune the local oscillator. This could be extremely annoying if SSB signals were being received. In fact this involuntary detuning of the oscillator is so much a problem that it is often supplied from a special supply section with a voltage regulator fitted. It may be necessary to supply the HT to a two stage IF strip through separate decoupling networks if the individual stage gain is high.

In transmitters similar problems arise, and they must be just as carefully laid out, if not more so, as a receiver. A transmitter that is badly laid out or designed is likely to radiate spurious signals — and these are just the things to get us into trouble with our neighbours and the authorities. The high level RF output sections should be kept well away from low level audio sections of the transmitter. RF getting into the audio section can cause all sorts of odd effects, such as distortion, feed-back, lower than expected audio output, etc.

The newcomer I anticipate will be building the simpler AM - CW - FM type transmitter with very few stages of RF or Audio. A CW transmitter is the simplest type of transmitter to build which will give good results. It is most desirable with transmitter RF stages, particularly when you are designing them for the HF bands, to fit parasitic suppressors to either the grids, screens or plates. A simple suppressor can consist of a 30 to 100 ohm resistor in the grid lead of a valve, or maybe a small ferrite bead. Screen leads usually have about 40 to 100 ohm resistors in series with them. The plate lead has much the same value of resistor which is usually a 1 watt unit with approximately 6 turns of wire wound over it connecting to either end of the resistor. Some at least of these should be fitted as a matter of course, as it is surprising the number of transmitters putting out energy on frequencies not related to the desired output. Your television set and a multiband receiver can be of assistance in tracing likely parasitics — although the exact method of tracing these parasitics and then curing them will have to be the subject of another article sometime in the future.

There is probably much that I could tell you about layout and design, but I believe that my job in this column is to show you the way to start on this problem and in fact to realise what the problems are. A particularly good book to read which will help considerably with the subjects discussed over the last two months is *Understanding Amateur Radio,* an ARRL publication. Another book which will help with fundamentals is *A Course in Radio Fundamentals* once again by the ARRL. Other recommended reading texts are, *The Radio Amateur's Handbook* ARRL, the *Radio Communication Handbook* RSGB, and *Basic Electronics* produced by *Electronics Australia.* All of these should be available from the bookshops who advertise in *Amateur Radio* and the Callbook.

ARRL National Convention.

Anyone likely to be in New York mid-July? Dee Logan WB2FBF invites anyone interested to attend the 1974 ARRL National Convention to be held at the Waldorf Astoria, New York City, from July 19th to 21st. The Convention is sponsored by the Hudson Amateur Radio Council Inc. and has the theme "International Friendship through Amateur Radio."

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

I wonder how many Geloso G222 transmitters are still in use. I suspect quite a few. Many have been modified to operate on the 160 metre band following an article in this magazine by John Adcock VK3ACA. No doubt too, many are still being used on CW and it is with this in mind that the following modifications were devised.

When used in the CW mode the G222 developed quite a strong and objectionable back wave. Keying is effected in the cathode of the 5763 driver with fixed bias applied to the 6146 final. The trouble is in two sections. Firstly, there is insufficient fixed bias to completely cut off the 6146. In the key up position there is still quite a deal of plate current. The 5763 cathode is returned to the high tension line through a 100K ohm resistor with the key up in order to cut this stage off. In practice there does not seem to be enough cut off bias applied to either stage.

Firstly reduce the 100K ohm register in the 5763 cathode to 50k by paralleling the first resistor with a second of the same value. Make sure it has a two watt rating. The next step is to add a voltage doubler supply. The original bias supply is left intact as this still has to provide bias for the 807 modulator tubes. New components needed are two 200 mfd electrolytic capacitors rated at 150 to 200 volts working plus two 400 piv silicone diodes. Connect the positive end of one of the electrolytics to the transformer connection on the existing bias rectifier N8918. Connect the cathode end of one of the diodes to earth, the opposite end to the negative side of the electrolytic just mentioned. Connect the cathode of the second diode to the same point. The second electrolytic connects positive side to earth, negative to the output of the second diode and then to the bias line to the 6146 final.

So far two Geloso transmitters have been modified as described, both owners reporting greatly improved results.

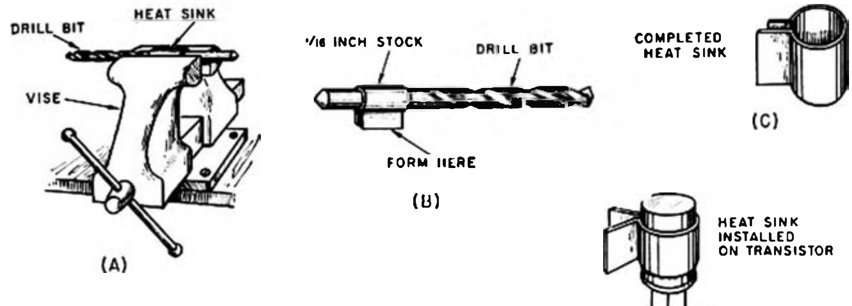


Fig. 4.—Steps used by W1CER in constructing heat sinks for small transistors.

SEMICONDUCTOR HEAT SINKS

Home-made heat sinks can be fashioned from brass, copper or aluminum stock by employing ordinary workshop tools. The physical dimensions of the heat sink will depend upon the type of transistor used, and the amount of heat that must be conducted away from the body of the semiconductor.

Fig. 3 shows the order of progression for forming a large heat sink from channels of near-equal height and depth. The width is lessened in parts B and C so that each channel will fit into the preceding one as shown in the completed model at D. The three pieces are bolted together with 8-32 screws and nuts. Dimensions given are for illustrative purposes only.

Heat sinks for smaller transistors can be fabricated as shown in Fig. 4. Select a drill bit that is one size smaller than the diameter of the transistor case and form the heat sink from 1/16 inch thick brass, copper or aluminum stock as shown in steps A, B and C. "Warp" the stock around the drill bit by compressing it in a vise (A). The completed heat sink is press-fitted over the body of the semiconductor as illustrated at D. The larger the area of the heat sink, the greater will be the amount of heat conducted away from the transistor body. In some applications, the heat sinks shown in Fig. 4 may be two or three inches in height (power transistor stages). — *W1CER*

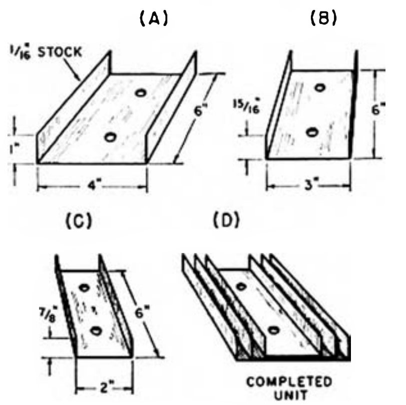


Fig. 3.—Details for forming channel type heat sinks.

LOCATING EARTH WIRES

Take the following situations. 1. You want to plant a shrub in the back yard and know you have some radials somewhere thereabouts. Rightly you don't want to damage them by digging. 2. You know there is a water pipe running somewhere past the shack and would like to take an earth wire to it. Puzzle, how to find where they run?

Answer. Take the active lead of a modulated signal generator to the radial system or kitchen tap as appropriate and leave the other end float. Set the sig. gen. about 550kHz. Borrow junior's transistor radio (you wouldn't have one of those devices yourself) and tune to the same frequency. Point the ferrite rod vertically to the ground and you can't miss the tone. On walking around you will find a null as you pass over the buried object. The closer to the ground the sharper the null.

In fact in tracing water pipes I push a long screwdriver into the ground where the null is indicated and meet the pipe every time. It will separate pipes 2" apart.

By using the antenna at 45° after having determined the vertical null, another null, not so sharp will be found and the distance between the two will be the depth of the pipe or wire.

Ken Gillespie, VK3GK

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

SHIFTING THE FREQUENCY OF A CRYSTAL

Lower.—A coating of finger nail polish thinned down with cuticle remover will lower the frequency of a crystal considerably. Very little, if no effect, on the strength of the oscillation will be noticed.

Higher.—To shift the frequency higher, give one side of the crystal a few light rubs with a little Bon Ami.

Suitable springs to replace those in drill chucks can be obtained from old motor tyre valves.—VK2AC.

* * * *

When carrying a multimeter, turn the selector switch to a high current range. The low resistance shunt across the meter is as good as shorting the leads together for heavily damping the meter and helping prevent bent needles and jarred movement.—VK3AKZ.

WHERE IS THAT RESISTOR?

How often is the junk box raked over for a resistor of some particular value or, if there is some order in the shack, how many times is a cascade of assorted resistors poured out on the bench and the resulting heap explored at length?

The problem has been solved here by a simple filing system using flat 50 cigarette tins and a few dabs of paint. Seven tins are used and the ends are painted respectively black, brown, red, orange, yellow, green and blue. Resistors are stored under the colour representing their multiplier (R.M.A. Colour Code), i.e., the colour of the third band or the dot.

When a resistor of a particular value is required, the tin of the appropriate colour is selected, e.g., red—thousands of ohms, or yellow—hundreds of thousands of ohms. The wanted resistor usually presents itself without further ado—or the nearest approximation is immediately available.

A similar filing system can be used for capacitors. It is remarkable how many items can be stored in this rather attractive, gaily-coloured stack of tins. —Robert H. Black, M.D., VK2QZ, 36 College St., Sydney, N.S.W.

Useful Workshop Hints

By N. E. COXON, VK6AG

Miss print W.E. Coxon

Keep a container in which to drop all odd nuts, screws, etc., that are come by from junk, alterations, or off the floor. Then, apart from a valuable source from which to find that odd screw, etc., periodically the container can be emptied into respective screw and nut compartments.

• • • •

Sheet aluminium is best divided by nicking and breaking. Have an 18" length of 1" angle iron held together by 2 x ½" bolts at the ends to form a clamp. Mark the line to sever, clamp and hold in vice, cut with point of a strong pen-knife, and bend several times, and the break is clear, straight, and no twists in the aluminium.

• • • •

Tinned copper wire used as bus bar often is tarnished when bought. To clean, rub with a wire file brush, and to straighten, hold end in vice and hold other end in flat nosed pliers. Give a sharp jerk and the wire is straight.

• • • •

Whenever a screw is shortened by cutting with pliers, always file off the burr, for you never know when it will be necessary to remove the nut, and no end of difficulty is experienced when a screw head has been chopped off. Brass screws are bad enough, but steel screws treated in this way are time wasters.

• • • •

When tapping sheet metal, it is safer to hold and tap the hole by using the tap (1/10th" to 5/32nd") in a wheel-brace.

• • • •

Paint with various bright colors, handles of small screw drivers, spin-tight spanners, and various other tools. It makes them easy to find when bundled together on the bench (not always as tidy as desirable).

• • • •

Keep a small bottle of thin oil with a wire dipper handy. Many a nut, wood or iron screw is coaxed along by a little lubrication.

• • • •

When a small drill is broken, insert and solder the broken portion into a shank. It makes a more robust drill, and uses the portion with the best cutting section. The contributor has often deliberately broken off ½" from a small drill to fit it to a larger shank. Solder is quite sufficient to hold it.

• • • •

Wheel braces will take several size larger drills if the shanks are filed with three flats. By such means a ¼" drill can be made to slip into a wheelbrace made for 3/16" shanks. The flats also prevent the drills slipping in the jaws.

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.

R. A. Dietz,
P.O. Box 3
Kearneysville,
West Virginia,
25430,
USA.

Dear Sir,

I am an amateur radio operator in the USA. My call is W8KKB, and my licence is advanced class. I live in the state of West Virginia about 60 miles west of the nation's Capital, Washington.

I like to work DX or long distance contacts as many other hams do, but the quantity of countries worked, such as for an award like DXCC etc. does not interest me as much as trying to span the greatest possible distance.

In my 20 years of amateur operation, my farthest contacts have been with New Zealand.

Geographically Australia is on the other side of the world from me. The city of Perth in VK6 land is the farthest inhabited area on Earth from where I live.

I would derive immense personal pleasure from making one or many contacts with Australian amateurs.

I have heard VK stations many times on 40 and 20 metres, but they are an elusive group to contact. Like most other DX stations they are probably sick of working thousands of US hams and would like to talk to hams in other countries. Generally when they do work US stations, the kilowatt boys out in California catch them before a low power station on the East coast like myself has much of a chance.

I run about 150 watts SSB or CW (at 15 wpm) to a dipole on 80 through 10 metres.

I recently wrote to the ARRL inquiring about Australian Amateur activity and was amazed to find out your max. pwr. is 150 watts, and you do not operate in the American phone bands on 40 & 80 metres.

The purpose of this letter is to find out anything I can about VK hams that will help me to contact them.

On 80 through 10 metres what are your phone & CW frequencies?

Do you have any awards such as "worked all territories"?

Are there any particular frequencies where VKs like to work DX?

Are there any DX nets, and at what time & freq. are they in operation?

What is your code speed requirement?

I have heard about your pending Novice License and would like to know what frequencies they will be allowed to use, what power and what code speed?

Any information you can give me regarding the above will be deeply appreciated. Thank you for taking the time to read this.

Rudy Dietz,
W8KKB.

Rudy's address is published so that VK DXers can write to him, answering his questions, and perhaps arranging scheds. Ed.

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN December 1973

A Variable Crystal Oscillator: Three Band Trap-less Vertical: Radio & Television Interference from Electrical Appliances: Amateur Radio—The Preservation of its Right to Operate: Oscar 7 and its Capabilities.

RADIO ZS. December 1973

RC Signal Generator: Microphones VSWR and all that: ZS Land and VHF: Quartz Crystal and Frequency Standards: Radio Breakthrough on Hi-Fi Equipment.

HAM RADIO. November 1973

Low-Power Solid-State VFO Transmitter for 20 Metres: Test Set for Motorola Radios: Variable Shift RTTY Terminal Unit: Medium Current Polarity Inverter: Single-Band SSB Transceiver: Single Frequency Repeaters for VHF FM: Open Wire Impedance-Matching baluns: Compact Electronic Keyer Package: Calculating Gain vs Height of DX Antennas: Antenna and Control-Link Calculations for Repeater Licensing.

RADIO COMMUNICATION. January 1974

Gains and Losses in HF Aerials: Technical Topics features TVI Statistics, Aerials a la G6XN, Baluns in reverse, Compact Beams, VK2ABQ Triband Beam, AGC-controlled RF Attenuator Mark 2, Neutralising FET Amplifiers & Cocktail Parties in Practice.

QST. December 1973

A Solid-State Transceiver for 160 metres: How to Build an SSB Transmitter: New Front End for Heath HW-7: Using the ARRL L/C/F/ Calculator: High Performance 20, 40, and 80 metre Vertical System: A 2KW PEP Amplifier for 144MHz: International Friendship Through Amateur Radio: The ARRL Intruder Watch: Oscar News.

AUSTRALIAN EBB. June, August & October, 1973

Three issues of this journal arrived in my mail during the month and they cover a wide selection of subjects, not all of them electronics. There is much to interest experimenters generally. Enquiries to P.O. Box 177, Sandy Bay, Tasmania, 7005.

MOBILE NEWS. November 1973

News and views of the European Mobile scene with particular emphasis upon what is happening in G Land. Those interested should contact N. A. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, England, CR21EZ.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

As a result of the recent changes in credits for Germany as notified in last month's AR, and the probable alterations as a result of changes in Papua New Guinea, very nearly all, if not all listings for the DXCC Award will have to be adjusted. When this is done, a complete list of members and their scores will be published in this column.

As in past months, I set out below details of some of the Awards available from other countries:

WAGE AWARD

1 The award is available to licensed amateurs
2 Contacts after November 1945 are valid
3 QSL cards and a check list must be submitted to the sponsors
4 The fee for the award is six IRCs
5 The address for applications is: Radio Club of Chile, Casilla 13630 Santiago, Chile.

Requirements: Confirmed contacts are required with 8 out of the 10 Chilean call areas.

FIRECRACKER

1 The award is available to licensed amateurs and shortwave listeners (on a "heard" basis)
2 Contacts on and after 1st January 1964 are valid
3 Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager
4 Awards are issued for all CW, all Phone, and mixed modes
5 The fee for the Award is 10 IRC (postal orders, stamps or cash are not acceptable)
6 The address for application is: QSL Manager, HARTS Post Box 541, Hong Kong.

Requirements: Stations require confirmed contacts with six different VS6 stations.

4X4 — 16 AWARD

1 The award is available to licensed amateurs
2 Contacts with the State of Israel only are valid
3 Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager
4 The fee for the award is ten IRCs
5 The address for applications is: Israel Amateur Radio Club, Post Box 4099, Tel Aviv, Israel.

Requirements: Confirmed contacts are required with 16 stations in Israel with four bands represented.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

THIRD TIME IN A ROW FOR VK5SU

Results of the 1973-4 Ross Hull VHF-UHF Memorial Contest

Trophy winner. **VK5SU J. W. K. Adams**
48 Hour certificate. **VK3ZAZ S. R. Gregory**
Detailed scores. First column 7 day.
Second column 48 hour.

SECTION (A) TRANSMITTING OPEN		
VK2BHO	3665	1222
2ZAM	—	1250
2HZ	608	406
VK3VF	375	181
VK4QO	5110	1620
4FH	2495	930
VK5SU	7300	2535
SECTION (B) TRANSMITTING PHONE		
VK1MP	2655	—
1VP	2565	1205
1DA	1795	860
VK2ATQ	799	431
2BMX	717	275
2YAV	582	300
2ZCT/T	382	156
2ZVJ	210	100
2DC	—	941
VK3ZAZ	6000	2211
3AOT	4638	2189
3AKC	4278	1372
3ASQ	3558	1575
3ASV	2662	911
3YFL	2052	884
3ZBB	1821	763
3BFG/T	1594	551
3ANP	1460	655
3ZGP	1274	527
3ZNQ	1402	687
3AUQ	1136	395
3BMD	1028	—
VK3ZYO	1001	480
3ZIM	check	
VK4ZAM	2479	775
4ZDI	1205	615
4ZTL	905	785
4ZRG	480	160
4ZGR	125	61
4PJ	check	
VK5ZWW	5332	2100
5ZMM	590	255
5LP	462	210
5BW	71	60
VK6ZJD	3265	1611
6ZGZ	860	650
6ZDG	110	95
6WG	—	1710
6QR	105	75
VK7ZAH	4998	2180
7ZAZ	2020	895
7ZGJ	617	353
7AX/T	34	—
SECTION (C) TRANSMITTING CW		
VK3KX	332	189

SECTION (D) RECEIVING
J. M. Hilliard 1745
Also
ZL1QI — 100 contacts
ZL2AID — 90 contacts

NOTES ON THE ROSS HULL VHF-UHF MEMORIAL CONTEST 1973-1974

Congratulations Kerry on another fine win with Stephen VK3ZAZ and Wally VK5ZWW running well in second and third place. Ivan VK4QO, VK7AH and Bob VK3AOT put up excellent performances. Kerry used 6 metres almost exclusively.

Thanks for all the comments which indicated that the contest was great DX-wise and very friendly. As one operator commented "Just like the RD contest".

Stephen VK3ZAZ, had the surnames of each of his contacts listed on his log. Again I say, if you have time to exchange names, try and do so . . . .everyone improves on acquaintance. I received 12 comments on the distance scoring table metric conversion and there were some very constructive comments which will help in setting up next years table.

This year it was made quite clear, by a great majority of those who commented on times, that we should be GMT wholly . . . i.e. start and finish on GMT days as well as use GMT.

Kerry VK5SU went to some trouble with his comments and I quote afew of them.

"CW, AM, SSB, and FM modes were again used, mainly SSB.

The trend is interesting. Of my 1008 contacts the modes received were as follows.

	1972/3	1973/4	
SSB	52%	70%	More SSB
FM	30%	24.5%	Too many on 52.525
AM	17.9%	5.4%	
CW	.05%	.08%	

Contacts made		Different stations worked	
1971/2.	445	1971/2	156
1972/3	602	1972/3	196
1739/4	1008	1973/4	252

Among Kerry's other constructive comments was a table indicating that the proportion of full to limited licencees who made contacts in the contest is changing from 1-2 to nearly 1-1. Thanks OM.

Bob, VK3AOT provided the most constructive suggestions on the metric distance scoring table, and "It has been a thoroughly enjoyable contest with more activity, more competition and better operating standards than last year . . . "

Ron, VK3AKC, one of the few who logged 1296 MH,z suggests that 2300MHz be double 1296MHz.

A few stations logged 432MHz and a few more 144MHz but the great mass of contacts was on 6 metres.

With 6 metres the primary band, doubtless some of the capital city station ops were at a disadvantage.

I did not receive any comment on the two contact per day rule so presumably everyone was happy? Yes, one comment in favour. Two ops mentioned that SSB stations often did not reply to AM stations.

As far as CW is concerned with but one entrant should we continue with CW as a section (c)?

There were seven logs in the open section (a) with not a great number of contacts.

You will note that two New Zealanders also enjoyed the contest.

LOG RETURN

I thought that we would have done a lot better this year. Instead of two logs to eleven who joined in last year we have two to ten who joined in this year.

As one of the contestants commented "nearly everyone knows how the other fellow is going in the contest and if he has not a show of winning any section of the contest then it is not worthwhile him submitting a log."

Should we be satisfied with 30% improvement this year? 16 logs.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

Many people in the northern parts would be recovering from flooding at the time of the contest.

I hope that many can see the virtue of being able to operate without mains power. Doubtless you will read of the assistance given by some VK4 amateurs in the flood disaster and realise that after all the "impossible" can happen and you and your field outfit may be worth many lives. Many Brisbane people now accept that the disaster could have been much worse . . . but next time the disaster may be "what", in whose area?

Don't say it can't happen to you.

So far quite a few logs to hand but too soon to tell how we are progressing. I squeezed in a couple of hours and thought the going good, though I only made 40 metres and 20 metre contacts.

15 metres was too poor for me but I heard VK5SR laboriously extracting numbers from reluctant Japanese stations. VK8DA was the highest scorer I heard.

CONTEST CALENDAR

April 6th-7th VHF Space net
April 6th-7th SP DX CW Contest
April 7th WAB LF phone Contest (1.8, 3.5, 7MHz)
April 12th-14th Novice QSO party, Contact W& K novices
April 14th WAB LF CW Contest. (1.8, 3.5, 7MHz)
April 20th-21st WAEDC RTTY Contest
April 20th-21st Bermuda phone Contest
April 27th-28th PACC DX Contest
April 27th-28th HELVETIA 22 Contest
May 4th-5th Bermuda CW Contest
May 11th World Telecommunication CW
May 18th World Telecommunication phone

SP DX CW CONTEST

1500 GMT Saturday April 6th to 2400 GMT Sunday April 7th.

The world working SP's 3.5 thru 28MHz.

Single OP; single and all band. Multi-op all band. SWL's also. Send usual RST and receive RST plus letters (powiat letter.) Each SP QSO 3 points with multiplier for each powiat. (Once only). Separate sheet for each band, summary sheet and declaration. Mailing deadline May 1st. PZK Contest Committee, [illegible] Warszawa, 1, Poland.

NOVICE QSO PARTY

1800 GMT Friday April 12th to 0600 GMT Sunday April 14th. USA Novice bands. 3.700-3.750, 7.100-7.150, 21.100-21.200, 28.100-28.200. Logs to Andi Anderson,WB9FGM, RR 3, Box 85-26, Belvidere, Ill. 61008.

WAB WORKED ALL BRITAIN

These are 12 hour contests from 0900 GMT to 2100 GMT.

Exchange RS/RST and QSO number. UK stations will give country and WAB area number as well.

Each contact worth 5 points. Multiplier is the number of different UK areas worked, counted once only.

Certificates to leading stations in each VK call areas.

Logs to J. E. Hodgins, G3EJF, Bridge House, Hunton, Bedale, Yorks, England.

PACC DX CONTEST

1200 GMT Saturday 27th April to Sunday 1800 GMT April 29th. 1.8 thru 28MHz. CW and phone. One contact per band per station. Either CW or phone, for QSO and multiplier credit (CW only on 160). Usual RS (T) and serial. Mulitplier is by provinces worked on each band. There are 12.

Final score-total QSO points X sum of provinces from all bands, max 72. Certificates to top scorers in each country and call areas (VKs). Summary sheet, name and address in blocks and declaration.

Logs to L. V. D. Nadort, PA0LOU, Contest Manager, Bespolderstraat, 15, Nieuwerkerk, a/d Ussel, The Netherlands.

HELVETIA 22 CONTEST (22 Swiss Cantons, There is a H22 Certificate)

1500 GMT Saturday 27th April to Sunday 28th 1700 GMT. 1.8 thru 28MHz. The same station may be worked on each band and mode for QSO and multiplier credit.

Usual RST. Swiss stations will include their Canton.

Cantons are—AG, AR, BE, BS, FR, GE, GL, GR, LU, NE, NW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH.

Each QSO counts 3 points. The multiplier is the sum of Cantons worked on each band, a possible 22 on each band.

Final score is QSO points by sum of Cantons from all bands. Mail log within 30 days to USKA Traffic Manager, HB9AHA, Im Moos, 5707 Seengen, Switzerland.

PROPOSED AUSTRALIAN AND WORLD WIDE MOBILE CONTEST

Suggested Rules

1. Contacts may be made mobile to mobile or mobile to fixed station on any Amateur band. Cross band operation not permitted.
2. Contacts may be phone, CW or cross mode.
3. Contacts may be made with stations inside or outside the operator's country.
4. Where a mobile station passes into another country the station is deemed to have started a new log.
5. Contacts may not be made between fixed stations.
6. No Beams or fixed aerials may be used by mobile stations.
7. All mobile stations entering the contest must operate from the normal vehicle electrical supply.
8. Contest is confirmed to land mobile stations.
9. Signal reports and serial number starting from 001 and progressing one for each contact must be exchanged.
10. The scoring shall be as follows: Mobile to fixed station in the same country . . . 1 point.
11. Mobile to mobile station in the same country . . . 3 points.
12. Mobile to fixed station in another country . . . 5 points.
13. Mobile to mobile station in another country . . . 10 points.
14. Mobile stations to multiply points scored . . . by kilometers travelled during the contest . . . divided by the number of operators. (That is a good one Syd.)
15. Contest will run for 24 hours from 1000 Z on 23rd December to 1000 Z on 24th Deecmber. (That will be cold for the northern hemisphere operators??)
16. All entries to include complete description of gear used together with map of route taken during contest.
17. Check sheets will be included with all contest logs and must be signed by two amateurs.
18. Mileage indicated on speedometer before and after the contest must also be included.
19. It is not necessary to travel from point A to point B at a high speed. One of course may circulate locally to develop one's mileage.
20. Only one contact per station per band is permitted.

Send your comments to Syd VK2SG . . . I can suggest several alterations and amendments and will be in touch with Syd who provided these suggested rules.

I trust that you enjoyed the CQ WW WPX SSB contest?

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233

Times: GMT

VK0	52.160	VK0RSG Macquarie Island.
VK0	53.100	VK0MA Mawson.
VK0	53.200	VK0GR Casey.
VK2	52.450	VK2WI Sydney.
VK2	144.600	VK2WI Sydney.
VK3	144.700	VK3RTG Vermont.
VK4	52.600	VK4W1-2 Townsville.
VK4	144.400	VK4W1-2 Mt Mowbullan.
VK5	53.000	VK5VF Mt Lofty.
VK5	144.800	VK5VF Mt Lofty.
VK6	52.006	VK6VF Bickley.
VK6	52.350	VK6RTU Kalgoorlie.
VK6	52.900	VK6RTT Carnarvon.
VK6	144.500	VK6RTW Albany.
VK7	144.900	VK7RTX Devonport.
VK8	52.200	VK8VF Darwin.
VK9	52.001	VK9GA Goroka.
ZL1	145.100	ZL1VHF Auckland.
ZL2	145.200	ZL2VHF Wellington.
ZL2	145.250	ZL2VHP Palmerston North.
ZL3	145.300	ZL3VHF Christchurch.
ZL4	145.400	ZL4VHF Dunedin.
JA	52.500	JA1IGY Tokyo.

There have been no reported changes this month to the various call signs and operating frequencies of the beacons.

GENERAL NEWS

Noted from the pages of "Q.R.M." (Launceston) that during the last Ross Hull Contest Kevin VK7ZAH managed to work Ron VK3AKC twice a day on quite a few occasions on 52, 144, 432 and 1296 MHz. This is quite an achievement. Daniel VK7ZDA is now operational on 144, 432 and 1296 MHz and probably has that 6 foot dish erected in the front garden.

ON THE SUBJECT OF NETS

On the subject of net operation, this page has tried at all times to steer a sensible course, and in line with this policy the following letter should be of interest to ALL VHF OPERATORS and I suggest you read it. It was first published in January, 1974 "**6 UP**" and comes under the heading of "LETTERS"

With regard to the FM nets and repeaters, and sensible attitudes towards that sort of operation, here's a letter that gets it all together—and makes a great deal of sense . . .

"Dear Sir, May I suggest a series of articles (in 6 UP) on how to technically move away from the nets, i.e. easy steps. Might I also suggest that a few people could re-think their "hard-line" attitudes towards the nets with an article along the following lines:- 'Don't Knock the Nets; or What Net Doesn't Need a Net Channel?'

The nets gave me —

(1) A chance to learn. With no radio background it's a formidable task to get the "feel" of the business.

(2) A chance to get to know the locals. You haven't got 40m. if you've got a Z call.

(3) Some contact with good construction practice. Mobile, ex-commercial gear is rugged and a good example to start from — granted that those with experience may be able to do better, but someone attempting to follow commercial practice will probably finish up better off than struggling on alone.

(4) A place to learn when things are working. i.e. If you are familiar with things and how they sound, an open circuit coax connector won't be a major problem and you will learn to recognise when a receiver is working O.K. I count harmonics on a cheap signal generator at 6 and 2 metres with a standard antenna — a very handy reference.

(5) A place to learn about antennas and demonstrates the benefits of a properly built one — also the effectiveness of good quality coax etc. Instal good coax and really hear the difference.

(6) Finally, the nets give a chance to find and get to know the locals when moving QTH. Amateurs are not always THAT social. If amateurs are not part of a group, or unified in some way, then no real technical progress can be made.

The real problem as I see it, is not the nets per se, but staying on the nets. One suggestion is for the more technically advanced to come on the nets and talk about other activities and areas and ways and means of making the change.

Perhaps a list of phone numbers and call signs of people interested in helping etc. could be published — this has obvious problems as no one wants every nut calling etc. But people who have recently built something are usually keen to talk about it for awhile. Listing the callsigns of newcomers to 6, 2 and 70cm SSB who are prepared to talk might also be a good thing. 73. Gordon Woolston, ex-VK2YC, soon VK4??"

Well, what about it?

I regret it has not been possible to present much in the way of news this time. Without making too much in the way of excuses, I must say that two nights of school each week (Colour TV Service Course) plus an hour of homework each night of the week, exams for same once a month, isn't exactly conducive to getting on the bands and hunting up information. No one has written with anything fresh this time, so that's about it. You may have to grin and bear such a situation from time to time throughout this year until the service course finishes at the end of the year. I will do the best I can under the circumstances, but anyone who is really upset can quite willingly carry on in my place for the time being; it will give me a couple of extra nights a month to study!

Anyway chaps, in an effort to help me to help you for the time being, what about some regular correspondence of happenings of a national interest. Local gossip is not what we are looking for; anyway the Editor won't print it if I send it in! Thanking you in advance for any help you can give.

Closing with the thought for the month: "Love looks forward, hate looks back, anxiety has eyes all over its head."

CLUB/ZONE/DIVISION NEWS

- The Publications Committee wishes to advise that the call on AR for space to print material is so great it is not possible to include a section devoted to Divisional, Zone or Club news.
- Arrangements were made with all Divisions that such news would appear in Divisional Bulletins if so required, and accepted by Divisional Bulletin Editors. Bulletins, when submitted, are carried as inserts in AR mailed to members of the Division concerned.
- It has been agreed however that AR should include an Events Diary to contain **very brief details** of forthcoming events. Items for this Diary **MUST** reach the Editor not later than the 1st of the month prior to publication.

Y.R.S.
with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

From time to time I receive letters from State Supervisors informing me of the dearth of helpers; that there is a tendency for clubs to be started in schools, and the instructor (a teacher) is transferred to another school, and the club collapses, sometimes leaving valuable equipment idle. This is one of the penalities of such clubs and is an area for investigation on the part of YRCS. Another observation is that some clubs, whilst using our teaching notes and issuing our certificates, are not willing to accept the polity of the Scheme. It is my contention that all clubs using our curriculum and issuing our certificates are required to accept the constitution of YRCS. Further, examination of students, should at all times, be subject to, and under the supervision of an accredited YRCS official.

May I commend the kits being distributed by Dr. Bob Callander for VK3. As an exercise I have obtained several of these, and for experience in wiring, performance, etc. I can vouch that they really work.

Allan Dunn, S.A. State Supervisor, reports four new clubs this year, with the most successful School Club being the Sacred Heart YRC, and the best Non-school Club, the Adelaide YMCA Electronics Club. These clubs will be recommended for the IREE Pennant. Carl Minerds of St. Marys Boy Scouts YRC will receive the book prize donated each year by Philips Industries. Good work, Carl.

Ere this State Supervisors will have received from the Standardisation Committee, a copy of the amended syllabuses. It is recommended that the revised Elementary syllabus be used on a trial basis until August, following which it will be presented to the Supervisors Conference for assessment.

Of interest is the monthly circular sent to all S.A. club leaders by Allan Dunn, and I recommend that this be done by other supervisors. Club leaders may not acknowledge receipt of your communication, but, at least, you as a supervisor will have done your part in communicating!

20 Years Ago
with Ron Fisher VK3OM

April 1954.

Are Conventions necessary? This is the question posed by the Federal Executive in the April 1954 Editorial column. That year a convention was not held due to the decision of the Federal Council apparently somewhat against the thoughts of Federal Executive. One paragraph is worth repeating: "Your Federal Councillor has a very important task — keep him fully informed of your local problems; make him work all the year round; do not assume that he only comes to life when a Convention is held."

One of the great sagas of amateur radio was recalled by VK5PS. April 1954 saw the passing of K7UT Clyde de Vinna. During the winter of 1932 Clyde was working for MGM, filming in Alaska. While in contact with a ZL he was slowly overcome by carbon monoxide fumes. The ZL sensed trouble and contacted another station who was able to arrange a rescue party in the nick of time.

Technical articles for April included one of Hans Ruckert's famous papers. Short Wave Receiver Selectivity Problems and the Double Crystal filter as the answer. It was about this time that we were starting to discover that selectivity for phone reception was more than just a lot of IF transformers back to back. The ideal flat top response was not easy to achieve. Hans looked at the problem and made some good suggestions to overcome it.

The results of the 1953 VK-ZL DX contest give us an idea of just who the top DX men of the period were. VK2GW topped four sections, the open, 7MHz, 14MHz, and 21MHz. In the phone section VK4SF was outright winner in the open, 14 and 21MHz sections. Other high scorers included VK3XK, VK4RT, VK4KS and VK5MS. It seems that floods on the North Coast of New South Wales were a problem in 1953 as they have been this year. Amateurs were right up with things providing communications in and out of devastated areas. Bill Morore VK2HZ told the story of how they did it.

Hamads

- Eight lines free to all W.I.A. members.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- QTHR means that the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Tower. 5 x 10ft. sections bolted together—supplied with bolts, triangular latticed construction with 8 inch sides—no rust $80.
Hy-Gain 18AVT/WB, perfect condition with instruction book, 9 mths old, complete with radials $65.
Brand new coaxial cable—UR57 (75 ohm)— 65 yards. $40.
FTV-650 complete with all cords, converted for use with FT101, never used, $145. G. Stern, P.O. Box 330, Hurstville, 2220.

Heathkit SB610E Monitorscope, new condition $85 ONO.
Speech Processors model SSP-V1, imported. Solid state, 2IC's, 6RC's, 6Q's, $50, ONO.
J. Rooks, VK2BDD, 5/46 Fontainbleau Street, Sans Souci, N.S.W., 2219. Ph.: (02) 529-4356.

No. 10 XTL Calibrator $10. Signal generator, 0.150 to 30MHz, calibrated to 1uV, $25. **432MHz** converter $25. **Oscar** 10m preamp, $8. **AWA** BS50 FM base station, $50. **Courier** hi-band FM carphone, mostly transistorised. $80. Bob, VK3AOT, QTHR. Ph.: (03) 277-8295.

HR 10 Heath Rx 80-10 Ham bands only, S met. N.L. and 110 transformer as new $120.
TU5B tuning unit 7MHz VFO and P.A. tuning unit, 15" x 7" x 6" original. $20.
Acitron 3003 12V HD PSU with fitted cable for FT200, as new, $100.
Geloso VFO on 19" chassis and panel with PA cond. $15.
PI Coupler switched coil unit 80-10 unused $10.
Ceramic coil switch 3 sections each 3" x 4" for aerial tuner $4. Please add freight. VK3DS. QTHR

Inoue IC20 2 FM all channels inc. new RI and 4 $150.
Collins R390A RX as new $690.
Collins 51 x 2 aircraft Rx 108-151MHz, 5kHz increments with AC power supply and control box (new) $280.
Kleinschmidt TT4ATG teleprinter with ST6 TU $380.
Singer Metrics Pan adaptor—cum-analyser 455kHz input, one new $300. One used $200.
Ph.: (03) 435-8319.

Yaesu FTDX-400 transceiver and spare final tubes, incl. blower. Very good condition.$385. ONO Gerry Bahre, VK4YB. QTHR. Ph.: (072) 84-4334.

FT101 Transceiver. Includes cooling fan and CW filter $480 or best offer. Ph.: (03) 459-6445 after 5 p.m. weekdays.

Pye Ranger Transceiver, commercial high band, 10 Watts, $35. ONO. Telephone: (03) 467-2131 bus hrs.

2-AWA MR3a Carphones, 3/12 PA, 3 channel units 2 Mx "A & C"—6Mx "A & B" crystals. Units modified as repeaters for WICEN use with control box, connections, 1 Mic, & circuits.
Can be used as originally designed or remote controlled & channel switched.
(Less remote control equipment). $60.
2-Portable folding beam aerials, 2 Mx-4 el.—6Mx-3 el. V or H mount, with 2-15' masts ex 122 equipment, with guy ropes pegs and bag. $10.
VK3EM. QTHR. Ph.: (03) 58-7745.

Antenna System, Top performance, comprising telescopic 42' mast supporting new Ham M rotator with control cable, and new 203BA 20 metre beam with quality co-ax: G5RV with customised ATU, 160, 80, 40, and 20 metres; 5/8 wave 2 metre ground plane with co-ax. Moving QTH—must sell—$330 ONO. VK3ARZ, QTHR. Telephone: 232-9492.

WANTED

Circuit diagram of domestic Rx Reliance Skyraider Model 85. Buy or borrow for copying. VK2AZA, 2/871. Ph.: (02) 668-5471. AH 412-3305.

TH6DXX or TH3 JNR or similar HF triband beam. Offers to G. Lee-Manwar, VK4ZML. QTHR. Ph.: (072) 56-3807.

Commercial Minibeam new or used. Qth not suitable other beams. FT101B and mobile 3-band whip antenna, good price paid. Ph.: (02) 939-7215. VK2BBD, 11/92 Soldiers Avenue, Harbord, 2096.

BC348 J, N or Q 4 gang tuning condenser or cannibalised set.. VK2AAJ. QTHR. Ph.: (02) 48-4721

Info, CCT on AWA Superhet comm. RX 2-IC6770 will copy pay costs, etc. S. Dogger, 71 Lonsdale Berowra Heights, 2082.

Copies of QST 1970—74 price plus freight paid. VK3KE. QTHR

Silent Keys

G. H. BAMFORD, VK2AGB
N. R. WATKINS, VK2APE
R. M. MORRIS, VK5UI

OBITUARY

W2CC — K1CC

Scores of Australian hams who operate CW will be saddened at the passing of Al Scarlett K1CC (ex W2CC) on 22 January, 1974. Al, who was active for upwards of 40 years was a disciple of anything and everything Australian. He was a gentle man and a gentleman, and visited Australia in 1963. He maintained weekly CW schedules with the late VK5HG, the late VK3HL, VK2OJ, VK5BO, VK3XB and the writer, for periods ranging up to 43 years, his QSO tallies with the abovementioned stations ranging from 500 to 1300. His home at Scarsdale NY and later in Englewood Florida was always open to visiting VK hams.

Ray Jones VK3RJ

THE "40 AND OVERS" STRIKE AGAIN!!!

At the suggestion of Bob Cunningham, VK3ML, a dinner was held in the Science Club of the Institution of Radio and Electronic Engineers in Melbourne on Monday 25th February, 1974. This dinner was a get-together of VK3 hams who had held a licence for 40 years and over. This was a most successful evening and voted by all who attended as being one of the best nights at which they had been present for many years.

The guest speaker on this occasion was Alan Butement, VK3AD who has been residing in Australia since about 1956 and prior to that had been G6TM. Alan Butement gave a very enjoyable reminiscence of the early days of radio from the UK in the era of the initial contacts of G-land to Z (ZL) and A (VK) areas. Alan carefully outlined the trials and tribulations of manufacturing equipment and antenna systems in these early days. He quoted from the official records of the RSGB the initial contacts with New Zealand and Australia to which the meeting listened with much excitement and interest.

The address in reply was given by Max Howden now VK3BQ who, as we all know, was one of the original amateurs to contact Europe and the United States as far back as 1923.

It was a most exciting and interesting evening, interspersed with remarks by the 38 hams who attended the dinner, not only with details of their early days in amateur radio, but with highlights which had occurred up to the present time.

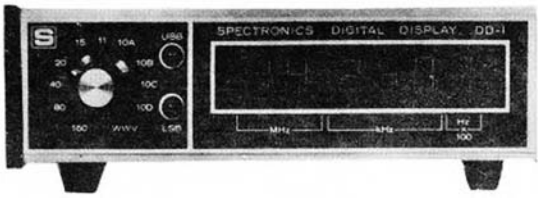
No actual record was kept of the attendances but they did include Vaughan Marshall VK3UK, Ray Ohrbom VK3OC, "Snow" Campbell VK3MR, Chris Rainbow VK3JR, Geoff Frew VK3PM, Bruce Mann VK3BM, Geoffrey Thompson VK3AC (formerly VK3GT), Gavin Douglass VK3YK and George Glover VK3AG. Because no official record was kept of the attendances it is regretted that a complete list is not available for publication.

Respects were paid to the many early day amateurs in all the States including many famous names and callsigns such as Chas MacLurcan VK2CM, Harold Cox VK1GU (formerly VK3BD), Ross Hull, Wally Coxen and many others.

For the sake of posterity and the history of amateur radio in Australia, a recording was made of the talk by VK3AD and VK3BQ which we hope will be filed in the Archives of the Wireless Institute of Australia.

SIDEBAND ELECTRONICS ENGINEERING

For YAESU MUSEN FT-101 and FT-101B, 560 and 401 users, a digital frequency read-out counter, made for the YAESU sets but coming from the U.S.A., plugs straight into the transceivers and reads the operating frequency to 100 Hertz measures 8" wide, 3" high and 7" deep with clear LED digits, **$180**



YAESU MUSEN TRANSCEIVERS

Prices quoted are with by-law import duties exemption, subject to an expected price-increase in Japan. Firm order must be accompanied with minimum 50% deposit, 3 photo-copies of the amateur station licence for the by-law application, average delay in delivery 6 weeks.

FT 101 B AC/DC 160 to 10 M and fan **$525**
FT DX 401 AC supply built-in **$475**
FT/FP 200, but in very short supply **$350**
FL 2100 linear amplifiers **$375**
YC 355 D frequency counter, up to 200MHz, only **$250**
FT 101/101B & FT DX 400/560 CW filters **$30**
FT DX 400/560 noise blankers, **$20**
FT 101 (older models) conversion kits **$50**
FT 101 (older models) 160 M kits **$15**

144-148MHz Two Metre Equipment

CLEGG FM 27-B 25 Watt output 145-147MHz transceivers, independant continuous receiver and transmitter tuning, with by-law import duties exemption only **$350**

BELCOM Liner 2 20W SSB PEP 12V DC solid state transceivers **$250**

KEN PRODUCTS KP-202 hand--held 2W output FM transceivers **$150**
KCP-2 NICAD battery chargers & 10 NICAD batteries **$35**

KLM ELECTRONICS solid state 12V DC linear amplifier, 12 Watt output with 1 to 2 Watt drive, ideal for the KEN KP-202, with automatic antenna-change-over when driven **$50**

YAGI ANTENNAS 9 element 10 ft. boom, with gamma match coax feed **$30**

MIDLAND PRODUCTS

SWR Meters, 52 ohm impedance, twin-meter type **$16**
same SWR Meters, single-meter type FSM **$12**
PTT hand-held microphones 50K dynamic **$10**
5 Watt CB 23 channel 12V DC operation AM solid state transceivers, complete with crystals for all channels, ideal for future novice licensees. PTT microphone included **$95**
5 Watt AM 15 Watt PEP SSB CB 23 channel transceivers, same comments **$175**

PONY CB TRANSCEIVERS

Model CB-74 5 Watt AM 6 channel capacity 12V DC with microphone **$80**
Model CB-78 5 Watt AM 23 channels, with microphone and all crystals, 12V DC **$95**

BARLOW-WADLEY RECEIVERS

Model XCR-30 Mark 2 portable crystal controlled communications receivers, cannot get enough of them from South Africa, when available **$225**

HY-GAIN ANTENNAS & TRANSCEIVERS

14 AVQ 10 to 40 M Verticals, no guys, 19' tall, needs lots of radials **$45**
18 AVT 10 to 80 M verticals, no guys, 23' tall also needs lots of radials **$65**
TH 3 JR 10/15/20 M junior 3 el. Yagi, 12' boom 20 lbs weight **$100**
TH 3 Mk 3 10/15/20 M senior 3 el. Yagi, 14' boom 40 lbs weight 1 KW **$145**
TH6DXX 10/15/20 M senior 6 el. Yagi 24' boom 60 lbs weight, 1KW **$175**
204 BA 20 M mono-band 4 el. full size Yagi 26' boom called the TIGER Array and it is a TIGER! **$150**
DB 10-15 10/15 M 3 el. Yagi ideal for use above the 204 BA 25 lbs. **$110**
Mobile Whip 108MHz up, with magnetic hold base, 18' RGG-58U cable and coax plug **$18**
Mobile Whip, standard base, 12' coax cable & plug **$9**
BN-86 baluns for beam buyers only **$18**
Locally made balun **$15**
HY-GAIN SSB/AM CB 23 channel transceivers, 5 Watt AM 15 Watt PEP SSB, all channel crystals provided, ANL and noise blanker, PTT mike, 12V DC use RF output and S-Meter, with provision for external receiver VFO control **$200**

ANTENNA ROTATORS

CDR AR 22R **$40**
HAM-M **$130**
HY-GAIN model 400 roto-brake, **$190**
All with control/indicator units
New surplus 8 core control cable, $0.25 per yard.

NOISE BRIDGES

Omega TE 01 up to 100MHz **$25**

EGG INSULATORS the old style porcelain eggs, a dozen for **$1.50**

POWER OUTPUT METERS

Galaxy RF-550A with 6 position coax switch **$75**
Swan WM-1500 4 metering ranges 5 to 1500 W **$50**

POWER SUPPLIES, 240V AC to 12V DC 3 to 3.5 Amp. regulated output overload protected **$26**

ELECTRONIC KEYERS Katsumi model EK 105 A 230V AC with key paddle **$35**

ASAHI AS-303 A set of 5 mobile whips, complete with swivel mount, spring, base section, the lot for **$80**

All prices quoted are net, cash with orders, basis Springwood, N.S.W. Sales tax included in all cases, prices subject to changes without prior notice. Sorry, no terms nor credit or COD, only cash and carry. Government orders same conditions!
Include $0.50 per $100.—value for all-risk insurance. Freight, postage and carriage are all extras.!
Arie Bles, Proprietor.

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TELEPHONE (STD 047) 51-1394

amateur radio

MAY, 1974

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

Model TE-22D

SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8
12 AT7, 6Z4
Power Source: 105-125, 220-240V AC. 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
Printed Circuit for uniform Characteristics.
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

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The popular REALISTIC DX150B which has gone from strength to strength with amateurs, short-wave and broadcast listeners alike, now has a further improvement. A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells if current fails or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product-detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical band-spread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

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GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz. Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes
- Product Detector for SSB/CW
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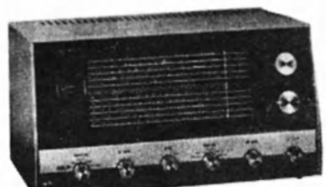
- Continuous Electricai Bandspread Calibrated 80-100M Amateur Bands
- Variable BFO, Automatic Noise Limiter.
- Speaker Impedance: 4 to 16 ohms.



Price $215.00
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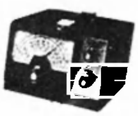
Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration facility: $210.00. 100kHz Xtal Extra $10.75. P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402



This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

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Ericaion Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. $19.50 Tested. p&p 75c
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Plastic Type. Standard PMK type. Manufactured by L. M. Ericson. As new tested. All phones fitted with standard phone plug and socket. $17.50. p & p 75c
Double Phone Plug, 6.5mm 75c
Standard 2 Circuit Phone Plug PMG Type 30c
PMG Type Counters, 4 digit, 48 Volt operation 50c
PMG Type Telephone Plug & Socket, round type. PMG Type Phone Plug & Socket, standard Ericson Type White Plastic 95c per pair
PMG Type Telephone Extension Bells, 48V $2.00
230 Volt RVB Horn Tested $7.50

TRIO 3" OSCILLISCOPE DC — 1.5 MHz MODEL CO-1303A

SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
3. All solid state construction for compact, lightweight portability.
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
5. Direct input to 150MHz for SSB and AM transmission monitoring.

Price $150. p & p $2.00

LARGE QUANTITIES of hard to get valves, transformers, semi-conductors & components, dural tubing, cables multicore & coaxial, connecting leads Cannon type & miniature, telephone parts, teleprinter units, all types of panel meters new & used, test equipment, multimeters, signal generators, oscilloscopes, power supplies, standard racks and thousands of component parts, potentiometers, capacitors oil filled & electrolytic, high & low wattage resistors, transistor circuit boards, crystals.

Brand new valves and semiconductors

2N3055,	$1.30
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6SK7-ECH35-6K8G-5763	$3.00
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Coil Formers 1¼" diameter Octal base	40c

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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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TECHNICAL —

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DEPARTMENTS —

FRONT COVER

The new Headquarters for the Victorian Division, situated at 412 Brunswick Street, Fitzroy. The Division paid $68,000 for the building and intends spending about $10,000 on library, workshop and lecture theatre facilities.

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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: 24-8652.**

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P.O. Box 150, Toorak, Vic., 3142

DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI
First broadcast scheduled for Sunday 21st April and thereafter same day and time:
10.00Z 3595 kHz
7146 kHz
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI
11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.866 MHz AM
145.13 MHz AM
Hunter Branch Mondays 19.00h 80m.

VK3WI
10.30 local time Sundays.
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI
09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch B FM. BC officer VK4HB.

VK5WI
23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambler on 2m

VK6WI
09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM

VK7
09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

HIGH STABILITY VFO PLUS!
PHASE LOCKED SYNTHESIZER!!

50MHz TRANSCEIVER IC-501
VHF SSB 10W

FEATURES:
- 50-54MHz
- SSB, AM, CW
- 10 WATTS P.E.P.
- USB. LSB. AM. CW
- XTAL FILTERS FOR AM AND CW
- VFO OPERATION WITH XTAL STABILITY USING PLL TECHNIQUE
- RECEIVER SENSITIVITY
  A3, Ødbμ (S+N) /N 10db
  A3J, A1. —6dbu (S+N) /N 10db
  NOTE: Ødb = 1uV
- 4 XTAL CHANNELS AVAILABLE
- SIZE 111 x 230 x 260 mm, 5.1 kg WEIGHT

PRICE $398

Plug-in Power Supply AC
EXTRA $35

ALL PRICES INCLUDE FREIGHT AND S.T.

COMING SOON! IC201 2m SSB TRANSCEIVER!

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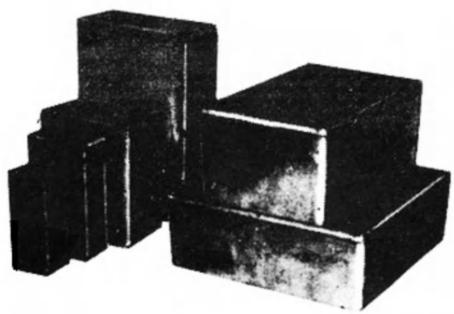

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6357/P 7½"L x 4½"W x 3"D
7134/P 4½"L x 2½"W x 1"D
6827/P 7½"L x 4"W x 2"D
7970/P 7⅜"L x 7⅜"W x 2²¹⁄₃₂"D

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ECONOMICAL SSB! *from YAESU*

FT-200 FIVE-BAND TRANSCEIVER

GENERAL DESCRIPTION

A superb quality, low cost, versatile transceiver. Covers 80-10 mx, tuning range 500 Kc. each band. On 10 mx, crystal supplied for 28.5-29 Mc. (Crystals available optional extra for full 10 mx coverage.) SSB, CW, AM; with a speech peak input of 300w. Transistorised VFO, voltage regulator, and calibrator. 16 valves, 12 diodes, 6 transistors. PA two 6JS6A pentodes. ALC, AGC, ANL, PTT and VOX. Calibrated metering for PA cathode current, relative power output, and receiver S units. Offset tuning ±5 Kc. Uses a 9 Mc. crystal filter with bandwidth of 2.3 Kc. at —6 db. Selectable sidebands.

Provision for use of optional external VFO, FV-200 VFO includes fixed channel facility.

Operates from conservatively rated separate 230 volt 50 c.p.s. AC power supply, FP-200, which includes built-in speaker. Transceiver incorporates power take-off and low level R.F. drive outlets suitable for transverters.

Cabinet finished in communication grey lacquer. Panel, etched, satin finish aluminium.

TECHNICAL DATA

( ) OPTION

MODE OF OPERATION:	SSB(A3J), PHONE(A3H), CW.
FREQUENCY RANGE:	3.5~4.0, 7.0~7.5, 14.0~14.5, 21.0~21.5, (28.0~28.5), 28.5~29.0, (29.0~29.5), (29.5~30.0 MHz)
FREQUENCY STABILITY:	AFTER WARM-UP, 100 CPS/30 MIN.
SPURIOUS RESPONSE:	BETTER THAN −40 db
ANTENNA IMPEDANCE:	50~100Ω UNBALANCED
CARRIER SUPPRESSION:	BETTER THAN −40 db
SIDE BAND SUPPRESSION:	−50 db AT 1000 CPS
3 RD HARMONIC INTERMODULATION DISTORTION:	−30 db (P.E.P)
TRANSMISSION BANDWIDTH:	3 KHz
RECEIVE SENSITIVITY:	0.5μV S/N 10 db
FILTER SELECTIVITY:	2.3KHz (−6 db) 4 KHz (−60db)
I.F. MIXING BEATS:	50 db DOWN
IMAGE INTERFERENCE:	50 db DOWN
AGC CHARACTERISTIC:	AMPLIFIED AGC
RECEIVER OUTPUT POWER:	1 W (AT 10% DISTORTION)
WEIGHT:	17.6 LBS
DIMENSIONS:	13 ½" wide, 5 ½" high, 11" deep.

Price including Sales Tax, excluding freight

FT-200 - $331.00
FY-200 - $115.00
FP-200 - $90.00

Prices and specifications subject to change

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QSP

FEDERAL CONVENTION

The 38th Federal Convention held in Sydney during the Easter holidays is now a talking point.

Every Convention earns a nickname. This one was the Procedural Convention.

A brand new Division was admitted into the WIA — the WIA ACT Division Inc. The VK1 Division is now a reality. This event did generate considerable constitutional discussions.

However, this Convention also decided that surprises should be the order of the day.

The Victorian Division withdrew en bloc on a procedural tangle. The Secretary resigned and walked out.

Both returned thanks to good sense and diplomatic moves.

Without a VK3 Division the Institute would certainly appear peculiar to say the least. If the Secretary goes, get another.

Traumatic? But doesn't this indicate our slip shows on so many occasions? The NSW Division voting last September becoming a damp squib thanks to the good sense of members was another example. But can the Institute withstand too many doses of brinkmanship?

The view of Lake Burley Griffin from 10 000m whilst flying back from Sydney somehow highlighted the intense commercialism surrounding us and the intrusion of politics into our lives.

Is it necessary for any of us in amateur radio to ape the antics of politicians or the power games of commerce? An observer at the Convention could well have thought this even though the intent was not there.

The Convention was essential — make no mistake about this. Where in it all can be found the help that each member hopes to be at hand when needed. Probably in better understanding, better administration, better appreciation of common problems.

Amateur radio as such did not receive attention in great depth because other matters pre-occupied the time available. Finances, budgets and inflation however were closely examined.

The element necessary to cover the costs of AR, IARU representation and the continuance of the central Executive office in 1975 was raised by $2,60 with the greatest reluctance from the present $7.20 p.a. All Councillors fully understood the implications which will reflect upon the annual subscriptions payable. But the facts of life cannot be swept under the carpet.

Whatever the outcome, the WIA is here to serve the members. The Executive will continue to serve the members of the Institute, Australia-wide, to the best of the ability of each amateur elected to the Executive.

Amateur radio is a wonderful leisure activity — it deserves the very best effort by everyone.

D. A. Wardlaw Federal President

VICTORIAN DIVISION

Correspondence received by the Executive Office still shows that many members do not distinguish between the WIA (i.e. Executive) and the WIA Victorian Division. Mail arrives at one office but in reality refers to matters within the others' jurisdiction. The offices are several miles apart. In the absence of any regular courier service between the two any incorrectly addressed mail must therefore be re-directed. This causes delays apart from involving the Institute in extra costs in postage and time. The following are the main items dealt with by the Executive Office —

- Amateur Radio
- Call Book (except incorrect listings)
- Magpubs
- WIA Subscriptions processing (but not changes in amounts and not new members)
- WIA EDP membership records, changes of address and the like.

Please do not include Victorian Division matters in letters (etc.) referring to Executive matters.

EXECUTIVE OFFICE

Because of the operation of 'flexihours' and staffing difficulties the Executives' Office in Toorak will not normally be manned before about 10.30 a.m. on working days. If any member has any occasion to telephone the office it would be best if this could be done in the afternoons. Members in Victoria are specially requested to ensure that calls to the office should be confined to matters dealing with Executive affairs (such as Amateur Radio, Magpubs, etc.). Matters of a Divisional nature (such as components, membership, classes, meetings, etc.) should of course be referred to the Victorian Division.

BREAK-IN

From 1st July 1974 the annual subscription to NZART's journal 'Break-In' will be $4.20 when purchased through Magpubs. Subscribers to this service who pay or have paid before 1st July will naturally continue at the old rate.

NEW PREFIXES

Radio Communications, Feb. '74, quotes ITU as having allocated the following call sign series —

P2A-P2Z Papua New Guinea.
S6A-S6Z Rep. of Singapore.

DELAYS TO CORRESPONDENCE

The Executive office has been severely inundated with subscriptions processing and other pressing matters since mid-November. For periods there was also an absence of typing and clerical assistance. During March the office was heavily engaged in dealing with pre-Convention material. Consequently there have been some delays in answering correspondence and any member so affected is requested to be as patient as possible although in most instances any requested action was done on receipt of the letter concerned.

POLLUTION

"The electromagnetic garbage which devastated our 20-metre band during the summer and early fall (complex signals every 4 kHz) was finally cleared up after an unprecedented amount of diplomatic and administrative pressure had been brought to bear by the United States and Canada. Most of what was heard in North America originated in Cuba, but our friends in Europe had similar interference coming from at least one station in the USSR. The amount of time and energy devoted to this problem by the W and VE administrations was indeed gratifying." QST, Jan. '74.

SSB BROADCASTING

Pat Hawker (G3VA) writes in Radio Communications for Feb. '73 in his Technical Topics Column, "From time to time we have referred to the work going on in various parts of Europe in an effort to develop domestic receivers which would be suitable for either SSB or AM broadcasting. Most of these systems use synchronous (product) detection either by the use of phase-locked loops or the reconstitution of a phase-coherent carrier from the incoming signal. While I feel that widespread use of SSB broadcasting is still some way away, there is no doubt that some very interesting techniques are emerging from this work. One of his (GW3XNU) contributions represents an independent development of the huff-and-puff type of oscillator stabilisation as a means of overcoming the problem of expecting broadcast listeners to tune to SSB signals (for music this needs to be an accuracy of about 2 to 5 Hz compared with the 50 Hz which is about adequate for speech communication)."

ITU CONVENTION

The IARU Region 1 News for Dec. '73 reports as under on the recent ITU Conference.

"The Plenipotentiary Conference of the International Telecommunication Union met for six weeks (from 14 September to 25 October) at Malaga-Torremolinas (Spain) and ended with the signing of the new International Telecommunication Convention by the representatives of 132 ITU Member countries.

The Conference, which is the supreme organ of the Union was convened to consider and revise the Union's basic document the Convention, drawn up by the previous Plenipotentiary Conference held in Montreux, Switzerland, in 1965, and to decide whether the new document should take the form of a convention, as hitherto, or that of a Constitutional Charter.

The Conference, attended by 655 delegates from 132 countries, finally decided to retain the Convention form, dividing it into two parts: the Basic Provisions containing articles of a permanent nature; and the General Regulations, containing the rules governing the functioning of the various organs of the Union.

The Convention will come into force on 1st January, 1975."

STOP PRESS

Customs Department Canberra advise Amateur Transceivers up to and including 29.7 MHz are included in Consolidated By-Laws from 1st April 1974, as duty-free in their own right. Ref.: CG72/78684.

EXECUTIVE MEMBERS 1974

The Convention elected the following: Dr. D. A. Wardlaw VK3ADW, Surg.-Capt. S. J. Llyod VK3CDR, Messrs. J. J. Martin VK3TY, D. H. V. Rankin VK3QV, K. V. Roget VK3YQ and P. A. Wolfenden VK3ZPA. The Secretary, P. B. Dodd VK3CIF, continues in office.

1973 Murray River Red Cross Marathon

Roly Roper
C/o PO Box 150, Toorak, 3142

On Wednesday 26th December 1973, the WIA commenced its second involvement with the Red Cross in the staging of the Murray River Marathon.

Over thirty operators with more than ten vehicles slogged it out for five days, working their way from Yarrawonga to Swan Hill along the river.

This WICN exercise is probably the toughest and most realistic yet devised with real traffic (concerning the safety of real people) being passed continuously through the long days. The toll on people and equipment was heavy — but the amateur spirit was abundant; whatever went wrong was fixed and whoever was ill was nursed back to health by the kind efforts of the Red Cross First Aiders .

Each day a complex net was set up on 80m SSB and 2FM (1 and/or B) consisting of net control, five or six riverside stations at checkpoints, up to seven boats on the river, a relay group, two medical evacuation vehicles (Medivacs) and a forward reconnaisance party. 10M SSB was used for a few hours to find its effectiveness in the flat terrain.

The willing assistance of the Land Rover Owners Club (LROC) was essential as the area (particularly the Barmah Forest) had been recently flooded leaving many tracks impassable and the heavy rain on day 4 only made the situation worse.

On more than one occasion LROC members rescued WICEN teams whose enthusiasm and dedication caused them to take on tracks that were better left to four wheel drive vehicles.

"Botalism" (Morrie VK3BMD) showed an admirable sense of 'espirit de corps' by putting on his WIA tee-shirt on Boxing day and refusing to remove it until New Years Day.

After Bob VK3BMA came down with a stomach wog, most operators opted for tinned supplies rather than drink the water and a new Q code was coined "QBB" (which is perhaps better left undefined here).

Those present included:

VK3s AVJ, ZRG, BMD, ZZU, TX, YQ, BGY (and wife), AUI, ROLY ROPER, ZKO, ZCO, ZAZ, YGK, ZLP, YGY, ZSQ, ZCX, ZMM, (CAPTn)OR, YJM (YJ What his name?) SS, ZJS, YCQ, AUR, YHJ, JOHN COX, VK, YBM, YJE, NEIL MATCHEN, AYL and "locals" 2ZEO (who dropped down from Deniliquin) REX 3VL, **Beekeeper** GEORGE 3AGM and wife, BRUCE 3BM and visitors BAF and WW, all of whose assistance both on and off air was greatly appreciated.

ROBERT VK3AVJ with his mobile rig, complete with "heat sink".

On the lighter side, the group sponsored one of the First Aiders, Barbara Taczanowski in the Queen of the Marathon Quest and she repaid our confidence in her by winning.

The exercise was organised by RAY VK3ZRG and KEITH VK3YCQ, who were assisted by "Captn" John VK3OR.

LEFT. Barbara Taczanowski, of the Queen of the Marathon Contest.

MARTIN VK3YJM (YJ what's his name?) with Ken hand-held unit.

Operating in recently flooded country took on a new dimension with the Queensland floods and any person who thinks WICEN is not needed need only glance at the latest copy of APO News, ". . . an estimated 35,000 telephone services in the state were out of order at one time as a result of flooding, . . ." and at Ipswich exchange, ". . . traffic levels were running as high as three times more than the system could handle."

Anybody interested in joining in WICEN activities should contact Keith VK3YCQ, Ray VK3ZRG, or drop a note to PO Box 63, Kew 3101. ●

RIGHT. Keith VK3YCQ Dean (Key Section) VK3TX brass pounding in the van of Robert VK3AVJ, and VK3ZCX.

experiments in modulation and audio part three

J. A. Adcock, VK3ACA
P.O. Box 106, Preston, 3072

This month the third part of this series is presented. It describes the rarely used fourth method of generating SSB.

GENERATING OF SSBSC BY THE FOURTH METHOD, System 4

This method and variants of it have been called the fourth method. There is already a third method. This method is a development of the method of generating DSBSC described in system 1. It consists of first generating the frequency component of the SSB signal and then impressing the amplitude component of the signal on it. This is done in a class "C" final.

For a single side band signal let $A \sin \Theta_1$ be the audio wave form where A is the amplitude component and $\Theta_1 = 2 \pi f1\ t$. Let $B \sin \Theta_2$ be the RF wave form where B is the RF amplitude and $\Theta_2 = 2 \pi f2\ t$. $A \cos \Theta_1$ and $B \cos \Theta_2$ is the above RF wave-form when shifted 90 degrees. A and f_1 are variable whereas B and f2 are fixed for a particular case.

The general expression for SSB from the phasing method is given by:

$A \sin \Theta_1 . B \sin \Theta_2 + A \cos \Theta_1 . B \cos \Theta_2$ (5)

From the identity:

$a \cos \Theta + b \sin \Theta = \sqrt{a^2 + b^2} \cos (\Theta + a)$ we get:

$AB\sqrt{(\sin^2\Theta_1 + \cos^2\Theta_1)}.\cos (\Theta_2 + \Theta_1)$ (6)

The left hand side of the product is only audio and represents the envelope of the wave. The right hand side is only RF and by itself represents the frequency component of the side-band, with the amplitude removed. On the left hand side, B is a constant and can be removed, so we have envelope:

$$= A\sqrt{\sin^2 \Theta_1 + \cos^2 \Theta_1}$$
$$= \sqrt{(A \sin \Theta_1)^2 + (A \cos \Theta_1)^2}$$

which is the expression for the amplitude curve given in equation (4). If the expression for an SSB signal, equation (6) is divided by the envelope wave form, equation (4), we are left with RF with no amplitude variation. Similarly if the audio wave form is divided by the envelope wave form we get audio without amplitude variation — thus $\frac{A \sin \Theta_1}{A} = \sin \Theta_1$.

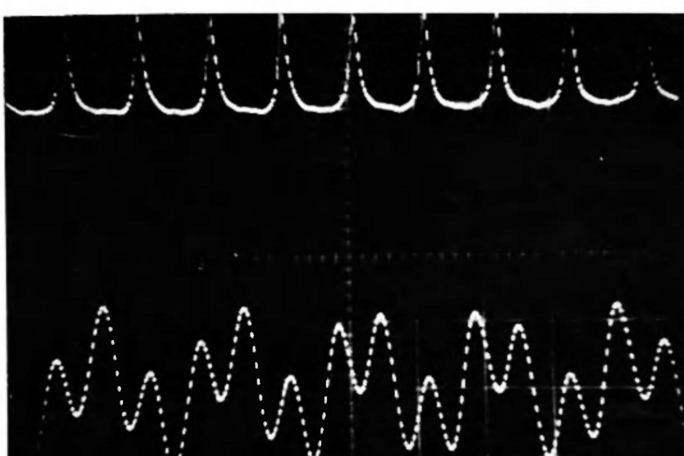
This is the basis of system 5 to be described briefly later in part 4 of the series.

Using the equations $\frac{A \sin \Theta_1}{A} = \sin \Theta_1$ and $\frac{A \cos \Theta_1}{A} = \cos \Theta_1$ in the phasing system, sideband can be produced without amplitude variation. That is by substituting the above into equation (6) we get $\cos (\Theta_2 + \Theta_1)$ only. Since this signal is without amplitude variation, it can be generated in an early stage of the transmitter and amplified by class C stages. The amplitude (or envelope) wave form "A" derived from equation (4) can be used to high level modulate a class C final to produce the original side band signal of equation (6). Such a system is shown as a block diagram in fig. 9.

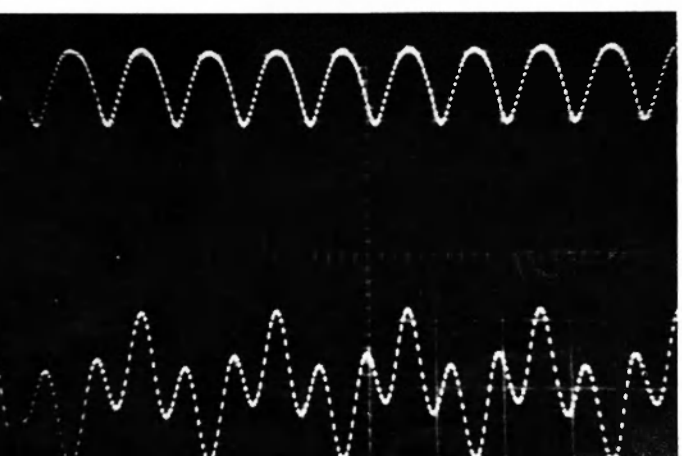
The system above has never been tried in that form. As described it is a complicated and difficult method of putting side band together. The chief disadvantage is that it would require a direct coupled series modulator for the amplitude component.

Can the above system be simplified? In the first place, since a fully clipped side band is most desirable, why put the amplitude on the signal at all?

(There is no evidence to support the desirability of a fully clipped sideband signal. Anyone who has attempted to use much more than 20dB of clipping, will realise that increases in average power are accompanied by increases in distortion. Eventually, although the signal is a little



PHOTOGRAPH 3.—ENVELOPE WAVEFORMS
Horizontal Scale. 1 division 1 ms. Upper Trace. Two tone audio input. Lower Trace. Envelope waveform produced by computer. This waveform corresponds to that defined in equation 4.



PHOTOGRAPH 4.—FREQUENCY DEVIATION WAVEFORMS
Horizontal Scale. 1 division 1 ms. Upper Trace. Two tone audio input. Lower Trace. Voltage proportion to frequency deviation as defined in equation 7.

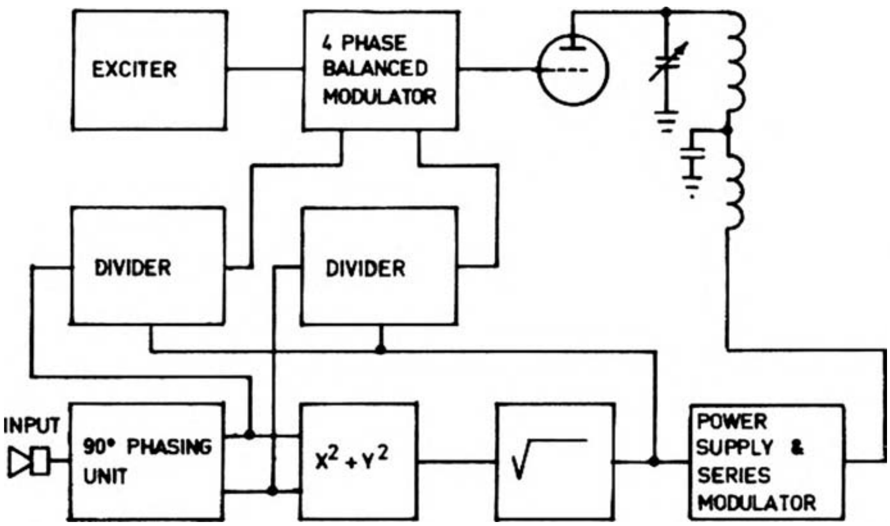


FIG 9 SSB MODULATOR FIRST VERSION DESCRIBED

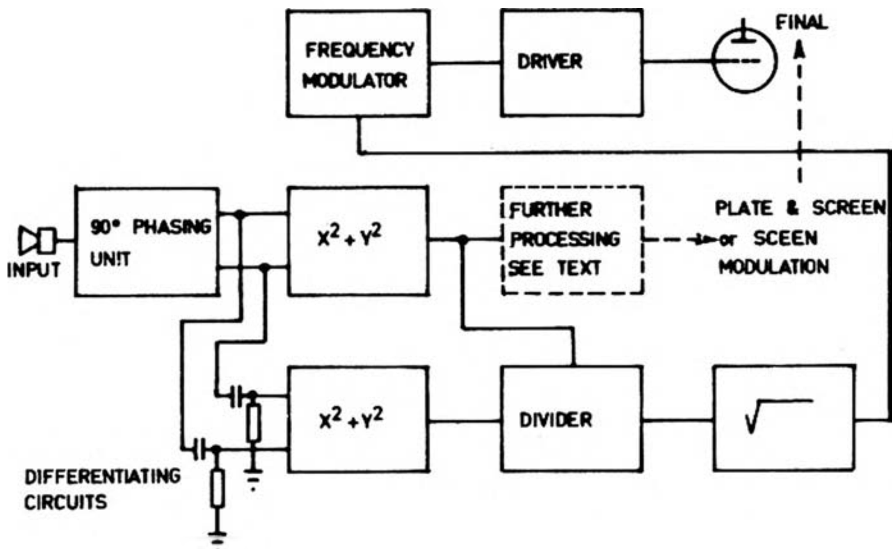


FIG 10 IMPROVED SSB GENERATOR

stronger, it is unintelligible. — Technical Editor.)

In the second place it is possible to derive the amplitude curve and impress it on the signal containing the frequency components. It is also possible to derive the frequency deviation curve and frequency modulate the oscillator with it.

The equation to produce the frequency deviation curve is shown thus:

Frequency deviation =

$$\sqrt{\frac{\left[\frac{d(A \sin \Theta)}{dt}\right]^2 + \left[\frac{d(A \cos \Theta)}{dt}\right]^2}{(A \sin \Theta)^2 + (A \cos \Theta)^2}} \quad \text{--- (7)}$$

At present no explanations or derivations are offered for this equation. A block diagram of the system is shown in fig. 10.

If a sine wave of varying frequency and amplitude is fed into the system of fig. 10, a DC voltage will appear at the output of the computer with value independent of amplitude, but proportional to frequency. If this signal is fed into a frequency modulator, it comes out as single sideband. (Without the amplitude variations of course. These must be added later. — Technical Editor.)

The amount of deviation used must match the frequency excursions in the original audio. Also, like most of the circuits described so far, the system must be DC coupled from the $X^2 + Y^2$ units to the frequency modulator. Note that the output from equation (7) will have one sign only, that is, it is a varying DC voltage.

It is suggested that some form of compressed amplitude modulation be used in the final so that a very much compressed amplitude of the original envelope is impressed on the final signal. The signal will now be cut off between sounds. The final result should sound like side band with RF clipping.

Very briefly a compressed amplitude curve could be obtained by the formula $\frac{A}{a + A}$ where a is a small constant value as compared with A peak. This is suggested by the dotted square on fig. 10. See also system 5 and equation (8).

To be concluded.

Afterthoughts

EXPERIMENTS IN MODULATION AND AUDIO — Part two

The symbol 0 is intended to be Theta. Equation 1 should have read:
$A \sin \theta \times A \cos \theta = \frac{1}{2} A^2 \sin 2\theta$
Equation 3 should have read:
$\pm\sqrt{A - A \cos \theta} = \sqrt{2}\, A \sin \frac{1}{2}\theta$
The $\sqrt{A}$ should appear before every $\sin \frac{1}{2} \theta$.

an AR special

WIA Submission to the Independent Enquiry into FM Broadcasting

In December last year the Federal Government announced the terms of reference for an Independent Enquiry into FM Broadcasting. The WIA, through the VHF Advisory Committee, prepared and presented submissions to the Enquiry with a twofold purpose. Firstly to present an argument that in the public interest the proposed FM BC service should be established in the generally accepted 88-108 MHz International FM band; and secondly to advance the standing of the WIA in the community.

The establishment of an FM broadcasting service has been considered by a number of enquiries over the years. These were held in 1941/42; 1957/58; 1971, and again in 1974. The first enquiries generally came out aginst FM, but in 1947 experimental stations were set up in Sydney and Melbourne, and later in Brisbane and Adelaide. In 1956 the TV service was established, and a 10-channel plan was used which kept the region 92-108 MHz free for use by FM if required. In 1959/60 the ABCB (after public hearings on TV licences) determined that 13 channels would be necessary for an adequate TV service. The Huxley Committee, on behalf of the PMG, allocated a number of new channels including those on 94-101 (Ch4) and 101-108 MHz (Ch5). This meant that virtually all the 88-108 MHz **international** FM band was lost to TV. At the 1971 enquiry, the ABCB decided that an FM service should be set up on UHF, either (preferably) between 470-510 MHz, or between 500-540 MHz. This was an unpopular decision in many circles, and when the Whitlam Government came to power it was decided to review the question once more.

Australian Amateurs are fortunate to have been given the opportunity to comment on that 1971 decision. Establishment of an FM service between 470-510 MHz would present a threat to our 420-450 MHz Amateur band. If that allocation were confirmed, the only direction for expansion of the 450-470 MHz land mobile band **would be downwards.** The 70 cm band is of great value to amateurs. It is the only band below 1 GHz which is wide enough to accommodate high definition TV and other broadband modes.

Any serious lopping from the top end to make room for commercial land mobile services would ruin it.

We are equally fortunate that our own interests in not wanting the FM BC service to be set up on UHF could be strongly argued as being in the public interest as well.

Much of the opposition by the public to providing a UHF FM service was inspired by financial motives, and many owners of imported FM receivers wanted a VHF band service. However, notwithstanding the volume of dissatisfaction with the ABCB 1971 recommendation, their justification has not received much technical criticism. The VHF Advisory Committee subjected the ABCB report (the "Red Book") and their Technical Report No. 34 (1973) to close examination, and found some flaws in the argument put forward for UHF. A detailed submission was prepared and presented to the new enquiry, the essence of which is given below.

The Institute submission put the proposition that an FM service could be set up in the **international** FM band with very little disruption to TV services. This could be done if FM stations were co-sited with local TV transmitters, and in those areas which have TV on channel 5 the FM transmitters should be on the channel 4 frequencies. Conversely, where channel 5 TV existed, the local FM transmitters could occupy channel 4.

This proposition was considered to some extent by the ABCB in their Technical Report No. 34 — "The sharing of TV channels". This is a very detailed document, and is generally opposed to the idea of channel sharing. However, in the view of the WIA, the report did not present a convincing case against the basic idea.

When our proposal was put forward within the Committee, TV channel allocations throughout the country were then examined to find, in particular, the distribution of TV channels 4 and 5. Following this, a map study quickly pinpointed the one main problem area:— Wollongong — Sydney — Newcastle, with overlapping service areas. Thus any high power FM station set up on Channel 5 in Wollongong could be expected to interfere with the pictures of those in the overlaping service area trying legitimately to watch Newcastle channel 5.

A number of other places had channel 4 and 5 in adjoining areas, but in these cases the TV service was derived from low power stations or translators, with limited service areas and no overlaps, so that co-siting of low power FM transmitters on unused channels would be practical.

It was proposed by the WIA that the NSW central coast problem could be overcome by changing the Newcastle channel 5 transmitter (an ABC station) to channel 6. This proposition was considered by the ABC in their 1971 enquiry into FM broadcasting. It was rejected because of adjacent channel and local oscillator interference problems which would prevent Newcastle viewers from watching channel 7 and 10 respectively from Sydney. The ABCB favoured channel 0 as the alternate channel for Newcastle channel 5 TV, but the WIA could not accept this proposal! The protection of the Sydney TV service for Newcastle viewers does not seem reasonable — no such consideration was given to Ballarat viewers who were trying to watch Melbourne's channel 7 when BTV6 was set up.

The WIA contended that if the above channel re-allocation was made, with some other minor adjustments it would be practical to establish an adequate FM service between 92 and 108 MHz throughout the country. The benefits of vertical polarisation for the FM service were pointed out. Mobile reception would be simplified, and mutual interference between TV and sound broadcasts would, in most areas, be made even less likely.

The proposals for co-channelling of FM and TV broadcasts put by the WIA have several advantages.

(a) The necessary spectrum space can be had at low cost. The cost of changing channels for a TV transmitter is not high, relatively speaking. Newcastle viewers upset by the change would hopefully regard the introduction of a quality sound broadcasting system as a reasonable compensation.

(b) The interests of international uniformity would be maintained — the unknown and probably high costs of Australia being the only country to establish an FM service on UHF would be avoided; and the million or so owners of standard FM receivers would form a solid audience for the new service from its inception.

(c) The threat to the 70 cm amateur band would be eased.

Co-siting FM and TV transmitters must

be beneficial to broadcasters for geographic and (where masts can be shared) economic grounds. In the latter case the visual pollution of very high masts cluttering the horizon would be held to a minimum.

The Institute recommended that the FM service be phased in over a number of years. The early establishment of UHF TV was advocated as a means of ultimately closing down all channel 4 and 5 TV transmitters (and by the way certain other channels — notably 0 and 5A — could be relocated to UHF with benefit to viewer and amateur alike). Arranging for the ultimate transfer of these stations to UHF would make the entire 92-108 MHz segment available for FM throughout the country, should it ever be required.

The WIA case was presented to the Enquiry on 5/2/74 by members of the VHF/UHF Advisory Committee. They were Technical Editor (for AR) Bill Rice VK3ABP, assisted by the Advisory Committee chairman, Peter Wolfenden, VK3ZPA. The main WIA case had previously been presented to the enquiry in writing, and the verbal submission mainly sought to clarify items by the written submission, and to comment on the ABCB Technical Report No. 34 (which document had Impressed the chairman, Sir Francis McLean, with its detail).

A number of interesting items arose at the Melbourne hearing, including:

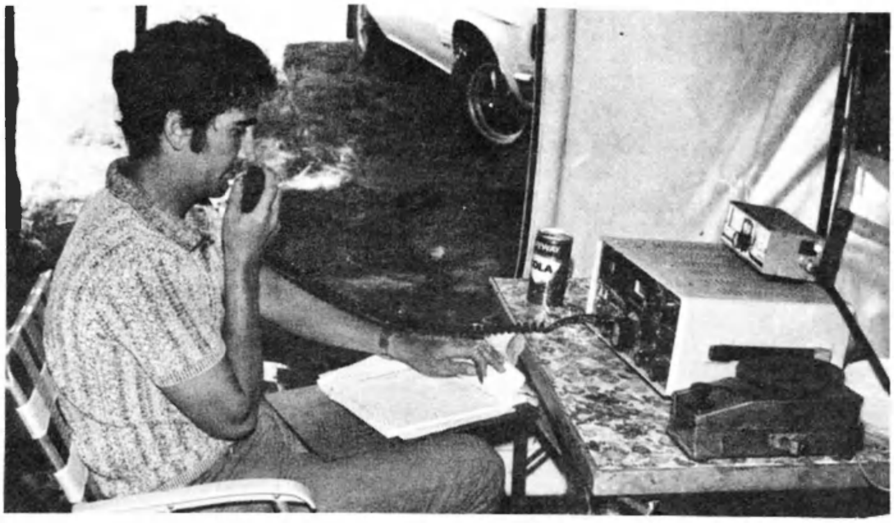
(a) That the probability of the FM service being established on VHF seemed high, as was the likelihood of the Department of Transport losing Its Distance Measuring Equipment (DME) allocation just above 200 MHz.
(b) The WIA submission was the only predominantly technical submission other than that of the Department of Transport, heard in Melbourne on that day.
(c) All those presenting submissions witnessed in Melbourne favoured VHF for the FM service.
(d) The land mobile "low-band" may well be moved to UHF, and the transfer of this service could itself pose a threat to our 70 cm band.

As this article was prepared, reports were just beginning to appear of the findings of the Enquiry. It is pleasing to note that the bulk of the WIA submission was accepted by the Enquiry — even to a recommendation being made on the early establishment of a UHF TV service. Of course, we have no way of knowing how significant our efforts were in achieving the final outcome, but there is satisfaction in having been on the "winning" side.

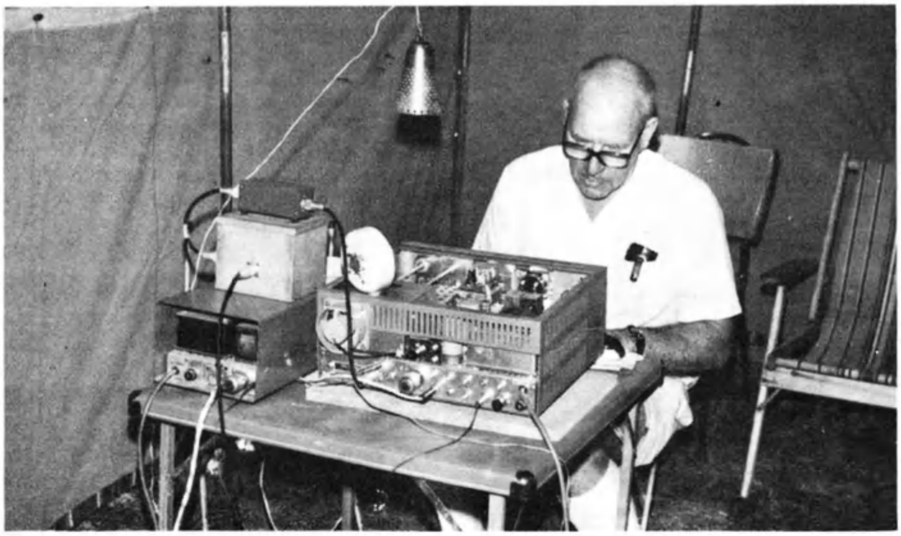
The Institute was thanked for having taken an active interest in the enquiry by a senior officer of the ABCB, even though the WIA had taken Issue with certain of their technical proposals. From this Incident it is apparent that the efforts of the Institute have also been worthwhile from the public relations point of view.

VK3ZDW

MOORABBIN DISTRICT CLUB ON FIELD DAY 1974 — VK3APC/P MOUNT MARTHA

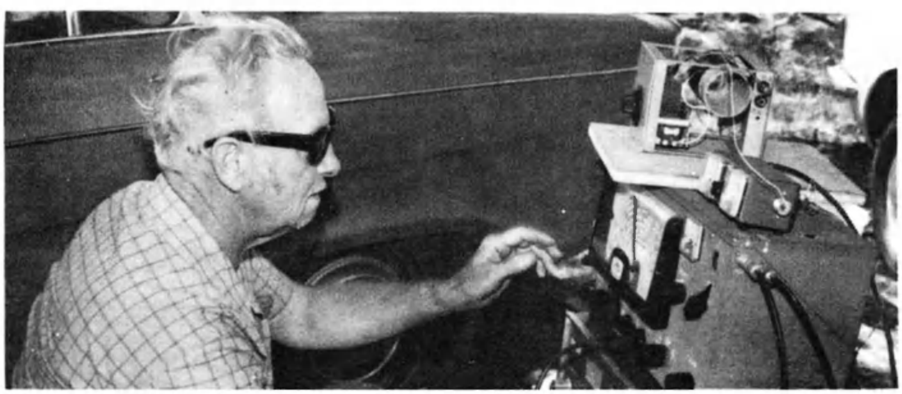


ABOVE: John VK3ANM, 80 and 10 metres.



ABOVE: Basil (the Brass Pounder) on 40 CW and Phone.

BELOW: Ray VK3BHL 160 metres CW and AM.



a Six Metre Transverter

MIKE TRICKETT, VK3ASQ
8 Matlock St., Herne Hill, Geelong, 3220

This is the Six-metre version of the transverter described in the December issue of AR. The two transverters plus an FT200 or similar transceiver make up a complete VHF SSB installation.

From the block diagram, it can be seen that the transmitter section consists of four stages, an oscillator at 24MHz, mixer stage, driver and PA stages. The unit described produces in excess of 60 watts RMS into a 50 ohm load, with full carrier or tone in. As with the two metre unit a few criteria were kept in mind utilisation of the FT200 low level output and power supply, 28MHz as the IF, eventual dual-band operation with 2 metres. This transverter was constructed on the same chassis as the 2 metre unit. A 4 pole change over switch on the front panel facilitates band change giving 6 and 2 metre operation with a minimum of fuss.

CIRCUIT DESCRIPTION:

The oscillator V1 produces 24MHz output. With this oscillator circuit, either a 12 or a 24MHz crystal can be used. The output has a double tuned circuit at 24MHz to minimise any 48MHz harmonic content. In the mixer stage the 24MHz and the 28MHz SSB, at about 1 watt PEP, are mixed. The resultant 52MHz signal appears at L4, and is then amplified by V3 and V4. Transmit-receive switching is accomplished by switching the bottom leg of the two voltage divider networks from the -100 volt rail. With the relay contacts as shown, the full -100 volts is applied to the grids of V3 and V4 thereby cutting them off. When the relay contacts change-over on "transmit" the operating biases appear at the grids, -18V for V3 and -35V for V4.

The receive converter used was a VK3 VHF Group 6 metre converter. This uses an MPF121 in the front end, and is most stable, producing good results. No modification to the oscillator stage was required to allow external oscillator injection. A small amount of the transverter oscillator injection is coupled off by L2. A length of co-ax feeds this straight into the crystal socket on the converter and the oscillator transistor simply operates as an emitter follower.

ALIGNMENT:

Dip all coils to frequency with a GDO, then switch the transceiver to TX position. Adjust VR1 to give -18 volts on the grids of V3 and check V4 bias as -35 volts. This should produce about 60mA of cathode current in V4.

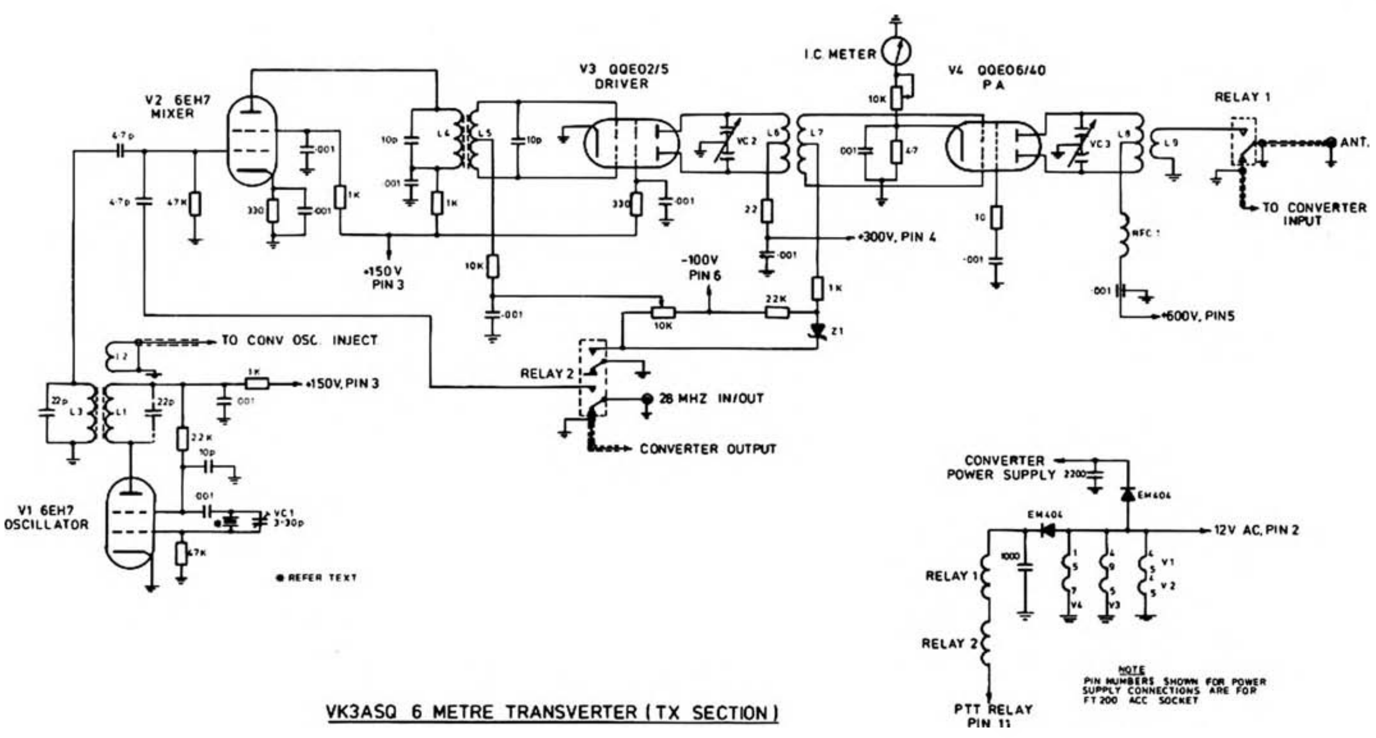
With an RF probe on the end of the co-ax from L2 adjust L1 for max and L3 for dip. With transceiver in tune position (full carrier or tone in) and absorption wavemeter near L4, peak L4 for max at 52MHz. L6 is then peaked in the same way. With a wattmeter connected to the antenna socket peak VC3, L8 and the coupling of L9 for max. Now re-peak and adjust coupling of all stages for max output. It may be necessary to reduce the carrier/tone level of the transceiver to avoid overdriving.

A word of warning—it is possible to tune the whole TX section up on the second harmonic of the oscillator i.e. 48MHz, if one is not careful. This is frowned upon as it could cause TVI to a certain TV channel! To avoid this, check each stage as it is tuned up, using the absorption wavemeter. Particular care should be taken with L4 and L5 tuning and coupling.

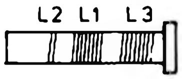
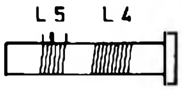
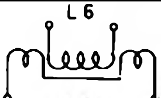
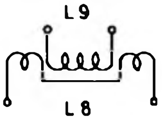
DUAL BAND OPERATION:

For dual band operation a 4 pole 2 position slide switch was mounted on the front panel. This was used to switch over the following connections: 12 volts to the receiving converters, 150 volts to the oscillator sections, 28MHz input-output and the transceiver PTT relay to either 6 or 2 metre relay coils. The converter outputs are wired in parallel. The 150 volts change over switch is also used to remove the 150V HT from the second half of the 12AT7 and the screen of the 12BY7 in the 2 metre oscillator section.

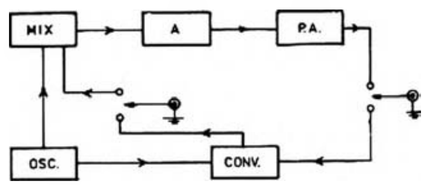
A common cathode current meter was used for both finals, with separate 10K trim-pots to each final cathode for meter calibration.

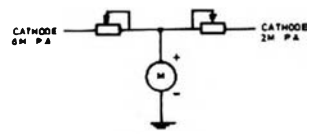


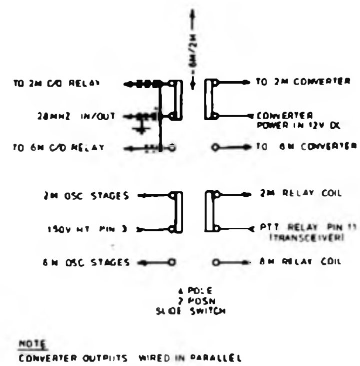
VK3ASQ 6 METRE TRANSVERTER (TX SECTION)

 L2 L1 L3	L1 - 14T 26 B&S CLOSE WOUND 5/16 IN. COIL FORM IN CAN, SLUG TUNED L3 - AS FOR L1 L2 - 2T 26 B&S CLOSE WOUND 5/16 IN. COIL FORM IN CAN L2 CONNECTED TO COAX LEAD & BROUGHT OUT THROUGH SIDE OF CAN
 L5 L4	L4-10T 22 B&S CLOSE WOUND 5/16 IN. COIL FORM IN CAN, SLUG TUNED L5-3+3T AS FOR L4 1/2 IN. SPACING BETWEEN
 L6 L7	L6-10T 20 B&S CLOSE WOUND 1/2 IN. DIAMETER L7-3+3T AS FOR L6
 L9 L8	L8 - 4+4T 16 B&S 1 IN. DIAMETER SPACED 1 TURN L9 - 3T 16 B&S 1 IN. DIAMETER WITH INSULATION

COIL WINDING DETAILS







INTERCONNECTIONS FOR DUAL BAND TRANSCEIVER OPERATION

a 5/8 wavelength Mobile Antenna

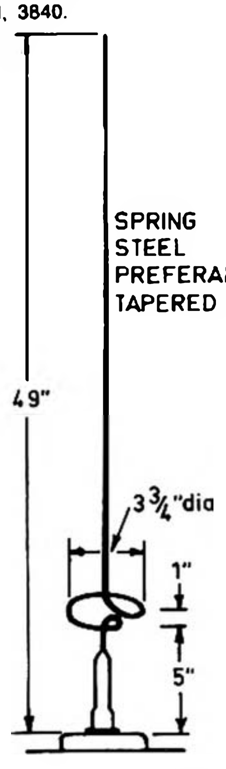
W. GEORGE FRANCIS, VK3ASV
31 Donald Street,
Morwell, 3840.

Here is an article showing a practical example of the 5/8 wave mobile aerial using a single turn bottom loaded coil suitable for 2 and 6 metre mobile net frequencies.

The original 5/8 wavelength mobile whip for the two metre FM net became popular around 1966 following an article in Amateur Radio, (1) which used a small base loaded multi-turn coil wound on a fibre glass rod or tubing which supported the vertical radiator in the form of a wire or braid, in turn covered over and protected by PVC tape or shrinkable plastic tubing.

The author studied mobile aerial design including research into overseas designs (2) extensively from 1954. During 1968 the idea of using a 5/8 wavelength mobile aerial with a subtle difference came to mind. The difference was in the base loading coil, which as in the original design tunes the aerial to .75 wavelength resonance.

It was felt this coil could act as a mechanical spring, should the aerial get knocked by a tree branch, service station roofs, etc. Stan VK3ZPL (3) experimented and developed such a prototype, superior to the simple ¼-wave whip and equal in performance to the original 5/8 idea. This new arangement was found also to have a very good match on 6 metres with near unity gain, acting as a base loaded ¼ wavelength whip on that band.



STANDARD VHF MOBILE AERIAL BASE AND FERRULE

Since the many Eastern Victorian and Melbourne amateurs have used this aerial with considerable success.

It is now commercially produced for U.S. amateurs. (4) For further technical information and polar diagrams refer to the recent article in Amateur Radio. (5)

The 5/8 whip can also be used with a ground plane on top of a tower and forms an excellent low angle base station aerial. (6). ●

REFERENCES —

1. "5/8 Wavelength Vertical for Two" AR July 1964.
2. "Vehicular Advanced design gain Antenna", Cat. 251-509 Communication Product Co. U.S.A. 1959. "5/8 Wavelength Whip for 164 & 174MHz", type RT, Associated Aerials Ltd., Kent, U.K., 1967.
3. now VK3BAB, G4BHN.
4. "6 and 2 metres antenna" Cat. No. 251-509.2.5db gain 2m., unity gain on 6 Phelps Dodge Communications Co. Advert. Page 12 CQ, June, 1970.
5. AR September, 1970 "5/8 Wavelength Verticals" by WA0NGV also CQ Magazine, May, 1970.
6. As used by VK3AJK, VK3BBB, VK3ADB & VK3ZUN

Multi-channel Switching for the Vinten MTR13

MORTON P. DAVIS, VK3ANG
9 Hillingdon Court, Dingley, 3172.

Here is a concise step-by-step procedure for producing your own 6 channel Vinten MTR13, MK2.

Having firstly obtained the parts listed, and secondly arranged for a free Saturday afternoon, clear a spot on the work-bench and follow the procedure below.

STEP 1—Re-location of Heat Sink on power supply side of chassis.

a Unsolder leads to transistor.
b Remove under chassis components as necessary to gain access to the bolts holding Heat Sink.
c Remove Heat Sink.
d Drill and tap two new 5/32" diameter holes in the Heat Sink so that it may be relocated on the existing mounting bolts and moved to the side of the chassis by ⅝".
e Mount Heat Sink in new location.
f Reconnect leads to transistor.

STEP 2—Modification of Switch.

a Replace ½" spacers with ¼" spacers.
b Remove excess of holding bolts and flatten the shaft.
c Do not reduce the length of the shaft at the front of the switch.

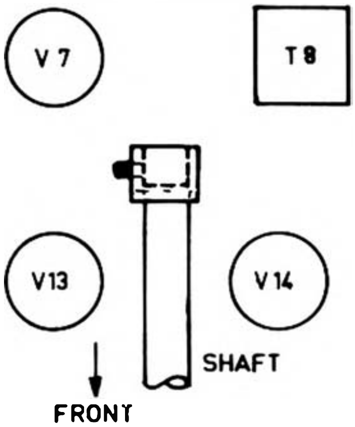


FIG 1

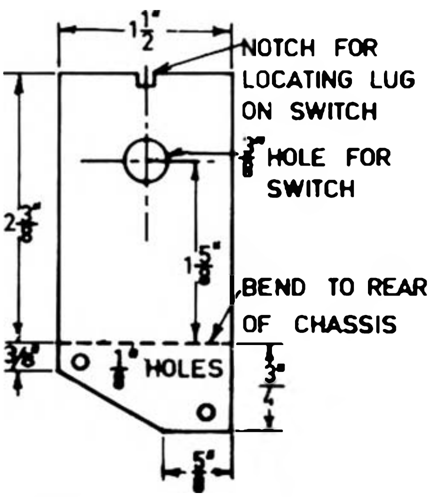


FIG 2

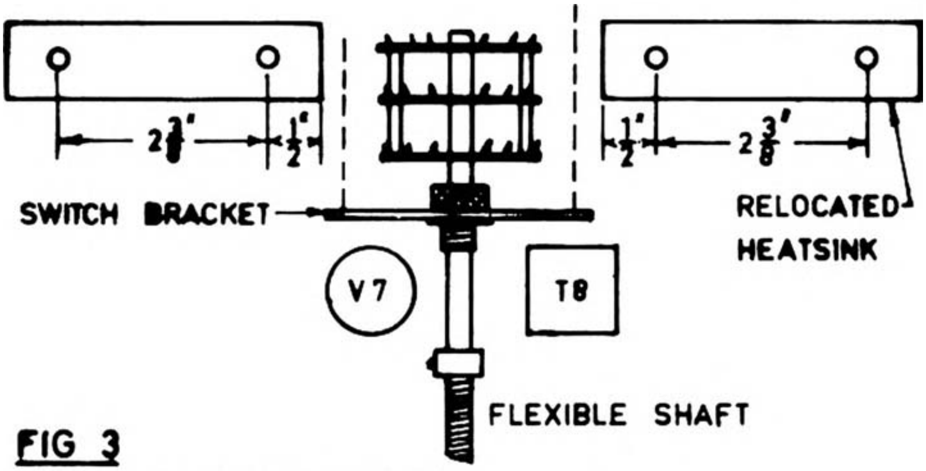


FIG 3

STEP 3—Relocation of Switch Shaft.

Locate flexible shaft so that the joiner lies between V13, V14, and V7, T8, as illustrated in Fig 10.

STEP 4—Manufacture of Bracket to Hold Switch.

a Only one bracket is required. Take the piece of aluminium sheet and mark out as shown in Fig 2.
b Cut out and file to size.
c Drill holes, cut notch and de-burr.
d Bend.

STEP 5——Mounting of Switch.

a Mount Switch on bracket and locate between Heat Sinks, with shaft in line with flexible shaft as close to V7, T8, as possible.
b Centre punch chassis as required to mount switch bracket.
c Remove under chassis components as necessary and drill two ⅛" diameter holes.
d Shorten switch shaft as necessary and join to flexible shaft.
e Mount bracket to chassis with ¼" x 6BA bolts, or ⅛" Whitworth bolts.
f Replace under chassis components.
g Fit bush to front panel and fit knob.

STEP 6—Modification to Heat Sinks.

a Drill two ⅛" diameter holes in the top of each Heat Sink as shown in Fig 3.
b Mount half inch tapped insulated spacers at each of these four holes with a ¼" 6BA bolt from underneath as shown in Fig 4.

STEP 7—Manufacture of bracket to hold trimmers.

a Mark out two brackets as shown in Fig 5. Note that some dimensions may require slight modification to suit particular crystal socket strips.
b Cut out and file to size.
c Drill holes and de-burr.

STEP 8—Mounting of crystals.

a Place bracket under socket strip with apron to front.
b Place both brackets on the spacers on the Heat Sinks.
c Fasten with ¼" x 6BA bolts.

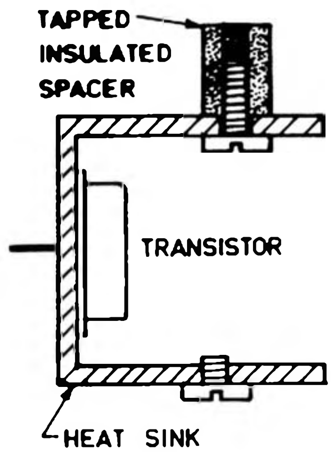


FIG 4

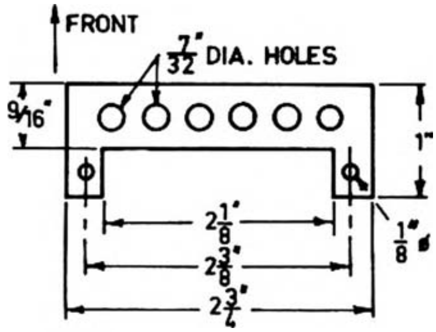


FIG 5

d Check clearance. The top of the crystals should be no higher than the power transformer. If necessary reduce height of spacers.

STEP 9—Mounting of Trimmers.

a Remove socket strip and trimmer brackets.

b Mount trimmer to bracket taking care not to fracture the ceramic.

c Make sure trimmers are bolted on tightly.

d Check that trimmers are clear of Heat Sinks and transistor lugs.

STEP 10—Wiring of new components.

a Wire sockets to switch.

b Wire trimmers to sockets.

c Receiver wiring crystal oscillator V4, will be as for X1 and C33, 6 times.

d Remove X1 socket and C33 trimmer from chassis. Fit a tag strip underneath to connect wiring and components removed from X1 and C33.

e Wire transmitter carrier oscillator, V13. This is as for X2 and trimmer C80, repeated six times.

f Remove X2 socket and trimmer C80 from chassis.

g Fit a tag strip underneath to connect wiring and components removed from X2 and C80.

STEP 11—Mounting of Crys!ai Assembly

a Mount assembly on the Heat Sinks.

b Earth both trimmer brackets to chassis.

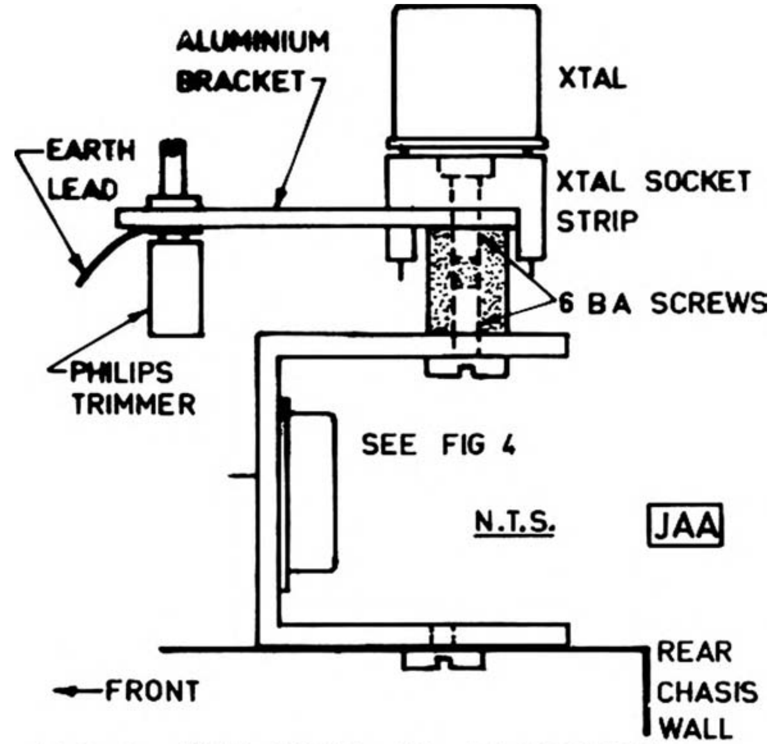


FIG 6 SIDE VIEW OF COMPLETED ASSEMBLY

STEP 12—Wiring of Channel Selector into Circuit.

a Connect switch to the tag strips as in 10D and F using the inner conductor of RG58 co-ax.

b Take these leads through the holes in the chassis that were occupied by X1 and X2 previously.

STEP 13—Alignment.

a Switch on your MTR13 MK2.

b Tune to frequency with trimmers.

PARTS REQUIRED

1 x Oak Switch MSP type F, AK 52267
1 section, 2 pole, 6 position.

1 x 8" Flexible shaft with panel bush to suit ¼" shaft.

2 x McMurdo Moulded Crystal Sockets—part number 998/P12/UG.

12 x Philips Ceramic Trimmers
part number COO4EA/12E 3-12PF.

4 x ½" Insulated Plastic Spacers. tapped for 6BA screws.

4 x 6BA x ½" Bolts.

6 x 6BA. ¼" Bolts.

2 x 6BA Nuts.

1 Piece of 16g aluminium for brackets, about four inches square.

2 x 3 Lug tag-strips.

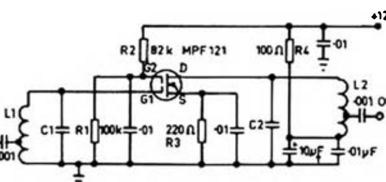
Pre-amplifier for 28 MHz

Reprint from GARC, Nov., 1972

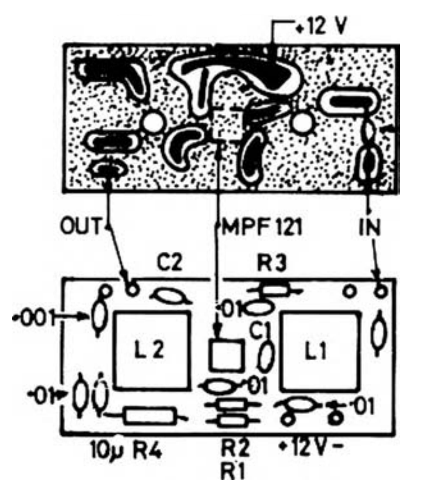
Values are given for the 28MHz band; however, by changing L1 & L2 to resonate at the desired frequency, the pre-amp can be made to improve the performance of any receiver on any band.

Suggested layout of PC board is shown actual size.

(If 5% components are used, the G2 bias values given are satisfactory. However, if R2 is increased to 100k, then resistors with 20% tolerance could be used. R3 may need to be adjusted to give a course current of 5mA. Technical Ed.).



L1 15 turns L2 18 turns
C1 47 pF C2 33 pF
L1 & L2 wound close spaced on neosid formers



A Linear Amplifier

STUART MILLIWICK, VK5MS
15 Acacia Street,
Mt Gambier, S. A. ,5290.
Reprinted from "SERG BLURB" (VK5 South East Radio Group, March, 1973).

The author, during the last ten years or so, has used a number of different conventional linear amplifiers in various modes but, for simplicity, he desired an amplifier with only one HT supply, no screen dropping resistors or bias supplies, and using pentode or tetrode tubes. Here is the result.

Looking through the various handbooks and magazines, several types of amplifiers which would fit into this category were seen. The type selected was a circuit designed by G2DAF. The amplifier makes use of two diode rectifiers in a voltage doubler circuit to supply positive screen voltage. This arrangement gives about twice the screen voltage for the same RF drive, as could be provided by a single diode.

The charging capacitors used in the circuit present a low impedance to RF but a high impedance to audio frequencies. This means that the screen voltage is obtained from the rectified RF input signal and should always be in accordance with and directly proportional to the amplitude of the modulating signal. As the screen voltage goes from zero in a positive direction at the modulating frequency, the plate current will rise and fall similarly.

The G2DAF amplifier permits zero bias operation with pentode or tetrode tubes like 813, QB3/300, 4/125, 4/250, 4/400, 4/1000 etc. (All these except 4/1000 have been tried by the author).

During the course of checking, testing and operating this amplifier, a number of small kinks were encountered. The amplifier is tuned and loaded like a conventional amplifier, taking manufacturer's figures for AB1 or AB2 as guides.

Check for parasitics or instability in the usual manner. If an oscilloscope is not available, the loading should be adjusted to about 20% of the off-resonance plate current value with screen current at the manufacturer's specifications. The old rule to observe with linears still applies here, **When in doubt, load heavily.**

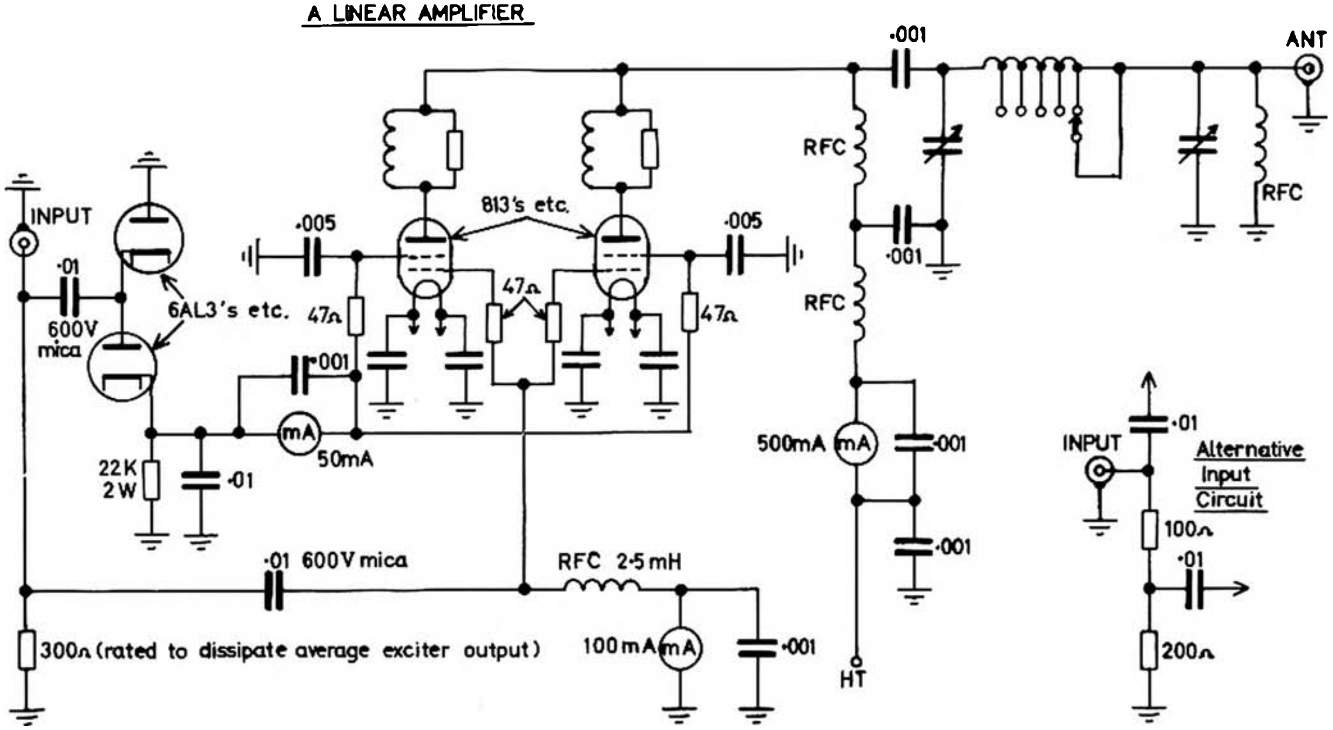
The exciter used was a Drake T4XB, the output of which is swamped by a 300 ohm resistor. Using some of the tubes listed it was found necessary to tap the control grid down this resistor to reduce the control grid voltage. The 22K resistor is the screen grid load, and must not be omitted.

6AL3's were used for rectifiers but any types suitable for RF are OK. Point contact diodes can be used but they must have adequate ratings.

After making many checks with amateurs from all over the world regarding quality and bandwidth, reports were good and bandwidth in comparison to an AB1 amplifier was better, but it was found much more difficult not to overdrive the AB1 amp.

Several G stations mentioned that some amateurs who had tried the G2DAF amplifier had some problems with TVI, but in the author's case it was found that the harmonic output was low and no TVI has been reported over the four years this amplifier has been in use at VK5MS. ●

A LINEAR AMPLIFIER



a Solid State Front End

I. W. COWAN, VK3ZDW
31 Daly Road, Murrumbeena, 3163.
(Reprinted from the Victorian VHFER, July 1972.)

Every VHF operator needs a tuneable IF. Thanks to the many IC's available IF and audio sections are easy to build. The unit described here is a high performance front end for your favourite IF strip.

Shown in Fig 1 is the circuit of the front end unit which I use in my tunable IF and which feeds a slightly modified EA240 solid state IF strip. The unit tunes 9.0-11.2MHz. Its image rejection is reasonable and the gain is sufficient to operate the EA240 noise blanker from a WIA 2 metre FET converter.

Frequency coverage and dial linearity are dependent on oscillator circuit and tuning gang. The oscillator is a Colpitts type chosen for best stability and low "birdie" generation. However, this has a fairly large permanent shunt capacitance. To obtain a reasonably linear dial scale, a gang with a circular profile is used as a square-law gang would result in cramping at the low frequency end. The gang used is a high quality 3 gang double spaced unit which was available from a source in Lonsdale Street, Melbourne. Its maximum capacity is around 15pf per section.

I spent some time fiddling with the oscillator to make sure it was free from drift, pulling, and "birdies". Oscillation is not violent, but it is completely reliable, and stability is quite good enough for easy SSB copy. The oscillator buffer serves two purposes—firstly, to permit an appropriate injection level to be set for the mixer, and secondly, to isolate the oscillator from the RF and mixer stages and preven "pulling".

AGC is applied to the RF stage by means of a JFET in the source. I tried feeding AGC to the AGC gate but this was difficult using the negative-going AGC from the EA240 IF. The MPF102 works quite well in this application.

The front end unit is built up on a "U" shaped aluminium bracket. The oscillator is on one side, coils, gang and RF FET are in the centre, while the mixer is on the other side. The coils associated with the RF stage input and output are separated by a few inches and are mutually perpendicular. The RF FET is mounted directly on the gang and all by passing associated with this stage is returned to one point on the gang.

Tuned windings are all 25 turns of 30 B & S close wound on 5/16th slug-tuned formers. Primary windings have 2 turns and 5 turns for input and RF coils respectively.

Tune-up is simple. First the oscillator is set up for correct range. Then the RF stage slugs and trimmers are set for best tracking. The RF coils peak sharply, and tracking is quite good.

One final comment. MPF121 FET's make excellent amplifiers and mixers. However, they do not equal the old 6BA6-6BE6 combination for immunity to cross-modulation. A few db of attenuation which can be switched in ahead of the RF FET works wonders here.

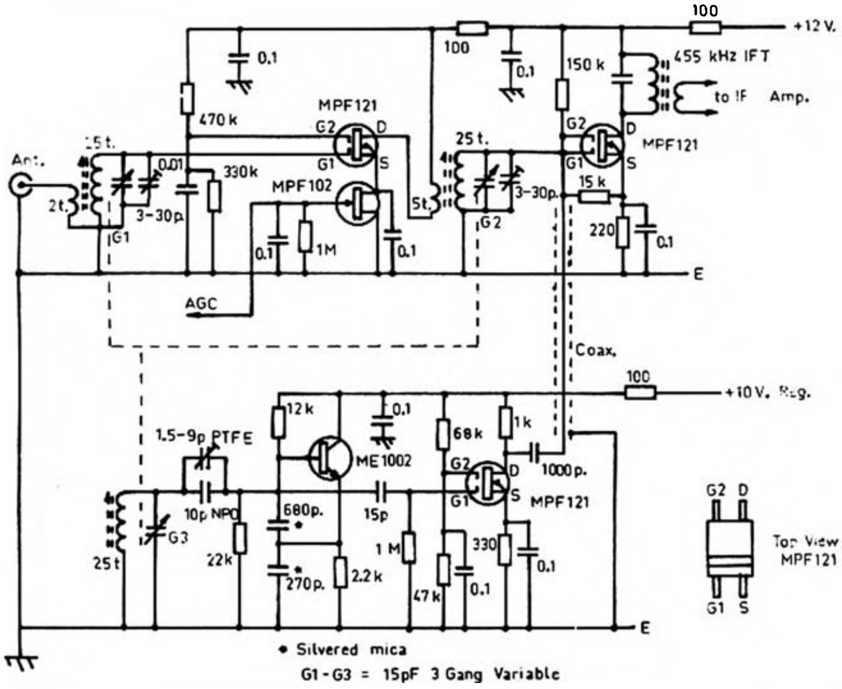


FIGURE 1. CIRCUIT DIAGRAM FOR TUNABLE FRONT END

FM Discriminator Meter

Reprinted from GARC Newsletter, July, 1972.

This circuit can be connected at all times without any effect on the receiver audio. Almost any uA or mA meter will do. The 4.7 megohm resistor (R1) is of nominal value, and will be required to be altered to obtain a centre reading on the meter.

The meter used by the writer is a small tape recorder type of approx 250uA.

If necessary, adjust R2 so that not too much current is passed through the meter.

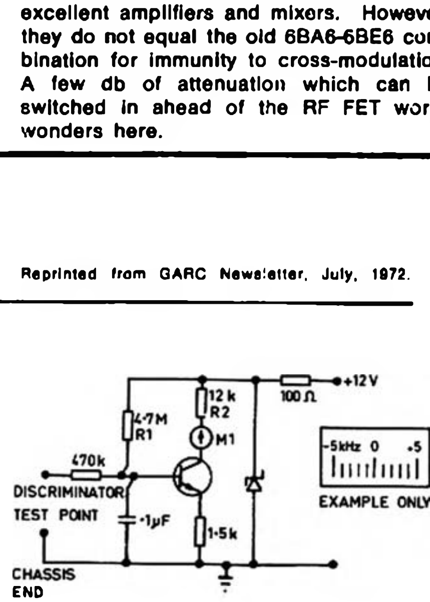
A 9 volt (approx) zener diode is used to regulate the circuit.

Almost any NPN silicon transistor will work.

SETTING UP

Check at discriminator test point on the carphone that the discriminator transformer is set correctly on frequency by the usual multimeter method.

Connect DC amplifier circuit and adjust RI for centre reading on M1.



Amateur Operators Certificate of Proficiency Examination February 1974

TELEGRAPHY
SECTION L (RECEIVING)
(Speed — 10 words per minute)

Gales lashed Bass Strait over
the weekend with winds of 60
knots creating delays to some
shipping of almost 12 hours
Passengers reported waves of
nearly 25 feet washing over
the bow of their ship Seasoned
sailors have said this 173
mile stretch of water between
Tasmania and the mainland can

SECTION L (SENDING)
Time allowed 2½ minutes
(Speed — 10 words per minute)

Most of the 249 passengers
aboard one ship which arrived
at her destination 13 hours
late were showing the effects
of about 25 sleepless hours

SECTION K (Regulations)
(Time allowed — 30 minutes)

NOTE:—THREE questions only to be attempted. Credit will not be given for more than THREE answers. All questions carry equal marks.

1 (a) Under what circumstances would the general call "CQ" be used?
(b) Give an example of a telephony call using "CQ".

2 (a) State the regulatory requirements regarding the inspection of amateur stations.
(b) What documents should be made available for inspection at the amateur station?

3 Describe the method of resuscitation you would give to a person who has suffered an electric shock. Your answer should include the steps you would take before commencing resuscitation.

4 Give the meaning of the following abbreviations:—
QRA QSB? QRU QSA? AS

SECTION M (Theory)
(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) Draw the circuit diagram of an amateur station transmitter suitable for operation in the 144-148 MHz band. Explain briefly the theory of operation of each stage of the transmitter.
(b) Describe how you would tune the transmitter described in (a).

2 (a) Explain possible causes of interference to television receivers from amateur station transmitters.
(b) Discuss with the aid of diagrams the technical precautions you would adopt to avoid interference from an amateur transmitter to television and broadcast receivers.

3 With the aid of a circuit diagram, describe the operation of the "product detector" stage of a receiver designed for the reception of single-sideband suppressed-carrier radio-telephone signals.

4 (a) Aided by a sketch or circuit diagram, describe an aerial system for use in the 7 MHz amateur band capable of correctly loading a mobile transmitter while in motion.
(b) Indicate the areas in a motor vehicle from which noise may be radiated and picked up by the receiver. Suggest means of reducing or eliminating this radiation.

5 (a) What are parasitic oscillations and how are they produced?
(b) Why are parasitics undesirable in a transmitter?
(c) Explain the methods you would adopt to locate and suppress them.

6 (a) Discuss features you consider desirable in a microphone suitable for use at an amateur station.
(b) With the aid of a sketch describe the construction and theory of operation of a microphone which you consider meets these requirements.

7 With reference to the propagation of radio frequencies explain what is meant by the following terms:—
(i) vertical polarisation,
(ii) critical frequency,
(iii) temperature inversion, and
(iv) skip distance.

8 (a) Assisted by a circuit diagram describe the operation of a Grid-Dip-Oscillator or a Transistorised-Dip-Oscillator.
(b) Indicate the reason for loosely coupling the oscillator described in (a) to the circuit being measured.

9 (a) Explain the theory of operation of grid-leak bias when used in the final stage of a transmitter.
(b) If the required bias is 45 volts, of which 18 volts is supplied by an external source, what grid current is necessary to provide this extra voltage if the grid resistor is 2,700 ohms?

A Touch of History

Reprint, Melb. "Herald", June 5, 1928

AMATEURS AND THE PACIFIC FLIERS
Department Inquires Into Interference

Mystery surrounds the identity of the wireless station which last night interfered with 3LO when that station was picking up wireless messages from the Southern Cross plane.

It was stated that, when 3LO asked certain wireless amateurs and experimenters to cease interfering with signals coming from the plane, one station replied: "Go to hell".

Today the studio manager for 3LO (Mr. Bearup) said that the interference was reported to him. On the other hand, well known amateur wireless operators, who listened in last night, deny that there was any interference.

The Postmaster-General's Department is conducting an inquiry, and the Chief Controller of Wireless Services (Mr. J. Malone), said that he hoped to be in possession of the full facts late this afternoon.

"Interference Very Bad"

"When the interference was reported to me", Mr. Bearup said, "I got in touch with the PMG's Department, and with their concurrence made a request from 3LO for the interferers to cease. That was not directed at the amateur who knows how to use his set, but to those causing interference by radiation, who, as they probably could not read Morse, were wasting their time.

"The interference was very bad from 8 to 8.45, and I made the first request at 8.16, repeating it several times later on. About 9.30 the interference eased considerably, and from then on we had no great trouble.

"It was reported to me that someone had sent the reply, 'Go to hell', but whether it came through the air or by telephone I do not know. Until I see the operator on duty last night our hands are tied".

"Merely a Cloak"

The president of the Wireless Institute of Australia (Mr. Howard Love) said that he was listening in from 7 to 11 p.m. yesterday, and was not bothered by any interference. In his opinion, the attempt to blame transmitting amateurs and owners of oscillating receivers for interference was merely a cloak for the defectiveness of the receiver. Anyone who could not pick up KHAB (the Southern Cross), should have their receiver overhauled, for the signals were coming in perfectly all the time he was listening.

Mr. B. Hardie (secretary of the Institute) said that only at one period during his watch, from 8.30 p.m. last night, until 1 a.m. today, did he hear an amateur station operating close enough to the wavelength of KHAB to cause interference. That was at 5.45 p.m., and when the amateur was informed he shifted his length to 30 metres. KHAB operated on 33.3 metres.

One other transmitter was heard on the 33.3 metre wave — an American Navy ship sending greetings to KHAB and transmitting only during the times when the latter was off the air.

On several occasions, when important transmissions have been sent on the short-waves, amateurs were blamed for interference, but in this case the leading Australian amateurs were listening for the Southern Cross, and he was justified in backing their opinion that no amateur station was responsible for the interference.

U.S.A. Stations Cut In

Mr Jack Simms, of East Malvern, who has received practically all the messages from the Southern Cross, said that last night he heard no interference from local amateurs, although one earlier in the afternoon had to be told, and willingly obeyed, the instruction to shift off KHAB's wave-length.

He had, however, been interfered with by 6XB and 2XAR, American commercial stations, the former at 5.5 p.m. yesterday cutting in and completely obliterating one long message from the plane.

Another well-known amateur, Mr. H. M. McCubbin, said that he had been told by a wireless operator from an overseas steamer that last night, when one local station was operating, it would have drowned messages from the plane.

Amateurs pointed out that the interference could have come from any station anywhere in the world.

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

This month I have a correction for the February column, a method of reducing 6 metre interference to Channel 0 TV viewers, and some hints from VK5TL.

CORRECTION

I wouldn't be surprised if you had trouble understanding a small section of the first paragraph in column three, February issue, page 26. Portion of the paragraph was missed out and here is the correction for it. Look towards the bottom of the paragraph. The correction is as follows: **Incidently this end of the resistor doesn't have to attach to the coil, it can go direct to earth. If the oscillator is not working check that voltage is being applied to pins 5 and 6 and that a voltage drop across the cathode resistor of up to about a volt is measured.** This should make this section easier to understand.

SIX METRE AMATEURS AND CHANNEL 0 VIEWERS CAN CO-EXIST

Recently I spoke at length with John Patterson, VK3ATQ of Berwick on the problems that beset 6 metre amateurs in channel 0 viewing areas. John has suggested that a net channel be established in Victoria at the top end of 6 metres. It is understood that VK4s already have a net channel on 53.995 MHz, so it is suggested that a net be established in Victoria on this same frequency. Initially at least it would be an AM frequency but as time and techniques advance SSB may also become a common mode on this frequency. Crystal locked transmitters and receivers are thought to be the initial answer to the technical requirements on this frequency. A Yaesu FT-620 or a Midland 13-894 with transverter would make ideal units for this type of operation and are available, as far as I can tell, from a couple of our advertisers.

Some say this idea of going to the top end of the band will not reduce interference to television sets tuned to channel 0. With an average television set, or any ordinary radio for that matter, the principle of getting as far away from the frequency of the signal causing the trouble to reduce its effect is well known. The sensitivity of the television set at 52 MHz is perhaps 6 to 12 db greater than at 54 MHz when tuned to Channel 0.

Hopefully then, if you transmit somewhere near 54 MHz you can expect to be able to run 4 to 16 times as much power — 6 to 12 db — as at 52 MHz for the same amount of interference into TV sets. If you have no interference problems because you use low power, you could increase your power by the factors above without creating interference. It may happen though that the television sets concerned are being overloaded by your signals, whether you are at 52 or 54 MHz. In this case a trap will be necessary on the affected television set.

There is much that can be said about the 6 metre — channel 0 problem; much of it has been said before and there is, I believe, much still to come forward in the way of trap designs, technical standards for television sets, and education of the public. Further reading on this problem can be seen in this column for January 1973 and 1974.

I wholeheartedly endorse the move to 53.995 MHz as a new 6 metre net frequency. It is a positive step forward to reduce interference whilst still staying on 6 metres. Six metres is a fascinating band to operate on; it has most of the features of the HF bands and the interesting aspects of the higher VHF bands. I suggest that you contact John VK3ATQ if you want further information on this new network. Perhaps our VK4 friends can give us some idea on how well this move has worked for them!

SOME HINTS AND COMMENTS FROM VK5TL

Tom suggests that an erinoid knitting needle, size 3, which is about the same size as a ¼ inch drill, would make an excellent extension shaft, and may well have advantages over a metal shaft as it is non metal and non conducting. It is cheaper but possibly would break more easily. Front panel bushes may be obtained from discarded potentiometers. The formers that plaster of paris bandages are wound on are suitable to make spacers from. Have you a friend in the medical profession who could obtain these throw-away items? Another useful plastic strip is the one that artificial teeth are supplied to Dentists on. They are about 2½ inches long.

The octopus straps, as used to hold surf boards on roof racks, etc., make good straps for holding down mobile gear. Tom uses a set of the shorter ones to hold his 6 metre equipment down. I assume that the equipment is held down on the seat, Tom doesn't make this point clear. It is a very good idea, however, as sharp cornered amateur transceivers would not be fun flying around in a car unfortunate enough to be involved in an accident.

Some time in the past Tom had a 22 set which is very similar to the 122. Tom's comments are sparked off by my article on getting rid of chirps from the 122, which was in February's issue. On the particular set Tom owned the 300uF 16 volt capacitors were defective. I would suggest additionally that all electrolytics in the set and its power supply be checked. With these defective Tom was getting a **"chirp"** of 4kHz. You may well have to do both modifications if you own a 22 or 122.

Thank you very much indeed Tom for your comments and ideas, I am sure others will find them of value. Supposedly the comments on the 22 - 122 should not appear in this column, however, knowing how to spot faults in your equipment is part of becoming proficient in electronics. The question now is why should a faulty electrolytic cause extremely bad chirp on a CW signal? That is something for you to figure out. If you want to know, write to me and I will discuss it in this column. ●

Try This

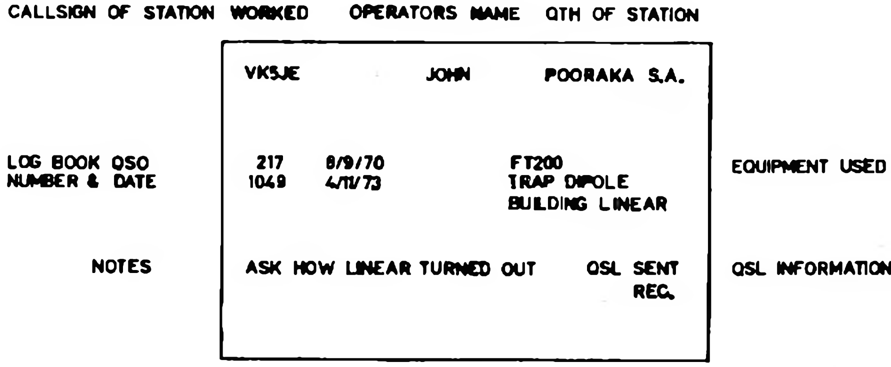
with Ron Cook VK3AFW and Bill Rice VK3ABP

"A QSO FILING SYSTEM"

I have received many "on air" requests for information on the filing system used at my QTH. It was suggested a short article on my system may be of interest to other members.

The cards I use are standard office stationery lined cards, and measure 6 inches by 4 inches. They are laid out as shown in the diagram, and are filed alphabetically by prefix and call-sign.

One advantage of such a system is that a quick check through the cards can reveal a particular operator who has built, or is using some piece of equipment that you are interested in. Once identified, it only takes a short note through the mail to the operator of the station to enquire or obtain a circuit etc. I have found this filing system useful already in this regard, and a quick check through the cards reveals just how popular the FT200 and tri-band beams really are! ●



Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

This month a few notes on the Heathkit transceivers SB100 and SB101. Although not as common as many of the Japanese transceivers, these rigs are usually highly prized by their owners and in general command a relatively high price on the second hand market.

The first of the series, the SB100, was first released in late 1965, and in common with the other Heath 'SB' gear released a few months before, featured a new quality in kit type gear. It seems that perhaps Heath looked closely at the Collins range and borrowed a few of their outstanding features. The SB101 followed in 1968 and now had provision for an optional CW filter. The still current SB102 is identical in all respects except that the VFO is now transistorised and the receiver front end has been slightly hotted up. Apart from the VFO, the first SB100s can be up-dated to the latest specifications.

For SB100 owners here are the simple modifications to update to a 101. Change the following components:

R221 from 470 to 100 ohms.
R927 from 220 to 100 ohms.
R928 from 150 to 56 ohms.
R104 from 47 to 56 ohms.
R105 from 47 to 56 ohms.

Insert a 4700 ohm 1 watt resistor between ground and the ground end of the 10K BIAS ADJUST potentiometer.

Connect a 0.005 disc ceramic capacitor from the B+ connection to the LMO to ground.

If you are using a home made power supply for your 100 to 101 make sure that the 300 volt supply is right up to the mark. In fact it is better to be a little on the high side and up to 325 volts is recommended. The higher voltage will improve both receiver gain and transmitter output. If the receiver audio output appears a bit low, gain in this section can be increased considerably by removing C928, a 0.05 negative feed back capacitor between pin 7 of V14b and the audio output transformer T301. Now add a 100 mfd electrolytic capacitor (25 volt) from pin 7 of V14b to a convenient ground point.

Receiver gain and signal to noise ratio was improved in the SB102 by changing the RF stage tube to a 6HS6. This tube does not seem to be obtainable in Australia, however the 6AH6 appears to have almost identical characteristics and is in stock at most dealers. I have also found that substituting a 6AH6 for the 6AU6 first receiver mixer gives a very worthwhile gain improvement.

One problem that seems to crop up with most of these transceivers is the inability to zero the 'S' meter. Heath make the following suggestions. "Very likely the meter problem could be caused by a defective tube at V3 or over injection from the hetrodyne oscillator into the mixer stage. We suggest that you reduce your hetrodyne oscillator injection as a possible corrective measure".

Look into the above as a first resort, but in many cases it has been necessary to replace resistors associated with the 'S' meter circuitry with high stability components.

If you wish to add the CW filter switching to the SB100 a kit is available from Heath to do the job. However, as the normal SSB filter has to be replaced with one of smaller physical size, the price is rather higher than might be thought. The kit has a Heath part number of SBA-100-2.

Low mike gain is another common complaint. The first way to overcome this is to use a high output microphone. The very cheap lapel type crystal microphones appear to be a good choice.

It may also be possible to increase the gain of the microphone pre-amp stage V1a. If both R1 and R2 were increased in value to 470K and 1M ohms respectively a worthwhile increase in gain should result.

Many of the modifications discussed above may also apply to the Heath HW100 series as all circuit boards of this model are common with the SB101.

Next month it's back to two meter FM with a regulated power supply for your solid state transceiver. ●

Magazine Index

With Syd Clark, VK3ASC

As you can imagine, due to the uncertainties of mails the work load varies somewhat from month to month. For this month our load is quite light with only four magazines to be mentioned in our index. A number of foreign language magazines come to the Institute and although some of these sometimes contain material worthy of mention, translations, especially technical translations, are not easy to come by.

CQ February 1974
The Low profile Quad Antenna; Radio Communications in Primitive New Guinea; Results of the 1973 CQ World Wide WPX SSB Contest; Ten-Tec Model 315 Receiver (Review); Oscar News & Orbital Data; SSTV.

HAM RADIO: October 1973
Electronic Keyer with Memory; Audio-shift RTTY Keyer; Touch-Tone Decoder; Two-band Antenna Matching; RF Power Meter; Advanced VHF Prescaler; Half Wave Rectifiers; Frequency Measurement of Received Signals; Electronic Bandpass Tuning.

RADIO ZS: January 1974
Workers of the World Ignite! VHF Repeater Aerial System; Quartz Crystal & Frequency Standards; Mobile BRRR . . to mobile PFFF . . .

RADIO COMMUNICATION: February 1974
Top Band Conversion for the KW Viceroy 111A; The 5-Square. A new VHF & UHF Aerial; A Digital Morse Code Generator; Technical Topics: this month's space is devoted to new approaches to AM reception; a cunning RF wattmeter; Japanese Component Markings and High Pass Filters. ●

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.

Editor,
Dear Sir,

GO NIHON

In addition to the Hitachi books on the Japanese language mentioned by VK5RB in the March 1974 issue of Amateur Radio, there is another source of instruction readily available to the amateur fraternity.

Radio Japan broadcasts a weekly 15-minute session for beginners called 'Let's Learn Japanese' and one for more advanced students called 'Let's Practice Japanese.

Frequencies used for these broadcasts are subject to change throughout the year, but up until at least May 4, 1974 the schedule is as follows:

Let's Learn Japanese

Service	Day	Time GMT	Frequency MHz
Aust. & N.Z.	Tue.	1005 - 1019	15.235
		1005 - 1019	11.875
General	Tue.	1015 - 1029	15.195
		1415 - 1429	11.815
		2315 - 2329	15.195

Let's Practice Japanese

Service	Day	Time GMT	Frequency MHz
Aust. & N.Z.	Thu.	1005 - 1019	15.235
		1005 - 1019	11.875

'Let's Learn Japanese' consists of a full year's course and will be re-commencing in April 1974. A text book covering all of the lessons is available free from Radio Japan on request to:
Nippon Hoso Kyokai
Tokyo
Japan.

A. B. Hollebon,
VK6EQ.

Intruder Watch

with Alf Chandler VK3LC
1536 High Street, Glen Iris, 3146

By the time this is in print I shall be in Japan. The XYL and self sail in the "Marco Polo" for a six-week cruise around the Orient on April 17th returning in June. I hope to contact some Amateurs interested in the Intruder Watch in Japan, Hong Kong and Singapore and will be plugging for co-operation from them.

As I have not had the co-operation desired with the 3.5 MHz IW skeds monthly I am discontinuing them, and instead substituting individual skeds. So far I contact VK4KX on 14160 kHz at 2330 GMT on Thursdays our date, and with VK6DA on 14130 kHz at 0030 GMT on Sundays. I hope other states will co-operate. With the departure of our VK2 co-ordinator, Bill VK2ZO for a stint in Nauru, a vacancy has ben created in that state. I do hope some enthusiastic member will fill the gap. We do need enthusiasm.

A recent report by several VK6's of a spurious signal from Voice of America (Philippines) in the 14 MHz band, and relayed by me to my friend in the U.S. caused quite a stir there. I don't think we shall hear any more spurious signals from that source.

An interesting, though disquieting, fact can be ascretained by reading pages 83 to 86 in the publication by Wirless World, London "Guide to Broadcasting Stations, 17th Edition". From 7000 kHz to 7150 kHz there are 153 Broadcasting stations listed, and they are by no means all Iron Curtain or Communist China stations. Food for thought, eh?

On my return I shall give you an account of what transpired between myself and the various Amateurs I was fortunate to meet. ●

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RSG, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra, x	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney x	144.002
VK3	VK3RTG, Vermont	144.700
VK4	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth x	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
VK9	VK9GA, Goroka x	52.001
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

x — denotes change

AT LAST. The great news has been received. The beacon licence for VK1 has been approved, and steps are being taken to erect same in its final position. Power output 18 watts, nominal frequency 144.475 MHz and identification is FSK (F1) morse code, call sign VK1RTA. The initial antenna was a vertical aimed on Sydney. It is hoped the antenna will be more versatile than that in the final set-up, as VK1 is not an enormous distance even from VK5, and certainly possible to VK3. Anyway, congraulations to the boys in Canberra, and we all hope the installation of your beacon will bring rich rewards in VHF DX contacts.

Roger, VK2ZRH, writes with news of the VK2 beacons, advising they were poerational from 6/1/74 on 52.450 and 144.600 MHz. Due to interference from various FM units having a crystal frequency in VK2 on that position, and also interference from the VK2 repeater, which is at the same QTH, the 2 metre beacon was shifted to 144.002 MHz on 20/1/74.

The beacons are completely solid state, and produce about 30w output on both bands. The antenna on 6 metres consists of crossed dipoles stacked five-eighth wavelength apart at a height of 50 feet. Two metres consists of two 10 element yagis — one bearing magnetic north, and the other on Geelong, Victoria. Average height of the 2 metre array is 39 feet.

The identification is VK2WI at approx. 10 wpm at intervals of 40 seconds, with continuous carrier for the remaining period. The beacon on 6 metres has been heard in most States and ZL, while the 2 metre beacon has been heard in VK1, VK3, VK2 (Boggabri and Tamworth — about 250 miles) and in ZL3 during February.

Roger would be pleased to receive any reports of either beacon, the address being: The Beacon Committee, C/- WIA, 14 Atchison Street, Crows Nest, NSW 2965, Roger being the Beacon Officer.

While still on beacons, Wally VK5ZWW advises that the VK6 beacon on 6 metres in Perth is off the air, and that a new one is being tested on 52.3 MHz with the call sign VK6RTV. The Perth beacon remains listed, but under the new call and frequency, as it may well be operating by the time you read this; if it's not, then when you do hear it you will know what it is!

Not sure of the position of the former VK9 beacon at Goroka, PNG. With the change of administration this beacon will now probably have a new call sign at any rate, but it is listed this time and you should bear in mind changes are likely with this one.

With the installation of the beacons in Sydney and Canberra we can now say truly that all States are represented with beacons, either on 6 or 2 metres, so one way or the other, or with the aid of various repeaters and other FM stations, Australia is now well provided for when the DX comes through. Surely now there will be few lost opportunities — somebody must hear the long distance station and set the ball rolling even if in his own area only.

SIX METRES DX

Wally VK5ZWW reports some interesting activities on 6 metres during March. On 9/3 at 2005 VK0WI heard in Adelaide at S3 with QSB. At the same time heard in Albany WA at S9. No ZL or VK TV or any other activity at the time. 23/3, 1530 to 1730 JA districts 3, 6 and 7 worked in Adelaide up to S9 with usual QSB. Quite a lot of activity on 50 MHz. Wally heard a beacon on 50.5, but as there are a number of such stations operating on that frequency, no positive identification could be made. 24/3, 1500 to 1530, JA 3, 5, 6 and 9, signals peaking to S9. At 1800 the band opened to Kalgoorlie, Perth and Albany at the same strength for over 2 hours. 25/3, 1850, band opened to Sydney for 2 hours, signals to S9. 30/3, 1200, quick strong opening to Lindsay, VK4ZIM, Rockhampton, who reported he worked JA's on 24/3. Also on 30/3 at 1630, 10 minute opening to JA 2 and 3. Thank you Wally for the info.

I suppose somebody's loss is another's gain, but we in VK5 are surely going to miss Wally, VK5ZWW when he shifts to Orange in NSW in May of this year. With him will go the big beams, high powered rigs, and one person who could be relied upon to be on the band when something happened. Wally did much to foster interest in meteor scatter circuits, and one marvelled at his ability to read weak signals through all the QRM from the busy road just outside his front fence. He is a valued member of the WIA and the leading light in the VK5 Contest Committee. I am sure all in VK5 and other places where you have been heard (there couldn't be many where you haven't!) will join with me in wishing Wally, his XYL Dorothy and family a successful new venture. See that you look after him you VK2ers.

OSCAR 7

This page does not usually become involved in these things, being left to the special articles appearing from time to time, but I would like to reprint the following from the March issue of "Forward Bias", the journal of the VK1 WIA Division. I think it is advisable for all areas to be informed of the type of thinking which goes on in some places; I'll leave you to draw your own conclusions. I quote: "Oscar 7 will have a 5 watt output translator between 145 and 29 MHz. Excited by the prospect of some real technical work, the Sydney boys are talking of building converters to convert the Oscar 7 signal on 29.4 up to 145.9 so that they can work through the satellite, using the channel 4 repeater! That way, they transmit on 146.4, the repeater retransmits on 145.9, this thumping great signal blocks up the entire satellite and produces a large signal on 29.4 which they then reconvert to 145.9 to receive on their FM receiver. All this, you say, when the official WIA policy is to clear the satellite band so that repeaters do not interefere? Yes, but remember, democracy is only OK if it works your way. The Sydney chaps are now talking about a South Sydney repeater. The frequency? OLD channel 2 or 3. Groan." End of quotation, my comment "Oh! Boy!"

432 MHz MOONBOUNCE

The Illawarra Branch of the WIA continue with their moonbounce activities and the following report is made.

"EME tests were made on February 2nd, 3rd and 9th. Weak signals were heard from W6FZJ on the 2nd and he indicated that he was copying us reasonably well. Nothing was heard on the other two tests except our own echoes, which were up to 8 dB above noise on 9/2/74.

The next test was organised for 2/3. It was known to be a little late in the night for W6FZJ but K2UYH is willing to operate at any hour of the night. VE7BBG was also notified of this test as it is known he passes such information to a number of other stations who operate EME.

An excellent QSO took place with K2UYH which lasted for the full hour. His signals peaked to 10 dB or more above noise. He was also receiving VK2AMW very well. We were intrigued at the variation in his frequency at the end of his transmissions, but it is now thought that he was shifting carrier to demonstrate ability to use RTTY when he obtains a teletype machine. He suggested during the contact that we try RTTY next month.

This EME test produced results far better than anything achieved previously, mainly as a result of the other station having a good size dish (28 feet diameter) and possibly assisted by the use of linear polarisation both ends, though results may have been even better (less fading) if we had both been circularly polarised.

Much of the information received was put on tape and some on the chart recorder. Our echoes were up to 6dB above noise. VK2ZEN made much use of this growing ability to copy CW! The next test will probably be on 30th or 31st of March.

There are now approx. 10 stations on 432 MHz EME in USA and arrangements are being made to schedule a larger group on our tests than in the past.

The latest letter from OE6AP in Austria indicates he hopes to be ready for EME tests within 6 months."

GENERAL

I note that this year is the 10th anniversary of the South East Radio Group Convention in Mt. Gambier, and planning is well under way. This year the VK3 and VK5 holidays coincide so this should pave the way for a good attendance on 15th, 16th and 17th June.

One cannot but help being a little wistful in his thinking of times gone by when one reads the comment in the SERG journal "Blurb" that "There was little activity from Mt. Gambier during the last DX season on 6 metres . . ." I guess it is the inevitable result of many of the former limited licencees gaining their full calls and migrating to the HF bands for easy contacts. Probably the same situation exists on 2 metres to a degree. With the ready availability of good HF transceivers it is now so easy for anyone anywhere to join the chaos on HF, but always assured of a contact. One glimmer of hope for the 6 and 2 metre bands in particular seems to lie in the fact that there is now available on the market a transceiver designed especially for 6 metres, and the promise of a similar machine for 2 metres soon. Although low power devices, they can be readily brought up to reasonable power with a linear and, as such, provide a good means of SSB on VHF, being even easier than the traditional transverters now in use.

The Geelong Amateur Radio & TV Club will be holding their fifth HAMFEST on the weekend of 11th and 12th May. The first such function was held in 1970 with 90 attending, last year 240 were present. There is entertainment on the Saturday, and field events on the Sunday, with things for the XYL's, YL's and harmonics to do. This column wishes the Geelong boys a very successful weekend.

That's about all the news for this month. Don't forget to keep an ear to the ground — sorry, transceiver — for that winter DX which could pop up on 6 and 2 metres during the cold months. Just turn up the shack oil heater a little, and listen on the bands between your own calls.

Closing with the thought for the month: "The most important person to listen to is oneself, and our most important task is to develop an ear that can really hear what we are saying."

The Voice in the Hills.

QSP

He who hesitates is known as QRM. ARNS Jan. '74. Amateur Radio is like war — easy to begin, hard to stop. Adaption from ARNS Jan. '74.

2m DX VIA BALLOONS

This is the heading of an article in Radio ZS, Feb. '74, which states "Inspired by the spectacular successes of Radio Amateur groups in Europe — DL, OH, F — we are planning to launch a series of airborne 2m beacon-transmitters and repeaters in the near future in South Africa" . . . These weather balloons can reach a height of 25-30 km and flight time would be about one to four hours.

ANOTHER LOSS

IARU Region I advise that in France the hitherto exclusive amateur band of 144 to 146 MHz is to be shared with military stations. Rad. Comms. Mar. '74.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

A FEW GENERAL NOTES ON THE CONTEST
Reports tell me that the contest was friendly and of course most enjoyable. A few home stations mentioned that they will be in the contest next year.

BUT DID WE HAVE A NARROW ESCAPE?
We went forward by but 1.4 per cent or if you wish ONE log. 70 logs this year, 69 last year. Fortunately we are up one log in field stations. Some of those missing field station logs would have given us a marked improvement.

It is good to note that multiple op stations are up.

Thanks for all the comments and letters . . . every one of interest. I'll tidy up the rules and next year will be another great get together.

CONTEST CALENDAR
May 11th: World Telecomunication Contest CW
May 11th: YL ISSBers QSO party CW
May 18th: World Telecom Contest Phone
May 18th: YL ISSBers QSO party
May 31st - June 3rd: CHC/FHC/HTN QSO party
June 15th-16th: All Asian phone Contest.

AUGUST
REMEMBRANCE DAY CONTEST
THE FRIENDLY CONTEST. Make it the greatest yet. 800 logs. We'll make it . . . if you send in your log, and get someone else, who has been missing out, to join us. Date in next month's Amateur Radi.o

CQ CONTEST
As I write this the contest is in full swing. At the times I was on, 15 metres was the only band of interest . . . Some QSB on the Ws and Ks and the JAs were starting to come in . . . I may get a chance later.

Did you know that Martin VK4VU, a great contest man, came fourth in the world in the year's CQ SSB contest. Congratulations.

YL ISSBers QSO PARTY
CW 0001 GMT to 2400 GMT May 11th.
phone, 0001 GMT May 18th to 2400 GMT May 19th.
CW 24 hrs, one 6 hour rest period.
phone, 48 hours, two 6 hour rest periods.
Rules are lengthy and are available from W7EOI . . . but you can join in.
Frequencies: CW 3565, 7085, 14070, 21070.
phone, 3873, 7273, 14333, 21373, 28873.
DX on 3775 and 7090.
Logs to L. W. Coleman, W7EOI, 412-19th Street, SW Great Falls, Montana, 59404.

WORLD TELECOMMUNICATION CONTEST
CW 0000-2400 GMT Saturday, May 11th.
phone, 0000-2400 GMT Sturday, May 18th.
Single op stations 160 through 10 metres.
Exchange: RS/RST plus ITU zone.

Scoring	10/15/20	40	80/160
Same country	0	0	0
Other countries, same zone	1	1	2
Other zones, same continent	2	3	4
Other continents	3	5	6

Final score: Total QSO points X different ITU zones worked.

Same station may be worked each band for QSO points but zone counted only once.

Log entries in order . . . Time GMT, station worked, exchange S&R, band, continent, zone, QSO points.

Awards: Diplomas to the three highest scoring stations in each country. Separate awards for CW and phone.

Mail logs before June 30th to: Ministerio das Communicacoes, DENTAL, 70000 Brasilia, DF, Brazil.

SOME NOTES ABOUT RD COMMENTS RECEIVED
Again thanks for all the comments . . . especially those on rules. By the time you have read this, Federal Council will have appointed a new Federal Contest Manager because I have completed the three year term planned. However your aforementioned comments will be passed to him . . . and the corrections made.

1974 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS

24 HOUR DIVISION

Section (a) Tx phone

VK3AUQ	1162
3BMA	340
VK4IE	2375
4AL	1435

Section (b) TX CW

VK3ANU	1154
VK3JI	672

Section (c) Tx Open

VK2RJ	1686

Section (d) Tx Multiple Open

VK1ACA	6288	12 ops
1WI	4680	6 ops
2WG	2334	9 ops
3APC	5742	13 ops
3ATL	5397	8 ops
VK3ATM	5101	9 ops
3AWS	2736	8 ops
3XK	1635	4 ops
4WIT	2731	19 ops
8DA	2619	8 ops

Section (d) Tx Multiple phone

VK3ANR	703	2 ops
5LW	1989	9 ops
VK9XI	625	3 ops

Section (e) Tx VHF

VK2YAV	626
2YBT	518
2ZCT	442
VK3AVJ	619
3YAP	516

Section (f) Tx Home Station

Section (f) Home Station

VK2RX	330
3AYL	975
3CM	730
3RN	650
VK3ZML	530
3VF	405
5ZT	850
5DL	210

Section (g) Receiving

K. D. Cunningham	850

6 HOUR DIVISION

Section (a) Tx phone

VK1JG	320
3BBC	940
3EF	647
3DY	537
3HE	425
3ZA	358
VK3SS	210
4GT	877
4PJ	248
5BW	814
7AX	560
7BM	260

Section (b) Tx CW

VK2YB	324
2JM	216
VK3TX	255

Section (c) Tx Open
Nil.

Section (d) Tx Multiple

VK3JH	913	3 ops
3BDQ	834	3 ops
VK3WIA	338	7 ops

Section (e) Tx VHF

VK2PN	272
3ZAE	34
VK5BW	54

Section (f) Home Station

VK2ZA	250
2OW	check
3QK	845
3RA	215
VK3EM	40
3AJB	check
4UJ	225
5LM	555
5DV	435

Section (g) Receiving

S. Gillespie	1600
P. J. Hall	710
A. J. Everett	400
E. Trebilcock	390 CW log
J. H. Zinkler	check

VK2AFI was on a fire tower with a Swan 350, FT101B, MR6A, MTR13, MTR20, MR20A, Trio TR-ZE, and a 1.5 KW alternator. David suggests moving the times forward a couple of hours as 7 pm is a bit late to pack and travel.

Good to see Christmas Island back with us again. VK9XI powered with a 15 kVA Lister . . . Canvas set up, plenty of coloured lights, box of iced 807s for visitors . . . queue up fellas.

VK8DA roughed it in a caravan converted bus with a 30 kVA?? alternator, 2 el Quad and 180 ft V beam.

SWL Peter Hall used a VK2ABQ triband beam.

VK6ZIW, a lonely log, used an F7-2FM in his car and an FR/FLDX 420 + FTV650 with a 240 volt alternator.

Alan VK5BW used a home brew petrol motor alternator.

VK5LW used 2 x FT101s, a KW2000, dipoles, helicals to 6 VHF Txs from a 2.5 kVA Honda.

John VK4IE remarked . . . "Activity seemed to be better than previous years with rule 14 undoubtedly helping here. As a matter of interest, deleting all the points scored under rule 14 still leaves me with more contacts than last year . . . it was good to hear the same friendly (yes friendly) call signs from previous years . . .".

Alan VK4AL hung one of his dipoles from a friendly gum and powered his rig with a car alternator and lawn mower motor.

Bruce VK3VF remarked . . . "Very enjoyable. Another nice friendly contest".

Drew VK3ANU/3, who managed a nice CW score, would like to see /3 or /P standardised, after each callsign on portable operation.

Harold VK3CM . . . "A very enjoyable contest. Most portable stations thanked the home stations for taking an interest. Signals were surprisingly strong from most stations, apparently their location was carefully selected. Hope to be in the field next year".

John VK3JH mentions "This year we took a young and enthusiastic group of SWLs with us and had a tremendous day . . . if next year is still half as good it will still be a great day".

Paul VK3ZML scored 530 points on one VHF channel.

VK3AWS has a 5 kVA alternator to keep 6 Txs and 8 ops going.

"Thoroughly enjoyed by all".

VK3ATM on a 60 ft fire tower with a 10KVA diesel . . . (at the foot).

VK3APC worked 9 bands including 435 and 1296 MHz and had 2 x 3KVA and one only 1KVA alternator.

VK2WG used a 5 KVA alternator and listed every contact's name.

Anthony VK2ZCT used a 3 phase alternator mounted on a trailer.

VK1ACA with 6 HF Txs and 4 VHF Txs had a portable tower and a 15KVA alternator.

VK1WI was 5782 ft up on Mt GININI.

There are many more comments but the mail closes soon. Don't miss next year.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS
Two more logs have been received.
24 hour Section (a) Tx phone
VK5SR 1803
6 Hour Section (e) Tx VHF
VK3ZFI 34
So now we have 3 logs more than last year.

TOWNSVILLE PACIFIC FESTIVAL CONTEST 1974 (BIENNIAL)

The aim of the contest is to foster an interest in the Townsville Pacific Festival, and to increase interest and activity on all Amateur Bands by Australian Amateurs.

It will be noted that a further effort is made in this contest to increase popularity of the CW mode of communication. Hence CW contacts count for double score.

This year will be the first Townsville Pacific Festival Contest (I hope the first of many). I trust that all will find it as interesting and enjoyable as other contests.

73's es good luck
Ray Kearney, VK4HE
Queensland Contest Manager

1 **TIME OF CONTEST**

The Contest will be of 24 hours duration 0900 GMT Saturday 8-6-74 to 0900 GMT Sunday 9-6-74.

2 **SECTIONS**

A Transmitting all bands phone only.
B Transmitting all bands CW only.
C Transmitting all bands. Open.
D Receiving all bands. Open.

3 **CONTACTS**

(a) CW contacts count as double score (CW to CW).
(b) 1 contact per band only.
(c) No cross band contacts.

4 **AWARDS**

1 A Certificate will be awarded to each entrant who submits a log.
2 A Certificate will be awarded to the highest scorer in each section for each call area.
3 The entrant with the highest overall score will be awarded a Certificate.
4 A trophy will be awarded to the entrant with the highest total score. The trophy will be held until the next contest (i.e. two years).

SCORING

Bonus

(a) for contact with VK4WIT 15 points to be added to score on table below
(b) for contact with any other Townsville station 9 points to be added to score on table below.

N.B.—VK4WIT and other Townsville stations are the only VK4 stations that other VK4 stations can contact. Scoring for VK4WIT and other Townsville stations will be the same as for other VK4 stations. However VK4WIT and Townsville stations receive no bonus points.

*Queensland stations may work VK4WIT and other Townsville stations.

SCORING FOR VHF and UHF

Same as for H.F. except that on bands above 50 MHz (i.e. intrastate contacts are permitted). For this purpose, a contact on frequencies above 50 MHz within an entrant's own call area will score 1 contact point. With the exception of VK4 where the Bonus rule applies for contact with VK4WIT or other Townsville stations.

CONTACTS ON 160 METRES

Same scoring as in table with additional 5 bonus points per contact.

SEND LOGS TO:

Townsville Pacific Festival Contest,
P.O. Box 984,
TOWNSVILLE, Q'ld. 4810

CLOSING DATE FOR ENTRIES

31st July 1974.

CONTACT POINTS as per table below —

	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9	VK0
VK0	6	6	6	6	6	6	6	6	6	6
VK1	—	1	1	2	3	6	2	4	5	6
VK2	1	—	2	1	2	6	3	4	5	6
VK3	1	2	—	3	2	4	1	6	5	6
VK4	2	1	3	*	4	6	5	2	1	6
VK5	3	2	2	4	—	1	5	1	6	6
VK6	6	6	4	6	1	—	4	1	2	6
VK7	2	3	1	5	5	4	—	6	5	6
VK8	4	4	6	2	6	1	6	—	2	6
VK9	5	5	5	1	1	2	5	2	—	6

* Queensland stations may work VK4WIT and other Townsville stations.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA. 5152

Townsville Pacific Festival Award 1974

A certificate will be awarded to those amateurs who work VK4WIT (Townsville Amateur Radio Club Station) on either a HF or VHF band.

The award is available only during the Pacific Festival, which is to be held 7th June 1974 to 17th June 1974 inclusive. Open to all licensed amateurs and SWLs, Australian and overseas.

Endorsements will be made for a particular band or mode where applicable.

VK4WIT will be operating for the duration of the Festival. Other Townsville stations will be operating on all bands during the period of the Festival. The Townsville Club Net operates every Sunday on 3600 kHz at 0945 GMT.

Send applications to PO Box 964, Townsville, together with a list of the stations worked.

WAZP Award

The award is available to licensed amateurs. Contacts on and after 15th May 1952 are valid. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager.

There are no band or mode restrictions. The fee for the award is five IRCs. The address for application is:

Radio Club Paraguayo
Post Box 512,
Asuncion, Paraguay.

Confirmed contacts are required with each of the nine ZP call areas.

Heard All Continents

The award is available to shortwave listeners. QSL cards dated on and after 30th July 1952 are valid. Do not send QSL cards. A list showing full details of the stations heard should be certified by the Awards Manager.

The fee for the award is five IRCs. The address for application is:

JARL Awards Manager,
Post Box 377,
Tokyo Central, Japan.

Rules: Continental limits are those defined by the IARU.

Requirements: One QSL card is required from each of the six continents: North America, South America, Europe, Africa, Asia and Oceania.

Lebanon Award

The award is available to licensed amateurs. There are no date limitations. Only log data is required for the award, and full details should be sent to the sponsor.

There is no fee for the award. It is suggested that two or three IRCs be sent to help defray expenses. The address for application is:

QSL Manager,
Post Box 8888,
Beirut, Lebanon.

Requirement: Contact is required with ten different OD5 stations.

Y.R.S.

with Bob Guthberlet
Methodist Manse, Kadina S.A., 5554

With the seasonal break ended, clubs will have commenced activities again, and we look forward to another year of increased activity and service to youth. Within a few weeks, definite plans will be made for the Conference to be held at Maitland, NSW during the period August 31st and September 1st, 1974.

I have to announce the resignation of Mr. Rex Black, VK2YA, as Chairman of the Standardisation Committee, as required by the last meeting of the Council. Mr. Black has rendered noteworthy assistance to the Scheme, of which he is the Founder, and his influence and service will be duly recorded. The report of the committee will be presented to the forthcoming Conference.

An interesting letter received from Mr. T. A. Grunsell, Acting Principal of the North Rocks Central School for Blind Children, makes inquiry regarding the possibility of YRCS giving assistance to blind people, enabling them, through the media of Amateur Radio to have contact with others more fortunate, and also to afford a hobby activity which could open up for them a whole new world. In answer to this appeal, the Maitland Radio Club will investigate the possibility of sending tape recordings to the school, and helping to assist these people. The day may come when YRCS will have lessons in braille for the instruction of the blind.

During the past few months new State Supervisors have been appointed, and there appears to be a serious problem over records not being available. Will all supervisors please keep accurate records of clubs, members, etc. etc. so that same can be handed to successors.

Details of the Novice Licence are not to hand, but we anticipate that ere we meet at Maitland, we shall have definite information for discussion.

In the meantime, be enthusiastic about YRCS. Talk about it; work for it, and above all, do not lose your sense of humour!

Key Section

with Deane Blackman VK3TX
Box 382, Clayton, Vic., 3168

Since the last list, we welcome as new members to the section VK3AYL, VK4GX and VK4KO. I am again behind with preparation of certificates, and am having trouble finding a method of sending them which will withstand the assaults of the postal system, but you will get them.

The section will be losing the services of Russ, VK3KX, who has assisted in VK3 and made valuable suggestions in the early days of the section. Thanks for your help, Russ.

My comment about CW in the Ross-Hull raised a couple of letters (for which I thank the authors), but I will remark on one point only from these which seemed to me to question the motives of the Key Section in urging the use of the mode in what is undisputed phone territory. Let me say that the Key Section has no view other than trying to make the most opportunities available to those who enjoy key pounding. As I see it, that includes the continuance of a CW section in a VHF contest. The politics of the matter of course are that if nobody uses the opportunity it will go away, so some encouragement does not seem out of place.

For VK3 there is another slow morse transmission becoming available shortly through the members of the Western Suburbs Club: 1900 local, on 1806 kHz, and as I understand it this will be nightly during the week. A good effort.

Merv, VK4SO, wrote to me before Christmas suggesting that the Section might look into the Hi-Mound' key being advertised in AR. Getting a satisfactory hand key is becoming a positive impediment for some in using the mode. As a result Ivor, VK3XB, has been playing with one of these and his testing has been extensive enough to warrant a separate report for the magazine. One comment Ivor made to me (I don't want to anticipate his article) was that the key sits pretty high, so that you cannot easily use the technique of resting your forearm on the table edge. I am not sure how many who train for the sending test for the AOCP realize that the PMG key sits at the front of the table. I for one can remember being much disturbed by this discovery, made at the exam.

Ionospheric Predictions

with Howard Rider, VK3ZJY May, '74

This month's predictions from information supplied by the Ionospheric Prediction Service Division indicate point tc point band openings for at least 50 per cent of the month. Times quote are GMT.

28 MHz

VK2 to	W6	2200 - 0400
VK4 to	KH6	0100 - 0500
VK7 to	VK9	0500 - 0800

21 MHz

VK2 to	ZL	0400
	SU	0400 - 0800
	KH6	2100 - 0600
	ZS	0600 - 0700
	VK0	0100 - 0500
VK3 to	UA	0600 - 0800
	W6	2100 - 0500
	KH6	2100 - 0700
	JA	2200 - 0800
	9G1 (SP)	0700 - 0800
VK4 to	KH6	2200 - 0800
	ZS	0500 - 0700
	VK0	2200 - 0600
	JA	2100 - 0900
VK5 to	UA	0500 - 1000
	W6	2300 - 0500
	ZS	0500 - 0800
	KH6	2100 - 0700
VK6 to	G (SP)	0700 - 1000
	ZL	2400 - 0600
	JA	0200 - 0900
VK7 to	ZS	0600 - 0700
	VK9	0300 - 0800
	W6	2300 - 0500

14 MHz

VK2 to	G (SP)	0900 - 1000	2100 - 2400
	G (LP)	0600 - 0900	2100 - 0300
	SU	1500 - 1900	2100 - 0300
	VK0	2200 - 0700	
	W1	0100 - 0500	1200 - 1600
	ZL	2100 - 0700	
VK3 to	JA	0600 - 1000	1600 - 1800
	VE3 (SP)	0200 - 0400	1200 - 1600
	VE3 (LP)	2300 - 0200	
	VK9	2100 - 1000	1600 - 1800
	UA	1500 - 1900	2200 - 0200
	ZS	0400 - 1000	
VK4 to	W6	0200 - 0900	
	VK0	2100 - 0900	
	ZS	0400 - 1100	
	JA	0600 - 1000	1300 - 1400
VK5 to	KH6	0300 - 1500	1700 - 1800
	PY	2300 - 2400	
	9G1 (SP)	0600 - 0800	2300 - 0200
	9G1 (LP)	0300 - 0400	0600 - 1000
VK6 to	PY	1000 - 1100	
	UA	1100 - 1200	2300 - 0300
	W1	1100	
	ZL	2200 - 0800	
VK7 to	G (SP)	1800 - 1900	2200 - 0100
	SU	2300 - 0500	
	VK0	2400 - 0500	
	W6	0100 - 1000	1600 - 1800

7 MHz

VK2 to	G (SP)	1800 - 2100
	W6	0700 - 1400
VK3 to	JA	0700 - 2000
	9G1 (SP)	1600 - 2100
VK4 to	VK0	0400 - 2300
	PY	0600 - 1000
VK5 to	KH6	0700 - 1700
	VE3 (SP)	0700 - 1100
VK6 to	ZL	0800 - 2100
	SU	1600 - 2400
VK7 to	VK9	0700 - 2100
	UA	1600 - 2200

Historical Section wants old mags, papers, articles, photos, drawings—up to W.W.2—for copying or as donations. Please write VK3ZS, QTHR or WIA Executive office.

Hamads

* Eight lines free to all W.I.A. members.
* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150 Toorak, Vic., 3142.
* QTHR means that the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Lafayette Receiver HA800, 80 to 6 metres solid state, as new. $160. Ph.: (02) 663 7336. VK2ZKA, QTHR.

Receiver Indicator Unit RAAF Type R65/APN9. $10. **AR7** complete with PSU rack and manual. $60.

Receivers BC455 and CCT46106, 6-9.1 Megs. $15 each.

Modulator A & R, Valve Type AM with 3 transformers and 3 807s. $10.

Will separate, or the lot for $100. VK3YBW, QTHR. Ph.: (03) 52 2661.

Yaesu FT101 Transceiver, 160-10m, complete with MIC, manual, AC/DC plugs, excellent condition. $425. VK3SB. Ph.: (03) 55 03521.

14AVQ 10-40m, trap vertical antenna with instructions. Worked DXCC. $30. VK3BCY, QTHR. Ph.: (03) 848 4775.

Endless Cassettes. Ideal for CW and Phone CQs, SSTV Video CQs, Station and operator identification, Test patterns etc. A few new and sealed 30 and 190 second TDK compact cassettes available at $3.50 each, postage paid. Hear in use on 14230/21340 SSTV. VK1AU, QTHR.

FT 75, with companion external VFO and AC and DC (mobile) power supplies. $300. Write Alan VK3LW c/o Box 520, Geelong or Ph.: (03) 341 2452 B.H.

FT101, mike and fan, as new condition. $485. VK3TG, QTHR. Ph.: (058) 52 1636.

30 ft Tower. Full 3 in. x 3 in. seasoned timber (undercoated). All braces, brackets, nuts and bolts. Ring Mr. Sinclair FIRST 76 9695, after 6 p.m. VK2SK, QTHR.

Swan 350 SSB Transceiver, AC and DC, PS, excellent condition, with manual. $330. VK3ADN, QTHR, but Post Code 3324. Ph.: Lismore 139 (evenings).

VK3 576 MHz Converter, complete with crystal, wired and tested. $26.

VK3 FM Car Phone, IF stages, complete with crystal, wired and tested. $49. VK3BEC, QTHR.

FTDX 560 Transceiver with noise blanker, 160 metre crystal and kit included, perfect condition, $440 ONO. VK2BQQ. GPO Box 3209, Sydney, NSW 2001.

FREE. Box pre-1935 bits, mainly junk but useful to restorers, plus 3 doz. valves, all pre-octal. You can have if you collect. VK3TX, QTHR.

GONSET GSB-100 100W PEP SSB/CW XMTR 80-10m, good cond. w/spare. 6DQ6 final tube, $140 ONO,

Philips EL3542 tape recorder with accessories, good cond. $50 ONO. You pay freight. VK4ZV, QTHR. Ph. (072) 82 2951. AH, (072) 80 2697 Bus.

AWA low band tx, rx, and h.d. 12V supply $12. **LSG11** Sig generator $25. **Class C Wavemeter** $10. 6 and 12 volt battery charger $8. **Heavy duty** power transformers, chokes, quantity 100 ohm co-ax cable, valves, crystals, etc. VK3AHG, QTHR. Ph.: (03) 288-2024.

Receivers specially built for SWLs. **8 Am. bands** 160-10 metres. 16 valves. A/C operated. $160. **Transistor Receiver.** 80-40-20-15 metres. AC or DC operated. 12 volt. 17 transistors and 6 Fets. $100. **Panoramic Adaptor.** 455Kc I/f. Type SA-3 T/200. $60. H. L. Roach. Ph.: (03) 58 3757.

Galaxy GT550 Transceiver, 550 watts, with Matching speaker cabinet, built in PSU. Excellent order and condition, complete handbook. $425.00, had from new, or exchange for Yaesu FT75, cash adjustments. VK7MG, QTHR. Ph.: Swansea 220.

Yaesu FT200 with FP 200 AC power supply, $300 ONO. **Matching** 160 metre transverter, $30. VK3AVO, QTHR. Ph.: (03) 544 4109 AH.

OBITUARY

CHRISTOPHER BRUCE DEIN, VK2ZBK
Died March 15th, 1974.

Amateurs were saddened to learn of the sudden passing of Chris, VK2ZBK, on March 15th at the early age of 22.

He had impressed the many amateurs on the VHF bands with his bright and friendly personality and willingness to help at all times. Chris enjoyed his hobby to the full. Only two weeks before, at the Gosford Field Day, he had entered most events to win one of them.

Few knew of his long standing illness that was eventually to take him from his family and friends. All associated with him were privileged — Chris was a true amateur in every way.

First licenced in 1968, whilst still at school, he was active from home and mobile on the 144 and 52 MHz bands. Perhaps he was proudest of his 525 mobile FM signal that was heard in many parts of the continent.

To his father George, his mother and family and to his fiance Joy, amateurs extend sincere sympathy.

VK2HZ

Audio Oscillator, AWA R7077, $30; Frequency Meter BC221-AL, $30. Both good order, VK5MO. 81 Cave Ave., Bridgewater 5155. Ph. (08) 339 2084.

Oxford black hammertone transceiver cases in cadmium plated steel. 2 off. Included are 2 inch subchassis. Size 7 inches by 14 inches by 10½ inches deep. VK3BDN (03) 848 3959. QTHR.

RME. Converter VHF, freq. range 48.5 to 54.5, 143.5 to 149.5, 219.5 to 225.5, $88. OLd Magnavox speaker box approx. 1920. Offer. VK2UV, QTHR. Ph.: (02) 709 6593.

Copies of **QST** 1970—74 price plus freight paid. VK2KE, QTHR.

WANTED

Information on Wireless Set No. 38 MK2 7.4 to 9 MHz. Also Valves for above 3 x VP23 (ARP12) and 1 x V248A (ATP4). VK3YBW. QTHR. Ph.: (03) 52 2661.

Digital Trainer as in March 1973, EA or similar. Ph.: (02) 663 7336. VK2ZKA, QTHR.

Circuit of PYE PTC 8204 LW FM transceiver. VK1DV, QTHR.

Yaesu FT DX 400 transmitter, details of any extras or mods to VK3ASO, QTHR. Ph.: (052) 71 666.

SSB Transceiver (pref. multi-band) for mobile use. Details to: VK2AFF, QTHR. Ph.: (042) 61 4287 AH.

Good **Collins ART** 13 with HT and Bias Supplies 60 watt CW and AM, all band CW circuitry ... to swap for 12V 2MX carphone or similar. VK2S.. QTHR.

Circuit Diagrams of TV sets, circuit diagram of Tasma AM1000 Transceiver and a good accurate Signal Generator,. State price and condition of all items. T. Bird. 75 Horatio St., Annerley 4103, Brisbane.

Circuit and/or Manual for RX TCA R5223. Please contact Cal Bryant, 16 Arnold St., Holland Park, Qld. 4121.

Inductor 30 mH, variable by Roller Type Wheel. Must be complete with indicating mechanism and suitable for home brew ATU. VK3CN, QTHR. Ph.: (03) 546 1916.

E M C

It is intended that September AR will be an EMC Issue . . .
Any articles on Interference and EMC generally will be gratefully received.
Dead line — 30th June

20 Years Ago

with Ron Fisher VK3OM

MAY 1954

It's always interesting to look back at the gear we used in the past and make a few mental comparisons. A full page advertisement by one of our large disposals dealers of the time gives an indication of what was available and presumably what the average amateur thought of as desirable around May 1954.

Try a few of these. Marconi communication receivers type 1155 at £45. Bendix compass receivers type MN26 at £27. Or what about a Bendix G09 transmitter, often found in the "best" amateur shacks, at only £37/10/-. Perhaps if you couldn't quite run to a G09, a Marconi 1154 transmitter at £12/10 or an AT5 transmitter at only £9/17/6 would fill the bill. For the home brew man what better than a few TU tuning units at £2/10 or £3/10 for the TU6B which covered the 80 metre band and had variable condensers ideal for all band transmitters.

I think we are getting rather better value for our money these days. May 1954 Amateur Radio featured the following state of the art technical articles. Hans Ruckert VK2AOU continued his series on receiver selectivity problems. The double crystal filter was discussed along with a pratical application of it in a typical amateur receiver.

Tom Athey continued his 'Complete Amateur' with the aerial tuner and two power supplies. In typical fashion of the time a 300 volt 200 milliamp supply took up no less than a 17 inch x 16 inch chassis. After all we had to fill that six foot rack come what may.

21Mcs. On the BC348 Receiver by L. Eliason VK3ALE. The 200 to 500 kHz range was modified to give band spread tuning of the new 15 metre band. Perhaps the same technique could be used to provide continuous coverage from 18 to 30 MHz on this still popular receiver. An easily built audio frequency meter reprinted from QST shows how to achieve spot-on frequency checks in the amateur bands in conjunction with a 10 kHz crystal locked multi-vibrator. ●

technical articles for ar

- preferably typewritten manuscript, but hand-written acceptable.
- double spaced, one inch margins, one side only of quarto or foolscap sheet.
- spelling and grammar entirely optional; editorial staff will polish.
- drawings made by AR staff from sketches submitted.
- good, clear, glossy photos welcomed with open arms. do not forget captions.
- send it **now** to:— P.O. Box 2611W, Melbourne, 3001.

● WIA PUBLICATIONS

RTTY-7B Vol. 1		Net Wt.
	$2.50	105g
Vol. 2 (nearly ready)	$3.00	220g
Log Book (VK6 model	$1.00	
1973 WIA Call Book	$1.20	120g

● Back issues of A.R.

March 1972 onwards except June, July, Aug., 1972 and April 1973, all of which are out of print—
1972 issues 30c each
1973 issues 40c each
1974 issues 50c each
each approx. 75 g

Please add sufficient postages for each order

● Magazine Subscriptions

Under revision—please refer to list on page 7, AR, February 1974

● OTHER ITEMS—Please write for new list

W.I.A. "MAGPUBS"
P.O. Box 150, Toorak Vic., 3142

GEELONG HAMFEST

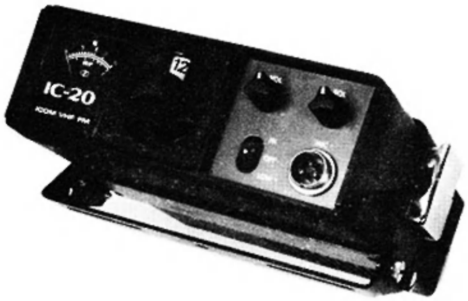
Over weekend 11th and 12th of May 1974.

SATURDAY
1400 hours onwards: Rag-chew, Registration, Car Phone checks, Dinner and Entertainment.

SUNDAY
Display of Commercial equipment, Car Phone checks, Scrambles & TX Hunts on both 40 and 2 metres. Disposal sale, Appetising lunch. Entertainment for everyone.

FURTHER DETAILS
ALAN BRADLEY
VK3LW Secretary,
Geelong Amateur Radio Club,
Box 520, Geelong 3220, or
Telephone Bob Wookey,
Geelong (052) 21-2674.

INOUE COMMUNICATION EQUIPMENT CORPORATION



'ICOM' VHF & UHF FM TRANSCEIVERS

Model:	IC-60	IC-22
General		
Numbers of Semi-Conductors Employed:		
Transistors	32	33
F.E.T.	4	5
IC	1	1
Diodes	20	20
Power Source: (Negative Ground)	13.5V ±20%	13.5V ±20%
Current Drain: Transmit HI-10W	2.1A	2.1A
Transmit LO- 1W	1.2A	1.2A
Receive at Peaking	350mA	350mA
Receive Average	150mA	150mA
Antenna Input:	50 ohms	50 ohms
Dimension: H x W x D in mm	58x156x216	58x156x216
Net Weight:	2 kgs.	2.1 kgs.
Transmitter		
Frequency Range: MHz	50-54	144-148
Band Spacing:	1 MHz	2 MHz
Channels: Crystal Controlled	12	22
RF Output Power: Switchable	10W as HI (high) and 1W as LO (low)	
Mode: (Phone by FM)	F3	F3
Max. Frequency Deviation:	±5-15KHz	±5-15KHz
Modulation System:	Variable Reactance Pnase Modulation	
Multiplication:	2x2x2	2x2x2
Spurious Radiation:	—60dB or less	—60dB or less
Microphone: Dynamic P.T.T.	10 K/ohms	10 K/ohms
Receiver		
Frequency Range: MHz	50-54	144-148
Band Spacing:	2 MHz	4 MHz
Mode: (Phone by FM)	F3	F3
Receiving System:	Double Super Heterodyne System	
IF: 1st MHz, 2nd KHz	10.7 & 455	10.7 & 455
Sensitivity:	a. Better than 0.4 uV at 20 dB quieting b. S+N/N at 1uV input, 30 dB or more	
Spurious Response:	—60dB or less	—60dB or less
Band Width:	a. ±8/±15KHz at —6 dB point b. ±16/±25KHz at —50 dB point	
Squelch Sensitivity:	—8 dB	—8 dB
Audio Output: 8 ohm	1.5W	1.5W
PRICE:	**$198**	**$198**

ACCESSORIES

Microphone, Microphone Hook, Power Cord with Plug, Spare Fuses, Mobile Mounting Apparatus, External Speaker Plug, and Silicon Cloth.

FOR OTHER MODELS SEE MARCH "AR"

VHF FM, PHASE LOCKED LOOP SYNTHESIZED VFO TRANSCEIVER

Model:	IC211
General	
Semi-Conductors Employed:	
Transistor	54
F.E.T.	13
P.U.T.	2
IC	6
Diodes	53
Power Source:	DC 13.8V +15%*
Antenna Impedance:	50 ohms Unbalanced
Current Drain: Transmit HI 10W	Approx. 2.5A
Transmit LO 0.5W	Approx. 1.2A
Receive at Peaking	Approx. 600mA
Receive Average	Approx.400mA
Dimension: H x W x D in mm	111 x 230 x 260
Net Weight:	5.4 kgs.
Transmitter	
Frequency Range: MHz	146-148 Variable
Band Spacing:	2MHz
Main Channel Selector:	146.9MHz
Mode: Phone by FM	F3
Channel S Power: Variable	10W-0.5W
Frequency Deviation:	±5KHz
Modulation System:	Variable Reactance Phase Modulation
Multiplication:	(133-137MHz + 10.7MHz) x 1
Spurious Radiation:	—60 dB or better
Microphone: PTT Dynamic	500 ohms
Receiver	
Frequency Range: MHz	146-148 Variable
Band Spacing:	2MHz
Main Channel Selector:	146.9MHz
Mode: Phone by FM	F3
Receiving System:	Double Super Heterodyne
Intermediate Frequencies:	1st 10.7MHz 2nd 455KHz
Sensitivity:	a. Better than 0.4 uV at 20 dB quieting b. S+N/N at 0 dB Input, 30 dB or more
Band Width: —6 dB Point	±8KHz
—50dB Point	±16KHz
Spurious Response:	—60 dB
Squelch Sensitivity	±8KHz or more
RIT Coverage:	
Audio Output Power: at 8 ohms	Over 1.5W
Marker Frequencies:	30KHz or its multiples by integral numbers
PRICE:	**$356**

Also available: IC30 for 430-450MHz **$328.** Details on request.

NOTE: Available Regulated DC Power Supply Unit for AC Operation for 100, 117, 200, 220 & 240V. Model IC-210 and 211 have inside space for such unit. Available Duplex Communication through Repeaters. Duplex by ±600KHz Installed in IC-211.

1. Current customs procedures requires your signed written order and 5 copies of your Amateur Licence. We will make By-Law application on your behalf.
2. Group orders for 10 or more of any model subject to 5% discount.
3. Bond store rates prevent ex-stock deliveries but most units available 3-4 weeks.

MAICO ELECTRONICS DIVN. SHEAFFER PEN

MOUNT STREET, HEIDELBERG Ph.: 45 2615 TELEX 32720

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GADDIS—**TROUBLESHOOTING SOLID STATE ELECTRONIC POWER SUPPLIES** **$4.60**

SAMS—**HOW TO BUILD SPEAKER ENCLOSURES** **$4.20**

ARRL—**FM AND REPEATERS FOR THE RADIO AMATEUR** **$4.40**

SHANE—**ALL-IN-ONE TV ALIGNMENT HANDBOOK** **$5.95**

EIMBINDER—**FET APPLICATIONS HAND BOOK** **$6.30**

CLIFFORD—**BASIC ELECTRICITY AND BEGINNING ELECTRONICS** **$4.75**

BELT—**PICTORIAL GUIDE TO TAPE RECORDER REPAIRS** **$4.75**

MILLER & TAGGART—**SLOW SCAN TELEVISION HANDBOOK** **$5.95**

GUTH—**BE YOUR OWN TELEVISION REPAIRMAN** **$1.35**

SAMS—**TV SERVICING GUIDE (arranged by trouble symptoms)** **$4.00**

Postages:

LOCAL — 45 cents **INTERSTATE — 70 cents**

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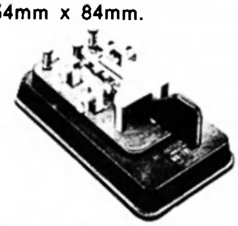
Established 1860 187-193 ELIZABETH STREET, MELBOURNE, VIC., 3000

"The G.P.O. is opposite" Phones 60-1475-6-7

MODEL HK-701. Heavy Duty De Luxe Hand Key, fully adjustable, ball bearing shaft, plastic protective cever. Mounted on heavy non-skid poly marble base. Price**$18.00**
Base dimensions 168mm x 103mm.

MODEL MK-701. Manipulator Paddle (Side Swiper) key. A superb action unit for electronic keying. Price **$22·50**
Base dimensions 154mm x 84mm.



MODEL BK-100. Semi-automatic (bug) key, with standard adjustments, wide speed range, protective plastic cover, on heavy non-skid base, beautifully finished.. Price **$38.50**
Base dimensions 175mm x 75mm.

Manufactured by Hi-Mound, Telegraphic Company, Japan. These keyers are first grade products, beautifully engineered and finished.

Above prices include Sales Tax. **P & P $1.10.**
Prices and specifications subject to change.

bail **ELECTRONIC SERVICES** 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 56, Mascot, 2020	Ph Day 667 1650 A H 371 5445
S A	FARMERS RADIO PTY LTD 257 Angas Street Adelaide 5000	Ph 23 1268
W A	H R PRIDE 26 Lockhart Street Como 6152	Ph 60 4379

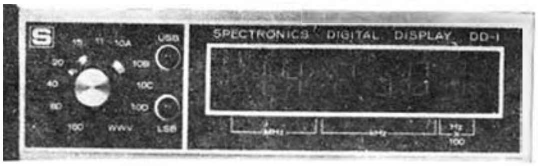
SIDEBAND ELECTRONICS ENGINEERING

YAESU MUSEN TRANSCEIVERS

Prices quoted are with by-law import duties exemption. Firm order must be accompanied by minimum 50% deposit, 3 photo-copies of the amateur station license for the by-law application. Average delay in delivery 6 to 8 weeks.

FT 101 B AC/DC 160 to 10 M and fan $525
FT DX 401 AC supply built-in $495
FT/FP 200, but in very short supply $370
FL 2100 linear amplifiers $375
YC 355 D frequency counter, up to 200MHz, only $250
FT 101/101B/401/560 CW filters $30
FT DX 400/560 noise blankers, $20

For YAESU MUSEN FT-101 and FT-101B, 560 and 401 users, a digital frequency read-out counter, made for the YAESU sets but coming from the U.S.A., plugs straight into the transceivers and reads the operating frequency to 100 Hertz measures 8" wide, 3" high and 7" deep with clear LED digits, $175



144-143MHz Two Metre Equipment

CLEGG FM 27-B 25 Watt output 145-147MHz transceivers, independant continuous receiver and transmitter tuning, with by-law import duties exemption only $350

BELCOM Liner 2 20W SSB PEP 12V DC solid state transceivers $250

KEN PRODUCTS KP-202 hand--held 2W output FM transceivers $150
KCP-2 NICAD battery chargers & 10 NICAD batteries $35

KLM ELECTRONICS solid state 12V DC linear amplifier, 12 Watt output with 1 to 2 Watt drive, ideal for the KEN KP-202, with automatic antenna-change-over when driven $50

YAGI ANTENNAS 9 element 10 ft. boom, with gamma match coax feed $30

MIDLAND PRODUCTS

SWR Meters, 52 ohm impedance, twin-meter type $16
same SWR Meters, single-meter type FSM $12
PTT hand-held microphones 50K dynamic $10
5 Watt CB 23 channel 12V DC operation AM solid state transceivers, complete with crystals for all channels, ideal for future novice licensees. PTT microphone included $95
5 Watt AM 15 Watt PEP SSB CB 23 channel transceivers, same comments $175

PONY CB TRANSCEIVERS

Model CB-74 5 Watt AM 6 channel capacity 12V DC with microphone $80
Model CB-78 5 Watt AM 23 channels, with microphone and all crystals, 12V DC $95

BARLOW-WADLEY RECEIVERS

Model XCR-30 Mark 2 portable crystal controlled communications receivers, cannot get enough of them from South Africa, when available $225

HY-GAIN ANTENNAS & TRANSCEIVERS

14 AVQ 10 to 40 M Verticals, no guys, 19' tall, needs lots of radials $45
18 AVT 10 to 80 M verticals, no guys, 23' tall also needs lots of radials $65
TH 3 JR 10/15/20 M junior 3 el. Yagi, 12' boom 20 lbs weight $100
TH 3 Mk 3 10/15/20 M senior 3 el. Yagi, 14' boom 40 lbs weight 1 KW $145
TH6DXX 10/15/20 M senior 6 el. Yagi 24' boom 60 lbs weight, 1KW $175
204 BA 20 M mono-band 4 el. full size Yagi 26' boom called the TIGER Array and it is a TIGER! $150
DB 10-15 10/15 M 3 el. Yagi ideal for use above the 204 BA 25 lbs. $110
Mobile Whip 108MHz up, with magnetic hold base, 18' RGG-58U, cable and coax plug $18
Mobile Whip, standard base, 12' coax cable & plug $9
BN-86 baluns for beam buyers only $18
Locally made balun $15

ANTENNA ROTATORS

CDR AR 22R $40
HAM-M $130
HY-GAIN model 400 roto-brake, $190
All with control/indicator units
New surplus 8 core control cable, $0.25 per yard.

NOISE BRIDGES

Omega TE 01 up to 100MHz $25

EGG INSULATORS the old style porcelain eggs, a dozen for $1.50

POWER OUTPUT METERS

Galaxy RF-550A with 6 position coax switch $75
Swan WM-1500 4 metering ranges 5 to 1500 W $50

POWER SUPPLIES, 240V AC to 12V DC 3 to 3.5 Amp. regulated output overload protected $26

ELECTRONIC KEYERS Katsumi model EK 105 A 230V AC with key paddle $35

ASAHI AS-303 A set of 5 mobile whips, complete with swivel mount, spring, base section, the lot for $80

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700 WATTS — FIVE BANDS — SSB-CW-AM TRANSCEIVER

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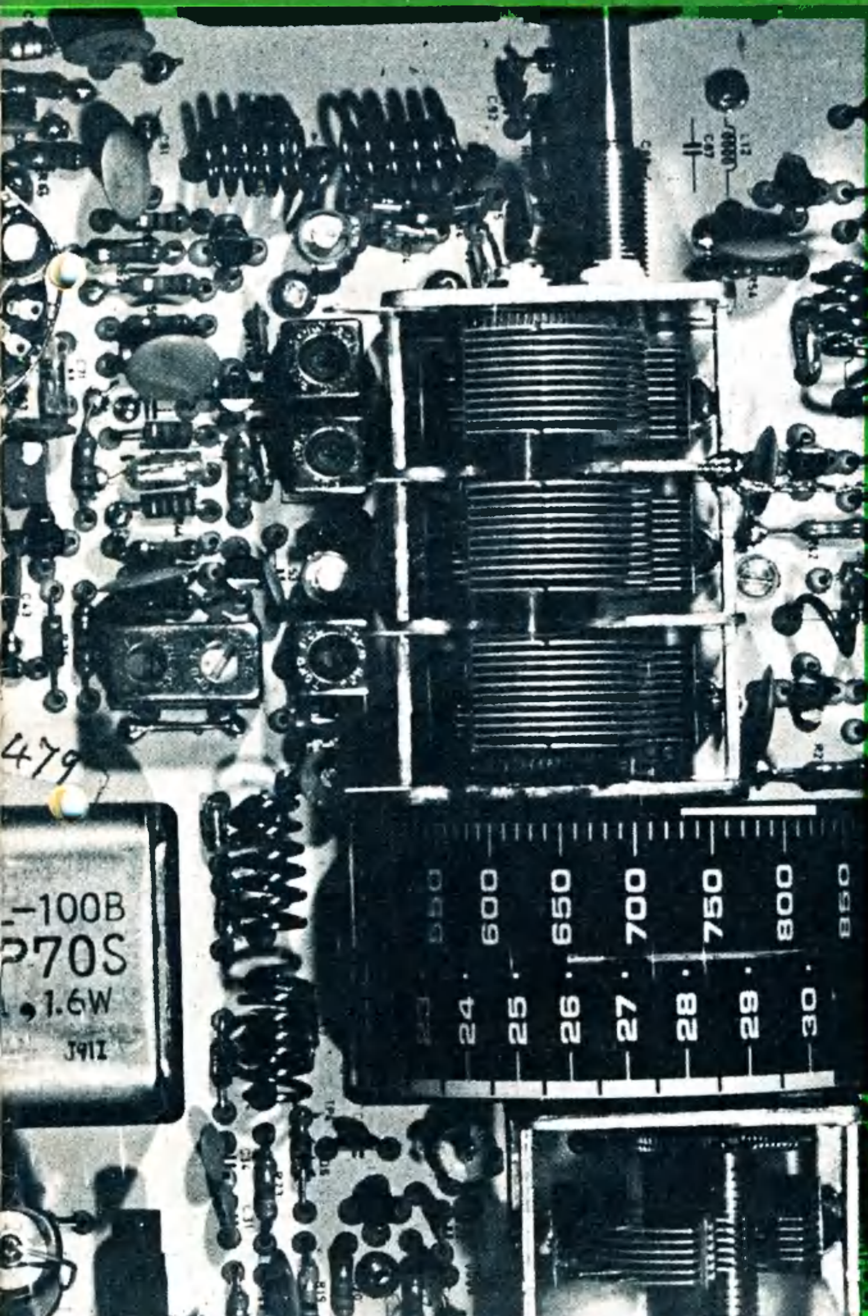
amateur radio

JUNE, 1974



- REPORT ON 1974 FEDERAL CONFERENCE
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JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15
SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
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F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

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AUDIO GENERATOR — Model TE-22D
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt. Square 7 volt
Output Impedance: 1000 ohm
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Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
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With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
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Dimensions: 140 x 215 x 170mm
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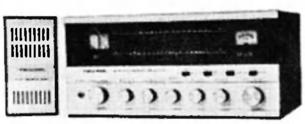

The popular REALISTIC DX150B which has gone from strength to strength with amateurs, shortwave and broadcast listeners alike, now has a further improvement, A SEPARATE MATCHING SPEAKER included.
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now price — **$189.00**

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GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
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- Continuous Electrical Bandspread Calibrated 80-100M Amateur Bands.
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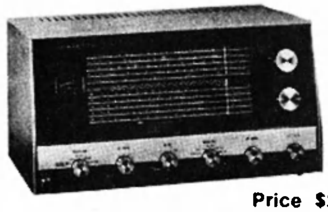

Price $215.00
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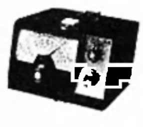
Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration facility: $210.00. 100kHz Xtal Extra $10.75. P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR
MODEL SG-402



This is an all solid state, wideband RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES
1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
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Ericaicn Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. $19.50 Tested. p&p 75c
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MODEL CO-1303A
SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
3. All solid state construction for compact, lightweight portability.
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
5. Direct input to 150MHz for SSB and AM transmission monitoring.

Price $150. p & p $2.00

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Brand new PMG-type relay racks containing relays, capacitors, transistors, reed relays and many other small components
$8
Other larger units from
$15

Coax. Cable, 58 ohm Ascand 15 P1/24. Brand new 1/8" outside diameter. 12c per yard. $10 per 100 yard reel

C11 Transmitter, AM or CW, made by Plessey (England). Continuous coverage from 2-16 MHz in 4 bands. Complete with 24 Volt power supply, cables, mike, etc.
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Brand New AWA Harmonic Generators, 240 VAC operation 10, 100 and 1000 kHz fundamentals with provision for external modulation
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(Disposal Branch)

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HAM RADIO SUPPLIERS
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Phones: 67-7329, 67-4286 All Mail to be addressed to above address

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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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CONTENTS

FRONT COVER

An interesting internal view of part of the Barlow Wadley receiver.

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DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI
First broadcast scheduled for Sunday 21st April and thereafter same day and time:
10.00Z 3595 kHz
7146 kHz
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI
11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.866 MHz AM
145.13 MHz AM
Hunter Branch Mondays 19.00h 80m.

VK3WI
10.30 local time Sundays:
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI
09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch B FM. BC officer VK4HB.

VK5WI
23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambier on 2m

VK6WI
09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM

VK7
09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

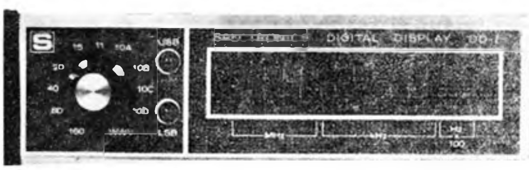
SIDEBAND ELECTRONICS ENGINEERING

YAESU MUSEN TRANSCEIVERS

Prices quoted are with by-law import duties exemption. Firm order must be accompanied by minimum 50% deposit, 3 photo-copies of the amateur station license for the by-law application. Average delay in delivery 6 to 8 weeks.

FT 101 B AC/DC 160 to 10 M and fan **$525**
FT DX 401 AC supply built-in **$495**
FT/FP 200, but in very short supply **$370**
FL 2100 linear amplifiers **$375**
YC 355 D frequency counter, up to 200MHz, only **$250**
FT 101/101B/401/560 CW filters **$30**
FT DX 400/560 noise blankers, **$20**

For YAESU MUSEN FT-101 and FT-101B, 560 and 401 users, a digital frequency read-out counter, made for the YAESU sets but coming from the U.S.A., plugs straight into the transceivers and reads the operating frequency to 100 Hertz measures 8" wide, 3" high and 7" deep with clear LED digits, **$160**



144-148MHz Two Metre Equipment

CLEGG FM 27-B 25 Watt output 145-147MHz transceivers, independant continuous receiver and transmitter tuning, with by-law import duties exemption only **$350**

BELCOM Liner 2 20W SSB PEP 12V DC solid state transceivers **$250**

KEN PRODUCTS KP-202 hand--held 2W output FM transceivers **$150**
KCP-2 NICAD battery chargers & 10 NICAD batteries **$35**

KLM ELECTRONICS solid state 12V DC linear amplifier, 12 Watt output with 1 to 2 Watt drive, ideal for the KEN KP-202, with automatic antenna-change-over when driven **$50**

YAGI ANTENNAS 9 element 10 ft. boom, with gamma match coax feed **$30**

MIDLAND PRODUCTS

SWR Meters, 52 ohm impedance, twin-meter type **$16**
same SWR Meters, single-meter type FSM **$12**
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5 Watt CB 23 channel 12V DC operation AM solid state transceivers, complete with crystals for all channels, ideal for future novice licensees. PTT microphone included **$95**
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Model XCR-30 Mark 2 portable crystal controlled communications receivers, cannot get enough of them from South Africa, when available **$225**

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TH 3 JR 10/15/20 M junior 3 el. Yagi, 12' boom 20 lbs weight **$100**
TH 3 Mk 3 10/15/20 M senior 3 el. Yagi, 14' boom 40 lbs weight 1 KW **$145**
TH6DXX 10/15/20 M senior 6 el. Yagi 24' boom 60 lbs weight, 1KW **$175**
204 BA 20 M mono-band 4 el. full size Yagi 26' boom called the TIGER Array and it is a TIGER! **$150**
DB 10-15 10/15 M 3 el. Yagi ideal for use above the 204 BA 25 lbs. **$110**
Mobile Whip 108MHz up, with magnetic hold base, 18' RGG-58U, cable and coax plug **$18**
Mobile Whip, standard base, 12' coax cable & plug **$9**
BN-86 baluns for beam buyers only **$18**
Locally made balun **$15**

ANTENNA ROTATORS

CDR AR 22R **$40**
HAM-M **$130**
HY-GAIN model 400 roto-brake, **$190**
All with control/indicator units
New surplus 8 core control cable, $0.25 per yard.

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Omega TE 01 up to 100MHz **$25**

EGG INSULATORS the old style porcelain eggs, a dozen for **$1.50**

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Galaxy RF-550A with 6 position coax switch **$75**
Swan WM-1500 4 metering ranges 5 to 1500 W **$50**

POWER SUPPLIES, 240V AC to 12V DC 3 to 3.5 Amp. regulated output overload protected **$26**

ELECTRONIC KEYERS Katsumi model EK 105 A 230V AC with key paddle **$35**

ASAHI AS-303 A set of 5 mobile whips, complete with swivel mount, spring, base section, the lot for **$80**

All prices quoted are net, cash with orders, basis Springwood, N.S.W. Sales tax included in all cases, prices subject to changes without prior notice. Sorry, no terms nor credit or COD, only cash and carry. Government orders same conditions!
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TELEPHONE (STD 047) 51-1394

QSP

Amateur Radio is a hobby. An absorbing hobby. A rather special hobby, in that, to participate, one must qualify before participating.

It follows, then, that we must act responsibly to retain our privileges and we must consider our activities in this context.

Yes, Amateur Radio is political. But only in the sense that the corporate body must negotiate with various authorities, both in this country and other countries, via our international affiliation with IARU.

Internally we should be concerned with those activities which are aimed at enriching our hobby and by being useful to our community, should the need arise.

We must foster the principles of Interstate and Intra-State co-operation as well as International fellowship.

I would like to conclude with the six precepts of the Amateur Code:

One The Amateur is Gentlemanly . . He never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others. He abides by the pledges given by the WIA in his behalf to the public and Government.

Two The Amateur is Loyal . . . He owes his amateur radio to the WIA and he offers it his unswerving loyalty.

Three The Amateur is Progressive . . . He keeps his station abreast of science. It is built well and efficiently. His operating practice is clean and regular.

Four The Amateur is Friendly . . . Slow and patient sending when requested friendly advice and counsel to the beginner, kindly assistance and co-operation for the broadcast listener; these are marks of the amateur spirit.

Five The Amateur is Balanced . . . Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school, or his community.

Six The Amateur is Patriotic . . . His knowledge and his station are always ready for the service of his country and his community.

J. J. Martin VK3TY
Executive Member

IARC

QST Feb. '74 lists a meeting of the International Amateur Radio Club at ITU HQ in Geneva on July 27th and 28th 1974. If you are likely to be up that way. It will be a technical meeting and for further details contact IARC President, Dr. M. Joachim OK1WI, ITU, Place des Nations, 1211 Geneva 20, Switzerland.

QUERNSEY GC8

A note from VK3APN includes times and frequencies for the rest of 1974 when GC8HT will be on sched. for 1 hour at a time relevant to VK operators. For June the dates, times, frequencies and modes are:

10th	0800 Z	7043	CW
	0900 Z	7083	SSB
16th	0900 Z	7083	SSB
17th	0700 Z	14013	CW
	0800 Z	14043	CW
	0900 Z	14113	SSB
23rd	0900 Z	14113	SSB
25th	1400 Z	14173	SSB

When QSLing write the month in words. GC8HT prefers direct QSLs to Box 100, Guernsey, G.C. with SAE plus 1/IRC for surface mail reply or 2 IRCs for air mail reply.

ENERGY CRISIS

"Although large-scale use of wind-driven generators declined in the USA with the introduction of the rural electrification programme in the '30s, there is a revival of interest in alternative energy sources resulting from the threat of the growing energy crisis, several individuals in the US are presently utilising wind-driven generators as their only source of power in the home and are finding it quite adequate". Part of an article in Feb. '74 QST.

Afterthoughts

Fig. 1 on page 14 of April AR. Total length of antenna is 102 ft, not one leg which should be shown as 51 ft.
AMEND YOUR COPY NOW!

In the "Afterthoughts", page 11, May AR, the square root sign on the right hand side of equation 3 should cover 2A only. In equation 6 the square root sign covers the first bracketed section only. The photographs 3 and 4 are back to front and upside down.

DEPARTMENT OF CUSTOMS & EXCISE
Quote 72/78684

April 18 1974

Dear Mr Dodd,

I refer to past correspondence concerning by-law admission of transceivers designed exclusively for amateur radio use.

The situation has been under review for some time and it has now been decided that amateur transceivers may be admitted under by-law without the necessity of producing an Amateur Station Licence.

In accordance with this decision, a reference operating on and from 1 April 1974 is currently being inserted in the Consolidated By-law references publication to provide for duty free admission of amateur transceivers up to and including 29.7 MHz.

While this will cover the bulk of imported amateur transceivers, there are units operating on higher frequencies that will, of course, not be covered. The situation in respect of these is still under review.

However, pending completion of this review, consideration will be given to by-law admission of specific models on receipt of formal by-law applications, accompanied by details of the goods concerned and evidence establishing that suitably equivalent goods are not reasonably available from Australian manufacturers.

Yours sincerely,
R. P. Monck
for P. A. MURPHY
Director, By-law Operations

Mr. P. B. Dodd,
Secretary
The Wireless Institute of Australia
PO Box 150
TOORAK Vic. 3142

VHF/UHF ADVISORY COMMITTEE

The Chairman of the WIA VHFAC advises the Committee is about to look into the replies to questionnaires relating to the 6m band. Has anybody anything to submit about this band? If so, it is recommended you write at once to VK3ZPA QTHR. Include your ideas on the 2m band too if you want to. Also any uncompleted questionnaires would be welcome properly completed.

IARU

News has come to hand that the Pakistan Amateur Radio Society has applied to IARU H.Q. for membership. The secretary of the society is M. Noor Khan and the address is given as PO Box 65, Lahore, Pakistan.

WARC 1979 — ITU GENEVA

Tom Clarkson, ZL2AZ, writing in his Report to NZART for 1973 as published in Break-In for April 1974 stresses the vital significance to the amateur service of the World Administrative Radio Conference scheduled for 1979. He wrote 'They (FCC/ARRL high-level committee in the USA) are approaching the task of evaluating all aspects of the Amateur Service. The frequency space it needs, or deserves, is being scrutinised in great detail. This includes the justification for having amateur activity'.

experiments in modulation and audio part four

J. A. Adcock, VK3ACA
P.O. Box 106, Preston, 3072

Here is the concluding and perhaps most controversial part of the series. If you too would like an analogue compressor, then read on.

PERFECT COMPRESSION (System 5)

As described earlier, equation (6) represents the complete waveform of an SSB signal. This in simplified form is A sin ($\theta_2 + \theta_1$) where A, θ_1 and θ_2 are as previously defined. If this signal is heavily RF clipped or RF compressed, the result will be k sin ($\theta_2 + \theta_1$), that is, the A or variable amplitude component of the waveform has been removed and replaced by a constant k. When the signal is heterodyned back to audio, the result is simply sin θ_1 or the original audio with amplitude variations removed.

A similar result can be produced using the analogue computer by dividing the original audio by A in which case we have . . . .

$$\frac{A \sin \theta_1}{A} = \sin \theta_1$$

A is as defined for equation 4.

This process was referred to in system 4. The circuit for carrying out this operation is shown in fig. 11. Note that the waveform produced by this system will not be the same as one which uses audio clipping.

If the audio from this system is fed into the microphone jack of an SSB transceiver, the signal coming out of the aerial terminal will be almost the same as if RF clipping and RF filtering had been used. (9dB advantage has been claimed for RF clipping in reference 1).

There is one small problem which is easily overcome. With zero signal input ($A = 0$) there is a situation of zero divided by zero at the divider and noise is the result. To overcome this, slightly less than complete compression can be used. This is done by introducing a small offset into the divider. The complete equation will now read, output:—

$$= \frac{A \sin \theta}{A + a}$$

Where "A" is derived from equation (4) and "a" is a small constant, that is small as compared with "A" peak.

(This also overcomes the very objectional distortion that complete removal of the amplitude produces.—Technical Editor.)

CONCLUSIONS — SYSTEMS 4 AND 5

Tests so far have produced encouraging results. It was found necessary to provide a simple integrating circuit at the input of the system to produce a 6dB per octave roll off above 300Hz. At the time of writing, the need for this is not understood.

Simultaneous amplitude modulation by the envelope has not so far been tried. The signal which is present between speech is annoying to the listener and should be eliminated if possible.

This system presents a number of interesting possibilities to anyone who wishes to experiment with new ideas. It at least shows there are some new methods of attack on old problems.

The system described presents a new flexibility in generating SSB. For example, by reducing the deviation narrow band, SSB can be produced! In effect, the frequency of the audio produced can be divided by any required factor. For example, by using half deviation, the modulating audio is divided by two and therefore the result would be similar to modulation, by half frequency audio, from system 3. Also suitably reduced deviation can be used before feeding the signal into a varactor multiplier. For example by division of the frequency components by three and heterodyning to 144 MHz an SSB signal is produced that may be successfully tripled in a varactor circuit to 432 MHz. Result is good quality UHF SSB.

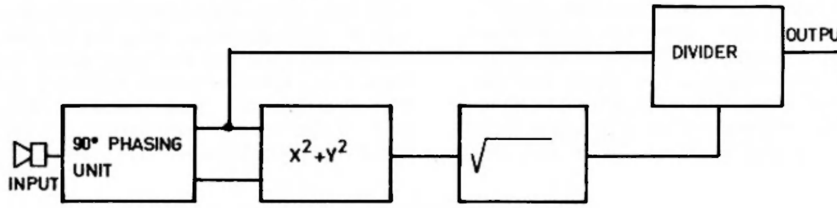


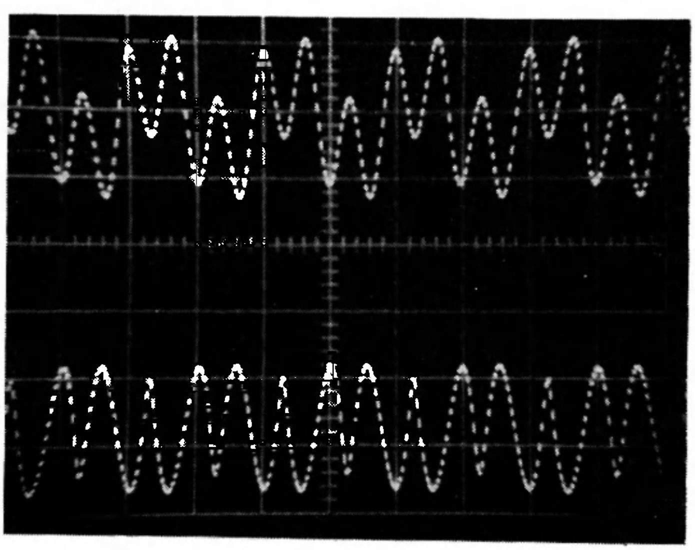
FIG 11 PERFECT COMPRESSOR

The compressor system was undoubtedly the simplest of all to get going and the results are very effective. The actual construction of a unit to perform this function is not a difficult job — don't be frightened by the use of the term computer. The whole unit could be built on a PC board with several trimmers for offset adjustment. Four "four quadrant multipliers" are required for about $4 each. The rest of the circuit consists of several operational amplifiers and a number of conventional components.

On a predesigned PC board, it should be much simpler than building an extra filter into an SSB rig. If none of the other systems appeal I am sure this one will.

The author would appreciate contacts with anyone interested in developing the subject further. He is active on 1.8, 7 and 144 MHz but can use most modes on all bands up to 144 except 52 MHz. Anyone interested in demonstrations of the system can make a sked by writing or telephone.

The author would like to thank Dan Van Elkan, VK3UI and several others for their assistance in carrying out on-air tests.



PHOTOGRAPH 5. OPERATION OF THE ANALOGUE COMPRESSOR. Horizontal Scale: 1 division = 1 ms. Upper Trace: Two tone audio input. Lower Trace: Compressor output.

References

1 QST Jan. 1969

(Note systems 2, 3, 4 and 5 have been covered by provisional patents.)

Further ideas on the Ubiquitous G5RV

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The article in January 1973 Amateur Radio by the originator of this famous antenna was extremely interesting, but there are a few further points which have resulted from re-locating my station from a quiet semi-rural QTH to an urban situation which is much more noisy.
These modifications concern the low impedance feeder from the Z match to the bottom of the 300 ohm feed-line, and a method of feeding and matching the antenna as a top-loaded vertical for 160 metre operation.

The usual form of the G5RV is a 102 ft centre-fed flat-top antenna, which works best when at least 30 ft high. Even the G5R-inverted-V works well on a single central pole. The central feeder is usually a 20 metre half-wave resonant piece of 300 ohm or open wire line which it pays to grid-dip before erection by shorting both ends, stretching out full length and grid-dipping to say 14 150kHz. From the bottom of this to the transmitter or Z match (which should always be used with a multi-band aerial) it has been usual to employ coaxial cable of 50, 70 or 100 ohms impedance.

This is fine for transmitting but the outside of the coax cable picks up more noise than I wanted to hear, and much of this is transferred capacitively to the Z match tuned circuits from the link. The 80 and 40 metre bands were worst affected in this regard.
Remedies for this were firstly to replace the coax cable with balanced feeder such as lamp flex, Telcon 72 ohm twin-lead, or a low Z balanced quad line, and secondly to earth the centre tap on the low frequency link on the Z match. A third remedy, after the implementation of the former, was the fitting of a cylindrical Faraday shield be-between the coils. However, this provided only marginal, though measurable, improvement.

In his article in Amateur Radio for January, 1973, Page 7, Louis Varney mentions the use of 70 ohm twin lead or the use of 83 ft of 300 ohm line directly to the ATU. However, I had fears about operating the former at 350 watts and high SWR, and the open wire line is sometimes unsightly in the house.

The twin lead used was twisted polythene coated copper wire from discarded multi-core telephone cable. The wire was designated 20 lbs per mile or about 20 SWG. A balanced quad was also tried connecting diagonally opopsite wires together, but little improvement was noticed. About 30 ft of the twisted line showed no sign of distress with 350 watts pep SSB. Black PVC tubing was pulled over the twisted pair as a weather and ultra-violet light shield where the feeder is in the open.

Noise varies with time and weather but, typically, the above measures reduced S6 or 7 levels to less than S3. The Faraday shield resulted in a further reduction of about 6db or 1S point, but did not make any great difference to readability of signals on 80 metres.

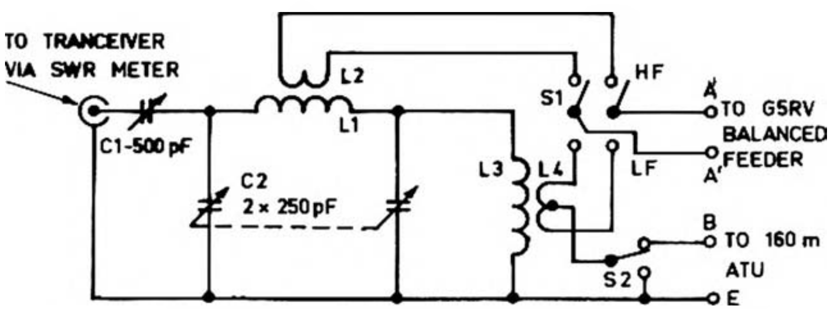

FIG 1 MODIFIED "Z" MATCH – ORIGINAL FROM RADIO COMMUNICATION HANDBOOK RSGB P13·37 FIG 13·60

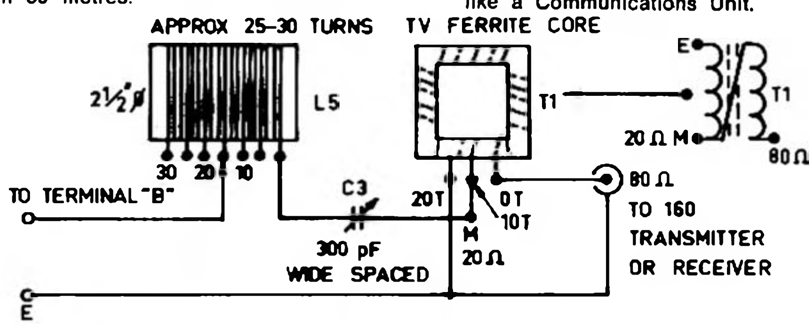

FIG 2 ANTENNA TUNING UNIT FOR 160 METRES

Fig. 1 shows the general arrangement of the G5RV and Z-match. The additional switches shown are well worth-while. S1 enables the antenna to be switched to L2 for 10, 15, and 20 metres, or to L4 for 20, 40 and 80 metres, and saves having to jump up to unplug or operate on terminals. The other switch, S2, enables the antenna to be fed against ground for 160 metre operation. A good earthing scheme is needed, such as stakes, radials, etc., but this will not be elaborated on here.

The centre point of the link L4 is a convenient point for feeding, and both 160 metres on a receiver and another band on the transceiver may be monitored at the same time, but it is inadvisable to energise two transmitters into one aerial.

The suggested method of feeding and matching at 160 metres is shown in Fig. 2. Looking into the resonant antenna via L5 and C3 at point M with a noise bridge, for a typical G5RV at about 30 feet height, a radiation resistance of about 20 ohms is measured. The transformer T1 consists of a TV timebase ferrite core (2 sections forming a square loop) with 20 plus 10 turns (bifilar wound) to give a 4 times impedance step-up to 80 ohms, into which the transmitter pi-network loads happily.

Select a tap on L5 which permits C3 to tune 1815 kHz when near maximum capacitance. C3 may be calibrated for 1875kHz for receiving ZL CW stations and up to 2000kHz for other DX as required. This tuning is useful for reducing BC station overloading of the receiver front end and the resulting beats and harmonics. L5 is a coil of about 25 turns 2½ inches diameter tapped every 5 turns or so. C3 is a transmitting type capacitor of about 300 pf, with widespread plates mounted on insulators well clear of the chassis or box and with an insulated drive coupling.

I trust these notes may be of value to those 6-bands-on-one-antenna men, whose band-changing must all be done in the shack, and whose homes must not look like a Communications Unit. ●

Receiver AFC for RTTY

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The author describes an electronic method of providing AFC for RTTY signals which has obvious advantages over an earlier mechanical system, but can still be applied to most receivers with a minimum of modification.

We are all aware that occupancy of the amateur bands has increased rapidly over the past decade with resultant increase in QRM. To combat this, RTTY enthusiasts accepted the necessity to reduce bandwidths. The 850Hz frequency shift with relatively broad band channel filters has been discarded in favour of using 170Hz. As a result of this, greater selectivity is required in mark and space channel discrimination.

When 170Hz shift was introduced some years ago, both transmitting and receiving equipment stability was not of the same order as is generally found today, but even so there are still some signals which require that a constant check be made of receiver tuning. In earlier days of the narrow shift, a hand had to be constantly kept free to re-adjust tuning during a QSO. One who suffered this was Jack Kenner VK3PB and it was he who first attacked the problem and evolved a mechanical AFC unit which was **shunted** on to the tuning knob of his then used Galaxy 5. This unit was subsequently described in **Amateur Radio** in the November 1967 issue.

The author, more electronically than mechanically minded, also attacked the problem. After sorting through the junk box, he devised an AFC unit which is still in service, and is likely to be until sufficient time and energy is mustered to complete a solid state version which has been on the drawing board for some time.

PRINCIPLE

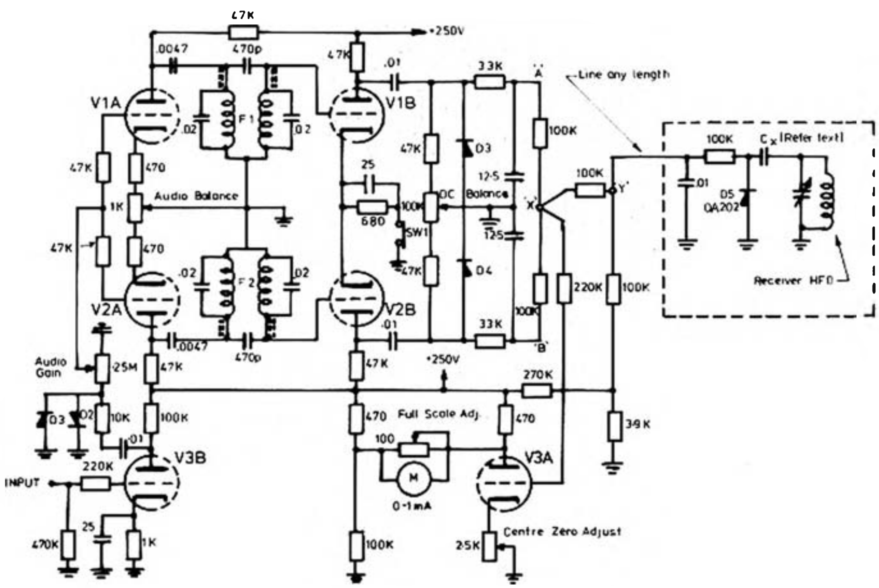
The principle of operation of the unit to be described is to use the mark frequency at the receiver output to control the frequency of the receiver HFO in such a way that minor changes in the audio frequency (2125Hz) are translated as a change in potential above or below a reference amplitude applied to a Varicap diode associated with the oscillator.

In early experiments it became obvious that changes in audio level due to QSB resulted in changes in the potential applied to the Varicap with resultant **hunting**. This was overcome by the introduction of severe audio limiting. It also became evident that efforts to control over a fairly wide frequency range were not practical because of the possibility of AFC capture by an adjacant signal. After some usage, satisfactory parameters were resolved and the circuit shown by the accompanying diagram was decided upon. This the **initiated** will immediately recognise as resembling the input and detecting systems of a conventional two-tone terminal unit.

With reference to the circuit diagram, audio at the same level as that fed to the TU is applied to the grid of V3B via a resistive network which limits excessive grid current when relatively high signals are applied. V3B amplifies and limits; further and more severe limiting is applied by the two diodes (D1 and D2) associated with the anode network. As a result, audio fed to the grids of V1A and V2A remains constant for any useful level of signal from the receiver.

Associated with the anodes of V1A and V2A are the filters F1 and F2, the resonant frequencies of which are centered on 2100 and 2150Hz respectively. These filters are made as sharply resonant as possible even to the extent of **ringing**. Output from the filters is amplified by V1B and V2B and rectified in opposite polatity by diodes D3 and D4. The resultant DC is distributed in the associated network having a termination at point **X**.

To examine operation up to this point, assume a frequency of 2125Hz is applied at the input. It is amplified, limited and again amplified at a constant level. Because the filters are centred 25Hz either side of 2125Hz, the resultant DC from either rectifier will be less than would be the case if the applied frequency corresponded to the filter resonance. Additionally, if the amplification of V1A and V1B equals that of V2A and V2B, and the response curves of the filters are equal, a 2125Hz signal would produce equal positive and negative potentials at point **X**. In the event of the resistor connecting **X** and **Y** being removed this would result in the potential between **X** and ground being zero.



Note
V1 & V2 - 12AT7
V3 - 12AX7
D1-4 - OA200 or any gen purp diode
F 1-2 - Refer text

AUTOMATIC FREQUENCY CONTROL FOR RTTY RECEIVERS

This is the desirable effect in practice and to achieve this a balancing control is associated with both the audio amplifier and DC network.

Assume now, that the input frequency changes from 2125Hz. If it goes lower, it approaches the resonant peak of F1 so the positive potential at **X** tends to rise. Because the frequency moves further away from the centre frequency of F2, negative potential at **X** tends to fall, and point **X** becomes positive with respect to ground.

Conversely, a rise in the applied frequency causes **X** to become negative with respect to ground.

CONNECTION TO RECEIVER

Leave this portion of the circuit for the moment and pass to that portion associated with the receiver. It will be seen that a diode is coupled via Cx to the **hot** end of the receiver HFO tank circuit. It will also be seen that a reverse potential (+4V.) is applied via two 100k resistors in series. This potential was chosen as that which causes the particular diode (OA202) to assume a capacity near the centre of its useful range, which rises or falls with a change of applied potential.

Cx which couples the diode to the tank circuit must be chosen by experiment for a particular receiver, and should be as low in value as will provide adequate frequency control, and at the same time not disturb receiver calibration more than a minor amount. In those receivers **doctored** by the author, the highest capacity used was 2.2 pF. In some instances sufficient control was obtained by winding two or three turns of solid pvc covered hook-up wire around a lead associated with the **hot** end of the HFO. Needless to say, the diode and its associated components should be mounted as close as possible to Cx and made quite rigid in mounting. The lead from the .01 capacitor to the AFC unit can be any convenient length and an earth return between the receiver and the AFC unit should also be included.

To assist in the choice of Cx, the following symptoms will be exhibited for incorrect value. (i) Too high value will result in over control of the receiver and will be manifest in the receiver **hunting**, (an effect brought about by the relatively slow time constant of the RC network associated with the rectifiers). (ii) Too low a value will result in too great a lag in correction of HFO frequency, or no correction at all.

It is conceded not every ham wishes to disturb the **innards** of his costly transceiver and this was the main reason behind VK3PB's resort to the mechanical and totally external AFC unit. However, many commercially produced ham transceivers have a **clarifier** facility which controls receiver frequency without disturbing the transmitter. In many cases the clarifier control changes the potential applied to a Varicap diode, in which case a facility is already available which could be controlled by potentials developed by the AFC unit. Perhaps some enterprising ham may care to investigate this.

The only difficulty liable to be encountered in construction of the AFC unit would be the filters F1 and F2. In the author's case the inductors are a nominal 300mH wound on Ferroxcube adjustable pot cores type LA2400. The parallel capacitors are Styroseal 0.02 uF of 1% tolerance, and the coupling capacitors 470 pF ceramics. Choice of the Styroseal capacitors lies in their temperature co-efficient being opposite to the pot cores, thus resulting in good frequency stability over a large range in ambient temperatures. The particular pot cores used are probably no longer available, but a substitute may be the Siemens Type 185T2 - N22 having dimensions 22 x 13. Winding details for particular values of inductance are available from the manufacturers.

ADJUSTMENTS

Adjustments to the AFC unit are facilitated by the metering. This is an essential part of the unit as it provides a continuous visual means of monitoring any drift which may occur away from the 2125Hz mark units during reception of the RTTY signal.

Before switching on power to the unit, see that the **full scale adj.** potentiometer shunting the meter is at its lowest value; this ensures no damage to the meter during preliminary adjustments. Next disconnect the 100k resistor between **X** and **Y**, open SW1, remove V3 from socket, switch on power and turn the **full scale adj.** control to obtain a full scale reading on the meter. Replace V3 and after allowing a warm-up period set the **centre zero adj.** control to obtain exactly half scale deflection. This reading is the result of the standing +4V bias. Short circuit point **X** to ground and note the meter returns towards full scale. Remove the short circuit from **X**, the meter should return to centre.

With the 100k resistor still disconnected again ground point **X**. Switch off power and adjust the moving arm of the DC balance control to the point where it is resistively centered. Close SW1 and re-apply power. Connect a source of audio to the input. This can be either an audio frequency generator or the receiver itself. The object being to apply a frequency which corresponds to the centre of the mark filter in the TU and which may be varied either side of that frequency. A simple means of doing this is to apply a **netting** signal to the receiver and adjust tuning to the point where a heterodyne provides the mark frequency. With a low level output from the receiver (the minimum level the TU will operate from), apply a VTVM or a high resistance mulit-meter between points **A** (positive) and **X** (earth), and vary the input frequency to obtain a peak reading on the meter. If the peak appears broad, adjust the Audio Level control until a relatively sharp amplitude peak is obtained as the signal is varied through resonance of the filter. Note the value of the meter reading.

Transfer the meter to point **B** (neg.) and **X** (earth) and vary the input frequency above the nominal centre frequency noting any difference in DC amplitude from the previous reading. Any discrepancy should be corrected by means of the Audio Balance control. A minor discrepancy of say 5% can be tolerated. Beyond this, steps must be taken to provide a better balance which can usually be done by applying a capacitor across the cathode circuit of the half of either V1A or V2A which exhibits the lower amplification. An important part of these adjustments is to allow sufficient time for the DC potentials to stabilise because the time constants of the 12.5 uF capacitors introduce a lag. A final DC balance is obtained by the adjustment of the DC balance control to the point where zero potential exists at point **X** when the applied frequency corresponds to the centre frequency of the mark filter in the TU.

Replace the 100k resistor between points **X** and **Y**, but leave the lead to the varicap in the receiver disconnected. Open-circuit SW1 and check that the meter still reads centre scale, then close SW1 and vary input frequency either side of the mark frequency. At the peak frequencies of F1 and F2 the meter should read zero and full scale. A minor adjustment may be needed to the meter adjusting controls, but the important thing is that when the input frequency corresponds to the centre of the mark filter in the TU, the meter should return to a centre reading.

Connect the lead to the varicap in the receiver and slowly trim the receiver either side of a signal supplying an output frequency corresponding to the centre-mark frequency (2125Hz). Watch the AFC meter move either side of centre, due to variations of the audio output frequency not more than about 5Hz. As the frequency is tuned away from the mark frequency, the meter will reach full scale or zero and then return to centre scale. This indicates that control has been lost.

A condition which may arise when the foregoing tests are being made, particularly if the receiver employs two mixers (double superheterodyne) is exhibited by the receiver refusing to **lock** in on the mark frequency. This is easily overcome by reversing the grid connections to V1B and V2B.

OPERATION

When tuning to a RTTY signal leave SW1 open and use the normal tuning procedure. When print out is satisfactory, close SW1. If the receiver is exactly tuned the meter will indicate a centre scale reading. If not, trim the receiver until a centre reading is obtained. Thereafter, any drift will be indicated by the meter and from time to time, the receiver may be re-tuned to maintain a centre reading. This trimming will not change the audio output frequency if done slowly. With experience, the meter will indicate if the signal has drifted high or low and thus the appropriate direction for re-tuning.

The long time constant of the DC filtering network provides a sufficiently constant potential to be maintained at point **X** during normal RTTY transitions between mark and space units. The TC is short enough to allow **tracking** of a normal slowly drifting signal.

The power supply is not discussed as it may be a conventional supply delivering about 250V HT and 6.3V AC for heaters. Component layout is not important in the AFC unit, nor is shielding as it is not operational during transmission. ●

VK6IZ Double Inverted Vee

more gain for less money

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Many amateurs find that twenty metres requires a better antenna than just a dipole and are perplexed as to how to get more signal. Here is a solution that will give good results and cost a minimum to build.

A beam costs about $200 and a quad over $100. Then there is the problem of what to hold it in the air with. A tower is the most popular device, ranging in price from perhaps $50 for a used tower up to many hundreds of dollars, depending on the type desired. The more expensive types might be crank-up, non-guyed (with tilt over action). Of course a heavy duty rotator such as a Ham M costs around $130 plus cable, freight, etc., and the cost never seems to end.

This antenna, which may also be built for other bands if desired, is known as a **double inverted vee,** gives good directivity and power gain in the direction chosen, but also allows signals to be heard and worked from the sides and back. Construction is relatively simple and cost can be held to a minimum depending on how it is constructed. The antenna will give a much lower angle of radiation and thus a better signal to DX areas not normally workable with simple antennas such as a dipole.

When finished the antenna looks like the outline of a tent, Fig 1. The lower this antenna is placed to the ground the shorter the elements become due to ground effects. This can be determined by experiment with an SWR meter and cut and try, the easiest method being to allow a foot or two of the element to hang down beyond the end insulator, where it may easily be trimmed. This saves unfastening insulators each time. Fig 2 shows how the connections may be made at the feed-point. Alternatively the elements and co-ax may be soldered together at the appropriate points using egg insulators or similar supports. Theoretically a 1.1 balun should be used at the feed-point, but it does not appear to make much difference.

The antenna will work well with 75 ohm co-ax but the SWR will be slightly higher, although not excessive (less than 1.5 to 1). With 52 ohm co-ax SWR should be near unity, depending somewhat on height and surrounding objects.

If no co-ax is available a twisted pair of wires will serve the same purpose as

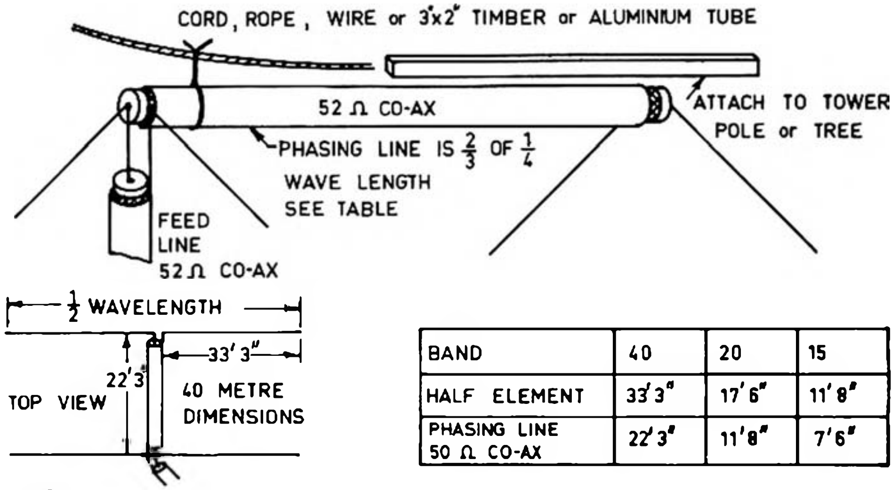

FIG 1

BAND	40	20	15
HALF ELEMENT	33' 3"	17' 6"	11' 8"
PHASING LINE 50 Ω CO-AX	22' 3"	11' 8"	7' 6"

72 ohm co-ax and should substitute quite nicely. Another possibility is 75 ohm twin lead, which will make the whole structure lighter.

For the adventurous, more elements (up to 6 or so) can be added for higher directivity and gain. Element ends are insulated and tied off on bushes, trees or stakes in the ground. The beautiful thing about this antenna is that it is highly transportable, fitting into a box when travelling to a Field Day site and easily erected in a matter of minutes in emergency conditions. Note when more than 2 elements are used the element length, co-ax length, and spacing are exactly the same. Just add them on.

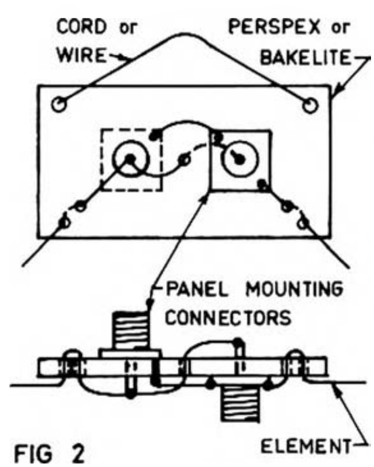

FIG 2

CLUB/ZONE/DIVISION NEWS

- The Publications Committee wishes to advise that the call on AR for space to print material is so great it is not possible to include a section devoted to Divisional, Zone or Club news.
- Arrangements were made with all Divisions that such news would appear in Divisional Bulletins if so required, and accepted by Divisional Bulletin Editors. Bulletins, when submitted, are carried as inserts in AR mailed to members of the Division concerned.
- It has been agreed however that AR should include an Events Diary to contain **very brief details** of forthcoming events. Items for this Diary **MUST** reach the Editor not later than the 1st of the month prior to publication.

History of a Repeater

GOLD COAST RADIO CLUB
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Following many discussions with a handful of repeater minded local Amateurs, the "Gold Coast Radio Club" was inaugurated and affiliated with the WIA, Qld. Division, on 19th October, 1969 for the express purpose of constructing and installing a 2 metre FM Repeater in our area.

Prior to the forming of the Club a couple of us had, in fact, already constructed and tested a working repeater. When the PMG Radio Branch was asked for an experimental licence for actual air testing of the unit we were told that only the WIA or a bona fide group afficiated with the WIA was eligible for such licence.

Shortly after the formation, and necessary affiliation of the Club, application was made through the WIA to the PMG for a permit to operate an experimental repeater. The PMG Permit was issued on 16th Jan., 1970 (the application was dated 24th Nov., 1969) for a period of three months only.

The Repeater had actually been installed and commissioned, on a site on Mt. Tamborine, by 14th Dec., 1969 and had been operational from that date. The equipment in use, at this time, was a PYE PTC8702 25 watt Base Station. The Tx and Rx were separated by some 200 yards and were connected together with a 600 ohm audio and control line. Aerials in use were 5 half-wave elements fed in phase, vertical Colinears, approx 40' above ground. Coverage from this original setup was very good considering the desensitisation problems encountered with the small Tx/Rx frequency spacing. The Tx was on Chan. "C", 146.146, and the Rx was on Chan. "A", 145.854.

After a couple of months operating under these conditions a permanent licence was applied for, along with a frequency change to "Repeater Chan. 1", 146.1 input and 145.6 output. The licence was issued by the PMG on 9th April, 1970 with the callsign VK4EI/R2. Two months prior to the issue of the licence (Feb. '69) a new solid state, home brewed Rx was installed, in lieu of the old PYE valve unit, and the "A" and "C" frequencies were changed to the new "Ch. 1". With this setup (500kHz separation) and a more sensitive Rx the range of the repeater was much improved. At this point in time the Rx range outdid that of the Tx and a new 50 watt Tx was contemplated to replace the 25 watt unit then in service. Solid state design was looked at but lack of finances (power transistors for VHF are pretty expensive) put our sights back on to a valve device. We were lucky to find, in very good order, a Philips 1674, 50 watt Base Station for $20. After removing the Rx section from the base station and incorporating the necessary modifications the 50 watt Tx was put into service during June, 1970.

The site on Mt. Tamborine, 12 miles west of Southport and 40 miles South-West of Brisbane, had an elevation of 1600 feet and, with the now updated equipment, the range of the repeater was all that could be expected. If you have a look at a map of S.E. Qld/N.E. N.S.W., you will get some idea of the coverage, as follows:

Mobile/Mobile contact was possible between Lismore, Gold Coast, Brisbane, Toowoomba, Nambour, Maroochydoor and most points in between. There was hardly a location in the Brisbane area where a 10w mobile could not be heard by the repeater, and vice-versa. The whole of the Pacific Highway between Murwillumbah, in the south, and Brisbane in the north, was completely covered, with good signals all the way. The Bruce Highway between Brisbane and Nambour was a little patchy but, none the less, usable all the way. Travelling the Cunningham Highway between Brisbane and Warwick the Repeater was loud and clear until one got 5 miles south of Cunningham's Gap. To coin a much used phrase: "She was a little ripper".

Up until this time the repeater was sited on an Amateur's property and was looked upon as a "manned station" and therefore fancy control gear, lockouts etc., were not required by the "Department". Even automatic station I.D. was not mandatory. A solid state keyer was, however, under construction. This was looked upon more as a "status symbol" rather than a necessity.

Everything was going fine with our repeater until March, 1971, when the "Rot" began to set in. During March, '71 a tropical cyclone, "Dora" by name, very unkindly wiped out both the Tx / Rx aerial systems and the repeater was off the air for some two months while new masts and aerials were organised.

The repeater site was subsequently changed and the repeater was off the air for another three or four months while suitable accommodation was found. During Oct./Nov.,1971 the equipment was resited at another site on Mt. Tamborine. Co-inciding with the sighting the now fully operational I.D. unit was installed.

The new site was below the elevation of the original and coverage of the repeater was very much reduced from its new location. The usual contacts with Brisbane Mobiles were now a thing of the past, much to the dissatisfaction of all concerned. This situation continued, everyone getting used to the reduced coverage, until August, 1972. At this time our Transmitter decided to blow up, all of its own accord. The power transformer was demised along with the QQE06/40 PA valve and othed expensive components and so was taken out of service for much repairing.

After many discussions amongst ourselves, it was decided not to repair the old Tx but to raise some money to purchase a new one. A beaut Solid State new one! The Club now issued Debenture Stock. With this, and many donations we managed to raise $1500!! This was far and above all expectations and it was decided to put all this good will towards not only a new Tx but a completely new repeater system.

Around this time two members of the Club purchased, between them, a block of land on Mt. Tamborine. This land was offered to the Club as a new site for our new repeater, which, needless to say, was very gratefully taken up. Investigation, radio range wise, of the site found it to have even greater range than the original location. We were elated and the long, hard haul of dealing with local Council Authorities, and the like, was initiated.

Meanwhile, Philips 1680 equipment had been purchased, along with cavity resonators, power supply, battery, 100' mast, coaxial cable and commercially built aerials. Oh! What a beauty!!

Technical work was carried out on the new project by the pioneers of the old one, Ross VK4ZFD and Mike VK4ZDA while some of the others fought with the local bodies and the drawing board on the Political and Building sides of the project.

Work on the equipment was completed long before any headway had been made with the local Council and our new repeater was air tested from local sites in Brisbane and later on the Gold Coast. It worked like a charm. The built-in time delays, callsign initiation, battery telemetery, etc., required a few modifications of the original design for reliability of operation. Once this was accomplished we felt we had the best repeater system in Australia ready for installation. Anyway the equipment was now locked away in a cupboard pending the result of the battle now raging on the Political front.

At long last, in May, 1973, the Shire Council concerned issued the long awaited "Use of Land" and "Building" permits. Work commenced on the preparation of the site almost immediately. Mast and building foundations were put down, requiring much excavation and the pouring of five yards of concrete, all by hand, and a fence was erected around the whole property. Timber, fibro wall sheeting, T&G flooring and other building materials were purchased and erection of the Shack was started. Everything was now running smoothly and the project was expected to be complete and operational by December, 1973.

In August, 1973, for personal reasons, the new site was no longer available as a location for the Club's repeater, and the construction work had to be terminated.

The present situation with VK4EI/R2 is a completely operational, solid state, repeater, worth some $1500. locked away in a cupboard awaiting a site for its installation. Needless to say, an all out effort is presently in action to acquire yet another location for the Gold Coast Radio Club's 2M Repeater. Obviously, with so much money invested, the project will never be shelved or forgotten even though the organisers of the project have been close to "throwing in the towel" on more than one occasion. As soon as another site is available VK4EI/R2 will live again!!

Perhaps other groups contemplating a repeater project can learn something from our past experience. Our feeling now is: forget the equipment side of such a project until the political battle has been fought and won! It would be better, by far, to have a permanent Repeater Site well and truly tied up before any money or effort is expended on equipment. The technical problems with getting a Repeater operational, even though not an easy task in itself, is far, far, easier than the problem involved in locating and retaining a permanent repeater site.

The moral of the story is: do not rely on verbal agreements. Put aside some of the Repeater Budget for legal assistance in drawing up a contract or binding agreement in respect of the property involved in the project. ●

Some thoughts on mobileering

S. C. Fletcher, VK2ASF
Maling St., Eden, 2551

This is one of the most fascinating branches of our Hobby and has been indulged in by a large number of amateurs.

Over the years, Mobile Equipment has evolved from crude and mostly cheap junk — through the post war years with some better class from disposals, and some home brew but, in the main, far from satisfactory.

Today, with the advent of Single Sideband together with VOX, and super selective receivers, the situation has changed radically. The impossible has happened, and happening every day — DX while driving along in your motor-car with your wife beside you and the back seat full of kids.

My first entry into this fascinating field of "Mobile", was in 1948, so I am not a new comer. Having just completed a 2,000 mile mobile run, I experienced several deplorable operational procedures, and it is these which prompt me to offer these few notes for mental digestion.

When contacting a mobile station, never forget while you are in the comfort of your lounge, the mobileer has quite a different kettle of fish. He has all the accoutrements of driving a motor-car, together with observing all driving conditions, watching road signs and the general safety of his pasesngers. So please let's make it easy for him. This, in the main, is what happens, but unfortunately it does not always apply.

I recently heard two gentlemen openly deride a "mobile", for saying he was "stationary mobile".

Now let's get this cleared up once and for all. The word "mobile" refers to equipment placed in a vehicle, which is capable of moving from place to place under its own power. The word mobile does not in any way infer that the vehicle is moving or doing anything else. It is simply to designate the type of station, and to distinguish the operation from the home licensed station. The main requisite is that the "mobile" indicate his position — this is most Important. And further, I say that if the "mobile" is not moving, then he indicate this fact by stating that he is "stationary mobile". This is information to the receiving stations generally. The two gentlemen(?) previously referred to for deriding a "mobile" don't seem to have a clue in these matters, and I personally object strongly to this type of thing. The mobile station was so embarrassed he didn't know whether he was "mobile", portable or what. This kind of behaviour in the amateur fraternity is deplorable and is only one more blot on the copy book of Amateur Radio.

If you are one of the long-winded type forget it. I had the unhappy experience of having my ears belted for a distance of eight miles along the road without a break — a painful experience. This is ear-bashing at its best (or worst!). Also for the initial call to a mobile please give your call sign distinctly, making full use of phonetics. This makes the mobileer very happy.

I have heard home stations "talk over" the mobile, with comments in which no one is really interested. This of course is a deliberate breach of regulations and should be dealt with accordingly; apart from being an embarrassment to the mobileer. As far as reporting goes, please always give an accurate report. Don't give a jazzed up report in an effort to raise the "mobile's" ego, he is not stupid you know.

Another nice courtesy is — if and when a mobile says "wait" or "standby" then do just that — as he may be turning a corner, passing a vehicle, or just being careful, so please don't jump in and start talking. This is an embarrassment to the "mobileer" and is operating procedure at its worst level. There are many more points I could mention but I will leave it at that. All these little points make for happy "mobileering" and allow us to enjoy our hobby to its full.

The mobileer has gone to a lot of effort (and expense) to make his equipment work well. He is very proud of it and loves every minute, so let us all endeavour, at all times, to make his lot a happy one. ●

Design of Normal-Mode Helix Antennae

R. J. F. GUERTLER
Antenna Engineering Aust. Pty. Ltd, Kilsyth

This article first appeared in the Proceedings of the IREE, January, 1972. It is represented here in a summarised form.

Design equations for short helical vertical antennae have been derived by A. G. Kardoian and W. Sichak, however these are inconvenient for the average designer (and amateur radio operator). For the case where the height of the helix is very much smaller than the operating wavelength we obtain two useful equations.

The basic design equation is:

$$n = \frac{30}{f.d}\left[\frac{h}{d}\right]^{1/5}$$

where n = required number of turns of wire
f = operating frequency of antennae in MHz.
d = diameter of former that wire is wound on in metres.
h = overall height of helical antenna in metres.

The approximate length of the wire, w, in metres, may be found by the equation:

$$w = \frac{30\pi}{f}\left[\frac{h}{d}\right]^{1/5}$$

This reduced to:

$$w = \frac{94.3}{f}\left[\frac{h}{d}\right]^{1/5}$$

where the symbols have their previous definitions.

When a tapered fibreglass whip is used, d should be the mean diameter in metres.

To allow for inaccuracies due to the approximate nature of the formulae, 5 to 10% more turns should be added to the whip initially. Turns may then be removed until resonance occurs.

If desired, the antenna may be set up for one frequency, say 7135MHz, and made to resonate at a slightly lower frequency, say 7070MHz, by the addition of a length of straight rod or wire to the top.

A matching network or transformer will be necessary if a 50 ohm load is required.

The choice of wire size is left to the individual.

To prevent corona discharges, the top end of the whip should be smooth and free from sharp points or edges—Technical Editor ●

an AR special

The 1974 Easter Federal Convention

The admission of the ACT Division into the WIA had been discussed and apparently agreed at the 1973 Convention. When a postal vote was circulated in March merely to formalise the entry one Division invoked the Article 44 veto thus ensuring that the matter had to be raised at the 1974 Convention. The NSW Division felt very strongly that the admission of such a small group must be preceded by the finalisation (a) of the whole question of the proportional (or weighted) voting powers exercisable by the Fed Councillors of the larger Divisions and (b) the satisfactory acceptance of the extra costs which would accrue from the attendance of an additional Fed Councillor at Conventions.

Almost as soon as the Convention was formally opened it dissolved into a Committee of the whole to consider the ACT Division question and at one stage listened to a play-back of the relevant part of the tapes recorded at the 1973 Convention to refresh memories (and obviate a proposed amendment to the Minutes thereof). After discussing a vast range of relevant material the formal session re-convened, a vote was taken, the ACT Division were admitted with effect from 1st April 1974 and the ACT delegation, having been previously accredited (when 4 out of the 6 Divisions had voted in favour of their admission and prior to the receipt of an Article 44 veto) took their place at the Conference table. It was then formally agreed by all delegates that they and the ACT Division would accept and abide by the Agreement of 29.6.1971 until proper accession to it could be done.

During the Convention various working Committees were set up to examine and report back on a number of difficult matters. Time ran out during discussions on the relative Committee's report on proportional voting and this remains to be resolved. The majority in this Committee favoured — (a) normal one for one voting, (b) where two or more Divisions declared a specific agenda item to be of major importance a referendum of all qualified (to vote) members be held and the result to be binding on the Council — Queensland emphatically adhered to the principle of one vote per Fed Councillor — and (c) a rider that the proposal in (b) could not be made on any future alterations to this (proposed) policy.

The Committee considering the application of Article 44 eventually produced a time schedule in diagram format which was accepted subject to being drafted into a suitable form to amend the Constitution. This specified a full 30 day discussion time before Article 44 could be invoked by two Divisions.

The Committee examining an Agreement between the Divisions on membership boundaries came up with many useful amendments to the draft including a clause stating that appropriate Divisions may agree that in an area in one Division (State) the members can belong to the other Division. Another clause stated that by appropriate Divisional Agreement a person could elect to become a member of a Division other than the State in which he is resident. Any member transferring overseas continues membership in his 'home' Division unless he resigns.

The acceptance of a 'Position Paper' from the Victorian Division and detailed discussions thereon occupied a considerable amount of time, including an almost unprecedented change of ruling by the chair to admit the paper. The Victorian delegation had taken strong exception to the non-acceptance of the paper, had withdrawn and were re-admitted after learning that the paper would, after all, be accepted as an Agenda Item even though it would have been taken as a Special Business Item anyway. The entire incident arose because whilst the Agenda Item (moving that a 'Position Paper' be received and incorporated in the Minutes) was constitutionally received more than 30 days prior to the Convention, the 'Position Paper' itself was not received until 12 days before the Convention. The paper evoked lengthy discussions in Committee on the questions of the EDP programme (it was agreed that improvements were necessary in the EDP accounting sphere), the work of Executive as Directors of the Company (improved management techniques throughout the WIA were required), Executive office (aspersions on Executive were countered by overworked office through volume of business and poor EDP systems — both are under intense current examination), costs of the Executive (remedy is through budget approved by Council) and methods of representations to Authorities by Executive (Council unwise to tie the hands of its Executive).

The budget and financial matters were debated in depth. Councillors required greater detailed analysis in future. Executive's budget covered the expenses of printing and distributing AR, the costs of the Executive office and various other minor items all of which were subject to inflationary trends. Unable to provide for deficits indefinitely because of cash flow problems. It was finally agreed with great reluctance that the Federal element of subscriptions would have to be raised in 1975 from the existing $7.20 to $9.80 per member per annum which included a 10c increase in the IARU element to allow for WIA representation at Region 3 Conferences, etc. The increase also included the costs of Conventions which previously were pooled and paid out of Divisional funds on a membership pro-rata basis, it having been recognised for many years that far distant small Divisions could not otherwise afford participation in a Convention for the expenses of its delegate. The investment of the $7000 ITU Fund in Commonwealth Bonds was ratified.

Other matters discussed included —

- ☐ Annual Reports, evoking detailed debate and thanks to all the volunteers involved;
- ☐ Call Book, so that Divisions could economically buy extra quantities over and above normal requirements, if a free issue to their members were desired;
- ☐ Subscriptions billing on an anniversary or cyclic basis in conjunction with the EDP accounting improvements;
- ☐ EMC — essential for all to co-operate in this most important field;
- ☐ The WIA fully supports IARU and IARU Region 3;
- ☐ PMG Handbook revision, Executive was supported;
- ☐ Exec. to approach APO —
  - (a) allow RTTY ident. in same mode of transmission;
  - (b) separate-series call-signs for WICEN stations;
  - (c) withhold re-issue of Y and Z calls for 12 months if requested by full 'call-sign' amateur concerned;
  - (d) near miss passes in CW to qualify for Novice Licence;
  - (e) that examiners identify by photograph with applications;
- ☐ Contests — RD Contests — working through repeaters disallowed, VK1 a separate Division.
  - CW to CW to count double.
  - P2 stations may enter as though they were VK9s,
  - VK4PJ perpetual trophy for participants in official contests accepted with acclamation.
- ☐ Advisory Committee members to serve for 2-year period, half the Committee retiring each year.
- ☐ Exec. to examine —
  - (a) Purchasers of transmitters to produce licence to transmit;
  - (b) Convention Agenda Items circulate well in advance and print in AR;
  - (c) If membership tokens can be done through EDP for Divisions;
  - (d) Methods of selling AR on bookstalls.
- ☐ Representation by geographic areas of Divisions by own Fed Councillor at Conventions — long term policy item.
- ☐ YRCS —
  - (a) Committee to re-draft YRCS Constitution;
  - (b) State YRCS organisation to operate under proper Constitutions;
  - (c) Each State Supervisor to make Annual Reports with accounts to the Div. Council.

☐ A beacon policy to be formulated;
☐ 432 MHz band plan needed;
☐ Divisions feed regular information to Fed Public Relations officer.

The 1975 Convention was set down to be held in Victoria over the Anzac Day holiday.

As this short report is necessarily highly condensed any member wishing to have further details on any particular item should contact his Federal Councillor.

STATEMENT OF INCOME & EXPENDITURE
for year ended 31st December, 1973

	1973	1972
INCOME:		
Members' Subscriptions	$12,874	$12,914
Publications, Misc. Income	4,473	3,664
Convention	2,688	1,742
Amateur Radio	26,718	17,052
	46,753	35,372
EXPENDITURE:		
Amateur Radio	27,348	16,116
Audit Fees	150	57
Accountancy Fees	189	—
Bank Charges	192	203
Convention Expenses	2,271	2,362
Committee Expenses	393	463
Depreciation	148	167
EDP Expenses	834	1,664
General Expenses	—	1,210
Insurance	144	181
Licence	6	—
Project Australis	491	458
Provision for Bad Debts	200	—
Postage and Freight	1,309	691
Printing and Stationery	1,268	1,783
Rent and Power	1,300	758
Repairs and Maintenance	99	19
Salaries	10,583	10,179
Staff Advertising	25	—
Secretarial	102	1,190
Travelling Expenses	116	217
TOTAL EXPENDITURE:	$47,168	$37,718
DEFICIT—To Accumulated Fund:	$415	$2,346

BALANCE SHEET
as at 31st December, 1973

	1973	1972
MEMBERS' FUNDS:		
Balance at 31st December	$58	$2,404
Less Deficit for year	415	2,346
	(357)	58
Reserve Fund	752	752
Special Funds—ITU Fund	6,903	6,903
IARU Fund	3,579	2,765
	$10,877	$10,478
Represented by:		
CURRENT ASSETS:		
Cash at Bank—General A/c	$3,056	$2,197
IARU A/c	1,469	1,469
ITU A/c	6,905	6,903
Sundry Debtors (after allowing for Provision for Doubtful Debts—$200)	6,166	3,514
Stock on Hand—at cost	2,384	1,050
Prepayments	—	1,089
	$19,980	$16,222
NON CURRENT ASSETS:		
Furniture and Fittings—less Provision for Depreciation	593	741
	$20,573	$16,963
Deduct—		
CURRENT LIABILITIES:		
Sundry Creditors	2,782	4,117
Subscriptions In Advance	6,664	2,368
Loan VK6 Division	250	—
	9,696	6,485
	$10,877	$10,478

THE EXECUTIVE'S REPORT TO FEDERAL COUNCIL (1973)

Gentlemen,

It gives me pleasure to present the report of Executive for the period May 1973 until March 1974.

In commencing this report I would be remiss if I did not make mention of the untiring work carried out for the Institute by the Immediate Past President Michael Owen VK3KI who held office for the last four years. I am happy to say Michael accepted the position of IARU liaison officer — a job for which he is well suited, with his countless international contacts.

1. MEMBERS OF THE EXECUTIVE

At the 1973 Convention the following Executive members were appointed. David Wardlaw VK3ADW President, Bill Roper VK3ARZ, Editor, Jack Martin VK3TY, Keith Roget VK3YQ, David Rankin VK3QV and Kevin Connelly VK3ARD.

At the first meeting of Executive for the year Jack Martin was appointed Vice-President and Keith Roget Treasurer.

During the year Bill Roper had to stand down as a member of Executive. This was because in the re-organisation of the magazine it was decided that the editor should be paid an honorarium and under the Constitution this made him ineligible for membership of the Executive. I will make further mention of this at a later stage in the report.

John Bennett VK3ZA was appointed to the position of Federal publicity Officer during the year, and as you can see by his signature under a number of QSP in "Amateur Radio" he has been able to give us some valuable help although not as much as he had hoped as illness in his family curtailed his activity during part of the year.

John was co-opted to Executive to fill the vacancy caused by Bill Roper's resignation.

Also in regular attendance at Executive meetings were the Project Australis Chairman David Hull VK3ZDH and the VHF/UHF Advisory Committee chairman, Peter Wolfenden VK3ZPA. We also had visits from Federal Councillors and Councillors of several Divisions.

3. EXECUTIVE OFFICE

In reporting on the Executive office I would like to pay tribute to Peter Dodd for his loyalty and untiring work on behalf of the Institute.

For reasons of economy we are forced to operate from a very small office. This helps to compound our problems as during the year we have had changes in clerical staff necessitating re-training each time. There is one distinct need in the office which I would like to draw to your attention and that is the requirement for document copying of a more modern nature. No capital funds are available and consequently the old and expensive methods and machines must continue to be used.

Since the formation of the Federal Company together with the Centralisation of records in the EDP system, the nature of the Executive Office has become very much that of a business office and to that end it is virtually essential that a strict routine be maintained on all financial matters.

To enable the Secretary Manager to lighten his load on the EDP side we are now employing part-time, a retired army officer whose sole responsibility is the EDP records. The training period has been relatively lengthy but seems to be paying dividends.

In addition to Federal Council business there is a considerable amount of correspondence to the Executive office which by its very nature needs the attention of the Secretary-Manager.

The matter of our office size has always been in our minds. Several possibilities have been investigated but have unfortunately fallen through.

3. EDP

During the year investigations were made into the computer programme and various possible changes were checked for feasibility and cost.

At this stage we have only made one major change and that is we are now producing the address labels for the magazine as Computer print-out from the membership list. This has eliminated the double handling of address records.

At this stage I would like to point out a problem that has arisen in the system and that is that in order for a new member to receive an early copy of "Amateur Radio" the relevant information must be forwarded to the Executive Office as soon as possible in order that his name be entered in the records. In some cases there have been delays.

4. IARU

During the year Peter Williams VK3IZ resigned as IARU Region 3 association secretary. As you may be aware Peter was one of the instigators of the formation of the Region 3 Association and I would like to take this opportunity of thanking Peter for his work in this field.

David Rankin VK3QV has been elected the new Region 3 association secretary.

Michael Owen VK3KI a Director of the Regional Association is the WIA liaison officer.

The Directors hope to have a plenary conference in Hong Kong either late this year or early next year to formulate the regional policy towards the 1979 World Administrative Radio Conference. It is also hoped to hold another regional plenary in 1978 just prior to the Conference to finalise regional policy.

As the IARU is now an accredited Agency as far as the ITU is concerned it seems that the Amateur Service may best be served by having IARU representation at the World Administrative Radio Conference rather than national delegations if finances dictate one or the other.

5. CUSTOMS IMPORT DUTIES

The Wireless Institute of Australia, properly recognising the legitimate claims of domestic manufacturers to reasonable Tariff protection, has pressed for many years that specialised Amateur Radio equipment should be recognised as articles suitable for importation duty free or at low rates of duty if nothing suitable or equivalent is produced in Australia.

These efforts are now receiving recognition although as might be expected, success carries certain limitation. Work has not stopped in this field but is being continued with the objective of attempting to secure results of a more permanent nature and to this end the Institute presented a case before the Industrial Assistance Commission for the removal of duty on a wide range of Amateur use only equipment.

In a letter dated 15th May to the Institute from the Department of Customs and Excise the following two paragraphs are significant:

'Extensive enquiries have now been conducted in this matter and it has been decided that by-law admission of certain transceivers specially designed for use by licensed amateur radio operators would not be detrimental to local industry.

'Accordingly applications for by-law admission of transceivers accompanied by details of the equipment and supported by evidence that the user is a licensed amateur radio operator will receive consideration in the light of availability of suitably equivalent goods of Australian manufacture.'

Whilst on this subject I must express my thanks to Bill Colborne VK3BP who provided invaluable assistance to the Institute with his expert knowledge on the subject.

6. ACT DIVISION

At the last Federal Convention the following motion was passed:

'That the Canberra Radio Society be admitted as the ACT Division of the Wireless Institute of Australia after fulfilling the requirements of Article 3 of the Articles of Association of the WIA.'

On the 23rd July, 1973 the first general meeting of the Wireless Institute of Australia (ACT Division) was held.

A copy of the Constitution of this newly formed Division was forwarded to the Federal Council for examination.

This Constitution was ruled by the Council to be inconsistent with the general requirement of a Divisional Constitution in that there was no requirement of Amateur Licence holding imposed on full members.

Following this ruling in November the WIA ACT Division amended its articles to comply with the Membership requirements of the uniform Divisional Constitution.

This constitutional amendment is at present under consideration by the Federal Council.

7. REPEATERS

Since the last report a new repeater frequency plan has been accepted as Institute policy. The matter having been finally decided at an extraordinary Convention held in September.

I feel that when changes in Institute policy of this nature are being contemplated careful logical and widespread consideration must be given to the matter.

8. **SECTION 44 OF THE CONSTITUTION**

This is the section of the constitution which holds over decision on a matter put forward as a postal vote until the next Convention.

This section was invoked again this year on postal vote. It is obvious that this safeguard must remain in the constitution in some form; however as it stands there is no mechanism of delaying a postal vote in order that further information may be sought other than to go the whole way.

The matter is scheduled for discussion at this Convention.

9. **NOVICE LICENSING**

At the last Convention the proposed novice licence was announced and it was hoped that the first novices would be on the air before the end of the year. However there has been a vast bank-up of legislation in Canberra and I dare not make a prophecy as to when we will hear the first novice.

The last Convention resolved that certain comments be made with regard to the proposed licence.

All were accepted except the proposed use of a segment of the 28MHz band and it was stated that until the scheme was in operation no consideration would be given to additional novice frequencies.

10. **AERO MODELLERS**

The announcement of the proposed novice licences and their allocation of the 11 metre band caused considerable concern to the Aero modellers fraternity who use this frequency for model control.

Their concern was such that they took political action on the matter which caused the PMG's Department to ask the Institute for its attitude.

Discussions have taken place between the areo modellers representatives and the WIA at different levels, although the hazards to models caused by routine Amateur radio operating are not proven it seems that some band planning arrangement would be the best for the peace of mind of all concerned.

At this stage I would like to comment on the rather deplorable accusations that amateurs are deliberately shooting down model aircraft. While I believe that the majority of Amateurs would abhor these actions I unfortunately feel that there are some irresponsible individuals who hold Amateur licences and have done just this.

It is action such as this that does the image of Amateur radio great harm and gives those who covet our frequencies added ammunition when they make their attacks.

Disquiet at the attitude of some amateurs has been expressed to me again this year by members of the staff of the Post office as it was before to the immediate Past President.

11. **INTERFERENCE**

In his opening address for the 1973 RD Contest Mr. Myles Wright, Chairman of the Australian Broadcasting Control Board, made mention of the matter of interference. I would like to quote a portion of this address which I think has an important message for us all.

> 'While on the subject of interference, let me also refer to the problems and indeed, the responsibilities we all have — professional and amateur alike — in using the precious radio frequency spectrum.
>
> 'The one important advantage which this national resource possesses compared with many of the other resources, is that the radio spectrum is not irrecoverably consumed. It may be misused but with wise management and co-operation between the users the position can be recovered.'

Now, in the case of the spectrum, I believe that the broadcasting users and the amateur radio users have a common complaint that they do not have sufficient channels. At the same time we both must keep our own houses in order to ensure that we use the channels which we do have to very greatest advantage and that we do not cause trouble to our neighbours. We must develop good housekeeping methods, reduce the amount of pollution or rubbish which we produce and, above all, we must attempt to keep our pollution within our own backyards.

As many of you will know, this simple housekeeping in the radio spectrum sense is now being promoted as a specialised topic within the field of radio engineering with the elaborate title of Electromagnetic Compatibility. Following submissions by Victorian Division representatives, the Executive had discussions with Mr. J. Wilkinson (ADG ABCB) and Mr. J. Shannessy (ADG Radio PMG's Department) together with several supporting officers.

As a result of this meeting the Executive formed the opinion that the main concern was that the amateurs would take all possible steps to make sure that their own transmissions were clean and would not cause interference per se.

It was pointed out that at present only licenced transmitting stations were under control as far as interference was concerned. They are in fact only a very small cause of interference and that legislation is being prepared to enable these other sources of Electro Magnetic Interference to be controlled.

The standard of performance of the front-ends of TV receivers is also to be covered.

It must be realised that the amateurs are only one of the services that are affected by the poor design of a TV receiver.

To deal with the potential interference problem the Executive has decided to form a WIA Central Interference Committee and urged the States to form their own divisional committees.

Duties of the WIA Central Interference Committee:

1. To inform and advise the Federal Council through the Executive on all matters pertaining to interference as it may involve amateur operators.
2. To liase with Divisional Interference Committees.
3. To render expert technical advice to Divisional Interference Committees in States where the required experts might be unavailable.
4. To prepare material for use by the Executive in discussion with the appropriate authorities.
5. To carry out any special investigations which the Federal Council may require.

It is the feeling of Executive that the onus of ceasing to cause interference must not rest solely with the Amateur.

Complainants must also bear responsibility to up-grade the efficiency of their systems and to co-operate.

12. **MELLISH REEF**

Due to a dispute between the parties making up a DXpedition to Mellish Reef some doubts were cast as to the validity of all of the contacts made. The ARRL asked the WIA for information as they were undecided whether to accept contacts to count towards the ARRL DXCC (they were recognised for WIA DXCC).

Michael Owen interviewed all but one involved and reported the evidence placed before him to the ARRL. The final decision is that of the ARRL.

13. **INTRUDER WATCH**

I would like to thank Alf Chandler VK3LC and his small but keen band of observers for the good work they are putting in. It must also be noted from the annual report of the excellent International relations they have developed.

14. **CONTEST MATTERS**

This is Peter Brown VK4PJ's last report as Federal Contest Manager as he hands over to Jim Payne VK3AZT after this Convention.

There was some confusion as to the use of repeaters in the RD Contest, which were allowed in the Contest after a last minute request from VK7 had been circulated to all Divisions. However the matter is to be brought before this Convention for a definite policy ruling.

15. **AWARD MANAGER**

This year Geoff Wilson VK3AMK has handed over the job of Awards Manager to Brian Austin VK5CA. To both of these gentlemen I would like to say thank you very much. To Geoff for all the work he has done in the past and to Brian for the way he has settled into the job.

16. **YRCS**

This activity of the WIA is in the capable hands of Bob Guthberlet, Federal Co-ordinator.

It is apparent that with the imminent approach of novice licencing there will have to be some changes in concept in this area.

17. **AUSTRALIS**

The Australis group have again provided something very concrete in amateur radio with the continuing life of Oscar 6 and I would like to express thanks to those who have acted as command stations as this is one of those jobs which although without glamour is essential for the life of the sattelite.

Two members of the group have had papers accepted for the Symposium on Satellite Communication for Australia. They are David Hull VK3ZDH and Peter Hammer VK3ZPH.

18. **EXTRAORDINARY CONVENTION**

On the 15th September 1973 an Extraordinary Convention was held in Melbourne on the requisition of the Federal Councillor for South Australia.

This Convention was called to consider motions originally submitted for decisions as postal motions by the Queensland and Victorian Federal Councillors, and held over by implementation of Section 44 of the Constitution by the New South Wales Federal Councillor. As you are no doubt well aware this Convention set the WIA National Repeater frequency policy.

Many other matters of importance were discussed.

19. **INDEPENDENT INQUIRY INTO FREQUENCY MODULATION BROADCASTING**

The proposed inquiry was announced during 1973. However the terms of reference were not known. At this stage the VHF/UHF Advisory Committee were alerted as to the possibility of the need for case material.

In December we received directly from the Minister for the Media the terms of reference and the names of the persons who would be carrying out the inquiry.

In view of the terms of reference the VHF/UHF Advisory Committee were asked to prepare a case, which was placed before the Executive for approval.

At this stage, due to the deadlines set by the Inquiry, it was impossible to circulate it to the Federal Council for prior approval. As a consequence, the Executive authorised the submission of the material to the Inquiry.

This material was immediately circulated to the Federal Council.

The material of the submission and a report on the hearing are to be published elsewhere.

I would like to thank Bill Rice VK3ABP and Peter Wolfenden VK3ZPA who presented the Institute's submission.

20. **AARTG**

Following the last Convention negotiations were carried out with a group of amateurs interested in teleprinter operation and consequently the Australian Amateur Radio Teleprinter Group was formed under WIA sponsorship to cater for the special needs of the RTTY operator.

21. **FRC**

The Federal Repeater Committee has had a difficult year and the chairman of the group has put forward some ideas as to its future which he hopes will be discussed at this Convention.

22. **70 cm BAND**

Questions regarding the frequency requirements on this band have been referred to the VHF/UHF Advisory Committee who will have the benefit of the returned questionnaires. They are in the process of preparing a band plan which they hope to publish soon in order to invite comments.

23. **'AMATEUR RADIO'**

I would like to congratulate the Editor of 'Amateur Radio' Bill Roper VK3ARZ and his Committee on the high quality he has achieved despite all the difficulties they have experienced.

During the year the Executive became aware that the workload on the Editor was much greater than anyone could expect from a volunteer.

There were three possible solutions:

1. That the editorial responsibility would pass back to the Executive Office.
2. A part time professional journalist be employed.
3. Pay an honorarium to the existing Editor to compensate for time expended in excess of that we could reasonably expect from a volunteer.

If the Executive office were to take over it would be necessary to take on further skilled secretarial assistance.

The third alternative which had the approval of the magazine committee seemed the most expedient and was recommended to and approved of by the Federal Council at the extraordinary Convention in September.

We have received an assurance from the Post Master General that 'Amateur Radio' will remain in Category B — however this still means a steep rise in the cost of postage.

The matter of advertising in the magazine has, as long as I can remember, been a problem. For most of the year advertising has been handled by the Secretary Manager. Several alternatives were under investigation but urgent Federal Council business often meant delays in making advertising contacts.

Just prior to this report a retired Airforce Officer has been employed part-time for a trial period with the sole duty of handling magazine advertising.

24. **MARCONI CENTENARY QSL CARDS**

1974 is the centenary of the birth of Marconi and the South Australian Division has, as proposed at the last Convention, produced Commemorative QSL Cards which have proved to be a great success.

25. **ASJA PLAQUE**

The Executive had pleasure in accepting Mr. Alan Shawsmith's (VK4SS) offer of an award, which is tenable for a period of ten years and that it be named the 'Alan Shawsmith Journalistic Award for Amateur Radio Contributors'.

26. **FINANCIAL MATTERS**

I am glad to be able to report that it was not necessary to obtain an overdraft from the bank this year despite early prediction that this may happen. I will leave the details of financial matters for the Treasurer to comment on.

27. **PMG's HANDBOOK**

Towards the end of the year the PMG Dept. expressed an urgent desire to reprint the Handbook for Amateur operators, and called on the Institute for comment on existing material. To this end we commenced work, forwarding material as soon as produced with the proviso in a covering letter that further comments may come in from the field.

I would like to express my appreciation of the courtesy with which the Radio Branch has always treated us. They are very much aware that there were sometimes extensive delays when dealing with matters concerning amateurs and Mr. Young expressed to me the hope that in the near future they will have an officer whose sole responsibility is Amateur affairs, thus speeding up things considerably.

28. **MEMBERSHIP**

The following table sets out the membership details as at 31st December 1973 compared with total licensed amateurs (figures courtesy Radio Branch), precentages and totals for the previous year in brackets —

	Note	Total Licences	WIA Members Licensed	% Members to Total Licences	WIA Members Unlicensed	Total Members
VK1/2	A.	2208	982	44	282	1244
		(2111)	(953)	(45)	(344)	
VK3		2057	1041	50	396	1437
		(2021)	(936)	(46)	(444)	
VK4/9	B.	846	435	51	140	575
		(831)	(352)	(42)	(180)	
VK5/8	C.	808	428	52	166	623*
		(787)	(393)	(49)	(207)	
VK6)		516	254	49	69	323
VK9x)		(530)	(218)	(41)	(109)	
VK7)		239	152	63	63	215
VK0)	D.	(231)	(153)	(66)	(61)	
Totals		6674	3282	49	1096	4417
		(6511)	(3005)	(46)	(1345)	(4541)

*Includes 29 Junior Associates (unlicensed).

NOTES

A. **Same Headings as above**

VK1	127	44	34%	10	54

B. VK9 (PNG) included for comparison but now new country: estimated 70 licensees in PNG (82 were there on 30.9.73 — the last figures obtainable) of whom 42 were WIA members at 31.12.1973.

C.

VK8	56	—	—	—	36

D. VK0 estimated at 6. Total licensed in 'Other Territories' was 11.

The licences distribution was shown as:—

	Full Licensees	Limited Licensees	
VK1	96	31	
VK2	1477	604	
VK3	1308	749	
VK4	628	248	
VK5	504	248	
VK6	370	141	
VK7	154	79	
VK8	47	9	
	4484	2109	— 6593

I would like to record in this report the technical achievement of Ron Wilkinson VK3AKC in conducting a 1296MHz moon bounce contact with WA2HFA in the United States of America.

In conclusion I would like to thank the other members of Executive for their co-operative and unstinting support in this rather hectic year.

(signed) D. A. WARDLAW

Federal President

AUSTRALIAN VHF/UHF/SHF RECORDS AS AT MAY 1974

NEW SOUTH WALES				
50/52 MHz	VK2ADE to VE7AQQ	8/4/59	7320 miles	(11778 km)
144 MHz	VK2ATO/2 to ZL2HP	2/1/66	1457 miles	(2344 km)
432 MHz	VK4ZT/2 to VK4KE/4	12/7/69	219 miles	(352 km)
576 MHz	No claim			
1296 MHz	AX4ZT/2 to AX4NO/4	12/4/70	250 miles	(402 km)
2300 MHz	**VK2ZAC/2 to VK2BDN/2**	**19/5/73**	**99.4 miles**	**(159.9 km)**
3300 MHz	VK2AHC/2 to VK2SB/2ZND/2	10/2/74	37.0 miles	(59.5 km)
5650 MHz	**VK2AHC/2 to VK2SB/2ZND/2**	**10/2/74**	**37.0 miles**	**(59.5 km)**
10000 MHz	VK2AHC/2 to VK2SB/2ZND/2	10/2/74	37.0 miles	(59.5 km)
VICTORIA				
50/52 MHz	**VK3ALZ to XE1FU**	**1/5/59**	**8418 miles**	**(13545 km)**
144 MHz	VK3ZNC to ZL2HP	13/12/65	1673 miles	(2692 km)
432 MHz	VK3ZYO to VK5ZDY	1/2/70	406.4 miles	(654 km)
576 MHz	VK3AOT/3 to VK3ZKB/3	11/4/71	147.5 miles	(237 km)
1296 MHz	**VK3AKC to VK7ZAH**	**17/2/71**	**273 miles**	**(439 km)**
2300 MHz	VK3XA to VK3ANW	18/2/50	9.0 miles	(14.5 km)
3300 MHz	**VK3ZGT/ZGK/3 to VK3ZDQ/3**	**14/12/63**	**63.0 miles**	**(101.4 km)**
5650 MHz	No claim			
10000 MHz	No claim			
QUEENSLAND				
50/52 MHz	VK4ZAZ to K6ERG	16/3/58	5305 miles	(8536 km)
144 MHz	VK4ZAZ to VK7ZAH	1/1/67	1187 miles	(1910 km)
432 MHz	VK4KE/4 to VK4ZT/2	12/7/69	219 miles	(352 km)
576 MHz	No claim			
1296 MHz	AX4NO/4 to AX4ZT/2	12/4/70	250 miles	(402 km)
2300 MHz				
and above	No claims			
SOUTH AUSTRALIA				
50/52 MHz	VK5KL to W7ACS/KH6	26/8/47	5361 miles	(8626 km)
144 MHz	**VK5BC to ZL2HP**	**23/12/65**	**1957 miles**	**(3149 km)**
432 MHz	**AX5ZKR to AX7ZRO/7**	**15/3/70**	**482 miles**	**(776 km)**
576 MHz	**VK5ZJL/5 to VK5QZ/5**	**28/12/69**	**195 miles**	**(314 km)**
1296 MHz	VK5ZSD to VK3ZHU/5	28/9/69	75 miles	(121 km)
2300 MHz	No claim			
3300 MHz	No claim			
5650 MHz	No claim			
10000 MHz	**VK5CU/5 to VK5ZMW/5**	**30/12/71**	**59.5 miles**	**(95.7 km)**
WESTERN AUSTRALIA				
50/52 MHz	VK6BE to JA8BP	30/10/58	5490 miles	(8833 km)
144 MHz	VK6KJ to VK3AOT	1/2/70	1517 miles	(2441 km)
432 MHz	VK6ZDS to VK6LK/6	25/4/66	66 miles	(106 km)
576 MHz	VK6ZDS/6 to VK6LK/6	15/12/63	101 miles	(163 km)
1296 MHz				
and above	No claims			
TASMANIA				
50/52 MHz	VK7LZ to JA9IL	3/12/59	5462 miles	(8788 km)
144 MHz	VK7ZAH to VK4ZAZ	1/1/67	1187 miles	(1910 km)
432 MHz	**AX7ZRO/7 to AX5ZKR**	**15/3/70**	**482 miles**	**(776 km)**
576 MHz	No claim			
1296 MHz	**VK7ZAH to VK3AKC**	**17/2/71**	**273 miles**	**(439 km)**
2300 MHz				
and above	No claim			

N.B.—Australian records are in bold type.

AUSTRALIAN EME RECORDS

144 MHz	VK3ATN to K2MWA/2	28/11/66	10417 miles	(16761 km)
1296 MHz	VK3AKC to W2NFA	6/10/73	10385 miles	(16713 km)

AUSTRALIAN A.T.V. RECORDS

432 MHz	VK7EM/T to VK3ZPA/T	13/12/72	256.6 miles	(413 km)

Audio derived AGC for SSB receivers

By JOHN, VK5QZ (John A. Hackworth)

Reprinted from the SA Wireless Institute Journal, July, 1971.

The following circuit is intended for use with a receiver incorporating a conventional IF amplifier and SSB detector using ordinary transistors. The objectives in its design were:

1. **Wide signal handling range.**
2. **Smooth S-meter characteristic over a wide range.**
3. **Delayed AVC decay or hanging effect to prevent undesirable pounding on strong signals, and give steady S-meter reading.**

EXPLANATION OF THE CIRCUIT

Method of applying AVC to the IF amplifier

It is well known that the technique traditionally employed on valve IF stages to control gain is to apply negative bias to remote cut-off valves.

When applied to transistor stages this method has serious limitations since **remote cut-off** transistors are not available.

A method which gives improved results is forward biasing of the transistors. The method employed in this circuit is to control gain by reducing the collector voltage so that the transistors in the IF amplifier pass into the so-called **triode region** of the collector volts but remains fairly linear to small signals.

As a result, large signal handling is assured, and the gain voltage characteristic is very smooth and roughly logarithmic giving a linear S-meter characteristic.

Fig 3 shows how to wire your IF stage to suit this AVC circuit. The negative point marked (1) is normally connected to earth but this should now be connected to the AVC circuit shown at point (b) in Fig 1. Normally there will be several transistor stages so all the negatives should be connected to the AVC point (b) in Fig. 1.

If your IF amplifier has been wired such that it is not possible to bring out the negative rail, separate from earth, then try the alternative circuit of Fig 2. This takes the place of that part of the AVC circuit to the right of section A-A (Fig 1). This will provide a positive output control voltage for the IF stages. This circuit has not been tried in practice so you may have to juggle with the resistor values for best operation.

Rember that the AVC control voltage (for either method) must be only connected to the IF and/or RF stages and not to the mixer oscillator or BFO detector stages.

AVC Delaying Decay Circuit

The audio signal should be taken from the output of the SSB detector in the receiver, or at any other convenient point between the detector and the volume control. About 100mV is required, depending on the gain of the AY112. This is amplified and rectified by two sets of voltage doubler type circuits, producing negative DC voltages on C6 and C7.

The negative voltage across C7 is applied to the gate of the FET and in turn a negative-going voltage on the base of Q3 produces a reduction of current and thus the voltage drops across terminals (a) and (b).

When the received signal ceases transmission and there is no audio output the voltage on C7 remains constant, thus holding the AVC up until C6, (which is charged to a higher negative voltage than C7) discharges through R9, D5 becomes forward biased and both C6 and C7 discharge rapidly.

The delay time can be altered by varying the value of R9. (10 megohm). The resistors R7 and R8 are inserted to reduce the effects of ignition noise. The attack time can be reduced if desired, by using lower values for R7 and R8.

The diodes used in the writers circuit are Miniwatt type 0A202 but any high back resistance silicon diodes will be satisfactory. (If you don't have 0A202 diodes try the Fairchild series AN1002 etc.)

INITIAL SETTING-UP

The overall performance of the AVC circuit will depend to some extent on the IF gain and the audio output level from the SSB detector stage, therefore you will need to check the following points.

1. S-meter reads too high/low on the scale on no-signal condition. **Remedy: Increase/decrease the value of the resistor,**

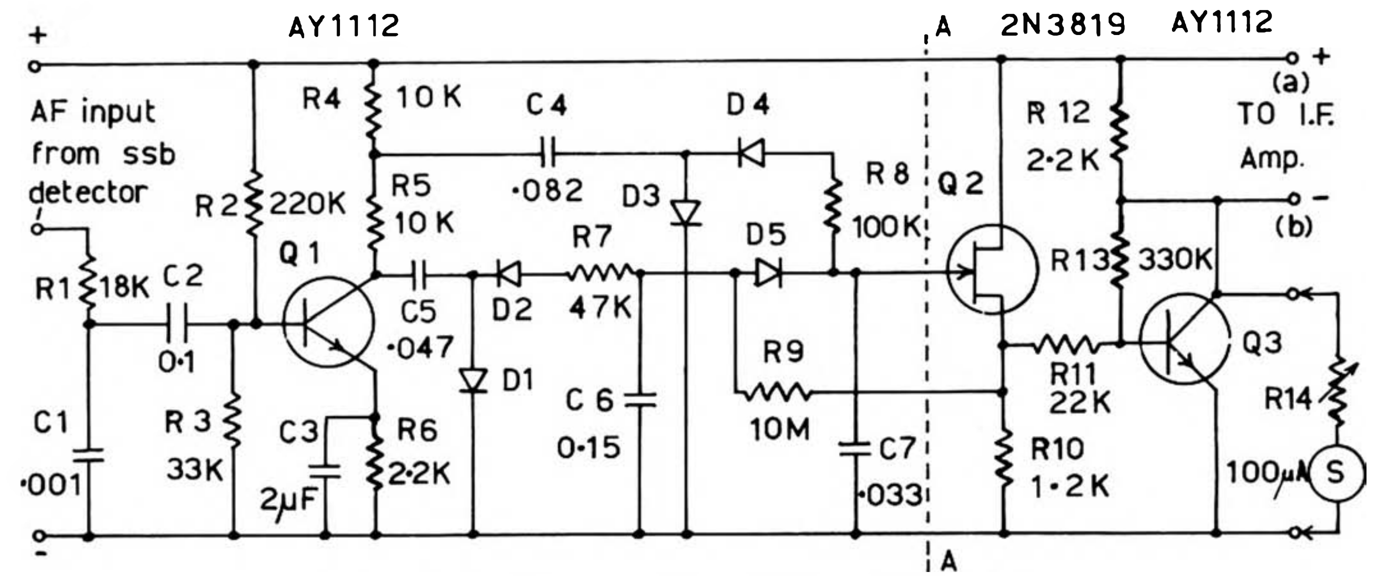


FIG. 1. - AUDIO DERIVED AVC FOR SSB RECEIVERS

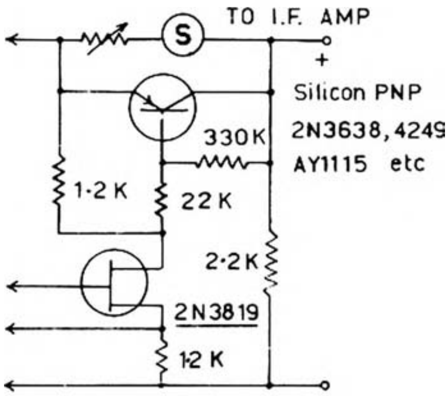


FIG. 2. ALTERNATIVE DC AMP

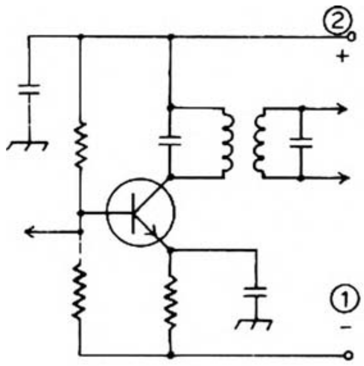


FIG. 3. TYPICAL IF STAGE

R1, connecting to the SSB detector output.

2. Strong signals do not cause full scale reading. **Remedy: adjust resistor in series with the meter.**

3. Strong signals overload and distort- this may occur if using an S meter of low sensitivity such as a 0-1mA movement. **If this is so, try reducing the load resistor across terminals (a) & (b), R12, from 2.2K to say 1K..** (The purpose of this resistor is to offset the current which bleeds through the S-meter circuit.)

4. The source voltage of Q2 should be about plus 2 volts with the AF input disconnected. **If it is not within about ½ volt of this, try another FET or adjust value of D10.** ●

a funny thing happened to me in the shack the other night

ALAN SHAWSMITH, VK4SS
35 Whynot Street,
West End, Brisbane, 4101

We all have a fetish about something. I've been an unabashed contest compulsive. Thirty years ago a 48hr. non-stop "sweat" would have been a breeze. Now it's a case of an old dog for a hard road and even with a quota of tricks, a three decade gap between grey hair and youth is too much of a handicap. OT's in my shape don't win contests any more, they just participate.

Now, in any stint, I must confess, the tortures of an aching back, head, wrist or ear soon begin to create discomfort and sap concentration. "Modus operandi" in the radio shack at night is to have the room in darkness except for a small light on the log book. Hearing my small daughter in the bathroom. I called to her to bring me a headache powder from the cabinet. This she did and I hastily unfolded it and gulped it down. It tasted odd but I was too busy to bother and keen to pick up every QSO and point possible.

The hours dragged on and the headache only got worse. At bedtime, my daughter came in for a good-night kiss. I asked her for another powder and washed it down with the dregs of a cup of stale, bitter tea. Again it tasted lousy but I blamed it on the dryness of my mouth. About an hour later I began to feel light-headed and queasy and had to lie down on the shack divan.

"Honey," I called, weakly, to the YF, "You still up?"

"What's wrong?" The voice from the bedroom was unsympathetic.

"I don't feel so good—musta bin somethin' I ate."

"Well it wasn't dinner or supper. You've been too busy to eat."

"I've only had a couple of headache powders and it couldn't be them."

There were sounds of the YF hurriedly getting out of bed. She appeared from the bathroom, switched on the light and held out a box of powders and said, "There's no analgesics; I forgot to get them in."

"Well, what are these—?"

"De-worming powders for the dog."

"De-WHAT?" Rage overcame my aches and pains. I sat up and bellowed, "That bloody hound has more status around here than the rest of the family. Since when does its medication mix with ours?" I sank back miserably on to the divan ,"Get the doctor, I feel 'crook'."

"It's eleven p.m. You can ring him up with a tale like that at this hour, but not I!"

The local GP is a pretty good friend, so I dialed him. "-er' Mac," I said sheepishly. "I've just swallowed a couple of de-worm dog powders. I thought they were aspirin-."

"You're back on the brandy. You've had another lapse-."

"No, no, it's fair dinkum. I really did and now my insides-."

A great guffaw echoed out of the headset. "Listen pal, you don't need me, you need a vet!"

"Very funny," I said testily. "All I want to know is—well, will I be OK?"

"Ha, ha, ha, they're a harsh purgative you know."

"Well, I have a radio contest going."

"Oh, yes, your usual week-end sub-cult ritual. Well just ignore the symptoms. They'll pass- away- and carry on."

I did carry on—all the week-end. But not in the contest. ●

WARNING

In terms of PMG directions*
from 1.3.1974
UNDELIVERABLE and UNDELIVERED A.R.'s
WILL **NOT** BE RETURNED TO SENDER
Unless you advise your
CHANGE OF ADDRESS
to the Executive Office
P.O. Box 150, Toorak, Vic., 3142
at least one month in advance
you may miss your A.R. No replacement can be sent to you unless accompanied by 70 cents per issue (subject to copies being available.)

The above applies only when you change your address

* Letter V 228/1/17 of 30.11.1973 (services)

VK ZL OCEANIA DX CONTEST 1973 RESULTS

VK — PHONE

Call	1.8	3.5	7	14	21	28	Total
VK1AOP		475	110	6820	2795	1330	11530
VK1JC				6750	2575	750	10075
VK1DA				300	628		1755
VK2XT		210	910	10035	7155	1900	20210
VK2APK		165	2520	9300	5305	2665	19955
VK2BPS				6655	2535	730	9950
VK2JX				4215	2390		6605
VK2CAX			55	4230	1590	850	6725
VK2ABC				5820			5820
VK2BJT				1120			1120
VK3MR		245	575	5981	3255	55	10111
AX3SM				3390	4150		7540
AX3AFW		155	490	4620	925		6600
VK3AVO				4475			4475
VK3ARY				3395	645		4040
VK3EF		110	175	475	230	320	1310
AX4FH				4770	8190	1695	14655
VK4EZ				8365			8365
VK4DO				3015			3015
VK4LZ				1850	930		2935
VK4PJ		55		55	1590	1180	2880
VK4XY					655		655
VK4OX				490			490
VK5WV			375	5725	1715		7815
VK5NO				4740			4740
VK5OR				1470	1860		3330
VK6PG				2720	3525		6245
VK6TU				1505	345		1850
VK6RL		110		205	60	205	735
VK7GK		465	4845	7940	3200	610	17060
AX8AZ				620	475	185	1280
VK9RY					10300		10300
VK9EJ				1230	1160		2390

ZL — PHONE

Call	1.8	3.5	7	14	21	28	Total
ZL1BKX	200	165	920	11775	5585	3015	21660
ZL1AXB				11960			11960
ZL1AVG/ BGH				11460			11460
ZM1AMM				6740	3535		10275
ZM1AIZ		530	1685	2970	2565	1920	9670
ZL1MQ		110	165	5175	2210	770	8430
ZM1BKL				7745			7745
ZM1AKY		310	55		4265	3075	7705
ZL1ANH				2145	410	55	2610
ZL2ACP		165	165	7210	4355	610	12505
ZL2TG				5480	3115	780	9375
ZM2AWH		2025					2025
ZL4BO			5835				5835

VK — CW

Call	1.8	3.5	7	14	21	28	Total
VK1AOP		265	1065	1215	660		3205
VK1DA		405		905			1310
VK2APK		940	3485	6430	4325		15795
VK2CX		400	1770	6810	3770	340	13090
VK2VN		1835	1715	3930	1305	920	9705
VK2BQO		55	2255	4270	905		7485
VK2QL		815	1495	1400	770	560	5040
VK2BAC				5625			5625
VK2CAX		670	820	2395	1480	55	5420
VK2BBB			525	1250			1775
AX3KK		275	3545	4805	4870	100	13595
VK3MR		890	5235	6470	2725		15320
VK3XB	55	1005	1665	6000	3845		12570
VK3MJ		265	1710	7260	2915		12150
VK3OP		1570	4185	2105			7860
VK3AVO				3980			3980
VK3BRC			135	40	385		980
VK3RJ	230						230
VK4XY				1495			1495
VK5NO		840	3165	7430	4860	155	16450
VK5FM				3290	1980		5270
VK5OR				960			960
VK6PG				3390	4100		9080
VK6RS		55	375	385	135	270	1220
VK7RY		165	55	375			595
VK7GK		1695	6605	6805	2800		17955
VK8HA			55	725	2250		3030
VK9EJ							5510

ZL — CW

Call	1.8	3.5	7	14	21	28	Total
ZM1AMM		780	1370	6030	5300	900	14380
ZM1AYG/BLR				11405			11405
ZM1AFW			2355	5080	2295	545	10285
ZL1ARV				6480	1140		7600
ZM1AIZ		2145	1770	1295	1565	735	7510
ZM1HV		365	1970	2395	1780	340	6800
ZM1MQ		190	370	1900	235		5780
ZL1BLS				5420			5420
ZM1AMO			5415				5415
ZM1IL				345	1955	100	5300
ZM1TB							3045
ZM1AYG		1170	735				1805
ZM2TG		755	1155	5815	3925	535	11885
ZL2ACP		455		2100	530		3085
ZL2AKW							1630
ZL2AWH		1230					1230
ZL3IS				8595			8595
ZL3GQ			6985				6985
ZL4AW				4595	1040		5635

VK — ZL — SWL

CW

L30043	1930

PHONE

L40104	3440
L60121	2305

PHONE — ASIA

YB3CW	1482	9M2DQ	7904
9M2CJ	846	9V1RJ	1390
9M2CX	84		

PHONE — OCEANIA

C21AA	2912	KH6GMP	23135*
C21N1	1344	KH6RS	1780
KG6JAR	13020	YJ8BL	3888
KH61J	23716		

NORTH AND SOUTH AMERICA

VE7VP	2794	W7SFA	13572
VE2AFC	120	K8VIR	486
W2FCR	1848	W8FJS	161
W3AZD	3288	W9QWM	115
W3 (!.U1BAR)	450	W0GNX	5278
W3TV	172	CE8AO	300
W4WSF	4284	HK5BWX	300
W4ORT	3125	LU5HFI	5282
W6PLH	16359	OA4AKL	2124
K6SVL	4949	PY1EMM	24
W6OXS	4117	PY1BDU	1
W6DGH	3888	PY3APH	2348
WA6FIT	1820	YV5-DLH	1080
W6RQZ	15		

PHONE — EUROPE

DL2UU	90	OK1KCP	692
DL8NU	3762	OK1ADM	288
DT2ATL	2496	OK1MGW	216
HA9KOV	40	OK1MPP	160
HA2KRL	30*	OK1AEZ	96
HA3KNA	2*	OK2SIR	72
HB9IK	280	OZ6MI	946
I4ELL	1484	SM7ACB	2091
LA6HL	1728	SK6AW	96
LA5QK	36	SP3DO1	1890
LA LM	20	SP6PZB	1001*
LZ1QR	132	SP5PWK	288
OH3MG	2500	SP5DZI	168
OH2BO	940	SP5XM	120
OH2BMG	564	SP9ABU	40
OH6ZH	40	SP9A1	33
OH2BFX	12	YO8FZ	126
OH7NW	4	YU1BCD	2249
OH3NJ	2	9H4G	21

PHONE — WORLD-WIDE

9J2GJ	100	CR71Z	8
OD5BA	450		

JAPAN — PHONE

JA1CMD	7686	JE1VTZ	30
JA1ILN	5616	JA2MGE	2736
JA1OCA	2717	JA2JSF	1078
JH1JGX	2338	JA2OJ	930
JA1WVK	1720	JA2JAB	574
JA1STN	1034	JA2SAP	374
JA1AAT	748	JH2BFT	333
JH1BBT	682	JH2NWF	36
JA1VP	120	JH2LUF	10
JA3AAW	8207	JA6CM	539
JA3BLN	1859	JA6EYD	400
JA3LVP	1045	JA6CRA	270
JA3XRC	182	JA6EFT	100
JA3PGV/4	10767	JA6ABG	97
JA3WBK	350	JA7MJ	6235
JA3CMD	310	JA7CUK	588
JH3GCN	264	JA7HLO	147
JH3BJN	60	JA7KM	6
JA4BBN	2576	JAGRY	1356
JA4TR	550	JA9BMG	9214
JA5GAL	912	JA9CIH	1900
JA5IU	588	JA9YE	742
JA5EVQ	440	JA0MHZ	238
JA5CEK	344	JA0HWZ	210
JA5IVC	40	JA0FMB	672
JA6YTU	8960	JA0AIE	65
JH6CAW	580		

*Multi Op Station

PHONE — U.S.S.R.

EUROPEAN S.F.S.R.

UK6LAZ	4179*	UK4NAA	1008*
UK4WAB	2180*	UK3AAC	696*
UA4OM	1786	UA3GM	684
UA1CS	1470	UW1AR	315
UW4NP	1404	UA1MU	304
UK3ABO	1260*	UK4WAC	210*
UK3YAB	1027*	UK3SAB	105*
UA1CK	1020		

ASIATIC S.F.S.R.

UA0FGM	18963	UA90S	627
UA0FBZ	5700	UK9CAE	[illegible]
UK9ABA	5670*	UW9WZ	[illegible]
UA0MI	4296	UA0CAH	256*
UK0AAB	3114*	UA9MP	24
UV9AB	2600		

UKRAINE

UK51BM	1690*	UK5ICD	840*

WHITE RUSSIA

UK2WAF	198*

AZERBAIJAN

UD6DER	376	UK6BD	210

UZBEK

U18CD	1066

KAZAKH

UL71AF	1104	UL7YR	245

MOLDAVIA

UO5BZ	32

LITHUANIA

UK2PAF	2760*

LATVIA

UK2GD2	528*	U02HO	30

SWL

UA3-142-498	1904	UC2-008-34	468
UA3-142-198	1406	UO5-039-48	342
UA9-154-565	3432	U02-037-83	1568
UA0-103-16	2268	U02-037-104	10[illegible]
UA0-103-25	1190	U02-037-8	2[illegible]
UB5-073-813	294	U02-037-115	80

CHECK LOGS

UA3VAQ	UK0AAC
UW6CV	UO5AP
UA9MT	

CW — ASIA

YB3CW	1110	9V1RJ	1123
9M2CX	352		

CW — OCEANIA

KG6JAR	12880	KH6RS	10295
KH61J	14550	KH6CF	4811

NORTH AND SOUTH AMERICA

VE7HQ	5184	W6PLH	11952
W1EVT	5200	W6OXS	6180
K1OME	150	W6DGH	858
W2LW1	3600	W6ZGM	568
WA2FGS	56	W7SFA	15246
K3GJD	4524	W7IR	12236
W4ORT	3640	W9QWM	160
K4RDU	880	HR1AT	1666
W4WSF	512	PY3APH	371
W5SBX	2737	PZ1CQ	20
W5OB	480		

*Multi Op. Station

EUROPE — CW

DL8NU	3525	OK3KAP	232*
DL9PT	638	OK3RC	152
DT2BJD	2540	OK1DWA	114
DM3QO	2322*	OK1DIM	90
DM4YEL	1394	OK3BH	84
DT2BTO	65	OK1TW	40
DN2FBL	8	OK2BJJ	36
G3KSH	160	OK2BGR	24
HG5A	1275	OK1AUP	12
HA5KBM	1245*	OK1ATZ	8
HA2KRL	598*	OK1KZ	4
HA5KFA	192*	OZ7HT	620
HA3KNA	147	OZ1W	256
HA5KFU	102	OZ5CI	242
HA4XX	96	OZ7XG	32
HA8KQX	80*	SM0CCE	1066
HA5KFV	65*	SM0EXO	854
HB9IK	378	SM0CCM	228
HB9AUR	126	SM0BVQ	8
HB9AFI	112	SP9DOI	649
I6BQI	576	SP9CTW	462
I2MAD	280	SP6PZB	264
LZ1FI	45	SP7BFC	264
LZ1KAU	8	SP8ARU	147
OH1TN	1008	SP7PBC	108
OH6UC	756	SP5AKN	96
OH3NJ	176	SP2AOB	90
OH7NW	132	SP2AVE	72
OH2DN	30	SP8AQN	56
OH9TD	18	SP5PWK	50
OH9PH	2	SP9ABU	40
OK1KOK/P	2970*	SP6DMJ	2
OK1KSO/P	1280*	SP2FBC	2
OK2QX	560	YU1BCD	1188
OK3EA	350	YU1SF	2

JAPAN — CW

JA1ILN	7200	JA4DZ	102
JA1SJV	6554	JA4AVO	60
JA1CMD	5738	JA5XX	2553
JA1FGB	944	JA5DQH	1617
JA1PCY	670	JA5EVQ	410
JH1OFW	590	JV5CEK	270
JH1BBT	522	JA6JML	1515
JA1VP	440	JA6BDB	238
JR1FVW	387	JA71KH	4316
JA1KQX	294	JA7FC	3C59
JF1RPZ	184	JA7JW	400
JE1GFS	95	JA7GAX	315
JA2XPU	693	JA7NU	308
JA2OJ	504	JA8ZO	4440
JH2BFT	3	JA81EV	288
JA2EG	2	JA8AQZ	50
JA3AAW	4296	JA9CIH	1892
JH3LXN	3536	JA0CVC	1292
JA3EA	2004	JA0SHC	182
JH3BJN	2	JA0IAD	85
JA4XW	6390	JA0FXH	30
JA4QVM	572	JA0YKE	2

CW — U.S.S.R.

EUROPEAN F.S.R.

UK6LEZ	4475*	UA3NAQ	315
UK3YAB	2580*	UA1QAU	240
UA4QM	1616	UK1AAQ	189*
UK4NAA	1020*	UA1FW	180
UK4WAB	1001	UA1RV	157
UA3GM	990	UK4AA1	138*
UA3ABO	741*	UA3ST	126
UK3SAB	640*	UA3DEA	80
UW4NP	567	UW3HV	36
UK3AAC	342*		

ASIATIC S.F.S.R.

UA0FGM	12222	UA9CBM	513
UA0FBZ	5017	UK9LAA	247*
UA0JO	4452	UA0NH	192
UA0MI	4008	UA9JL	189
UA9NN	2688	UW9WB	105
UW9PT	2300	UK9OBK	96*
UK0SAL	1456*	UA0LAF	60
UW9WL	804	UW0LT	56
UW9AT	670	UA9CBR	48

KALINGRADSK

UA2DP	120

*Multi Op. Station

UKRAINE

UK5UAL	2100*	UB5VY	869
UK51BM	1887*	UK5IAI	462*
UK5WBG	1590*	UB5GBD	260
UB5OE	240	UT5LN	44
UK5LBJ	145*	UK5E1AM	39*
UB5WAB	133	UK5GBN	33

WHITE RUSSIA

UK2WAF	1616*	UC2WP	168
UC2WAL	384	UK2WAE	70*
UC2XX	224		

AZERBAIJAN

UD6BQ	1085	UD6DHU	24
UK6DAU	261*	UD6BW	18

GEORGIA

UF6QAC	96

ARMENIA

UG6JJ	50

TURGOMAN

UH8BO	84

UZBEK

UK81AA	768*	U18CD	405
UK8AA1	506*		

TADZHIK

UJ8AB	28	UJ8JAS	7

KAZAKH

UL7TAM	52

MOLDAVIA

UO5AP	84

LITHUANIA

UK2PAF	3680*	UK2BAO	100*
UP2BL	120	UP2BAS	50

LATVIA

UK2GAN	432*	UQ2PJ	80

WORLD-WIDE — SWL

PHONE

DM-2703/A	728	14-14758	168
DM-4043/L	600	I1-12387	154
DM-6405/N	70	I0-55048	60
BRS32525	4400	NL998	682
RBS26431	4144	OK1-15835	462
JA1-11614	6885	OK1-17825	216
JA1-4876	962	OK1-15689	
JA3-7604	248	SM65338	100
JA4-4665	1220	SM5-2735	80
JA6-2188	25	UA9-145-47	1452
JA0-1918	7334	WDX4CE/	
LZ2A128	130	SH-W4-122	72
LA-M565	300	UA6-101-765	360
DL8497	962	UA3-142-198	252
I4-20691	2176	UA9-145-197	1200
IT9-14257	704	UC2-009-195	780
I50-20249	572	UC2-006-12	732
I2-14026	352	UC2-006-50	84
I5-50661	320	UD6-001-3	256
14-15407	304		

CW

JA02230	494	OK1-17825	80
OK2-14760	405	OK3-26239	60
OK1-11861	200	OK1-13188	12

CHECK LOGS

PY1TC	SM7ACB
W4JUK	F6BJP
LA6U	3D2ER
W2NCI	DT2BCD
SM6PF	VE3CEA
6Z4PM	VK1MS
DM2AYK	UA1ZAM
VK5ZX	UA3TAM
OK1APS	UW3YS
DT2CYO	UK4NAB
DM2DHN	UK4WAC
DM2BUN	UA6AJG
DM2BEU	UK9AAC
SP3CDQ	UK0AAC
VK4RF	UW1OR
SM5BKI	

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

ZERO BEAT AND THE YRCS

What is Zero Beat? This is the magazine of the **Youth Radio Club Scheme.** It is published by Bert Grove of South Australia every month or so, and has approximately a dozen duplicated pages of information for beginners, and certainly suitable as refresher information for those who have been around electronics for some time. The YRCS produce not only a fine little magazine but a variety of small, inexpensive construction kits ranging from BFOs, transistor checkers, signal injectors, RF amplifiers (for sick receivers); and I have no doubt they are designing more kits. These kits are produced by VK3AQ, R. J. Callander, 383 Warrigal Road, Burwood, 3125. I think that Bob is assisted by Roger Sewell? on these projects.

Why am I telling you all of this? The YRCS is allied with the WIA and as such each group can be of assistance to the other. I would suggest that newcomers who are just starting in radio/electronics consider seriously joining the YRCS. For information, I suggest that you contact the appropriate State Supervisor; his address is shown in the directory insert in the February issue of AR.

Over the next few issues I hope to present excerpts from Zero Beat which are helpful in themselves and additionally show people the style of article to be found in Zero Beat. Most of the excerpts will be from the section named **Short Circuits**, a section on hints and kinks on better methods to do certain jobs.

SHORT CIRCUITS

Zero Beat June '73

There are many times that a heat sink is required when removing transistors or other small parts from a printed circuit board. Usually the space between the board and part is too small for long nose pliers or other radio tools. An ideal solution to the problem is a pair of ordinary pointed tweezers from the first aid kit. Many more uses will be found for these, particularly when dealing with thin wires, so it will be an asset to keep a pair on hand.

Zero Beat June '68 by H. Smith VK3ZXS

1. Mechanical hum in a radio receiver or amplifier is often caused by loose laminations in the power transformer. This hum can usually be eliminated by tightening the long screws that hold the transformer together: they often extend through the chassis base in certain types of mounting.

2. A short length of fibre insulating sleeving may be used to remove or replace dial lamps in hard to reach places where the hand is too large for the job.

Use sleeving slightly smaller than the glass bulb so that when forced over the bulb it grips it tightly, thus providing a tool that will enable you to unscrew or re-insert the lamp in its socket.

Zero Beat February '69

1. Experimenting with circuits on a bread board construction and want an easy way to mount a toggle switch? Open the eye of a half inch screw eye until the switch barrel fits inside, then clamp the eye back with the pliers. The lock nut on the barrel will hold the switch securely, and the whole assembly can then be fixed to the bread board by screwing into the wood.

2. How many times is a former required for winding that test coil on and nothing available? This is easily overcome by keeping on hand some short pieces of Electricians PVC conduit, which is obtainable in diameters from five-eighths to two inches or larger, and is excellent for nearly all requirements. **(Can be lossy at VHF however, VK3UG).**

ELECTRO MAGNETIC COMPATIBILITY

Did you know that the September issue of AR is intended to be an issue devoted exclusively to EMC? The 30th of this month is deadline for any articles, comments, etc., on this subject. Being a newcomer you may be experiencing interference or may be causing it, but you do not understand it. Perhaps a letter to the Editor could be useful to highlight some aspect of interference you've come across. The September issue should be of help to many people who are just not aware of the problems of interference. It may come as a surprise that AR has had more articles on this subject over a period of ten years, than any other magazine that I have read. If you wish to contribute, do so now — straight away — if not sooner.

Next month I hope to have some more **SHORT CIRCUITS.** ●

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

A REQUEST

Since this column started there has been quite a bit of favourable comment in support. Unfortunately there has not been quite enough support in the form of contributions. Every amateur at one stage or another builds a new piece of equipment or modifies some existing gear. In the process he strikes problems and overcomes these. The solutions to these practical problems may be of help to others, so why not put pen to paper. Without your help, the column will not be able to continue.

AID TO SOLDERING

Capacitors and resistors which have been stored for some time develop tarnished pigtails and are difficult to solder. One solution is as follows: Take an ink eraser, the hard type with a gritty filling, and carefully slice a number of parallel slots in one edge using a razor blade. The slots should be spaced about 1/16 inch apart and about 1/8 inch deep. Bend the rubber so as to open one of the slots and push the pigtail of the component into the slot so that the body butts up against the rubber. Release the rubber so that it clamps onto the wire and pull the pigtail through the slot. If all the oxide is not removed on this pull-through repeat until the wire is clean and bright. ●

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

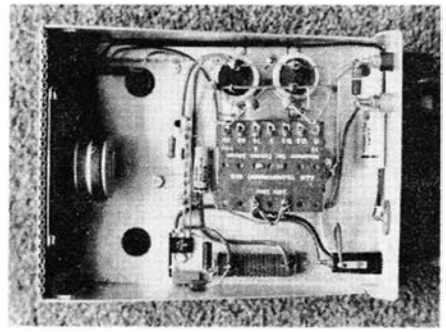
AC POWER SUPPLIES FOR SOLID STATE TWO METRE TRANSCEIVERS

A couple of months ago, when discussing AC power supplies for valve-type car phones, it was noted that low voltage high current supplies presented quite a few problems. At that time we took the other approach and adapted the transceiver to operate from a standard supply delivering high voltage DC and low voltage AC for the filaments. However when we consider AC supplies for solid state rigs running around ten watts output, the current requirements usually do not exceed two amps. At this output, special components such as heat sinks and large transformers are not required.

Homebrew equipment can be made to match the appearance of commercial units.

From the constructional point of view, the unit illustrated was designed to match my Trio TR7100 both in size and appearance. With slight changes it could match other popular FM transceivers such as the Yaesu FT2F or FT2FB, as well as the Icom IC20.

The circuit for the unit was borrowed from the September 1969 issue of Amateur Radio, being part ten of the Solid State Transceiver series. The transformer used in this supply is the A&R type 5526. This transformer is rather large for the trans-



Underneath view of the AC PSU described in the text.

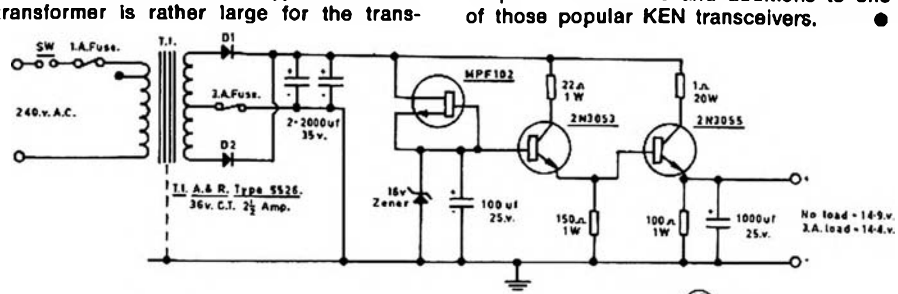
ceivers mentioned above but would be ideal for solid state rigs running up to twenty watts output. As a saving on both cost and size, I have used an A&R type 6978. This has a 15 volt 2 amp output and of course requires a bridge rectifier, in place of the full wave as used with the larger 5526. Four five-amp diodes were used and any with a PIV of 50 or 100 volts would be suitable. The power supply illustrated uses MR751 diodes rated at 5 amps.

CONSTRUCTION

I do not intend to give any dimensions of the power supply cabinet as these will vary depending on the particular transceiver it has to match. However a few details of methods used will be described. The basic chassis consists of a U-shaped piece of 20 gauge aluminium. Across one end of this a speaker is mounted on a scrap of hardboard with a piece of fine gauge expanded aluminium formed around this. This is then fitted into the chassis by two small right angle brackets and a few dobs of araldite. A panel to carry the output and input connections is now fitted into the other end. Use either hardboard or aluminium depending on your metal bending capabilities. To complete construction another U-shaped section of aluminium is made up to fit over the first piece. Finish with a spray paint to match your particular rig and fasten to the chassis section with four self tapping screws.

The brackets holding the transceiver on top were secured with araldite before painting.

Next month a picture story on a few simple modifications and additions to one of those popular KEN transceivers. ●



CURRENT LIMITED POWER SUPPLY.

The emitter resistor of the 2N3053 shows 150 ohms. This should be increased to 1000 to 1500 ohms.

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RSG, Macquarie Island	52.160
	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	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullen	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth *	52.3015
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth *	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini *	52.150
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

* denotes change from last month.

Roger VK2ZRH, of the VK2 Division Beacon Committee, has sent advice that the VK2WI beacon is now on 144.010 MHz, with FSK Ident., 850 Hz shift, moving down in frequency for key up. Initial tests show the frequency to be within 10 Hz per day. The 6 metre beacon will remain as is until the winter months when ident. will also go to FSK. Other members of the beacon committee are Brian VK2BX and Roger VK2ZTB. Thanks Roger VK2ZRH for your information, also a note regarding the same beacon from Roger VK2ZTB. Thanks to you also.

The VK6 VHF Group News Bulletin mentions the new solid state beacons over there are now nearing completion. The 6 metre beacon is putting out about 6 watts on 52.3016 kHz (aparently the frequency cannot be pulled down the last 1.5 kHz without upsetting the FSK). The 2 metre beacon on 145.0 MHz is putting out about 9 watts. Both beacons are using FSK 850 Hz shift. Main problem now is the provision of new aerials, and it is expected the old aerials will be pressed into service for the time being.

Also very happy indeed to have had a communication from Noel Spalding, Box 757, Lae, Niugini, P29GA, who advises his beacon with that call sign (previously VK9GA) runs an endless tape with a one minute break every three minutes, transmitting A3J from a FTDX400/FTV650 combination to a 5 element yagi pointed due south, at 32 feet height. The QTH is from his residence on the campus of the PNG University of Technology, 7 miles NW of Lae.

Noel also passes on the news that he uses a VK3 six metre pre-amp in the front end of the FTV650 with the centre frequency for optimum gain being 52.250. There is a local 53.032 MHz net using Pye MK 3As which he has converted, and a Weston Lowband AM rig. In Lae present operators on 6 metres either mobile or fixed station are P29ZJN, P29IF, P29MR, P29ZEV, P29EH, P29HT and P29GA. At P29HT Noel is making a collinear which is hanging beside a 40 foot tower on top of a two-storey building, and has a communications receiver which has 6 metre coverage: this enables him to monitor the band between lectures! Thanks for writing Noel; would be very pleased to hear from you again sometime.

NEW HEBRIDES

I note from the pages of the Geelong Amateur Radio Club bulletin that a recent visitor to their club was Ken Munyard YJ8KM from New Hebrides. Ken showed a great amount of interest in six metre operation and left the club with a six metre converter and a circuit of a six metre transverter, so there may be possibilities of another area in the Pacific for next year. Ken can be contacted on most HF bands, particularly 20 metres. He is also interested in 160 metres.

MOONBOUNCE

Lyle VK2ALU of the Illawarra Branch of the WIA, sent along his usual interesting information re their 432 MHz moonbounce activities. The following is condensed from his information, but carries all the interesting bits!

'Since last report major activity of the Group has been directed to construction of RTTY equipment in preparation for scheduled test with K2UYH. Receiving system was demonstrated at February Branch meeting, using a polar relay for teleprinter input. Circuit received from Rod VK2ZQJ for constant current driver in place of polar relay, for reduction in pulse distortion. Tests to date have not yet achieved the improved results. Transmitter frequency source was modified under some difficulty by Eddie VK2ZJ to give approximately 170 Hz shift, but frequency accuracy is not as good as with phase lock system. It is anticipated the exceedingly stable oven oscillator unit kindly donated by John VK2AU will eventually provide close to one part in 100 million stability and accuracy and also allow FSK to a more closely controlled shift.

'Scheduled tests for 30th March were for five separate tests, and four on the 31st. Stations concerned were K2UYH, W1SL, W8WCD, W0EYE, W0DRL, W4NUS and W0YZS, mostly newcomers to the Group. Then a request was received from G3LTF for two tests with him for the first time, just prior to him shifting QTH. His 16 foot dish was thought to be marginal, but 800 watts output helps!

'First series of tests on 30th March resulted in only W1SL being heard. Tests were then made with G3LTF, and delighted to hear him right from the start, and were able to copy both his and our calls, and duly acknowledged by him. Chart recordings and dB meter indicated he was peaking to 6 dB or so above noise. The second contact with him on 31st was even a little better and Rs were sent both ways quite early in the test period.

'31st March also provided a CW contact with K2UYH, requests for RTTY tests were not acknowledged. The group were very pleased with the contact with G3LTF who is a long time moonbouncer on 432 and 1296 MHz, but who had previously worked only K2UYH and VE7BBG, after repeated attempts on 432 MHz. This contact established a new 432 MHz EME distance record, eclipsing our previous record contact with K2UYH by a significant, but not yet calculated distance.

'Finally, a 60 foot dish is being re-erected by W3SDZ, who had it dismantled and transported to another location — what a tremendous job to take on! He hopes to use it on 144, 432 and 1296 MHz EME work in about 6 months time — it will have about 6 dB more gain than the Illawarra Group (VK2AMW) dish.'

5.6 GHZ AUSTRALIAN RECORD

Congratulations to Des VK2AHC, Dave VK2SB and Norm VK2ZND for their new Australian record established on 10th February 1974. Des operated on 5840 MHz from Kurrajong Heights, while Dave and Norm operated on 5810 MHz from Belrose, Sydney, the distance being just over 59 km. FM was used and signals were 5 x 9 both ways.

28-inch long home made horn antennas were used, with 17 inch x 13 inch aperture, giving a gain of 23dB. These were fed by 3dB couplers with single 1N23E crystal diodes in the side arms. RK549 klystrons were retuned and fed to ferrite isolators.

Des now hopes to produce solid state equipment for use on 3400 and 5800 MHz bands with the aim of extending the operating distances for these bands during the coming year.

Information taken from overseas journals indicates the following distances for 5.8 GHz: England 78 Km; USA 344 Km; which is a world record and established in June 1970.

OSCAR 6

It happened eventually. VK5LP finally had some contacts through Oscar 6! Wally VK5ZWW did a bit of prodding, so the homework was laid aside for a while, the 2 metre rig tuned up to 145.940, and fired into Oscar. Wally threatened that if I did not work him first our period of being on speaking terms would be ended. He had no fear, the first time I didn't work anybody, and couldn't hear my own signals. Decided the rather ancient communications receiver wasn't receiving SSB on 29 MHz too well, so out came a VK3 six metre converter, coils were pruned and retuned for a half meg. bandpass at 29.5 MHz, and the old receiver came to life. On the next attempt, I worked Wally through Oscar, as well as several other interstate stations. So we are still speaking! Some further work has been done on that excellent converter, and now it is fed into the 6 metre SSB equipment using a 24 MHz crystal to bring Oscar out on 53+ MHz. The moral of this story really is that it doesn't take a lot of effort to get set up to work through Oscar, and often some gear in the shack can be altered to improve matters, a bit of incentive to get with the strength or whatever you get with, and there are the results! As time permits I shall work more stations, but the homework has first pick of the available time!

MODEL AIRCRAFT

I bring this unusual heading in VHF notes to your notice to say I, together with a lot of others, was perturbed to read elsewhere reports that amateurs were transmitting strong signals on the 27 MHz band and 'shooting down' model aeroplanes.

I find it very hard to believe that amateurs would do this, unless they are very sick amateurs. As usual the reports carried no information to substantiate the claims, and once again the amateurs come in for criticism without proof.

It is probably unfortunate that the model aeroplanes and other crafts are allowed to operate in the 27 MHz band. Apart from the occasional amateurs who may operate there, most usage of that part of the spectrum is concerned with diathermy equipment, RF heating for industrial purposes, and of course the Citizen Band users, legal and illegal alike. A lot of the more commonly used model equipment is not elaborate and really doesn't need to be, but it does lack front-end selectivity. Generally the actuators in such equipment are tone operated, with the tone impressed on a carrier, and some of the simpler gear is not really critical of tone frequency, as long as it is audio. A small segment of the spectrum away from the industrial, CB and amateur band would have been desirable for these experimenters, many of whom are quite young, and the not-so-young include myself, having done a bit of work in this direction.

All this leads up to an appeal that if any amateur has such moronic tendencies to 'shoot down' model planes, please remember the heartache of a youngster who has his plane crash and be destroyed. I know young people who have spent hours on the roadside selling mushrooms, mowing lawns, doing odd jobs to get their planes and equipment together. Let us give them encouragement if only to help to keep them off the roads for a while, instead of out there killing themselves in fast cars!

That's about all for this month, an enlarged version of what has been happening on the bands can generally be read in '6 UP'. I use their material at times, and they use mine, so it's a mutual operation. Think about this in the meantime: 'Each of us is like a bank that issues tolerance, confidence, kindness, love. This currency — provided it is genuine — circulates'.

The Voice in the Hills.

E M C

It is intended that September AR will be an EMC issue . . .

Any articles on Interference and EMC generally will be gratefully received.

Dead line — 30th June

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box 638
Brisbane, Qld., 4001.

THE "FRIENDLY" CONTEST.
REMEMBRANCE DAY CONTEST
August 17th and 18th 1974
Make sure that you and your friends make this the greatest contest ever. Mark your calendar, mark your diary, and make sure that your gear is in top condition.
VHFers . . . get with it this year.
The rules will be in July 'Amateur Radio'. Next month.
CW/CW contacts count double.
AND this contest will count for the **Contest Champion's Trophy.**

CONTEST CALENDAR
June 8th — Townsville Pacific Festival Contest. Join in.
June 15th-16th — All Asian phone Contest. No details, but join in.
June 9th-15th — Massachusetts Radio Week. See rules.
July 6th-7th — Venezuelan Contest.
July 27th-29th — County Hunters CW Contest.
August 10th-11th — Argentina phone Contest.
August 24th-25th — All Asian CW Contest.
August 17th-18th — REMEMBRANCE DAY CONTEST.

Massachusetts Amateur Radio Week
Starts 0001 GMT Sunday, June 9th.
Ends 2400 GMT Saturday, June 15th.
You will earn a certificate signed by the Governor of Mass. if you contact 2 Mass. stations.
Exchange will be signal report, state and country.
Certificates will be endorsed for band upon request. Application by July 31st. Include a SASE No. 10, to William C. Holliday, WA1EZA, 22 Trudy Tce., Canton, Mass. 02021.

CONTEST CHAMPION TROPHY
At the recent Federal Convention my offer of a trophy, to be known as the Contest Champion Trophy, was accepted. I have commented previously on the tremendous help to contests given by high scorers, and this trophy is in recognition of this help.
Although rules have yet to be published, in essence the trophy will be for the most successful entrant in Australian contests. I see no reason why the next Remembrance Day Contest should not be the first to count . . . so polish up your gear.

John Moyle Memorial National Field Day
Here are some logs that were not with my original list . . .
24 hour Section (a) VK5SR-1803,
Section (d) VK3ATO-5552,
Section (d) phone VK2AFI-2161,
6 hour Section (e) VK3ZFI-34.
So we have made a more noticeable improvement.
Some more comments . . . I note that some of the SWLs are now showing up in contests with call signs . . . Congratulations.
VK4WITs contest effort was all the more noteworthy because of the disability of a mini-cyclone and 7 inches of rain.
Apparently through no fault of Bill VK3XO, Midland Zones, VK3ATO, log was too late for inclusion in May results . . . they had 8 ops at Mt Alexander with an FT200, FT510, 2 X FT400s, 2 X FT101s and an FL100, an AWAB550 and homebrew equipment.
VK3 Division again made a great effort with most teams in the field; Canberra put some 16 operators in the field.
It was interesting to note how well the ZLs joined in the contest this year . . . on the occasion of their field day.
What can be done on low power . . . Russ VK3KX mentioned that he made contacts with VKs 2, 3, 4, 5, 6 and 7 on TWO watts CW . . . no TVI problems.
A few comments on the rules . . . Rule 2 (e). I did not intend that there be multiple ops here . . . VHF ops are just starting to come into these contests . . . if there are likely to be multi-ops stations, VHF only, then they will be catered for. Most stations under 2 (d) had VHF ops. Rule. 14. This states . . . twice on each band . . . if one **contact** is made whatever mode, another can be made 4 hours later . . . any mode . . . if a **contact** is made CW/CW, I cannot see that another **contact** can be made phone/phone or any other mode, until 4 hours have elapsed.
Quite a few were penalised for making a contact on one mode and immediately making another contact on another mode.
Rule 13 and scoring for foreign portable stations. This depends, I guess, on the honesty of the operator . . . if the ZL or DX station is a portable field station 15 points should be claimed . . . however if the other portable station is just at another QTH with 240V reticulated power supply he should be recognised as a 'Home' station. Most contestants know what a portable field station is??
When we get enough operators to keep the portable field stations going perhaps we can drop the DX contacts?
No consideration was given to HF mobiles as a section, because of lack of interest.
Several commented on the consideration given to VHF ops . . . but we would like to see some response in coming contests.
By my count we had about 60 portable field stations and there were about 30 ZL portable field stations in the contest.
VK8DA tells that their new address is C/o Box 1418, Darwin, NT 5794.
Jim VK3AZT was appointed Federal Contest Manager at the recent Convention and I trust that you will give him at least as much help as you have given me.
If I have not personally acknowledged your comments please accept my thanks . . . all were most welcome. We'll meet in contests.
I have enjoyed working for you.

THANKS
The Editor wishes to join with the members of Federal Council at the Easter Convention in expressing thanks to Peter Brown, VK4PJ, for a very good term as Federal Contest Manager. Peter did a splendid job with his Contest work but, even more important to me, sent regular items for the Contests column in AR. Thank you Peter on behalf of all members.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA. 5152.

CDM (CERTIFICATE MEDITERRANIO) AWARD
The award is available to licensed amateurs.
Contacts on and after 1st June 1952 are valid.
If the applicant is a member of an IARU Affiliated Society, it is not necessary to submit QSL cards. A list, showing full details of the contacts should be certified by the Awards Manager of an IARU Affiliated Society.
Non-members of an IARU Affiliated Society must submit QSL cards to the sponsor.
The fee for the award is 10 IRCs.
The address for application is: ARI, via Scarlatti 31, 20124 Milan, Italy.

Requirements:
Confirmed contacts are required with 22 of the countries shown below, plus 30 stations located on the Italian Peninsula — Italy only.
Countries list for CDM:

EA—Spain
EA6—Balearic Islands
EA9/CN9—Spanish Morocco
CN8—French Morocco
F—France
FC—Corsica
I/T
MF3
AG2—Trieste (before 31st December 1957)
IS—Sardinia
IT—Sicily
SU—Egypt
OD5—Lebanon
SV—Greece
SV—Dodocanese Is.
SV—Crete
3V—Tunisia
4X4—Israel
5A—Libya
5B4—Cyprus
7X/FA—Algeria
9H—Malta
TA—Turkey
YK—Syria
YU—Yugoslavia
ZA—Albania
ZB2—Gibraltar
3A2—Monaco

WORKED ALL SM 1 (WASM1)
The award is available to licensed amateurs.
Contacts after November 1945 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 fee for the award is 20 IRCs (this award is in the form of a small cloth).
The address for application is: K. Edvardsson, SMCCCE, Halleskaran 43, 126 57 Hagersten, Sweden.

Rules:
Swedish call areas are SM1, SM2, SM3, SM4, SM5, SM6, SM7 and SM0. SK and SL calls are also valid. SM8 calls (Maritime Mobile) are not valid.

Requirements:
Amateurs must have confirmed contacts with ONE station in EACH of the eight call areas.

HELVETIA 22 (H22 AWARD)
The award is available to licensed amateurs.
Contacts since April 1948 are valid.
Do not send QSL cards. A list showing the call, Canton, signal reports and mode should be certified by the Awards Manager of a National Society.
The award is available for all CW, all phone and mixed modes.
There is no charge for the award. (It is suggested that 2 or 3 IRCs be sent to help defray expenses.)
The address for applications is: Walter Blattner, HB9ALF, Post Box 450, CH 6601, Locarno, Switzerland.

Requirements:
Licensed amateurs must have confirmed contacts with one station in each of the 22 Cantons.

Canton List:

1.	Zurich	ZH	12.	Schaffhouse	SH
2.	Berne	BE	13.	Appenzell	AR
3.	Lucerne	LU	14.	St. Gall	SG
4.	Uri	UR	15.	Grisons	GR
5.	Schwyz	SZ	16.	Argovie	AG
6.	Unterwald	NW	17.	Thurgovie	TG
7.	Glaris	GL	18.	Tessin	TI
8.	Zoug	ZG	19.	Vaud	VD
9.	Fribourg	FR	20.	Valais	VS
10.	Soleure	SO	21.	Neuchatel	NE
11.	Basel	BS	22.	Geneve	GE

Magazine Index

With Syd Clark, VK3ASC

HAM RADIO. December 1973
A Solid 80 Watts for two Metres; Crystal Controlled AFSK Generator; Wide Range RF Signal Generator; Two-stage Cavity Filter for Two Metres; Three-Terminal Voltage-Regulator IC's; Low voltage Audio AGC Amplifier; Band-pass Filter Design; Introduction to the Digital Mixer; Narrow-band Modifications for the Regency HR-2; Simple High-gain Wire Antenna for High Frequencies; Feedpoint Impedance, Characteristics of Practical Antennas; Improved Logic Test Probe.
January 1974
CW Memory for RTTY Identification; Five-Band Kilowatt Linear; High-Impedance Meter Interface; IC Logic Families; Compact Package for Two Metre FM; How to solve Transistor Heatsink Problems; Simple Lowpass Filter for Audio; Medium Power Toroidal Antenna Tuner; Four Band High Frequency Windom Antenna.
73 MAGAZINE. January 1974
Wide Range IC Audio Oscillator; Another ID Generator Circuit; Constructing Oscillators for 432 and 1296 MHz; Expanded Range Line Voltage Monitor active Filters; Video Tape Recorders; Inexpensive decimal Counting Unit; Whistle Up a QSO; Tuneable 10 Metre Converter; An IC Facsimile Receiving Converter; A Simple Touchtone Pad for Autopatch; The $1,000 Antenna System; Special Considerations for Digital Design; Selectable Voltage Power Supply; A Versatile Code Practice Oscillator; Wiring Harness Made Easy; Compact Mobile; Two Unbreakable Antennas for the TR-22; Leading Zero Suppression for Digital Displays; Automatic Touchtone Dialler; Newcomer and Youth Training in the DARC.
February 1974
Understanding the Slow Scan Monitor; IC Audio Amplifiers; A Simple Sweep Generator for Monitor Scopes; New Regulations (1938); Quick'n Easy 15 or 20 Metre Vertical; Telephone Control and Monitor System; Modifications for Heathkit GC-1005 Digital Readout Clock; Cook a Better Circuit Board; A Variable Q Audio Filter; Another Blown Fuse Indicator for Low Voltage; Building with Ten-Tec Modules; Simple Audio Pre-amp; An Integrated Circuit SWL Receiver; 432er Final Assembly, On the AIR; Transistor Keying Circuit; Low Cost Seven Segment Readout.
CQ. March 1974
The Sunspot Cycle; Worst Case Analysis; Let Your Fingers do the Talking; Plus all the usual features.
QST. January 1974
Interdigital Converters for 1296 and 2304 MHz; A Crystal Controlled Converter and Simple Transmitter for 1750 Metre Operation; Negative and High Voltages from a Positive Supply; A 2-KW Amplifier for 144 MHz.
February 1974
Energy Crisis; A Complete 2-Metre FM Transceiver; Rec/Counter for Swan 500 Receivers; Construction and Use of Long Helical Coils for Antenna Loading; The HW-40 Micro Beam; Computerised Search for Receiver Birdies; Improved Break-in with the Collins 75S-3B; A TTL Crystal Oscillator; A Versatile Scope for the Radio Amateur; Breadboard Revisited; Public Service Input; Doing Amateur Radio Publicity from Alpha to Zulu; Oscar 7 and its Capabilities.

20 Years Ago

with Ron Fisher VK3OM

JUNE 1954
At last, the Limited AOCP had arrived. The Editorial page of June Amateur Radio told the whole story of the waiting from May 1953 when the LAOCP was agreed to by the PMG.

It was announced also that all who failed in Morse Code only since January 1953 were now eligible for the Limited AOCP and could apply immediately for a certificate and licence.

Support for the LAOCP was by no means unanimous and many amateurs of the day saw it as the beginning of the end for Amateur Radio. After all, how could one be an amateur without a knowledge of morse code.

Trade reviews were not common in AR in those days, but one of the most significant reviews of all time was published in the June 1954 issue. The Geloso Signal Shifter model 4/101. For £10/4/9 here was the answer to the problem of designing an all-band table top transmitter. Over the next few years just about every amateur in Australia must have purchased one of these units.

Looking through the June issue of Amateur Radio the following technical articles were included. A Great Circle Nomograph by Alan Head VK3AKZ, who told how to design a great circle map and obtain bearings to all parts of the world.

Getting The Most Out of Your Receiver, a Few Hints on Proper Handling. This reprint from QST told amongst other things how to handle a crystal filter — a very misunderstood device.

National Field Day results for 1954 report that VK2AHA scooped the pool in all sections with VK5RG taking the honours in the home station section.

The Federal QSL Bureau notes written by Ray Jones VK3RJ usually contained interesting snippets of DX news. This month, the hair-raising story of the Hallicrafters sponsored Clipperton Island expedition was related. ●

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,
The other evening whilst working in my shack (actually I was designing a new 1296 MHz transmitter) I was listening to one of the lower HF bands and a conversation something like the following was heard.

"VK3DOB to VK3DDE, I've been playing around with ATV on 430 MHz; you ought to try it, it's great fun.

VK3DDE to VK3DOB; I would like to give it a go, but you can't buy any gear. I think I will wait until the Japanese put some gear on the market first. I'm no good at building stuff. Anyway I wouldn't know how to. I've never built any gear before and I don't think I would like to start now".

This type of conversation appears typical of that which can be heard around the bands especially on the HF bands.

I would like to know what is the modern radio amateur coming to?

I think all radio amateurs should read the extract from EEB in April 1974 Amateur Radio. The statements made there are very typical at the present time.

It is about time that Australian radio amateurs, in fact ALL radio amateurs, forgot some of their 20 metre and other skeds and did a little experimenting and building, and let everybody know that the modern radio amateur is not just an operator of a little black box that he has purchased from Joe Blow up the street for 54,000 cents, and that three element beam which cost 3,500 cents could have been built for only 10 dollars if he had only thought before spending.

I hope this puts a little inspiration into the heads of a few Amateurs. If it does the time spent writing this letter has been well spent.

Cyril Maude, VK3ZCK

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

This month's notes are devoted to one topic, and that is a proposal to introduce a scheme whereby overseas amateurs can become associate members of the Key Section. They cannot become full members because under the constitution of the Key Section, membership is restricted to holders of VK licences.

This proposal has been under discussion by the divisional co-ordinators for some time, and has been accepted in principle by the Federal Executive of the Institute. However, because its operation will touch you if you work DX on CW (at least I think it will), I thought it best to let you know what we have in mind. If you have any strong thoughts let me know about them before June 30.

We are proposing to offer associate membership to overseas amateurs who work 20 members of the Key Section. All Members of the Section have a membership number, and applicants for associate membership would have to quote this number in their log extract when applying. It is proposed to give all associates a certificate.

This is in many ways a rather modest enterprise, but it has the same motivation as the rules for local amateurs, namely, to offer encouragement to people to enjoy CW operating irrespective of ability. All going well, I would hope the plan to start in 1975.

Hamads

- Eight lines free to all W.I.A. members.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150 Toorak, Vic., 3142.
- QTHR means that the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

HRO, 10 coil boxes, 50 kHz to 30 MHz and bandspread. HRO-mx, 4 coil boxes and outboard RT & H torodial filter. Neither set has speaker or P/S. Offers? R. Graham, VK2ZQJ. QTHR. (02) 642-0122.

FT-200, 18 month old in V.G. condition, with mike and mains power supply. All 10 metre Xtals and 11 metre Xtal installed. $280. ONO. Morry Daly VK3BMD. QTHR. Ph.: (03) 630-6954 bus. hrs. only.

TR4 Transceiver with remote VFO and AC P/S in excellent condition, spare set of finals and other valves, $475. Also Heathkit VTVM model 1M11, $30. VK2AGO. QTHR. Ph.: (02) 43-2427.

Yagi 4 element, 20 metre. Copy of 204BA. Superlative construction. $80.00, purchaser to disassemble. VK3AIF. 8 Abassia St., North Balwyn, Vic. 3104. Ph.: (03) 857-5401.

2 VHF Transceivers, 2 Converters and several power supplies and other interesting bits. Enquire at 20 Chifley Cres., Dandenong or Ph. (03) 707-1195 evenings or weekends.

Teletype Model 15 TG7B. 50 Baud. KBD. PTR. Recently overhauled $85. VK3AWM, QTHR (Dandenong). Ph.: A.H. (03 792 3475.

Yaesu FT2F equipped with new chs. R1, R2, R4 and simplex 40, 50. $100 or best offer to Russell Kelly, VK3NT. Ph.: (Bus. hrs.) (03) 645 1155.

FRDX 400 Rx 2m and FM options with xtls, both spare 29 MHz channels installed. Complete spare set 22 proper Jap transistors. Very little used. $300 ONO. Birch VK3ZRQ, QTHR. Ph. (054) 43 4544 AH.

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VHF Receiver. VK3AQ, QTHR. Ph.: (03) 288-2326; (03) 288-2983.

Copies of QST or **73** for the years 1970 to 1974. Please quote price wanted, freight paid this end. VK2KE. QTHR.

VK3 2 metre Transceiver. Details, price, etc. to VK2QB. QTHR but Postcode 2288.

Hallicrafters S27/S36 Receiver. R. Graham, VK2ZQJ. QTHR. (02) 642-0122.

BC221 Frequency Meter preferably in full going condition. OR — digital frequency meter to 30 MHz. AR7 Rx in any condition provided dial, gang, IFTs and valve sockets are OK — preferably with all coil bosses. Send prices and details to VK3ZIP, QTHR. Ph. (03) 89 4645.

Back Issues of A.R. April '73, July '72. All 1968 and earlier. Preferably in good condition as they are for binding into volume form. Write price and condition or send to VK2ZME. Martin Hood, 7/46 High St., Randwick.

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S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000	Ph. 23 1268
W.A.	H. R. FRIDE, 26 Lockhart Street, Como, 6152	Ph. 60 4379

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AC128	.60	.56
AC127/128 Pair	1.20	1.10
AC132	.60	.56
AC187	.70	.60
AC188	.70	.60
AC187/188 Pair	1.40	1.30
AD149 Use OC26		
AD161	1.40	1.30
AD162	1.40	1.30
AD161/162 Pair	2.80	2.60
AF114	.90	.85
AF115	.90	.85
AF116	.90	.85
AF117	.90	.85
AF118	1.40	1.30
AS215 (OC28)	3.60	3.40
AS216 (OC29)	3.65	3.45
AS217 (OC35)	3.60	3.40
AS218 (OC36)	3.65	3.45

Type	1 9	10 up
AY8140	1.50	1.40
AY9140	1.50	1.40
AY8171	1.20	1.10
AY9171	1.20	1.10
AY8149	1.20	1.10
AY9149	1.40	1.20
BC107 (BC547)	.25	.22
BC108 (BC548)	.25	.22
BC108B	.45	.40
BC109 (BC549)	.25	.22
BC109C	.45	.40
BC147	.45	.40
BC148	.45	.40
BC149	.45	.40
BC157 (BC177)	.30	.26
BC158 (BC178)	.30	.26
BC159 (BC179)	.30	.26
BC186	.70	.65
BCY70	.70	.65
BCY71	.85	.80
BCY72	.70	.65
BD137	1.70	1.60
BD138	1.75	1.65
BD137/138 Pair	3.40	3.20

Type	1 9	10 up
BD139	1.50	1.45
BD140	1.60	1.55
BD139/140	3.10	3.00
BDY20 Use 2N3055		
BF115	.70	.65
BF167	.65	.60
BF173	.85	.80
BF177 (BF336)	1.50	1.40
BF178 (BF336)	1.50	1.40
BF179 (BF337)	1.60	1.50
BF180	1.20	1.10
BF184	.65	.60
BF185	.65	.60
BF194	.50	.45
BF195	.50	.45
BF200	1.25	1.20
BFW10 Use 2N5459		
BFW11	1.45	1.35
BFW61	1.30	1.20
BFY50 (2N3053)	.80	.70
BFY51	.80	.70
BFY52	.80	.70
D1311 (2N6027)	1.40	1.30
MJE2955	3.00	2.80

Type	1 9	10 up
MJE3055	2.20	2.00
MPF102	.95	.90
MPF103 (2N5457)	1.20	1.10
MPF104 (2N5458)	1.10	1.00
MPF105 (2N5459)	.95	.90
MPF106 (2N5485)	.95	.90
MPF121	.95	.95
OC26 (AD149)	1.60	1.40
OC28 Use AS215		
OC44	.45	.42
OC45	.45	.42
OC70	.40	.36
OC71	.40	.36
OC72	.45	.42
OC74	.45	.42
OC75	.45	.42
OCP71 (Photo)	1.40	1.30
TT797	1.20	1.10
TT798	1.20	1.10
TT800	1.00	.95
TT801	1.00	.95
2N301	2.80	2.60
2N706A	.90	.80
2N2646	1.40	1.30

Type	1 9	10 up
2N2926	.50	.45
2N3053	.80	.70
2N3054	1.70	1.60
2N3055	1.20	1.00
2N3564	.55	.50
2N3566	.65	.60
2N3567	.65	.60
2N3568	.75	.70
2N3569	.65	.60
2N3638	.45	.40
2N3638A	.55	.50
2N3702	.50	.45
2N3640	.60	.50
2N3641	.45	.40
2N3642	.45	.42
2N3643	.55	.50
2N3644	.45	.40
2N3645	.55	.50
2N4292	.50	.45
40250 Use 2N3054		
40408	2.50	2.40
40409	3.00	2.90
40410	3.00	2.90

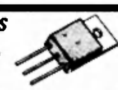
IC'S

Type	1 9	10 99	100 Mix
SN7400N	$0.60	$0.54	$0.48
SN7401N	.60	.54	.48
SN7402N	.60	.54	.48
SN7403N	.60	.54	.48
SN7404N	.60	.54	.48
SN7405N	.60	.54	.48
SN7408N	.60	.54	.48
SN7409N	.60	.54	.48
SN7410N	.60	.54	.48
SN7413N	.80	.72	.65
SN7420N	.60	.54	.48
SN7430N	.60	.54	.48
SN7437N	1.20	1.10	1.00
SN7440N	.60	.54	.48
SN7441AN	2.20	2.10	2.00
SN7442N	2.00	1.90	1.80
SN7447N	3.00	2.80	2.60
SN7450N	.60	.54	.48
SN7451N	.60	.54	.48
SN7453N	.60	.54	.48
SN7454N	.60	.54	.48
SN7460N	.60	.54	.48
SN7470N	1.00	.95	.90
SN7472N	1.00	.95	.90
SN7473N	1.20	1.10	1.00
SN7474N	1.20	1.10	1.00
SN7475N	1.50	1.40	1.30
SN7476N	1.20	1.10	1.00
SN7480N	1.80	1.75	1.70
SN7482N	1.90	1.85	1.80
SN7483N	2.45	2.40	2.35
SN7486N	1.20	1.10	1.00
SN7490N	1.25	1.20	1.15
SN7491AN	1.60	1.55	1.50
SN7492N	1.50	1.45	1.40
SN7493N	1.50	1.45	1.40
SN7495N	2.20	2.10	2.00
SN7496N	2.20	2.10	2.00
SN74107N	1.10	1.00	.90
SN74121N	1.20	1.10	1.00
SN74141N	3.20	3.10	3.00
SN74192N	4.00	3.80	3.70
SN74193N	4.00	3.80	3.70

D PACKS ALL $1.50 EACH

- D1 20 Red Spot Transistors PNP
- D2 16 White spot R.F. transistors PNP
- D3 5 OC 72 transistors
- D4 4 AC 128 transistors PNP high gain
- D5 4 AC 126 transistors PNP
- D6 7 OC 71 type transistors
- D7 2 AC 127/128 Complementary pairs PNP/NPN
- D8 3 AF 117 type transistors
- D9 3 OC 171 H.F. type transistors
- D10 7 2N2926 Sil. Epoxy transistors mixed colours
- D11 4 OC 44 Germanium transistors A.F.
- D12 4 AC 127 NPN Germanium transistors
- D13 20 NKT transistors A.F. R.F. coded
- D14 10 OA 202 Silicon Diodes Sub Min
- D15 15 IN914 Silicon Diodes 75PIV 75mA
- D16 2 10A 600 PIV SILICON rectifiers IS425R
- D17 7 Silicon switch trans. 2N706 NPN
- D18 6 Silicon switch trans. 2N708 NPN
- D19 7 Silicon NPN trans. 2N2369, 500MHz (Code P397)
- D20 3 2N3053 NPN Silicon transistors
- D21 7 BC 107 NPN transistors
- D22 7 NPN transistors 4 x BC108, 3 x BC109
- D23 6 NPN high gain trans. 3 x BC167, 3 x BC168
- D24 4 BCY70 PNP transistors TO 18
- D25 4NPN transistors 2 x BRY51, 2 x BFY52

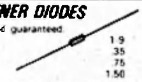
New Low Price TRIACS



G.E. Brand — Plastic Pack

	1 9	10 up
SC141D 6 amp 400V	2.00	1.90
SC146D 10 amp 400V	2.25	2.00

New Lower Prices ZENER DIODES



— brand new — fully tested and guaranteed.

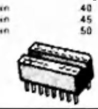
	1 9	10 up
400 MW (BZY88 BZX79 series)	.35	.32
1.8/2.5 Watt (BZX70 series)	.75	.65
10 Watt (Stud BZY93 type)	1.50	1.20

Bargain Diacs — for use with Triacs

	1 9	10 up
BR100	.80	.75
ST4	.98	.50

Low Cost D.I.L. I.C. Sockets

	1 9	10 up
8 pin	.40	.36
14 pin	.45	.40
16 pin	.50	.45



SIGNAL DIODES

Top quality Philips, S.T.C., Texas etc.

	1 9	10 99	100 up
AA119	.25	.20	.15
BA100	.25	.22	.20
BA102	.60	.55	.50
BA114	.40	.35	.30
OA90	.25	.20	.15
OA91	.25	.20	.15
OA95	.25	.20	.15
OA200	.30	.25	.20
OA202	.30	.25	.20
IN4148 (IN914A)	.15	.13	.10

POWER TRANSISTOR BONANZA!

1 9	10 up
$1.30	$1.25

Coded GP100 brand new TO3 metal case germanium P.N.P. Possible replace OC25, OC28, OC29, OC30, OC35, OC36, AS215, AS216, AS217, AS218 and majority of germanium power transistors in OC, AD and NKT range.
Vceo — 50V Vcbo — 80V I.C. — 10 amps
Ptot — 30W hfe — 30 170

EXPERIMENTERS

Buy some of our best low cost Germanium transistors!

	1 9	10 up
OC 44	.45	.42
OC 45	.45	.42
OC 70	.40	.36
OC 72	.45	.42
OC 74	.45	.42
OC 75	.45	.42

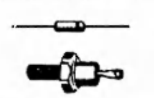
Yes — identical to those that normally sell at $1.80 each.

NO120 NIXIE DRIVER TRANSISTOR

Suitable replacement for BSX21, C407, 2N1893 etc. Vcb - 120V

1 9 **ONLY 60c** 10 up 60c

SILICON RECTIFIERS — Fabulous Value



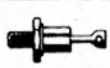
1 Amp (Plastic)	1 9	10 99	100
EM4005 / IN4001 50 Volt	.15	.14	.13
EM401 / IN4002 100 Volt	.20	.19	.18
EM404 / IN4004 400 Volt	.22	.21	.20
EM410 / IN4007 1000 Volt	.36	.34	.30
10 Amp (Stud SO10 Case) — A Bargain			
MR110 100 P.I.V.	.90	.85	.80
MR410 400 P.I.V.	1.20	1.10	1.00

UT46 UNIJUNCTION TRANSISTOR

Electrically equivalent to 2N2646 etc.

60 CENTS 10 up 50

ENORMOUSLY RUGGED SCR'S



— Ideal for S.C.R. ignition etc. — TO48 Case

	1 9	10 up
C164D 400 Volts at 16 Amps	2.75	2.50
C168D 800 Volts at 16 Amps	4.50	4.25

LIGHT EMITTING DIODES

Cheapest in Sydney — Litronix, Texas, Fairchild

	1 9	10 up
Miniature red	.30	.26
Lge with Mtg. red	.45	.40
Medium green	.90	.80

SILICON CONTROLLED RECTIFIERS

Bargain prices — all plastic pack G.E.	1 9	10 up
BAV39	1.60	1.50
C103B 200 Volts at 8A	1.76	1.56
C104Y1 30 Volts at 4A	1.00	0.95
C104D1 400 Volts at 4A	1.50	1.30
C122D 400 Volts at 8A	2.20	2.00
C122E 500 Volts at 8A	2.70	2.50

2N3055

115 Watt Silicon NPN Power — FULLY IMPORTED — best in Australia

$1.20 each

ZN414

10 transistor radio IC from Ferranti. Operates from 1.5V. Power Gain 72 db, consumes only 300uA. Frequency range from 150kHz to 3MHz. See Elementary Electronics E.A. May '74. **ONLY $3.95**

BABANI AND BERNARDS BOOKS

BP1	First Book of Transistor Equivalents and Substitutes	$1.00
BP2	Handbook of Radio, TV and Ind Tube and Valve Equivalents	1.00
BP3	Handbook of Tested Transistor Circuits	1.00
BP4	International Handbook of the World's Short Wave, Medium and Long Wave Radio Stations & FM & TV listings	.80
BP6	Engineers and Machinists Reference Tables	.50
BP9	38 Practical Tested Diode Circuits for the Home Constructor	.80
BP11	Practical Transistor Novelty Circuits	1.00
BP14	Second Book of Transistor Equivalents and Substitutes	2.20
129	Universal Gram Motor Speed Indicator	.25
161	Radio, TV and Electronics Data Book	.75
196	AF RF Reactance Frequency Chart for Constructors	.40
202	Handbook of Integrated Circuits (IC's) Equiv. and Substitutes	2.00
RCC	Resistor Colour Code Disc Calculator	.25

LINEAR INTEGRATED CIRCUITS

TYPE	CASE	DESCRIPTION	1-9	10 up
AWM 1306	TO5	FM Converter	$6.20	$5.80
CA 3028A	TO5	RCA Linear	3.00	2.80
LM 301A (UA 301A)	TO5	High input operational amp	1.30	1.20
LM 309 (7805)	TO3	5 volt 1 amp regulator	4.20	4.00
LM 308 N	D.I.L.	Operational amp	4.00	3.60
LM 381	D.I.L.	Dual operational amp	4.50	4.00
LM 709 (see UA709C)				
LM 741 (see UA741C)				
MC 1330P	D.I.L.	Homodyne IC	3.20	3.00
MC 1469R		½ amp voltage regulator	4.75	4.40
NE 555	D.I.L.	Timer IC	2.45	2.20
NE 556	D.I.L.	Dual timer	2.75	2.50
NE 561B	D.I.L.	Phase Lock Loop IC	9.56	8.90
TAA 300	TO5	1 watt audio amp	2.90	2.70
TAA 521 Equiv. 709C				
TAA 840	D.I.L.	AM Radio tuner	3.20	3.00
TBA 221 Equiv. 741C				
TBA 281 Equiv. 723C				
UA 703C	TO5	RF IF Amp	1.50	1.30
UA 709C (LM709)	TO3 or D.I.L.	General Purpose amp	1.00	.95
UA 723C (LM723)	TO5	Regulator	1.50	1.40
UA 739C	D.I.L.	Dual OP amp (low noise)	2.50	2.25
UA 741C	TO3 or D.I.L.	Operational amp	1.20	1.10
OM 802			2.50	2.30

US Callbook $9.95 (P&P $1.00)

Foreign DX Callbook $9.95 (P&P $1.00)

Prefix Map $1.50

Amateur Radio World Atlas $3.00

Amateur DX Guide $3.00

See last issue for details.

Special Digital ICs

	1 9	10 up
9001	1.50	1.30
9368	3.20	3.10
95H90 300MHz Decade counter	19.75	19.00

Silicon Bridge Rectifiers

High quality assemblies giving maximum ratings and reliability at minimum cost.

Type	Current	P.I.V.	1 9	10 up
MB1	1.8A	100	1.40	1.20
MB4	1.8A	400	1.80	1.60
MB8	1.8A	800	3.20	3.00
MB10	1.8A	1000	4.20	4.00
PA40	8A	400	6.00	5.75
PA60	8A	600	6.75	6.50
PB40	25A	400	*7.20	7.00

Solid State LED Displays

		1 9	10 up
DL707	0.3" high	3.90	3.50
DL62	0.6" high	8.90	8.25
FND70	0.3" high	3.70	3.50

Special RF Transistors

		1-9	10 up
2N5589	7 Watt	6.50	6.00
2N5590	15 Watt	7.75	7.45
2N5591	30 Watt	9.85	9.35

Set of three for only $22.50

How to Order

1. Send your order with cheque, money order or postal note. Allow a minimum of 30 cents to cover packing and postage.
2. A minimum order amount of $2.00 applies, so it is better for you to place a few large orders than a lot of little ones (saves you P&P!)
3. If you wish to receive goods C.O.D. a prepayment of $2.00 must be sent with your order.

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Tel 439 5311

NOVEMBER 1973—Continued

VK3YHP—H. J. Payne, 37 Palaroo Street, Swan Hill, 3585.
VK3ZCZ—M. R. Osborne, 46 Nirringa Avenue, Aspendale, 3195.
VK3ZIM—A. S. Wedgewood, 16/9 Latrobe Street, Mentone, 3194.
VK3ZQU—B. T. Dingle, 48 Heatherdale Road, Ringwood, 3134.
VK3ZRV—J. C. Weir, 221 St. Helena Road, Greensborough, 3088.
VK3ZVO—A. Saunders, Change postcode to 3033.
VK3ZXO—T. P. Cosway, 10 Aitken Street, Clifton Hill, 3068.
VK3ZYI—S. Curtis, 6/570 Riversdale Road, Camberwell, 3124.

QUEENSLAND

VK4KV—M. J. Y. McCartney, Flat 3, 56 Best Street, Yorkeys Knob, 4871.
VK4MX/T—J. R. Martin, Presbyterian Manse, Fincr Hatton, 4741.
VK4TU—K. W. Collins, Station: 8 Cook Street, Goondiwindi, 4390.
Postal: P.O. Box 238, Goondiwindi, 4390.
VK4ZLY—L. R. Yarrow, M/S 194 Gatton, 4343.
VK4ZXS—J. McPherson, 4 Iris Street, Gailes, 4300.
VK4ZLI—A. G. Linning, 14 Augustus Street, Corinda, 4075.
VK4ZMP—M. P. Moody, 992 South Pine Road, Everton Hills, 4053.
VK4ZSD—L. S. Dmitrieff, 6 Grevillea Street, Biloela, 4715.

SOUTH AUSTRALIA

VK5PW—P. W. Riedel, 20 Weys Road, Manningham, 5086.

WESTERN AUSTRALIA

VK6HD—M. E. Bazley, 8 James Road, Kalamunda, 6076.
VK6DE—A. W. Storm, Cherokee Village Mobile Home Park, Wanneroo Road, Wanneroo, 6065.
VK6WY—W. G. Wylks, 89 Evans Street, Shenton Park, 6008.
VK6ZDY—P. L. Jackson, 60 Anzac Terrace, Bassendean, 6054.

TASMANIA

VK7CD—C. A. Danforth, 3 Leonard Court, Ocean Vista, Burnie, 7320.
VK7KJ—G. C. Johnston, Main Road, Ouse, 7461.

T.P.N.G.

VK9HF—Rev. H. J. Fischer, Station: Papitalai, Manus Island.
Postal: P.O. Box 146, Lorengau.

CANCELLED

VICTORIA

VK3FJ—C. R. Nelson, Now VK3WC.
VK3ZT—M. Matthews, Not renewed .
VK3ABC—F. O. Voight. Not renewed.
VK3ZNO—R. A. Jones. Now VK3WL.
VK3AUV—K. A. Palliser. Now VK3GJ.
VK3BEJ—R. C. Lile. Now VK3VO.
VK3YDI—C. J. Jarvis. Not renewed.
VK3YDV—G. S. Pritchard. Not renewed.
VK3ZCS—G. G. Baker, Transferred to South Australia.

QUEENSLAND

VK4GG—G. Heilbronn. Deceased.
VK4OG—Gold Coast Radio Club. See VK4WIG.
VK4ZJV—R. J. Williams. See VK4UI.
VK4ZKV—R. H. Kyle. See VK4YE.
VK4ZRL—R. L. Reseck. See VK4EN.

SOUTH AUSTRALIA

VK5OW—B. E. Beckman. Not renewed.
VK5UT—P. F. Allen. Not renewed .
VK5ZPA—P. A. Reichelt. Not renewed.
VK5ZRZ—W. S. Baynes. Not renewed.

WESTERN AUSTRALIA

/K6OM—R. C. Marschke. Transferred to ACT.

TASMANIA

VK7FM—T. F. Moore, 23 McGuiness Crescent, Lenah Valley (Non renewal of licence), 7008.
VK7ZAR—R. A. J. Reynolds, 46 Jennings Stret, New Town (Transferred to Victoria), 7008

T.P.N.G.

VK9LP—L. Pedrini, Station: Portable throughout PNG.
Postal: P.O. Box 88. Lae.
VK9AV—E. V. Avenell, Station: St. Michael's Estate, Kieta.
Postal: P.O. Box 101, Kieta, Bougainville.

NEW STATIONS — DECEMBER 1973

AUSTRALIAN CAPITAL TERRITORY

VK1JR—J. R. Watson, 161 Brigalow St., Lyneham 2602.
1TH—E. W. Howell, 130 Bandjalong Cr., Aranda 2614.
1YL—M/S S. Britton, 27 Galway Pl., Deakin 2600.

NEW SOUTH WALES

VK2SB—D. I. Ralph, 7 Altona Ave., Forestville 2087.
2ACY—A de H. Christy, 218 Kelly St., Scone 2337.
2AGM—G. R. Molloy, 1 Onslow St., Rosebay 2029.
2ALX—A. R. Stuart, 10 Wanganella St., Balgowlah 2093.
2ANC—T. Clendon, 19 Benwerrin Ave., Baulkham Hills 2153.
2BBG—J. M. Potts, 14 John Street, Woonona 2517.
2BCR—C. Rushby, 11 Excelsior St., Leichhardt 2040.
2BCX—R. A. Bee, 30 Prince St., Glenbrook 2773.
2BDD—J. Rooke, 5/46 Fontainbleau St., Sans Souci 2219.
2BGO—G. W. Henshaw, 396 Heath St., Albury 2640.
2BLL—L. Leese, 14 Copeland St., Richmond 2753.
2BNZ—J. Mouritsen 37 Fourth Ave., Willoughby 2068.
2BRJ—R. James, 34 William St., Hornsby 2077.
2BRN—R. N. Blake, 32 Lynwood Av., Killara 2071.
2YBN—J. B. Scott, 13 Girliang Ave., Vaucluse 2030.
2YBO—B. P. Fitzpatrick, 20 Figtree Ave., Randwick 2031.
2ZEZ—G. W. Evans, 282 Morrison Rd., Ryde 2112.
2ZJW—A. J. Walker, 99 Labrador St., Rooty Hill 2766.
2ZMX—J. Moodie, 31 Mavis Ave., Peakhurst 2110.

VICTORIA

VK3FB/T—L. E. Steel, 21 Wade Lane, Goldern Square 3550.
3XS—D. B. Mundie, 112 Blackburn Rd., East Doncaster 3109.
3APJ—E. W. Martin, 8 Arthur St., Mt. Beauty 3699.
3BAW—H. D. Hanson, Unit 4, 35 Riversdale Rd., Hawthorn 3181
3BCE—D. E. Hill, Cnr. Riverside Ave. & Eleventh St., Mildura 3500.
3BIL—W. G. Maddern, 11 Wilson St., Ferntree Gully 3156.
3BKW—K. R. White, 59 Charles St., Ascot Vale 3032.
3BON—O. N. Eva, 5 Kennedy Rd., Shepparton 3630.
3YBL—W. A. Lyon, 97 Eglington St., Moonee Ponds 3039.
3YCA—D. C. Arnold, 8 Russell St., Camberwell 3124.
3YDI—C. J. Jarvis, Beaufort Ave., Ballarat 3350.
3YDO—M. Robinson, 338 Dorset Rd., Boronia 3135.
3YDW—D. P. Sharples, 79 St. Abane Ave., Box Hill 3129.
3YHC—K. A. Ayton, 145 Sunshine Rd., Tottenham 3012.
3YHI—K. I. Woods, 31 Glen Iris Rd., Camberwell 3124.
3YHW—M. A. Sharples, 79 St. Abane Ave., Box Hill 3129.
3YJW—J. L. Wickham, 186 Punt Rd., Prahran 3181.
3ZDA—A. E. Hiscock—1A Parker St., Springvale 3172.
3ZEF—C. D. Baldock, 71 Enfield Ave., Park Orchards 3141.
3ZFC—A. D. Buck, 283 Gooch St., Thornbury 3071.
3ZGA—G. H. Apperley, 22 McCracken Ave., Northcote 3070.
3ZJH—D. W. Horsey, 12 Palmerston St., Bendigo 3350.
3ZJK—A. J. Underhill, 44 Knox St., Reservoir 3073.
3ZJN—T. J. Jones, 5 The Broadway, Nth. Altona 3025.
3ZKN—A. E. Mallows, 20 Deakin Cres., Dandenong 3175.
3ZOD—O. G. Schmidt, 79 Frakenham Rd., Ashburton 3147.
3ZPG—S. A. Barnham, 97 Esplanade, Altona 3018.
3ZPH—P. A. Hicks, 26 Harrison St., Mitcham 3132.
3ZPT—M. Paget, 11 Johnstone St., Broadmeadows 3047.
3ZQV—M. J. McDonald, 60 Arkaringa Cres., Blackburn 3130.
3ZSR—B. H. Riley, 9/33 Evans St., Wangaratta 3677.
3ZTT—G. L. Sneddon, 20 Vermont St., Glen Waverley 3150.
3ZUD—D. Dickinson, 13 White St., Mt. Waverley 3149.
3ZUM—J. C. Jones, 2/25 Colin Rd., Sth. Oakleigh 3167.
3ZYU—D. C. Hunt, 28 High St., Mont Albert 3127.
3ZZI—G. W. Summer, 8 Michael St., Bendigo 3550.

QUEENSLAND

VK4WC—G. A. Clapp, 50 Mallawa Dr., Palm Beach 4221.
4ZJT—J. Langburne, 25 Barcelona St., Kirwan 4814.
4ZLL—L. E. Ashdown, 62 Monterey St., Wacol 4076.
4ZVC—P. V. Cunningham, 228 Toombul Rd., Northgate 4013.
4ZSR—R. W. Rigg, 18 Grevillea Ave., Southport 4215.

SOUTH AUSTRALIA

VK5ZDG—D. A. Morris, 21 Mantissa Rd., Salisbury North 5108.
5ZGS—G. K. Sills, 18 Keith Ave., Nth. Plympton 5037.
5ZSR—S. R. Wade, 13 Deepdene Ave., Mitchell Park 5043.

WESTERN AUSTRALIA

VK6HA—A. H. van den Avoort, 23 Slade St., Bayswater 6053.
6TZ/T—D. V. Robinson, 26 Chelsfield St., Gosnells 6110.

TASMANIA

VK7SG—S. Giudici, 109 Lansdowne Cres., West Hobart 7000.

NORTHERN TERRITORY

VK8BA—T. A. Bachman, 25 Hablett Cres., Alice Springs 5750.
8CEG—G. N. Vayro, RAAF Base, Darwin 5790.

CHANGE OF ADDRESS

NEW SOUTH WALES

VK2YBP—D. B. Poulton, 22 Beecroft Rd., Beecroft 2119.

VICTORIA

VK3DH—I. Morgan, Change of Postal Code to 3123.
3ABT—F. R. Barber, 13 Harrison St., Ringwood 3134.
3ABV—T. E. Straughair, 18 Capricorn Ave., East Doncaster 3109.
3AGJ—L. N. Hocking, 8 Nymph St., Mitcham 3132
3ASY—O. W. Guy, 4 St. Thomas Ave., Wantirna 3152.
3YHJ—M. J. Ross, 768 Malvern Rd., Armadale 3143.
3ZHX—H. E. Jones, 22 Screen St., Frankston 3199.
3ZMV/T—H. A. Kellock, Unit 10, 7 Kenilworth Pde., Ivanhoe 3079.

QUEENSLAND

VK4DV—M. T. Deakin, Bouldercombe via Mt. Morgan 4714.
4QY—K. B. Pounsett, 33 Lasseter St., Kedron 4031.

SOUTH AUSTRALIA

VK5LT—J. D. Churcher, Fl. 6/149 Lipsett Ter., Brooklyn Park 5032.

WESTERN AUSTRALIA

VK6ZGW—K. J. Chipper, "Yallambee" Hedges Rd., Glen Forrest 6071.
6ZBQ—E. J. Barbara, Station: Flat D, Lot 491 Loch St., Derby 6728; Postal: C/- Derby Regional Hospital, Derby 6728.

CANCELLATIONS

VICTORIA

VK3AAS—Army Apprentices School, Balcombe. Not renewed.
3APL—J. T. Cunningham. Not renewed.
3AYC—H. P. Caudell. Not renewed.
3BGM—L. Sambell. Not renewed.
3ZEW—P. Stroude. Not renewed.
3ZWM—D. E. Hill. Now VK3BCE.
3ZXV—R. J. Pertzel. Not renewed.
3ZKV/T—L. E. Steel. Now VK3FB/T.

QUEENSLAND

VK4WO—A. H. Tilse. Deceased.
4ZCH—C. P. L. Hunt R. E. Not renewed.
4ZGK—G. C. King. Not renewed.
4ZRN—R. L. Neilson. Not renewed.

SOUTH AUSTRALIA

VK5CW—P. A. Dennison. Not renewed.

WESTERN AUSTRALIA

VK6GN—G. E. Nixon-Smith. Not renewed.
6SV—K. E. Pledger. Not renewed.
6WF—F. Wawzynski. Not renewed.
6HV—H. K. F. Vun. Not renewed.
6ZAC—J. F. Chambers. Not renewed.
6ZHA—A. H. van den Avoort. Not renewed.
6ZFF—D. V. Robinson. Not renewed.

PERMISSION TO CONDUCT TV EXPERIMENTS

VK5TO/T—B. J. Blaby, 1 Amanda Way, Morphett Vale 5162, SA.
5ZTT/T—P. M. S. Birrell—Brigadoon Tolners Rd., Mt. Gambier, SA.

NEW STATIONS — JANUARY 1974

AUSTRALIAN CAPITAL TERRITORY

VK1DW—D. H. Watkins, 1 Friendship St., Red Hill 2603.
1ZKB—K. C. Barnes, 2/27 Gamor St., Waramanga 2611.

NEW SOUTH WALES

VK2RR—A. A. McCullagh—10 Woodland St., Balgowlah 2093.
2AWJ—J. W. Williams, Block 423, Mourquong 2648.
2AZP—J. W. Faulkner, 10 Lily St., Croydon Park 2133.
2BBD—N. L. Kinch, 11/92 Soldiers Ave., Harbord 2096.
2BKZ—J. W. Danial, 83 Chisholm Rd., Auburn 2144.
2BPI—Maitland Postal Institute Radio Club, Day St., East Maitland 2323.
2BWZ—W. E. Purser, 3 Thomas St., Balmain 2041.
2BYN—C. W. Brown, 20 Orange St., Eastwood 2122.
2BYO—A. R. Chapple, 1 Mimosa Rd., Turramurra 2074.
2YBR—D. A. Crofts, 83 Grandview Rd., New Lambton Heights 2305.
2YBS/T—G. C. Snell, 305 High St., Chatswood 2067.
2YBW—D. R. Pollard, "Knaith" RMB 405 Oura Rd., via Wagga 2650.
2YBY/T—J. O. Wightman, 10/37 Eddystone Rd., Bexley 2207.
2YBZ—D. B. Cottee, 16 Warona St., North Lambton 2299.
2YCA—G. S. Carter, 121 Victoria Rd., West Pennant Hills 2120.
2YCB—T. I. Clarke, 7/100 Pacific Pde., Dee Why 2099.
2YCJ—J. C. Campbell, 4 Tooke St., Newcastle 2300.
2ZAF—T. K. Austin, Univ. Hall 281 Parramatta Rd., Glebe 2037.

VICTORIA

VK3XO—W. H. Kelly, 6 Edwin St., Bendigo 3350.
3AHP—H. P. Haines, 12/53 Grange Rd., Toorak 3142.
3ANO—S. R. Brooks, 6 Edger Ct., Ferntree Gully 3156.
3AXI—R. A. Heron, 28 Ivanhoe St., Glen Waverley 3150.
3BGZ—R. C. Seng, 10/45 Caroline St., South Yarra 3141.
3BHV—H. K. Vum, 12/37 Hope St., South Yarra 3141.
3YHT—T. Harkness, 38 Dunblane St., Noble Park 3174.
3YJE—G. C. Wood, 8 Ross St., Aspendale 3195.
3YJH—J. H. Harvey, 4 Hillview St., Bendigo 3350.
3ZFK—F. R. Swainston, 12 Grimshaw St., Greensborough 3088.
3ZLM—L. J. Smith, 1 Emma St., Sth. Caulfield 3162.
3ZML—P. M. Higgins, 1025 Glenhuntly Rd., Sth. Caulfield 3162.
3ZPC—S. L. Coad, 38 Kevin Ave., Ferntree Gully 3156.
3ZPW—P. Chadwick, 12 Talbot Ave., Balwyn 3103.
3ZQQ—L. Stone, 7 McKinnon Rd., McKinnon 3204.

QUEENSLAND

VK4OI—J. S. Stent, Permanent Mobile.
4PI—W. R. Poole, 277 Charles St., Aitkenvale 4814.
4PY—J. K. McCarthy, PO Box 169, Surfers Paradise 4217.
4YI—P. A. Pender, 4 Donna Ave., Rochedale 4213.
4YJ—R. F. Woolley, 19 Alkeeba St., Banyo 4014.
4ZDB—D. F. Adamson, 157 Eyre St., Nth. Ward 4810.
4ZRF—A. Downie, 2 Inge St., Mt. Gravatt 4122.

SOUTH AUSTRALIA

VK5BA—M. R. Haskard, 64 Malvern Ave., Malvern 5061.
5KG/T—J. F. Ingham, 74 Fisher St., Fullarton 5063.
5MD—R. Baty, 43 HMAS Australia Rd., Henley Beach 5023.
5VG—W. D. Gaines, Waikerie Airport, Waikerie 5330.
5WQ—W. C. Wilkinson, 13 Donald St., Highbury 5089.
5XX—R. W. Worden, 14 Thomas St., Unley 5061.
5ZG—G. L. Stephens, 69 Sansom Rd., Semaphore 5019.
5ZCH—A. J. Challnor, PO Box 63, Mt. Gambier 5290.
5ZJD—J. D. Bishop, 10 Fraser St., Lower Mitcham 5062.
5ZLN—L. Chirakis, 12 Talbot Ave., Nth. Plympton 5037.
5ZPD—P. D. Berry, 19 Wilson Rd., Gilles Plains 5086.
5ZWC—W. C. Coates, 4 Malone St., Millicent 5280.

WESTERN AUSTRALIA

VK6AI—G. N. Marks, 62 The Grange, Tranby Park, Wall St., Maylands 6051.
6XD—D. L. Hall, 73 Cleveland St., Dianella 6062.
6CI—W. R. Cook, 30 River Dr., Pinjarra 6208.
6GN—G. E. Nixon, 69 Haig Rd., Attadale 6156.
6ZCL—G. Mears, 8 Coastes Street, Hamilton Hill 6163.
6ZJP—P. W. Jupp, 49 Kooyong Rd., Rivervale 6103.

TASMANIA

VK7UV—R. B. Greenwood (Name changed from R. B. Trollope), 25 Prospect St., Launceston 7250.
7ZDX—D. M. J. Bates (transferred from SA), 19 Browns Rd., Kingston 7150.
7ZYT—G. S. Taylor (transferred from Vic.), 4/7 Una St., Mt. Stuart 7000.

NORTHERN TERRITORY

VK7HM—C. E. Anderson, 60 Bloomfield St., Alice Springs 5750.

CHANGE OF ADDRESS

NEW SOUTH WALES

VK2ZOA—W. P. Harmon, 19/90 Cambridge St., Stanmore 2048.

VICTORIA

VK3FF—P. J. Fitzherbert, 115 Barrabool Rd., Highton 3216.
3GE—I. R. Wade, 23 Lawson Ave., Frankston 3199.
3QJ—V. N. Tulhill, 78 Maroney St., Bairnsdale 3909.
3TR—L. C. Sawyer, 6 Hainthorpe Gr., Mulgrave 3170.
3TV—A. C. Styles, Pascoe St., Avoca 3467; Postal Address: PO Box 66, Avoca.
3XQ—V. H. Richardson, 70 Devon Rd., Pascoe Vale 3044.
3AFX—R. Hocking, 27 Foote St., Elwood 3184.
3AQD—F. C. N. Clanville, 23 Falcon Rd., Macleod 3085.
3AQV—I. N. Clanville, 23 Falcon Rd., Mcleod 3085.
3ASN—K. J. Assender, 31 Celeste St., Doncaster 3109.
3AVK—N. O. Duncan, 15 Sherbrooke Ave., Ringwood 3134.
3BBI—B. Lukas, 3 Muir St., Mt. Waverley 3149.
3BGK—S. L. Spayde, 49 Kooringal Rd., Upwey 3158.
3YAD—A. W. Biddle, Lot 7, 7 Tarhilla Dr., Launching Place 3139.
3YBP—T. Robinson, 16 Parring Rd., Balwyn 3104.
3YCK—I. M. Wiseman, 40 Gardenia St., Horsham 3400.
3ZFJ—A. M. Tilley, 521 Glenferrie Rd., Hawthorn 3122.
3ZIL—P. A. Elton, 26 Abercrombie St., Deepdene 3103.
3ZIO—D. A. Fraser, 4 Stablesford Ave., Glen Waverley 3150.
3ZOO—O. G. Schmidt, 32 Brentwood Dr., Glen Waverley 3150
3ZXY—T. J. Leith, 2/25 Grandview Gr., East Prahran 3181.

QUEENSLAND

VK4IN—I. R. Horrocks, 16 Grevillea Dr., Burleigh Heads 4220.
4LL—L. F. Coyle, 180 Shearman Ave., North Rockhampton 4701.
4LT—A. E. Carter, 113 Pacific Ave., Sunshine Beach 4567.
4WR—W. M. Ryan, 6 Olive Ct., Hambour 4560.
4ZKP—K. R. Pollock, 24 St. Vincents Rd., Virginia 4014.

SOUTH AUSTRALIA

VK5BU/T—F. F. Bourne, The Rectory, 14 Memorial Dr., Keith 5267.
5DL—A. R. Dexter, 37 Adelaide Ter., St. Marys 5042.
5GZ—E. B. Gliddon, 19 Arnold St., Underdale 5032.
3YHN—E. S. Day, 21 Drummond St., Swan Hill 3585.
3YLC—B. D. Littlejohn, 19 Armstrong St., Laverton 3028.
3ZMX—I. A. Mackenzie, 10/306 Dandenong Rd., East St. Kilda 3182.
3ZUB—M. A. Cole, Lot 31, Dandenong Hasting Rd., Cranbourne 3177.
3ZXV—R. J. Pertzel, 16 Simmonds St., Oakleigh 3166.

QUEENSLAND

VK4ZBK—I. R. Barnett, 241A Mackenzie St., Toowoomba 4350.
4ZHE—J. W. Heares, 58 Elizabeth St., Gladstone 4680.
4FM—R. J. Davey, The Chalet Mapleton 4560.
4MC—R. W. Attwood, 27 Brampton Ave., Cranbrook Townsville 4813.
4MM—A. A. S. Millard, 178 Main St. Park Ave., Rockhampton 4700.
4WIA—Wireless Institute of Australia, Postal Box 638 GPO Brisbane 4001; Station: 24 Ailsa St., Aspley 4030.

SOUTH AUSTRALIA

VK5ID—A. B. Cleave, Smith Street, Port Vincent 5581.
5VE—L. M. Leslie, Supt. Reg/Lic, 30 Flinders, Adelaide 5000.
5ZGN—D. L. Park, 127 Robertson Rd., Moana 5169.

WESTERN AUSTRALIA

VK6CI—W. R. Cook, 30 River Drive, Pinjarra 6208.
6GN—G. E. Nixon, 69 Haig Rd., Attadale 6156.
6JE—J. E. Charoux, 182 Walcott St., Mt. Lawley 6050.
6LB—L. S. Blackman, 6AM Transmitter, Northam 6401.
6OJ—O. Jones, Station: Lot 86, Walpa Way, Duncraig; Postal: Flat 1, 241 Cambridge St., Wembley 6014.
6DK—R. Kilworth, 66 Robinson Rd., Morley 6062.
6AU—A. C. Graham, 2 Kathleen St., Lesmurdie 6076.
6VL—E. H. Connery, Lot 2, Holden Rd., Roleystone 6111.
6SV—K. E. Pledger, c/- TV Station, Koolan Island 6733.
6ZJP—P. W. Jupp, 49 Kooyong Rd., Rivervale 6103.
6ZAA—W. J. Howse, 11 Parkside Ave., Mt. Pleasant 6153.
6ZGA—R. M. Ayensberg, 19 Forrest Ave., Newman 6753.

TASMANIA

VK7TM/T—W. T. Moffat (was VK7TM), 7 Shannuk Dr., West Hobart 7000.
7WD—D. Whent, 12 Blackwood St., Grassy, King Island 7256.

NORTHERN TERRITORY

VK8RZ—R. J. Verral, Umbakuma, Groote Eylandt.
8PO—B. S. Miller, 80 Memorial Ave., Alice Springs.

CHANGE OF ADDRESS

VICTORIA

VK3CJ—C. J. Manning, Cabbage Treet Road, Marlo 3888; Postal: PO Marlo 3888.
3FO—C. K. Gibson, Lot 29E, Church St., Maldon 3463; Postal: PO Main St., Maldon.
3HA—R. F. Meany, Peck Rd., Sydenham 3038.
3KB—E. G. Mackay, 380 Glenferrie Rd., Malvern 3144.
3LW—A. B. Bradley, 9 Langdon St., Portarlington 3223.
3OE—E. N. Planck, 62 Eversham Rd., Cheltenham 3192.
3TX—Dr. D. R. Blackman, 129 Clayton Rd., Clayton North 3168.
3VE—L. D. Hayward, 192 High St., Wodonga 3690.
3AUR/T—R. Wilkins, "Wood View", Byaduk 3285.
3BCJ—R. C. C. Jackson, 64 Glenroy Rd., Glenroy 3046.
3YFB—D. Atkinson, 32 Lording Rd., Ferntree Gully 3156.
3ZAZ—S. R. Gregory, 36 Pleasant St., South Ballarat 3350.
3ZDT—D. F. Taylor, 50 Auburn Rd., Auburn 3122.
3ZHU—A. G. Moritz, 4 Dugdale St., Bacchus Marsh 3340.
3ZKL—L. Slamin, Lot 28, Timberglades Rd., Montrose 3765.
3ZLQ—R. F. Hall, 71 Somers Ave., McLeod 3085.
3ZRG—R. J. Roche, 1/2 Thomas St., Kew 3101.
3ZTV—A. G. Lyall, 102 Seaford Rd., Seaford 3198.

QUEENSLAND

VK4ZEM—P. Mead, 71 Coverdale St., Indooroopilly 4058.
4BG—R. J. Glassop, 18 Mentone Ave., Southport 4220.
4DJ—D. J. McGroy, 17 Anderson St., Cairns 4870.
4LM—L. E. H. Mallinson, 53 Waterson St., Annerley 4103.

SOUTH AUSTRALIA

VK5DJ—J. F. Drew, 19 Dunlop Ter., Jamestown 5491.
5FV—V. Clemence. 267 Salisbury H'way, Parafield Gardens 5107.
5KG/T—J. F. Ingham, 37 Second Ave., Sefton Park 5083.
5QT—J. L. Veale, 9 Hallett Rd., Erindale 5066.
5SU—J. W. K. Adams, 34 Lambert St., Ceduna 5690.
5ZBW—L. R. Burton, 25 Myall St., Renmark 5341.
5ZPC—P. Clemence, 267 Salisbury H'way, Parafield Gardens 5107.

WESTERN AUSTRALIA

VK6OW—O. J. Willoughby, 48 Pollack Ave., Balga 6061.
6FN—M. L. Faulkner, Station: 66 Mount St., Manjimup 6258; Postal: PO Box 309, Manjimup 6258.
6DR—J. G. Harmsen, 40 Russel St., Morley 6062.
6CZ—C. F. Lloyd, 88 Callisan Way, Koondoola 6064.
6KY/T—G. D. Ogg, 11 Apara Way, Nollamara 6061.
6CV—R. W. Walker, Lot 75, Camira Pl., Gooseberry Hill 6076.
6LR/T—L G. Rock, 40 Fairbridge Rd., Mandurah 6210 (now both station and Postal same).
6KS/T—T. Scorer, 14 Bateman Rd., Mt. Pleasant 6153.
6FT—F. T. Tuffin, Lot 44, Georgette Dr., Margaret River 6285.
6ZDF—T. W. Robinson, 48 Allenswood Rd., Greenwood 6024.

TASMANIA

VK7ZDF—R. H. Ferris, 15 Fisher Ave., Sandy Bay 7005.

NORTHERN TERRITORY

VK8FD—F. D. Baarda, Station: "Yuenduma" via Alice Springs; Postal: PO Box 746, Alice Springs 5750.

CANCELLATIONS

VICTORIA

VK3KM—K. W. Magee. Not renewed.
3VT—J. V. Hudson. Not renewed.
3WJ—Dr. F. S. Kantor. Not renewed.
3AEU—C. J. Schultz. Not renewed.
3AFP—J. H. Power. Not renewed.
3ANN—K. A. Vaskees. Not renewed.
3AYT—T. A. Rowan. Now VK3VY.
3BAG—D. A. Moffat. Now VK3FJ.
3BCD—E. G. Egan. Now VK3XT.
3YBM—R. J. Martindale. Now VK3BMB.
3ZDR—R. H. Chapman. Not renewed.
3ZJO—E. G. Briggs. Not renewed.
3ZYZ—D. C. Parnell. Not renewed.

QUEENSLAND

VK4ZAM—A. A. S. Millard. Changed to unrestricted.
4ZDW—D. W. Rickard.
4ZFL—R. Lynam. Own request.
4BA—A. R. Bradley. Non-payment of renewal fees
4KJ/T—L. Cordell. Transferred to Sydney.
4WI—Wireless Institute of Australia. See Section 1 above.

SOUTH AUSTRALIA

VK5UM—A. E. Taylor. Transferred to Victoria.
5ZA—R. G. Jolly. Transferred to Victoria.

WESTERN AUSTRALIA

VK6RJ—R. A. Burgess. Requested.
6FQ—R. L. Davies. Transferred to NSW.
6ZCQ—A. C. Graham. Now unrestricted — see above.
6ZGJ—W. Coertse. Non-payment of renewal fees.
6ZCV—Gaideleulcuis. Non-payment of renewal fees.

TASMANIA

VK7DZ/T—J. T. Kelly Hart, 838 Sandy Bay Rd., Sandy Bay 7005 (transferred to Queensland).
5SB—I. S. Brown, 170 Jubilee H'way, Mt. Gambier 5290.
5TH—T. R. Hutchesson, 53 Swallow Dr., Mt. Gambier 5290.
5YB—B. A. White, 81 Torrens Rd., Riverton 5142.
5ZEF/T—R. J. Foxwell, 39 Weroona Ave., Parkholme 5043.
5ZIR—R. W. Edwards, 21 Birks St., Parkside 5063.
5ZTS—T. Scholten, 175 Lacey St., Whyalla 5600.

WESTERN AUSTRALIA

VK6MG—L. P. McGuire, 3A Ripplewood Ave., Thornlie 6108.
6MO—A. Parkes, 25 Gloster St., Subiaco 6008.
6BD—B. F. J. Davis, 13 Cara Rd., Greenmount 6056.
6IR—J. R. van Lear—Postal: c/- M. A. Nickolas & Ass., PO Box 112, South Perth 6151; Station: Portable.
6RTT)—Carnarvon Amateur Radio Club, Postal:
6TS) c/- Hermiston PO Box 706, Carnarvon 6701; Station: Unchanged.
6RN—M. Rosenthal, Postal: c/- H. T. Mulder, 2 Bedwell St., Emu Point 6332.
6OW—O. J. Willoughby, 48 View Ter., East Fremantle 6153.
6ZGM—E. B. McAndrew, Station: Flat 5, 296 Scarborough Beach Rd., Doubleview 6018; Postal: PO Box 115, Doubleview 6018.
6ZFL—R. F. Lester, 27 Young St., Carnarvon 6701.
6ZHR/T—R. K. Henderson, 24 Forrest St., Quairading 6383.

TASMANIA

VK7JP—L. J. Darkin, 6 Cressey St., New Town 7008.

CANCELLATIONS

VICTORIA

VK3HL—A. T. Hutchings. Not renewed.
3AJK—W. H. Kelly. Now VK3XO.
3CDS—K. Sutcliffe. Transferred to NSW.
3YCH—M. G. Loxton. Not renewed.
3ZYT—G. S. Taylor. Transferred to Tasmania.
3YCY—S. R. Brooks. Now VK3ANO.
3YGZ—I. J. Dalwood. Not renewed.
3ZGV—J. Sutcliffe. Transferred to NSW.

QUEENSLAND

VK4BM—W. J. Mead, 8 Cross St., Mitchelton 4053.
4ZFL—R. Lynam, 48 Reuben St., Stafford 4053.
4ZJF—J. Field, 16 Adsett St., Taringa 4068.

SOUTH AUSTRALIA

VK5MZ—F. E. Bentley. Deceased.
5ZBH—M. R. Haskard. Now VK5BA.
5ZDA—D. M. J. Bates. Transferred to Tasmania.
5ZHT—H. G. Tremethick. Not renewed.

WESTERN AUSTRALIA

VK6GX—G. N. Marks. Now VK6AI. Note change of address, see New Stations.
6PS—Perth Modern School Radio Club. No longer required.
6MC—R. W. Attwood. Transferred to Queensland.

TASMANIA

VK7BB—A. E. Byrne, Exton 7257 (non payment of renewal fee).
7RZ—R. J. Verrall, 105 Arthur St., West Hobart 7000. (Transferred to Northern Territory)
7UV—R. B. Trollope, 74 Maranoa Rd., Kingston 7150. (Name changed to R. B. Greenwood — see New Stations)

NORTHERN TERRITORY

VK8ZB—G. L. Stephens. Transferred to SA.

NEW STATIONS

NEW SOUTH WALES

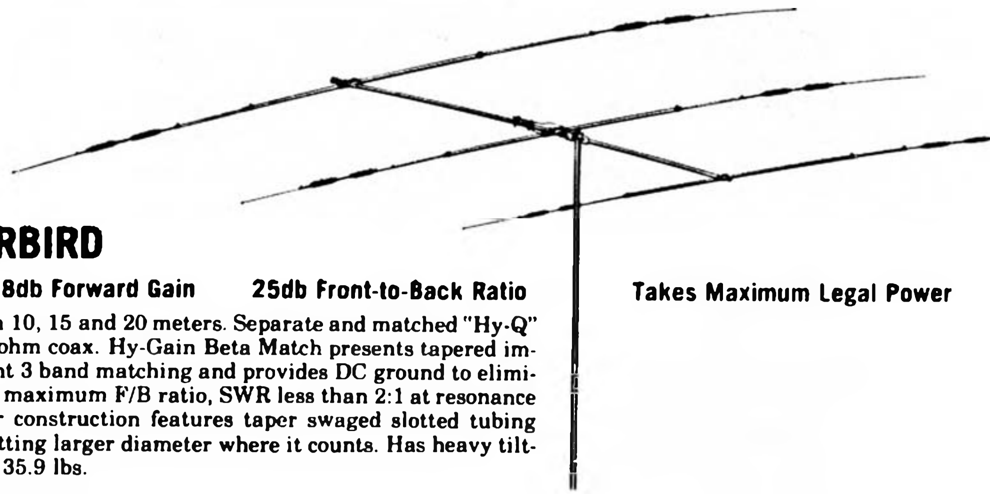
VK2BHT—H. R. Tyreman, 9/60 Charlotte St., Ashfield 2131.
2ZNZ—R. J. Mitton, 1C/40A Roslyn Gardens, Elizabeth Bay 2011.

VICTORIA

VK3FJ—D. A. Moffat, 13 Nottingham St., Syndal 3150.
3VY—T. A. Rowan, 2/2 Georges Rd., Toorak 3142.
3XT—E. G. Egan, 15 Clunies Cres., Mulgrave 3170.
3AOW—M. S. Hodgson, "Pine Ridge" Sheffield Rd., Montrose South 3765.
3ATZ—R. E. Glew, 80 Bernard St., Cheltenham 3192.
3BMA—R. J. Martindale, 6 Ilora Ct., Glen Waverley 3150.

(To be continued)

hy-gain NEW SUPER THUNDERBIRD TRIBANDER BEAMS from BAIL ELECTRONICS



NEW, IMPROVED SUPER 3-Element THUNDERBIRD

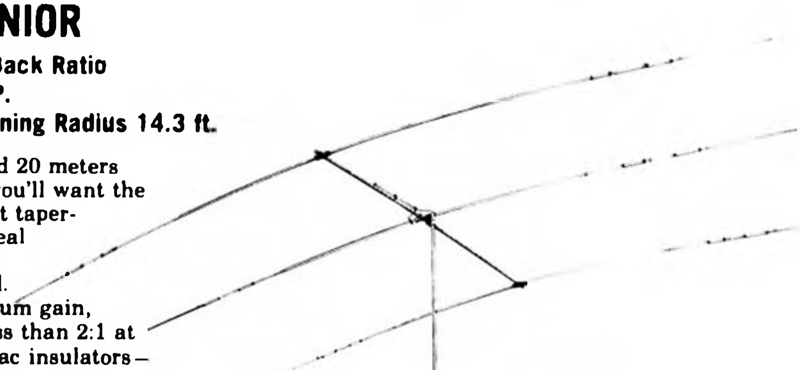
- New "Hy-Q" Traps Up to 8db Forward Gain 25db Front-to-Back Ratio

Takes Maximum Legal Power

Delivers outstanding performance on 10, 15 and 20 meters. Separate and matched "Hy-Q" Traps for each band. Feeds with 52 ohm coax. Hy-Gain Beta Match presents tapered impedance which provides most efficient 3 band matching and provides DC ground to eliminate precipitation static resulting in maximum F/B ratio, SWR less than 2:1 at resonance on all bands. Mechanically superior construction features taper swaged slotted tubing allowing easy adjustment and permitting larger diameter where it counts. Has heavy tiltable boom to mast clamp. Shpg. Wt. 35.9 lbs.

FABULOUS THUNDERBIRD JUNIOR

- Up to 8db Forward Gain 25db Front-to-Back Ratio
- Takes up to 300 Watts AM; 600 Watts P.E.P.
- Rotates with Heavy Duty TV Rotator Turning Radius 14.3 ft.



If you're looking for top performance on 10, 15 and 20 meters but are hampered with severe space limitations, you'll want the Model TH3JR. Constructed of durable, lightweight taper-swaged aluminum tubing, the Model TH3JR is ideal for rooftop or lightweight tower installations. Separate and matched "Hy-Q" traps for each band. Feeds with 52 ohm coax – Beta Matched for optimum gain, maximum F/B ratio without compromise. SWR less than 2:1 at resonance on all bands. Molded high impact cycolac insulators – all hardware iridite treated to MIL specs. Shpg. Wt. 20.4 lbs.

SPECIFICATIONS

ELECTRICAL	Model TH3Mk3	Model TH3JR
Gain	8db	8db
Front-to-Back Ratio	25db	25db
Maximum Power Input	1 KW, AM	300 Watts AM; 600 Watts PEP
VSWR (at resonance)	Less than 2:1	Less than 2:1
Impedance	52 ohms	52 ohms
MECHANICAL		
Longest Element	27 ft.	24.2 ft.
Boom Length	14 ft.	12 ft.
Turning Radius	15.7 ft.	14.3 ft.
Wind Load At 80 MPH	103.7 lbs.	87.0 lbs.
Maximum Wind Survival	100 MPH	80 MPH
Net Weight	36 lbs.	21 lbs.
Mast Diameter	1¼" to 2½"	1¼ to 1⅝"
Surface Area	4.03 sq. ft.	3.4 sq. ft.

TRIBANDER BALUN

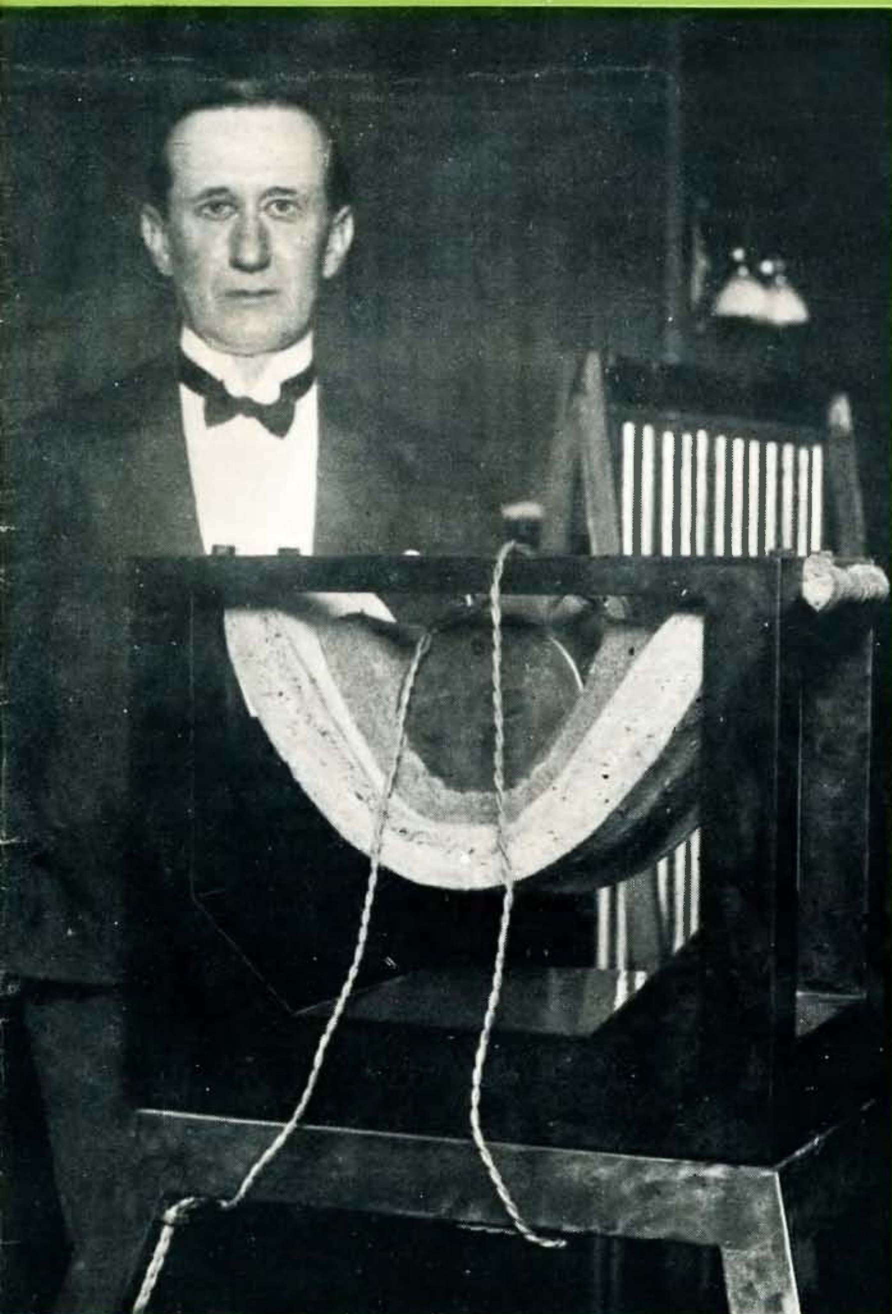
BAIL ELECTRONIC SERVICES

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 56, Mascot, 2020	Ph.: Day 667 1650 A.H. 371 5445
S.A.:	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000.	Ph.: 23 1268
W.A.:	H. R. PRIDE, 26 Lockhart Street, Como, 6152.	Ph.: 60 4379

amateur radio

JULY 1974



- EARLY DEVELOPMENT OF THE MORSE KEY AND CODE
- IMPROVEMENTS TO THE FT200
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- REVIEW OF THE SPECTRONICS DD-1
- EXECUTIVE OFFICE — EDP — AR MAILING
- 1974 RD CONTEST RULES
- THE CW NET (CWN) — AN EXPLANATION

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

Model TE-22D

SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8
12 AT7. 6Z4
Power Source: 105-125, 220-240V AC. 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving.
Printed Circuit for uniform Characteristics.
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

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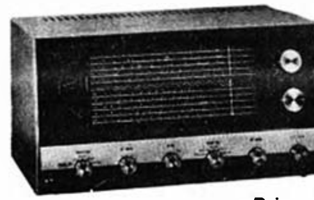

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amateur radio

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CONTENTS

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TECHNICAL —

GENERAL —

DEPARTMENTS —

FRONT COVER

Senatore G. Marconi, G.C.V.O., LL.D., D.Sc.
At the microphone of the London Station of the British Broadcasting Company (early 1920s).

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Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

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145.13 MHz AM
Hunter Branch Mondays 19.00h 80m.

VK3WI
10.30 local time Sundays:
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3600 kHz SSB
7146 kHz SSB
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI
09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch 8 FM. BC officer VK4HB.

VK5WI
23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambier on 2m

VK6WI
09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM
Ch1 FM

VK7
09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

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QSP

UNITED WE STAND

There seems to be a lot of talk about parts of States breaking away from their Divisions to form Divisions of their own.

The WIA is like a house. In the entrance hall lives the Executive to guard the front door, to keep it bright and sparkling for all passers-by to see and for visitors to use in passing in and out on daily business.

The house now contains seven main rooms. It used to have six; last Easter the owners of the house approved the construction of another room to accommodate a new Division. In each room lives one of the seven Divisions.

The owners of the house are actually a group consisting of seven people — one from each room.

Those who live in each room get together and appoint a Council of their own to look after their room.

If some of those who live in a room no longer like the room they could consider building another room onto the house. But they cannot do this without getting permission from the owners of the house.

The owners could easily refuse permision for many reasons. Perhaps a humpy tacked onto the house would detract from the appearance and value of the house. Perhaps the owners would be afraid that the occupants of the old room and the new extension would forever be at war with one another and thus upset the whole neighbourhood and those living in the other rooms of the house.

In days gone-by, some of the people in one of the rooms got the brilliant idea of trying to get a crane to lift up their room and deposit it somewhere else. But this failed because the house was very strong and their room mates, who were much wiser, could see that this was a very bad move.

Some of the people in one room conceived the idea of breaking down part of the outside wall of their room to build on another front door. Unfortunately the existing front door was the only one leading onto a pathway. Anyway, those who guarded the existing front door objected. So did the occupants of all the other rooms.

You can easily see that the owners of the house must have the facility to look after the house properly. If any rooms need to be sub-divided or if someone wants to extend the property the owners *MUST ALWAYS* have the final say. The "owners", of course, are the Federal Council.

J. McL. Bennett
VK3ZA

NOVICES

"This year — 1974 — is sure to be a **BIG YEAR** for **YRCS** with new syllabuses and course and **NOVICE LICENCES!** Good luck with your efforts to join the first batch of Novice Operators **EVER** to appear in Australia." Rex Black, VK2YA, writing in Zero Beat, Feb. '74.

A SLOW BURN

The **ARRL** authorised an expenditure of $38,000 as a grant for the construction of another Oscar for the use of all hams. Now to hear a brother ham speak with pride of the QSO he had through an Oscar which was supported by the **ARRL**, and at the next breath to hear the same brag that he "never belonged to the ARRL and never will", to me is the height of ingratitude. Strays in QST Jan. '74. (For 'Oscar' read 'repeater'? — Ed.)

OSCAR 7

Amsat report Oscar 7 launch delayed because of problems on launch vehicle. Earliest launch now expected to be September/October.

REPEATERS

A tabulation in issue 3 of QTC for 1974 (the Swedish Radio Amateur Magazine) shows 30 repeaters registered in Sweden of which 10 are QRT. These are allocated to eight channels beginning with 145.000 MHz upwards by 25 kHz steps for inputs with outputs 600 kHz separation from 145.600 MHz upwards.

REPEATERS AGAIN

In "Radio ZS", the official journal of the SARL, for Mar. '74 it is observed that 6 m repeaters in South Africa have been allocated frequencies 52.15 MHz input, 52.750 MHz output or 52.050 input/52.650 output. In the 2m band they have 19 repeaters in use or in preparation. The frequencies begin at 145.05 MHz input with 600 kHz separation for the output. Channel spacing has been 50 kHz but new allocations would have to be slotted in at 25 kHz spacings.

PIRATES PROSECUTED

RSGB Radio Communication regularly lists statistics about the successful prosecutions of persons using wireless transmitting apparatus contrary to the provisions of their Wireless Telegraphy Act. For example, in a recent four month period their Ministry of Posts obtained convictions in 10 cases involving 20 persons. Attempts have been made by the WIA to obtain regular statistics from the authorities here in Australia but there is either no central collecting and co-ordinating body or none can be obtained without recourse to every Court in the land. This latter is clearly a near impossible task but nevertheless amateurs would be interested in the figures if only they could be obtained.

NEW CALL SIGN

A8A to A8Z provisionally allocated to the Republic of Liberia. Rad. Comms., Mar. '74. DX-ers will of course have caught up with P2 (seemingly used mainly as P29) for Papua New Guinea.

ARRL — EARLY DAYS

In Feb. '74 QST we read that the Secretary on return "from an extensive 1923 field trip, primarily to the west coast, recognised a missing element. He found many members in some areas of the country feeling completely isolated from the course of ARRL affairs". Prior to that the ARRL had been governed by a board of 17 directors 'self-perpetuating' in the east with only 2 directors from west of the Mississippi. "While we were a small and rapidly growing organisation this probably was the best possible form of government for us. It was lacking, however, in that it did not take into account the idea of representation, and there were many large areas of the country which had no particular representation on the Board — every director was a director-at-large and merely one-seventeenth of the whole governing power".

STRAY FROM QST Feb. '74

Conditions on a CW 80m net were so poor that no stations were heard. "Even the few TV colour oscillators that were audible were coming in via skywave".

ARRL DXCC AWARD

The ARRL, in a letter of 1st May, advises IARU Societies that all applicants for their DXCC Award on and after 1st July 1974, must enclose U.S.$3.50, or the equivalent in IRCs, to cover the return postage costs of the applicants' confirmations by registered first class mail as well as the costs of mailing the DXCC Certificates and lapel pin. The ARRL has in the past 27 years requested but not insisted upon the payment of a sufficient amount to cover the cost of the return postage for applicants' confirmations but points out that the increases in postal costs have now reached the point where generosity must be tempered with practicality.

Be sure in future to send enough money (or IRCs) as shown above when you apply for the ARRL DXCC Award.

JA PREFIXES

Geo Francis, VK3ASV, sends details of call signs issued in the Tokyo area as JA1, JH1, JR1, JE1, JF1 and the latest JG1. Apparently it took 3 years to go through the JH1 series, 1½ years for JR1 and 1 year each for JE1 and JF1.

DXCC HONOUR ROLL

QST for March 1974 lists about 600 in the honour roll for DXCC ranging from 312 to 321 countries. In this list there are only two VKs, namely VK4QM with 315 in the general list and VK5MS with 316 in the radio telephone section. The lists reflect that only about 3 per cent are located in the Southern Hemisphere. Does this signify anything?

MELLISH REEF

In QST for March '74, page 96, there is a special announcement that contacts with both VK9JW and VK4FJ/Mellish Reef will be accepted for DXCC credit and submissions will be accepted starting 1st April 1974.

Transceiver reciprocity and receiver complexity

Reprint from Australian EEB, Augtober, 1972.

In reference to the article, "Direct Conversion Receivers" by K. L. Gillespie (**A.R.**, Feb. 1974) I would note that the author has perhaps presented an unduly rosy picture of the simplicity of the Double Conversion Receiver.

This subject has been examined in some detail in a series of articles in **The Australian EEB** throughout 1971 and 1972; your readers may wish to add this item to the list of Mr. Gillespie's references.

In those articles we discussed Direct- **vs.** Superhet-detection techniques, and showed that for the **same** performance and the same total circuit complexity, an equivalent amount of trouble will be encountered, no matter what (perfected) circuit is used. This is an absolute requirement of the laws of the Theory of Information, and it applies as truly to receivers as to antennas or love or anything else: you can't get something for nothing.

What we desire to get is, however, another matter, and it may well be worth simplification of a system if this appeals to our sense of fitness. For example, one may prefer to take the trouble to use and balance a good audio filter, compared to aligning a good I.f. system. Or one prefers the trouble of making a low-harmonic Local Oscillator and inserting a buffer, compared to the trouble of ganging tuned circuits. One often tends to regard as "simpler" that circuit which pleases one the most, and indeed to overlook its defects. There are, furthermore, many circumstances when the limitations of the simpler Direct Conversion systems are not too important, and then one appears to be getting something for nothing.

The multivalued nature of these matters is considered in the Augtober 1972 **EEB** in an article entitled, "Transceiver Reciprocity and Receiver Complexity", and which should be subtitled, "Is Direct Conversion Really Better?" I invite you to reprint it in **A.R.** for the information of your readers.

R. Leo Gunther, VK7RG, **Editor EEB**

A SQUARETABLE

Being a Discussion between Winston Henry VK7WH and Leo Gunther VK7RG with asides from Richard Ferris VK7ZDF.

PHASING-EXCITERS

Winston: I'm building that neat improved version of the Tucker-Tin SSB phasing exciter which appeared in the August 1971 **Break-In**. The original, much simpler version of this was reproduced some years ago in EEB (valves, 1968; transistors, 1969). I'll follow it by a transistor linear amplifier with perhaps some 15 W PEP output.

Leo: Why not use valves in the final? Simpler, less worry about nasty parasitics, transients, neutralisation, etc.?

W: No, I want this to be portable as necessary.

L: Carrying the battery in a Back Pack?

W: Well, I can use a reasonable dry battery, and simply not modulate so heavily.

L: Why not just put the exciter on the air?

W: It's only milliwatts.

L: All right, but say you take 2 W from your final, that's only two S-units better than 100 mW, for ten times the power drain.

W: Well — it's only peak power.

Richard: Peak power or not, it's still a stupid argument. Why not use only 10 mW? After all, it will **only** be 2 S-units down from 100 mW . . .

L: Arguments by themselves are never stupid! A couple of S-units may not be major, but double that might be significant.

I admit, however, that I am simplifying the picture. For a home-installation where power is no object, 100 W are 3 S-units **better** than 1 W, and valves do the job easier and cheaper than transistors. On the other hand there exist the QRPP enthusiasts who maintain that "power is no substitute for skill", and who delight in achieving 1000 or even a million miles per watt. It all depends what you wish to make out of amateur radio.

For Winston's portable system, however, performance must be balanced against weight and size. It takes rather more batteries to deliver 100 mA than 10 mA, and obviously a 1A load is not as portable as either.

Empirically, some 100 mW will give quite a lot of coverage if it feeds a reasonable antenna. If the antenna has to be carried on the back, that figure might go up to 2 W so that those two S-units are not **lost.** If, say, the average level of your signals received at the other end is about S6 (or say, "10db above S9" in modern language), you might be willing to reduce power 20-fold to bring it down to S4, but below that you would get into difficulties unless you were operating CW.

Thus it resolves down to the amount of batteries you are willing to carry/afford, to antenna efficiency, to the band used, and perhaps to your diligence with low power!

WITH DIRECT CONVERSION RECEIVER

L: What about the receiver?

W: I thought I might use a Direct Conversion receiver. It's simple, and I could use the same oscillator for BFO as I have in the exciter (with a bit of conversion).

WITH GOOD AUDIO SELECTIVITY

L: Ummm, perhaps. But of course you'll want to use an audio filter with a good bandpass shape factor. The Chebyschev response one in the 1971 ARRL requires only 4 88mH toroids.

W: Well, yes, all right.

AND PHASING-DETECTION

L: And then there's the problem of audio image — nasty if QRM is heavy within a few kHz of your signal.

W: Yes, but that can be phased out, can't it?

L: Just so. I'll show you the relevant books on the two-phase system, or "Signal Slicer" (**EEB,** 1969, p.100).

W: Very interesting: No reason why I couldn't use the same components for the receiver phasing detector, as for the transmitter phaser, is there?

L: That's right. In the transmitter, audio is stripped from a sideband by opposite-phasing, and transmitted as a signal. In the receiver the signal is detected and turned into audio stripped of a sideband. Just the same process.

Not only does this eliminate half the QRM in your bandpass, it also increases S/N ratio of a SSB signal by 3db. It also allows painless reception of DSB, and even AM by the exalted-carrier principle Receiving both sidebands of AM on a product detector is awkward because of the need for the LO to be in phase with the received carrier. That this can be done at all implies only that the Local Oscillator is being locked by **pulling** from the received signal.

PHASING FOR BOTH Tx AND Rx

W: It sounds like a good idea, and from these valve circuits you're showing me the "Signal Slicer" doesn't look too complicated. No reason at all why the same circuit can't be used from the exciter, run backwards.

L: Yes, but you can't really do that literally. The inputs and outputs would have to be switched around and that could be awkward. In addition, the requirements for linearity of the receiving product mixer would be rather more stringent than for the transmitting one because of the greater dynamic range needed.

This might suggest the use of a couple of Dual Gate MOSFETS for the mixers.

You could use the same LO and RF and AF phase shift networks as for the Tx, but you'd either have to switch to a different audio amp or switch input and output of the Tx one. I shouldn't advise the latter, because of the high AF gain needed. High AF gain can be attained easily enough nowadays with an IC.

W: All right, but those phase-shift networks are tricky, and it would be well worth switching them from Tx to Rx. And the same oscillator stability can be achieved on Rx as for Tx — and that is important.

L: Ah so, but remember that that oscillator should have a clean sine wave output, or you may be receiving 7Mc Peoples Radio on top of 80M signals (or 20M California KWs on 40M).

AND AN RF STAGE

W: Why not merely add another tuned circuit at the RF input?

L: It increases the complexity of ganging the tuning. And in addition it is really quite a lot more effective if you pop the FET between the tuned circuits. And you could improve results even further by using an RF Q-Mult. or controlled RF Stage regeneration (harder).

W: More RF selectivity would also help to reduce crossmodulation from adjacent strong signals, as long as RF gain is kept low.

L: True, but that RF stage will also introduce a little noise, and even more if regeneration or Q-multiplication is added.

R: Regeneration may increase noise, but it also increases signal: The SNR is not affected unless you operate very close to oscillation.

W: In any event, a good FET introduces low noise. And it allows good AGC control — otherwise how would you get AGC on a Direct Conversion receiver?

L: Audio AGC.

W: But that won't keep strong signals out of the mixer.

AND A LINEAR MIXER

L: Use a linear mixer, like a beam-deflection valve, 7360 or similar.

W: This setup can't use valves, so I'll have to use the best available semicon. mixer.

L: Then use Hot-carrier Diodes, though they have the disadvantage that they require balancing transformers for a doubly-balanced configuration, if you're to get the lowest amount of harmonics and feed-through.

W: The DG MOSFETs might be simpler, and if RF gain is kept very low as Dick suggests, the mixer should be able to take the normal range of signals on the bands.

AND A BUFFER

L: A further refinement could be to add a buffer stage between oscillator and mixers.

W: Why?

L: To reduce the effect of "pulling" on the LO by incoming carriers.

W: But the only signals will be sidebands, no carriers.

L: No, a sideband is just a carrier whose frequency and amplitude are varying at a certain rate. You can have pulling of a LO by a strong adjacent-signal sideband, with the consequence that the LO frequency is modulated by the audio of the QRM. You can imagine what this does to the desired signal!

R: That's what I said.

L: Yes, certainly, where do you think I get all these bright ideas?

W: Perhaps the buffer might be useful, we'll think about it. Simpler first to try it without the buffer and see what happens After all isolation ought to be pretty good between the gates of a Dual Gate MOSFET.

AND A GOOD AUDIO

L: Perhaps. Try it and see — and let us know the results. I might add only that you will need to be very cautious about avoiding internal transistor noise and external audio pickup, because of the very high AF gain needed. You can take care of the circuitry by using an IC for the audio amplifier, but G3VA (in "Technical Topics") has suggested that superior results might be achieved by using discrete amplifier stages having bandpass filtering on each stage. This can also do wonders for the shape factor of the audio response, if intelligently designed.

W: The result of all this should be a pretty good receiver.

SO WHAT HAPPENED TO THE SIMPLICITY?

L: Indeed, but what has happened to all that **simplicity** the Direct Conversion Receiver is supposed to have? For comparable performance you need comparable complexity. **Simple** D-C simply has the advantage that you get somewhat better performance for the same number of components than you would obtain, say, from a good Regenerative Detector (and on CW they could be comparable!).

W: But D-C would appear to have the advantage that the (audio) selectivity is placed very early in the receiver, right after the one and only detector.

In a Superhet the maximum selectivity is obtained only at the end of the IF strip, so allowing the possibility of IF overload within the RF passband. Pat Hawker has quite a lot to say about this in **Amateur Radio Techn.**

BACK TO THE SUPERHET?

L: All right, but it's not fair to compare the two circuits unless you do so under comparable conditions! In the D-C, the pre-selectivity gain is kept low, and high linear mixing is used. As Pat Hawker mentions, you get the same results when RF and IF gain is kept low in a superhet using similarly linear first mixer(s). See also the fine discussion on this subject by Peter Martin in early 1971 issues of Radio Communication ("Plagiarise and Hybridise").

W: In a superhet you have the problem of RF images (**and** 2nd harmonic images). If you use double (triple, even!) conversion to avoid images you invite a lot of "birdies" from the harmonics of all of those oscillators.

L: Modern technique is returning to single-conversion, with lots of selectivity (from mechanical or crystal lattice filters) at high IF, and right after the **first** mixer. This avoids both the images and the birdies, and also avoids IF overload. Additionally, up-conversion (converting to IF **higher** than the signal) (see **Am. Rad. Techn.** for interesting application via varactor diodes) renders oscillator harmonics harmless.

The picture is completed by low noise low gain RF stages, and mixers biased for good compromise between sensitivity and linearity (See **QST** for Jan. and Feb. 1972). Thus, superheterodynes having good performance are becoming simpler (and better), while good Direct Conversion is getting more complicated.

Murphy wins.

A Direct Conversion set is simply a superhet with zero IF. IF amplification is replaced by AF amplification. It is "better" only if it is easier to achieve high gain and low noise in AF stages than at IF.

It isn't.

BUT DIRECT CONVERSION IS STILL BETTER — SOMETIMES

W: You've presented a pretty convincing argument for the superheterodyne, but you've overlooked something: A simple D-C will give quite satisfactory performance, and we have seen this in Ron Brown's (VK7ZRO) neat little unit. A simple superhet will give terrible results because of RF images, though I'll admit that it is worthwhile to use good selectivity filters for either.

A simple D-C is not troubled by RF images (the LO freq same as signal freq), and for the sake of simplicity it would be worth a little trouble to build a LO with low second harmonic content.

L: I suppose so, say a push-pull oscillator, or an ordinary Vackar or Seiler with some degeneration; the latter are reported to have **amazing stability** as well. A typical good, low harmonic Seiler Osc appeared in the Jan. 1972 Ham **Radio.**

W: The main point is that I want only a **simple** set for my mobile operation, one which is compact and easily portable — and reasonably easy to build.

The D-C fits this requirement better than the superhet, and I'm willing to accept a few limitations on performance. On the other hand I see no reason why I shouldn't be able to use the phasing components of the Tx on the Rx, and for only a little extra complexity add the **two-phase** detector. It will slice the bandpass in half, and that's impressive. With that one refinement it is certainly going to perform as well as most superhets, and better than many.

L: But surely not better than a superhet **also** endowed with a **signal slicer?**

W: Perhaps not, but that addition makes the already complicated superhet even more involved. With the D-C without an RF Stage I can still get good results if I have a linear mixer. Superhets without

RF Stages are useless for serious work. And to get good results from RF Stages you have to go to a lot of trouble, as Blakeslee shows in the Feb. 1972 **QST.**

Under dire conditions of strong signal QRM I could still pop in a switched RF attenuator. One of the big advantages of the D-C system is this flexibility: the basic receiver is good, and complex ones are even better — with a wide choice of refinements. The superhet has to carry a lot of baggage merely to work.

R: It seems to me that Winston wins this argument on the basis of simplicity. A D-C **can** be more effective when simple, than a superhet for the sole reason that the IF of the former is zero, so if there is no serious QRM within the audio passband, there is no problem of images even without an RF stage.

If there is serious **audio image** the use of the Tx phasing network on the Rx will phase it out, as he suggests. This results in reasonably high performance for a **portable** mobile system.

L: Why should the question of portability be so relevant here? Surely a couple of small IF transformers hardly impose a crushing burden?

R: One of Winston's requirements was that it "be easy to build". If it gets too complicated that requirement is not filled — and better a simpler set that gets built than . . .

L: All right. You build into a system the degree of complexity consistent with your requirements for performance, and with your ambition. Life always involves **trade-offs,** and the argument here is quite analogous to the one about power levels, at the beginning of this article. But let us be disabused of the notion that by use of some magic design we can get **something for nothing.**

W: A bird in the hand is worth two in the oscillator . . . ●

Improvements to the *FT200*

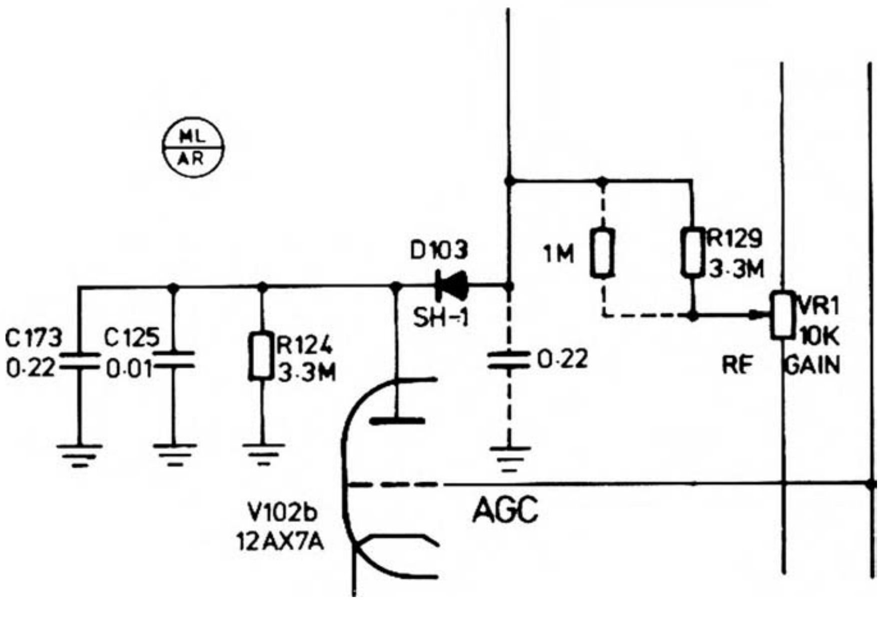
J. Brown, VK7BJ
12 Thirza Street, Newtown, Tas., 7008

The author suggests two modifications to the popular FT200. The first modification overcomes erratic indications on the panel meter which are apparently caused by grid current in the 6BZ6 RF and IF amplifiers. The second allows an increase in the time constant of the AGC system.

PANEL METER PROBLEMS

The author had experienced trouble with the metering circuit of his FT200, and as the final result was somewhat unusual, the story may be of some use to others.

The trouble began with the S meter zero wandering. This was fairly easily traced to either gas or grid emission in the 6BZ6 (V103 2nd IFA) causing current to flow through the 3.3M (R129) grid return, and so varying the bias. As both 6BZ6s in the set showed the same symptoms, the trouble was cured by fitting a 6BZ6 of Austrailan manufacture.



For some time after this, things proceeded normally until it was noticed that the PA resting current was dropping. The obvious suspect — the PA tubes and the bias supply-checked out OK. It was decided to let the fault "cook". However, when the current went negative, a full scale investigation was made. It turned out to be the 6BZ6 again. The metering return for the PA IC circuit goes to earth through the cathode resistor of this tube. It is supposed to cut off in the transmit position and so have no effect on the PA reading. However, the tube had intermittent leakage to grid, and this flowing through the 3.3M grid return (again!) allowed the valve to pass a variable current when it was supposed to be cut off. This allowed a reverse current to flow through the meter and so upset the PA readings. Another new 6BZ6 was called for to fix this.

However, it appeared that 6BZ6s were a lousy type and that further measures should be taken. The most obvious was to reduce the value of the 3.3M (R129) grid return as there seemed to be no reason for its high value. A 1M resistor was paralleled across it and this greatly reduced the process without any noticeable side effects on the operation of the receiver.

AGC MODIFICATION

Many suggestions have been published with the aim of slowing up the AGC fall time, and have been worthwhile modifications. However, in the author's opinion, the best way to do this is to connect a .22mf capacitor to earth from the junction of the anode of diode D103 and resistor R129. ●

an AR special

Executive office — EDP — AR mailing

By the time you read this the W.I.A. Executive office will have moved to a new QTH across the road from the old office.

The new address is Suite 2, 517 Toorak Road, Toorak. It is above and at the rear of the Commonwealth Bank in Toorak. The entrance is next to the banking hall and is on the north side of Toorak Road which is a clearway (no standing) from 16.30 to 18.30h on working days, so beware. There is usually ample short-period parking in the streets off, or parallel to, Toorak Road.

What does the Executive Office do?

As the name implies it carries out all the routine work ordered and required by the Executive. In addition it carries out the centralised processing of subscriptions and membership records on behalf of the Divisions.

The office houses the Secretary of the WIA. He is also the registered Public Officer of the WIA and is responsible to the Federal President. He is also answerable to the Editor for AR work and allied matters including Magpubs and other publications.

All the membership records as well as subscriptions are processed through WIA EDP programmes on behalf of Divisions. It is through EDP that your address label for AR is also prepared as an automatic function. The printing of subscription notices is another of the automatic functions and is carried out late in November or early in December each year.

With the exception of address changes and certain other changes of an essential but minor nature all the data for EDP comes from your Divisional officer responsible for the particular change. Thus, if you seek any grade alteration (such as a reduction of subscription because of becoming a pensioner), the EDP listings cannot be changed except by official advice from your Division.

Special EDP forms are in use to input the details of new members and to effect changes to the data already on file. The input to the computer is made once every month — on or near to the 15th day of each month. This is a convenient time for this to be done because firstly it is necessary to calculate the print quantity of the following month's AR and inform the printer. Secondly, a reasonable time must be allowed for the input to be punched, edited and then the address labels to be printed and delivered a day or two before AR is handed to the mailing service for packing and distribution.

As you will see, this is quite an integrated function in itself and does allow for a little flexibility in operation but which can easily disappear due to holidays and week-ends falling at awkward times. As long as any change, such as an address change, reaches the Executive Office before the mid-month shut-off date it will be in time for next month's AR. If the address change notification arrives even one day late it cannot become effective until AR of the month after the next AR.

An article in March QST about their change-over to computer labels last year said they have an average of 125 address changes a day. This is nearly twice as many as AR gets for a whole month and we have our problems even with our lesser quantity. Some addresses are too long for the number of spaces available — arriving at acceptable abbreviations for these causes quite a headache in itself. If the computer throws out any change because of perhaps a wrong member number or too long an address another month could easily be lost in sorting out the problem and putting in an amendment. This is quite possible when trying to resolve edit errors over the telephone.

Subscriptions processing causes more headaches than any other EDP area because of the multitude of different rates in force throughout the WIA. The accounting side of the EDP programme also is not a thing of beauty but has not so far been changed because of other more pressing alterations — such as getting membership records exact, change to computer address labels, etc.

There are seventeen different subscription rates in use. For new members two different systems apply. In one Division the applicant, on joining, is asked to pay only a pro-rata to take him up to the end of the year in which he joined. In the other Divisions he is asked to pay a full year's subscription. If the EDP papers suffer any delay in being sent forward the new member's first AR could be two or more months after the month in which he applied for membership so the pro-rata in the EDP file, which is based solely upon the month for which AR begins, will differ from a pre-calculated pro-rata. In these days of postal delays there could be quite a difference but in reality this matters very little because the EDP pro-rata will begin later and end later than anticipated.

AR address labels must also be printed out to comply with PMG requirements for bulk mailing under Category B. There are seven different distribution codes to cater for 4 different ordinary rate postages (internal and 3 for overseas destinations), 2 air mail rates and 1 for bulk parcels — i.e. more than 1 AR in an envelope.

The code is fully printed out on each address label, for example, "F 2 0 01." The "F" refers to the member's grade (see page 4 of January '74 AR), the "2" is the member's Division, the "00" is a pro-rata month indicator which is not yet in use for WIA members and the final digit "I" is the distribution code — I refers to ordinary mail deliveries within Australia. The member's call sign is not printed after the member's name because some members specifically do not want this to be done. The EDP programme does not cater for this either optionally or otherwise.

There is not a great deal of flexibility permitted for input data into any EDP programme. The parameters are laid down in advance. If you want any changes the programme itself has to be patched or altered. Every such alteration costs money so naturally this is only done when there is a really compelling reason for it to be done.

The great advantage to the WIA of an EDP system is the availability of a range of information in readily usable form. For example, the Executive Office keeps an exact full set of duplicates of every month's AR address labels. Membership lists, credit and debit lists and other varieties of print-out are kept up to date each month. Information retrieval in a convenient form is thus on hand so as to answer queries of many kinds.

Perhaps the non-receipt of AR by a member causes as much strife as anything. There could be several reasons for this and on receipt of a complaint each has to be carefully investigated. Was his label printed? If not, why not? Is the complainant financial? — late payers usually miss an AR or two; these cannot be replaced free of charge because of the small staff in the Executive office being fully extended on other day-to-day work. Is a financial member's address label suppressed because a previous month's AR had been returned to sender? — moral, notify your address change well in advance.

Basically, if it is reasonable to assume that a member does not receive AR through no fault of his own it is replaced free of charge but is mailed to him with next month's bulk mailings as an economy measure. The same applies if a member receives an AR with missing or blank pages. This does sometimes happen despite production controls all along the line.

The postage bill for AR each month is now well over $300 and sometimes nearer $400 on a higher weight category. This is almost one whole dollar per member per annum and yet there seems little likelihood of any improvement in the postal services. It still takes anything up to two weeks or more for AR to get to members interstate after the posting date. Perhaps in the not too distant future some other method of conveying information with precision and much cheaper will have to be invented. Will amateurs be in the forefront of such a development?

The CW net (CWN) — an explanation

FRANK MILLER, VK4II
95 Stanley Terrace, Taringa, 4068.

The Editor,
Dear Sir,
You perhaps recall the article on the CW Net which was published in AR, October 1973. Since that time the net has flourished and grown and looks likely to continue successfully into the future.

There are still many CW operators rather confused about what is going on on Sunday mornings on 40 metres. These chaps probably did not read that article but nevertheless have reason to be interested in the net. Unfortunately the net is being hampered in its operations to some extent by the need to take time off to explain how it works to passers by. Of course the necessary time is taken to explain things but it seems necessary to prepare some sort of written summary which can be sent out to answer the general questions. In collaboration with others the attached sheet has been developed. It should do the job.

Do you think it could be inserted somewhere in AR as general information?

CW is terribly important and must be preserved. The net is serving a very important role.

All the best, Frank Miller, VK4II

On Sunday mornings there is a net operating on the low frequency end of 40 metres* which has as its main purpose to arrange QSO's between stations which report in.

The net began over a year ago as an alternative to round table sessions which are often difficult to enter and leave, and which because of their sometimes clannish nature can seem forbidding to newcomers. Whereas in a round table of 10 a station has to wait 9 overs for his turn, in the CWN approach you can have as many QSO's as you wish, and on the average one would be in the transmit mode approaching half the time.

The CWN was formed early in 1973 and has been active ever since, with over 50 stations taking part at one time or another so far. On an average Sunday morning 15 stations report in.

The CWN is in no way exclusive. It makes no demands at all on members because it has no 'members' in the usual sense. It is an organised activity, however where operating procedure is concerned, and thus offers the added benefit of possibly improving the general standard of CW operating.

Being a net, it must have a net control station (NCS) whose job it is to record the station who calls in and to pair stations for QSO's. The NCS starts the net off (see QND), maintains order, and is always available on the same frequency to facilitate both reporting in and out. He remains on for the whole session and concludes it (see QNF). Following the end of each session those interested can take part in a 'post-mortem' discussion which takes place on 7040 kHz lower sideband, headed by the NCS. This affords the opportunity to discuss any problems which may have come up during the session.

To report in any Sunday, merely show up sometime between 0930 and 1130h EAST on 7025 kHz and listen for the station calling CQ CWN. Give him a short call and report in with QNI ('I report in'). Then wait until he calls you again with a station for a QSO. The NCS will check first that both stations hear each other before assigning you both a frequency to shift to. It is considered courteous to return after each QSO to let the NCS know whether you would like another one or would like to be excused from the net (see QNX)

In the course of the session each such day any station who thinks he would like a go at being NCS lets it be known to the NCS for that session. In this manner, there is no pressure on members to take a session yet those who would like to can do so. An efficient logging system has been evolved which makes the job of NCS almost child's play and this procedure is available to those interested.

Basic to the net is the use of QN signals. A list of these signals appears in both the US and Foreign editions of the Radio Amateur Callbook and also in the ARRL publication 'The Radio Amateur Operating Manual'.

To date, stations from all States except VK6 have reported in and there have been ZL's who tried to join in but the distance has beaten them. There have been as many as 18 stations in the net at one time and this has not been an undue burden for the NCS. It appears that a much larger number than this could be accommodated.

The CWN is not a high speed club. Its motive is honest, to encourage new CW operating and to offer the opportunity to get the practice. Why not be in it?

*A group is currently forming on 80m on Sunday evenings. ●

6 metre amateur band contacts between Japan and Australia

L. F. McNamara
Ionospheric Prediction Service Branch,
Department of Science

Some time ago VK amateurs were requested to forward details of contacts on 6 metres with JA stations to the Ionospheric Prediction Service Branch for analysis. The results of this work was described by the writer in a paper delivered at the recent IREE convention in Melbourne. A summary of this paper follows.

Radio circuits between Japan and northern Australia (and other similar circuits throughout the world) have been found to support propagation at frequencies well in excess of the conventional maximum usable frequency (MUF) and with signal strengths far greater than those normally obtained. This phenomenon has been called Transequatorial Propagation (TEP) and has been the subject of intensive investigations by both VHF radio amateurs and professional organizations for more than the last decade.

The predicted MUF on such circuits is based on a normal 2F mode and usually does not exceed about 40MHz. The TEP MUF, on the other hand, regularly exceeds 50 MHz and on some circuits regularly exceeds even 100 MHz.

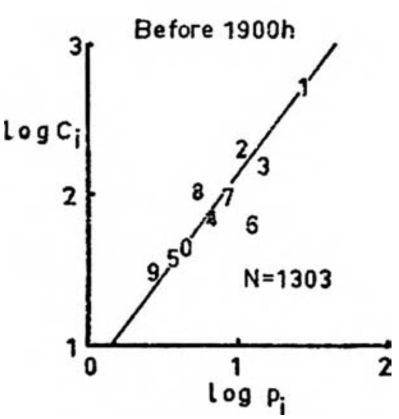


FIGURE 1:—Rockhampton data showing the numbers of contacts made with the different areas of Japan during the afternoon. The numbers denote the data points for the corresponding areas of Japan.

Information regarding the effect of circuit lengths of Japan-Australia circuits has been obtained by analysis of logbooks of Australian amateur radio operators and it is this aspect of TEP which will be considered here.

Japan is divided into 10 areas denoted by the call signs JA0, JA1, . . . JA9. These areas can be divided into three logical groups according to their latitudes. Area 6 is in southern Japan, areas 1, 2, 3, 4, 5 and 9 are in central Japan and areas 0, 7 and 8 are in northern Japan.

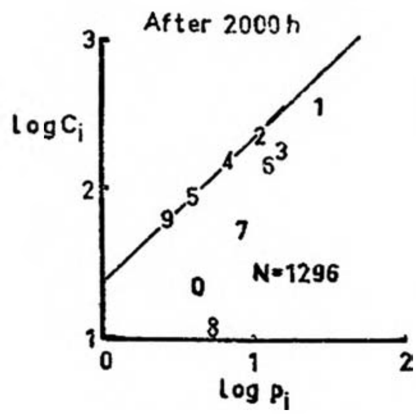


FIGURE 2:—Rockhampton data showing the numbers of contacts made with the different areas of Japan during the evening.

The information extracted from the logbooks of Australian amateurs was the callsign of the station contacted and the time of the QSO.

The data were found to be not amenable to rigorous analysis, although two limiting forms of a theoretical distribution were found to be quite useful.

In the limit of small numbers of contacts, it may be shown that the number of contacts C_i made in an observing period T is given by

$$C_i\ (T) \propto p_i^2 \qquad (1)$$

where p_i is the population of area i. This equation may be interpreted as arising from the facts that (a) the number of amateurs available in a given area is proportional to the population of that area and (b) the probability of selecting an amateur in one particular area of Japan when all areas are available is again proportional to the population of that area. The second limit occurs when all available amateurs in Japan have been contacted. Then

$$C_i\ (T) \propto p_i \qquad (2)$$

the number of contacts depending only on the availability of Japanese amateurs. The assumptions implicit in the derivation of these equations are that the areas are chosen at random and that in each area the number of amateurs is a constant fraction of the population of that area.

It follows from equations (1) and (2) that if log C_i is plotted against log p_i, the slope of the resulting best-fit straight line must lie between (1) and (2). Departures of a data point from the line for a particular Australian location provide information regarding the qualities of the circuits to the different areas of Japan. The position of a data point below the line, for example, can be safely inferred as indicating that the circuit to that area is poorer than to the other areas.

Figures 1 and 2 show the results of an analysis of data obtained at Rockhampton over several years (1957-1961).

There seem to be two types of TEP, with different characteristics. They are called, according to their time of occurrence, afternoon-type and evening-type TEP. The data have therefore been divided into two separated time periods in order to bring out any differences between the two types. Afternoon-type TEP is found to last until about 2000 LMT, with a major peak in occurrence rate at Rockhampton between 1900-2000 LMT. Evening-type TEP occurs after about 2000 LMT.

It can be seen from Figure 1 that during the afternoon, area 6 in southern Japan is significantly undercontacted on the basis of its population. During the evening (after 2000 LMT) areas 0, 7 and 8 were significantly undercontacted. This is illustrated in Figure 2.

Figures such as those shown have been prepared for 11 stations throughout Australia and have yielded a consistent picture of circuit length or latitude effects on Japan-Australia circuits. The conclusions reached are, however, limited by the nature of the data.

The general conclusions which can be drawn are:—

During the afternoons, the circuit to area 6 in southern Japan was the poorest.

During the evenings, the circuits to areas 7 and 8 in northern Japan, and to a lesser extent area 0, were the poorest.

The majority of contacts with areas 7 and 8 were made during the mid-afternoon.

ACKNOWLEDGEMENTS

This precis is published with the kind permission of the IREE*. A more detailed summary may be obtained from the Institution by purchasing a copy of the Convention Digest at $4 for members and $5 for non-members.

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Early development of the Morse key and code (or *the growth of the idiot stick*)

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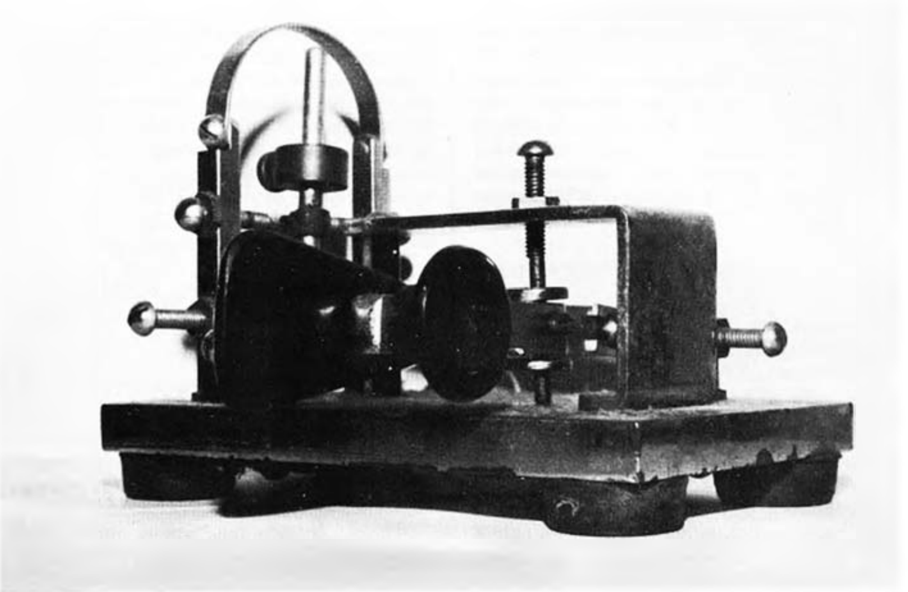
Next time you settle yourself at the rig, cast an eye at the key. Have you ever thought about the shape and design of the first such instruments, and the sound of the scene at the dawn of electrical communication?



PENDAGRAPH with a difference. Unlike most, the paddles are at right angles to the key — after the design of the SIMPLEX.

The history of the morse key is short — approximately 140 years — but voluminous in detail. In this short period it dramatically changed the life style of every civilised person on earth. No key development, no global village 1974.

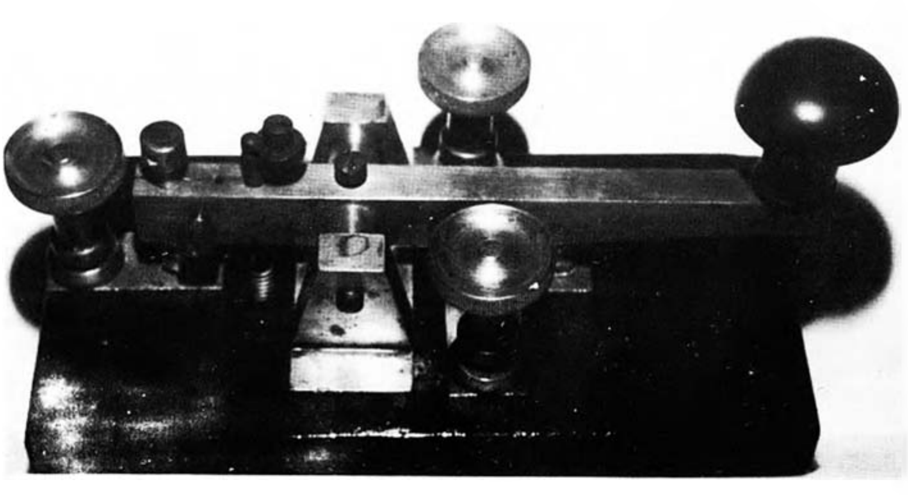
The first sending instruments and the code, while not exactly planned and born as identical twins, did as one would expect, grow together from humble beginnings and assisted in each others development, like the brain/hand complex.

THE CODE

Samuel Morse came up with his brainchild in 1838. This was a system of dots, lines, dots and spaces that eventually became known as the American code (as distinct from the International code). However before this, there were several types of signals in operation. The Chapp Semaphore was working in Europe. The single and double Needle Telegraph systems were also in use. These were a code of deflection of an indicating needle or needles, to the L or R on a Dial Plate. The double Needle instrument was the more rapid. Speeds of up to 15wpm could be achieved by concentrating on the flying needles (what a headache). Eventually this was incorporated with the International code. The L needle indicating dots, and the R, dashes.

One other method functioning during this early period deserves a mention. It was the Steinheil. This used an instrument that inked or imprinted code on tape. After this came the **Direct Writer** (used in conjunction with Wheatstone systems) and the **Ink Writing Register.** This latter machine was hand wound like a large clock and ran for about 20 minutes. It might be described as the primitive forerunner of the modern teleprinter.

SINGLE CURRENT Telegraph key made by Silverton, London 1872. Note huge terminals 3½ cm tall. Polished brass on oakwood base. A beautiful key.

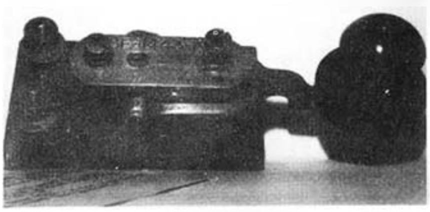


Generally speaking, visual code is more fatiguing to receive than sound. Committing it to paper becomes a task of divided concentration. The early visual Needle system, just mentioned, sometimes required a two or three man staff at each station. There was a reading clerk who read off the letters and words to a second party writing it on paper. A third, the Needle clerk did the sending (quite a business, eh).

The first recorded event of electrical pulses being converted into sound code, came about by means of the Needle Instrument. Some bright spark (pardon the pun) noticed, maybe quite by accident, that the needle or needles, striking by chance a foreign object, made a different sound. So the Dial plate on the instrument was equipped with dissimilar ivory or ebony damper pegs. Thus the needle striking to the L or R made distinctive sounds, enabling the operator to write without any visual distraction.

In Washington, D.C. USA on May 24th 1844, Samuel Morse tapped out his code over the first ever telegraph line. The operation was a success and a new language was born; one destined to be the means of saving countless lives, to direct great military battles, to serve industry and commerce and assist in education all over the world right up until this present day.

Four years after Morse's achievement, sound reading of the code was accepted in the USA. It proved to be faster with less brain fatigue and economically superior from a commercial aspect.



NAVY/AIR FORCE key. Not this one, but this same model was used by Admiral Byrd on his first and famous trip to the SOUTH POLE. Antarctica, 1929. Fireproof, all moving parts encapsuled.

The distinction of the world's first Ham has been given to Guglielmo Marconi. In the 1890s, he and others began to demonstrate the feasibility of WIRE-LESS communication by radio tests in the 200-3000 kHz bands. These were first conducted at sea by the Italian navy. The distance achieved was about 22 km. Later this DX was increased to 300 km. Then, on that momentous and now historic day in December 1901 at St. Johns in Newfoundland, he managed, with the aid of a kite trailing a 400 ft antenna wire to receive pre-arranged signals sent from Poldhu, England, 3000 km away.

Continents had now been spanned and little or no imagination was needed to realise the potential of such an achievement in relation to trade, commerce or news. Like Neil Armstrong's first small step on the moon, Marconi's DX reception was the first step to making the world, electronically speaking, **a global village.**

Ship and shore stations now came quickly into use and a new breed of men was born — the **Wireless Operator.** These men put the new language — morse code — to the test of DX. The International code thus proved itself to be a completely accurate method of communication by radio frequency.

Time passes quickly in this fast changing world. The whining spark Txs are now museum pieces. So are the ponderous, long handled 'pumps' on which the OOTs have long since sent their last SK but the International code remains in use and is virtually unchanged.

It may surprise many to know that the world's merchant marine with its many associated services, including the military and navy, still depend to this day upon manual CW communications. The code together with the latter innovation, the 'Q' code and the economics involved still appear to be the best means of handling traffic under all conditions.

All Hams use the International code (even though some 'fists' appear to have a code all of their own). This is not the system of dots and dashes first put together by Samuel Morse — but a progression of it. His code, after some modification, eventually became termed the **American code.** It was introduced into Europe but was not accepted. After further alterations it was moulded in 1859 into the form we use today — the International code. The sequence of dots and dashes in relation to letters and figures etc., are markedly different from the American or telegraphers code.

THE KEY

It has been said in jest that the earliest and most basic device for sending electric signals was two rusty nails. This may not be so far from the truth. Probably the first sender was almost as elementary. The crudest form of STRAP KEY is certainly only one step better. Later refinements were H.D. terminals and a squared bridge over the strap at the knob end. This enabled a second circuit to be made.

Early devices or instruments for breaking current into impulses were known by various names in several countries. In the USA, the home of **keys,** Samuel Morse and Vail both experimented with devices for sending signals. No matter their form of construction, they were given the common name — **Correspondent.** Marconi, in later years also called his key by this name.

Vail in his experimental work published in 1845 refers to a **Lever Correspondent.** Explaining its function, he said, quote "— it opens and closes the circuit in the same manner as a **key** does a door."

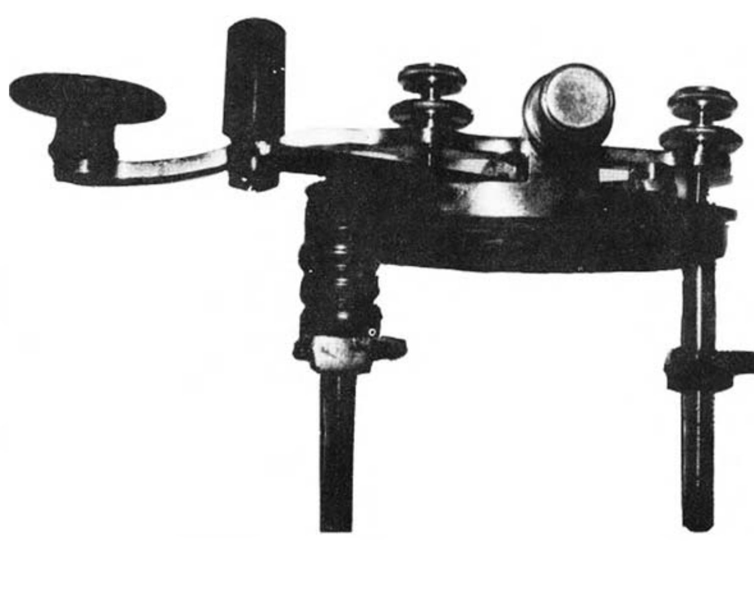
So the term **key** stuck and was universally accepted. Quite by accident Vail gave the instrument a name that's still with us 130 years later and now covers a wide range of 'pumps', 'bugs', electronic senders etc.

The odd shape of the vintage keys of the 1840-60 era would catch any eye. They incorporated the fulcrum movement and the sending arm was contoured similar to that of a camel's back. Some, in fact were known as the **Camel** or **Hunchback** key. The arm may have been shaped thus because it was felt it balanced the movement better — or maybe just to impress with a fancy design. Whatever the true reason, the form slowly changed over a period of twenty years or so to the more conventional straight or dropped arm we use today.

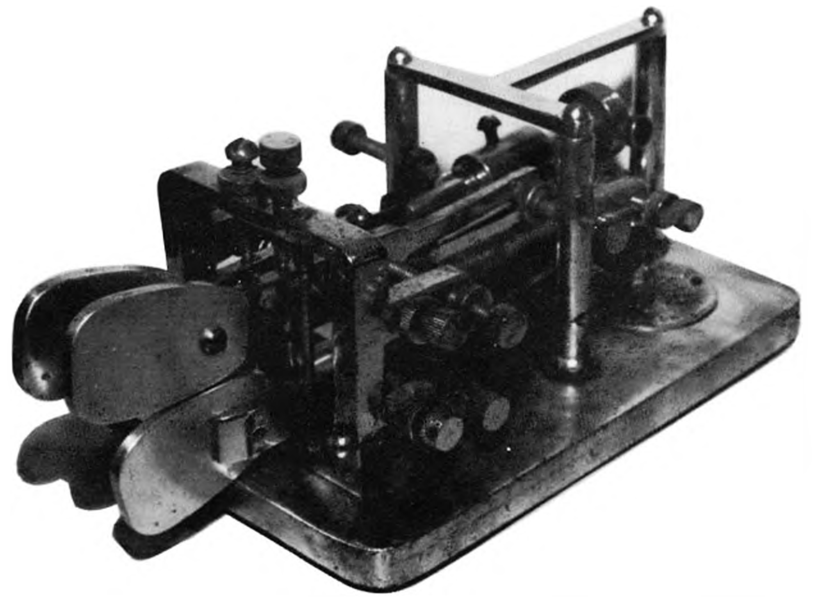
Design of the telegraph key developed along slightly different lines in USA and Europe. This was only to be expected. To attempt to state this difference in short and general terms, it could be said that the American trend was to a smaller and often metalbase oval key. The sending arm was downswept, slim and capped by a flat knob.

European keys tended to a rectangular wood, ebonite or other base, often an inch thick and heavier in general construction. The sending arm was straight and the knob round or tall. However no firm criteria applies.

In USA most early line keys were screwed to the table some 40-50 cm in from its edge. This meant the forearm could be rested and so assist long periods of sending with less physical fatigue. In VK and particularly in the PMG, the hand key was mounted right at the table edge where no forearm rest was possible. The



BUNNELL type 'LEG' Key about 1884, USA.



AUTOMORSE — or AUTODASH 'bug'. As name implies it makes automatic dashes as well as dots. Chrome parts on a polished aluminium base (no — you don't need two thumbs to work it).

correct operating position being to sit so that the arm, wrist and hand were parallel to the table top.

Up to the year 1900, exactly one hundred patents on morse keys were taken out in the USA and since the turn of the century to this present time, about the same number again. This total of two hundred does not include the many designs not patented and the wide range of keys built for the armed services. If we add to this all the keys of other nations the number is considerable indeed. Space would not permit a mention of even some of the better known types. However a comment must be made on one or two of the most famous brands.

The name J. H. Bunnel on an American key is the hallmark of quality, dependability and precision. This man was a telegraphist during the time of the civil war. Messages often ran to ten thousand words and more (no wonder the 'glass arm' became on occupational hazard). Bunnell realised the importance of a perfectly balanced key that could be operated for long periods with the minimum of fatigue. The result was the beautifully tooled, all metal, oval based, light but durable telegraph key perfectly balanced at any speed.

Practically every CW speed 'buff' has heard of, seen or used one or other of the **Vibroplex** series of auto keys. Top of the list is the super de-luxe model which has velvet smooth operation because of its jewelled movement. The smallest Vibrokeyer is a pocket sized edition suitable for portable use. Each key carries the bug insignia trade mark.

In past years in Australia, a considerable number of PMG keys found their way into Ham shacks. Those most commonly used were:

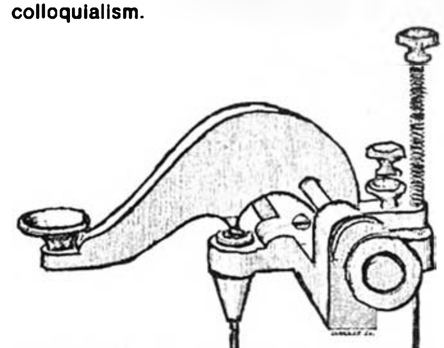
1. The **Learner** key. Straight bar, all HD brass, round bakelite knob and set on a 13 x 7.5 x 2.5 cm (approximately) wooden base.
2. Standard telegraph key used on single circuits. Design similar to 1. but has circuit breaker on LH side.
3. **Duplex** — as the name implies, used on duplex circuits. This key has a longer arm or shank than Nos. 1. or 2. The extra length is from the fulcrum to the knob.
4. Telegraph key similar to 2. Base approximately 10 x 7.5 by 2.5 cm, bakelite. Moving parts, chrome or white metal.

Automatics were the **Pendagraph** — also called a 'jigger' or vertical 'bug'. The arm and spring for making dots were set in an upright position. Others were **Vibroplex, Simplex** and the **Automorse** or **Autodash.** This latter **bug** had three paddles (see photo). It functioned as the name implies sending both dots and dashes automatically.

MASSIE W/T key 1908, USA. Is this the largest and heaviest key ever made? Compare its size to cigarette packet and foot rule. Approx. 32 cm long, 18 cm high. Weight 8 kg. In operation it broke 30 kW in air — no relays. To send — just pump the handle. Photo by courtesy W2ZI Museum.

AWA first supplied keys purchased from the Marconi Co. England in 1913. These senders were large and heavy and included a circuit breaker arm. During WW1, AWA began to manufacture its own. They were similar to the PMG design (probably No. 2 above). Until the mid-20s all AWA keys bore the **Expanse** trade mark. A vertically mounted rectangular plate at the rear of the instrument. Shortly after this the identification plate was changed to the more familiar AWA circular monogram. During WW2, AWA made several types of keys for the various armed services.

The Idiot Stick. Just another comic phrase in the esoteric language of **brass pounders.** To the lay person the movements of a key or bug make no sense at all — or does the term infer that only idiots pound brass? **Idiot stick fiddlers** might have been OK as a sub-title for the VK Key Club but unfortunately the phrase rather sticks on the tongue. It seems to have originated in the States — an American colloquialism.



CHUBBACK. America circa 1850. Similar to CAMEL or HUNCHBACK. A key with 'curvature of the spine'. Was its shape in keeping with the Victorian elegance of the period? (see text).

Some may think that progress to total communication will outdate the morse code. This seems unlikely. Radio and telegraph codes stand above and apart from all other forms of communication in one basic aspect. When conditions are really fringe and QRM, code will still get through when SSB and other forms fail. While the trained human ear is able to distinguish the difference of the dot and dash of a signal, no matter how weak or mutilated, then letter by letter and world by word the contact will be made. This is why in so many services today, the operator — from Ham to Astronaut — must still possess code proficiency. Morse can be transmitted in so many ways. By flashlight, car horn, flags, banging tin cans, tapping on any hard surface, arranging stones on the sand, etc. etc. Virtually anything that can be seen or heard will attract attention in an emergency.

Samuel Morse could not have seen the part his code would eventually play in world events. Someone writing in this magazine many years ago, rightly suggested that an obelisk be raised in his honour.

a review of the
SPECTRONICS DD 1

The DD — 1 is a digital frequency display which is designed to operate in conjunction with Yaesu Transceiver models FT101, FTdx401 and FTdx560. It provides a six digit display of both transmitted and received frequencies even when the clarifier is in use.
The operating frequency is displayed on 6 IEE DA-1300 incandescent display tubes. Resolution is 1 kHz or 100 Hz and is selected by push-button.

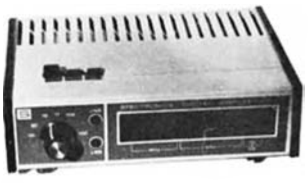
The DD-1 could be used with my transceiver using a VFO tuning from 8700 kHz to 9200 kHz. Operation on the 160, 80, 40, 20, 15, 11 and 10 metre bands plus WWV is provided for. The unit is very easy to instal as it requires only one coaxial connection to the transceiver and a 240 volt outlet to plug into.

Initially the display was thought to be a little difficult to read; however after a few minutes' use this feeling disappeared and it was with some regret that the unit was unplugged and returned to the supplier. The most convenient placement for use was found to be on top of the transceiver.

To obtain best accuracy the manufacturer recommends that a sheet of cork or asbestos be placed under the DD-1 when used in this position, but this did not appear necessary after a 30 minute warm-up had been allowed.

The DD-1 is simple to use as once it is plugged in all that is necessary is to select the band on which you are operating, select the mode (USB/LSB), and the desired resolution (0.1/1 kHz). The mode selected is indicated by means of two LEDs on the front panel.

CALIBRATION
The DD-1 measures the VFO frequency and not the transmitted frequency. The means by which this is done are described under the heading of technical details. The manufacturer recommends tuning to zero beat WWV on 10 MHz and adjusting the DD-1 oscillator until the display reads 10 MHz exactly. This procedure was found to produce differences of 0.1 to 1.2 kHz between the actual transmitted frequency and the display read-out. These errors were constant for any one band but vary from band to band and arise because no allowance is made for the small offsets that occur in the various band heterodyne



Top view of the unit clearly showing the operating push buttons.

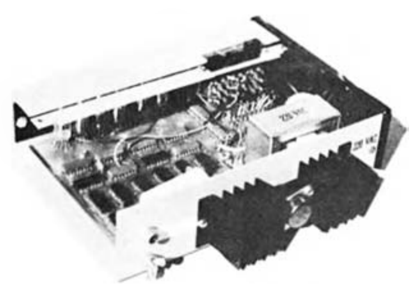
crystals in the transceiver. In the FT dx 401 at least no adjustment to the heterodyne crystals is possible. Therefore it is recommended that the following calibration procedure be used.

1. Remove the top screws at the rear of the case and slide the top cover back and out.
2. Apply power to the transceiver and DD-1. Allow both units to warm up for 30 minutes.
3. Tune in VNG on 7.500 MHz or WWV on 10.000 MHz on the transceiver and carefully set the 100 kHz calibrator to exact zero beat.
4. Set the band switches on the transceiver and the DD-1 to the band on which it is to be used. Press the mode switch to select the appropriate mode and select 100 Hz resolution.
5. Switch the calibrator to the 25 kHz position and tune the transceiver to a marker in the middle of the band e.g. 14.175 MHz.
6. Adjust the trimmer capacitor TC-1 in the DD-1 to obtain the correct display readout.

The maximum accuracy of ± 200 Hz can now be achieved on this band, and the errors on all other bands will probably not exceed 1 kHz. The procedure can be repeated on any other band if better accuracy is required.

TECHNICAL DETAILS
The DD-1 uses a bridge rectifier and an LM309k to provide a regulated 5V DC supply for the 22 IC's and the six readouts. A single 2N5133 transistor is used to amplify the incoming VFO signal before it passes to a DM747N flip-flop which is used as a gate. The gating pulses are of 0.01 second duration and occur about 17 times per second. These pulses are derived from a 10 MHz crystal oscillator which uses a DM7400 as the active device.

The 10 MHz signal is divided down by five DM7490 IC's to 100 Hz. As the transceiver VFO reverse tunes (e.g. 9.2 to 8.7 MHz for 3.5 to 4.0 MHz) the DD-1 has to count frequency "in reverse". This is achieved by connecting two DM7490 and two N8280A IC's as a four decade down counter. This divides the KHz and x100 Hz display tubes through four DM7447

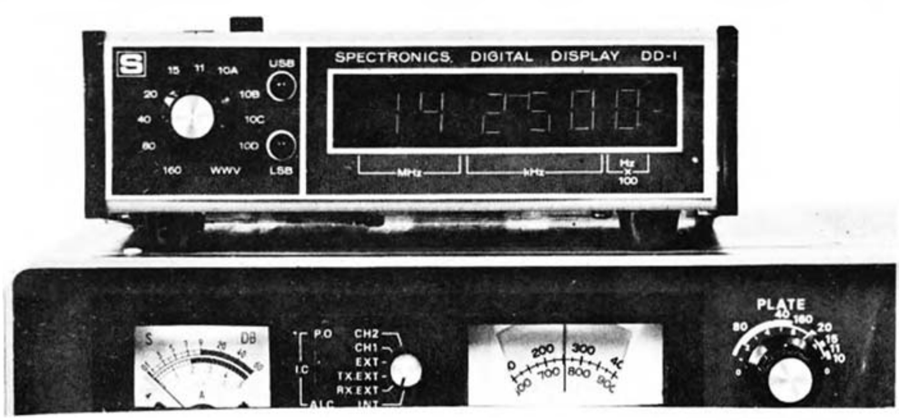


Top view of the DD-1 with the case removed.

IC's. The remaining two digits display MHz and are achieved by the band select switch and some of the 67 diodes used in this part of the circuit. An additional 500 kHz is also added to the display when the 160, 80, 10B or 10D bands are selected. Also 3 kHz is added or subtracted from the display when the mode switch is operated.

SUMMARY
The DD-1 is a convenient easy-to-use digital display unit which complements many of the Yaesu transceivers. It will appeal to those who want to come up on the exact frequency for skeds and those who like to know their operating frequency with high accuracy. The display is free from flicker and sufficiently bright for use with high ambient lighting. Its construction is of high quality and indicated that the DD-1 would very rarely require servicing.

VK3AFW



a Regulated power supply

JOHN EDWARDS, VK4IE
Reprinted from QTC, July 1972

This article describes a power supply built to enable a VHF mobile transceiver to be operated from 240 volts AC without a car battery as filter. The author set out to build a regulated supply capable of supplying up to around 15 amp with output voltage variable from 10 to 15 volts DC. The article is not intended to describe a unit to be copied exactly, but more as a source of ideas. To this end some details of the design are discussed.

The circuit consists of a transformer, bridge rectifier, filter capacitor, series regulator, and control circuit.

The bridge rectifier, depending on current ratings required, could be of the "Minibridge" type, or hard wired from automotive type stud diodes on Individual heatsinks. The Minibridge is rated at 25 amps and costs about $7 to $8.

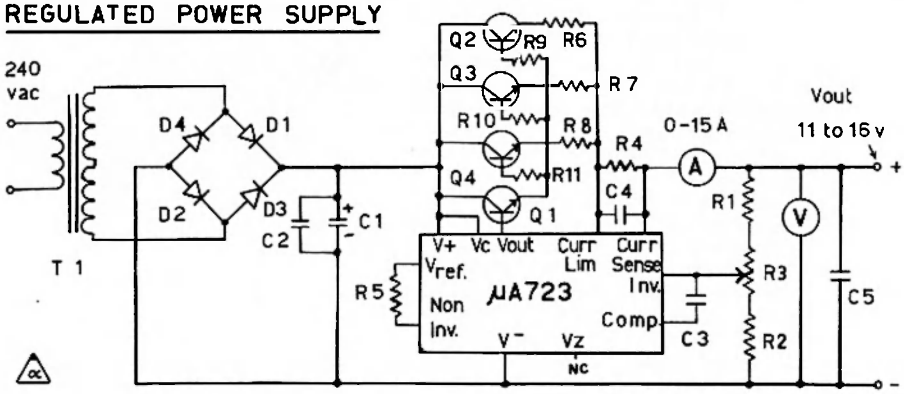
The control circuit is based on Fairchild's uA723 voltage regulator IC but similar units by other manufacturers could be used. The IC provides a current limiting facility which was set up to limit output current to 15 amps. The current limit terminals, as well as the input and output of the regulator, should be bypassed for RF. The uA723 is available for about $3. The data sheet on this device gives details on applications and also pin connections for the different package types available.

The series regulator consists of three transistors in parallel with the three bases driven in parallel by another medium power transistor. The driver transistor base is driven by the uA723 Volt pin. The 0.03 ohm resistors in each emitter and the 0.5 ohm in each base lead are to ensure equal current sharing in the power transistors. The power transistors used in the prototype were 2N3055 but any available transistor of suitable ratings could be used.

The transformer voltage and the filter capacitor required are inter-related and depend on the load voltage and current required. Normally a suitable transformer will be available and the value of C is unknown or vice-versa.

Consider the circuit shown in Fig 1. A transformer delivering a secondary voltage of Vrms is connected to a bridge rectifier. Now the output of the bridge rectifier, neglecting a small voltage drop across the diodes will be as in Fig 2 with a peak value of $V_{max} = 1.4 \times V_{rms}$.

REGULATED POWER SUPPLY



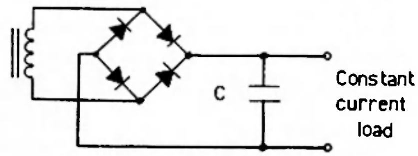


FIGURE 1

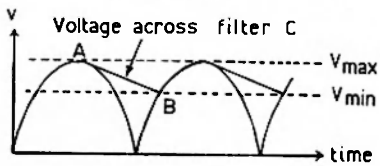
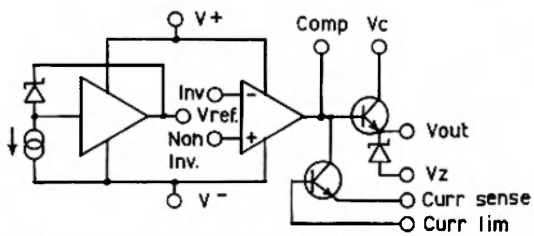
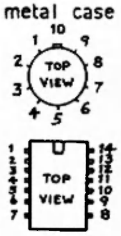


FIGURE 2



EQUIVALENT CIRCUIT OF μA723



μA723 PIN LAYOUTS

Pin No.	Metal Case	DIP Case
Curr Sense	1	3
Inv	2	4
Non Inv	3	5
V- (+ case)	5	7
Vout	6	10
Vc	7	11
V+	8	12
Comp	9	13
Curr Lim	10	2
Vz	—	9
Nc	—	1,8,14

Q1 Medium Power Transistor
Q2, 3, 4 2N3055
D1, 2, 3, 4 Bridge "Minibridge PB40" or Auto Diodes
C1 14000 MF

C2 0.47 MF
C3 0.001 MF
C4, 5, 0.01 MF
T1 3 x 6.3 volts 8 amps
If used (Ammeter 0-20 A/FSD (voltmeter 15-20V FSD

R1 4.7K
R2 6.8K
R3 5K Pot.
R4 0.04 ohms
R5 3.3K
R6, 7, 8 0.03ohms
R9, 10, 11 0.5 ohms

For satisfactory regulation, the input to the regulator must be about +4.4 volts higher than the required output voltage. Therefore assuming +13.9 volts to be the maximum voltage required at the output, the minimum voltage which may appear across the filter capacitor is

$$V_{min} = +13.8 + 4.4 = 18.2 \text{ volts}$$

At the peak of the input waveform, point A, the filter capacitor is charged to Vmax volts and he charge stored, C = C x Vmax. The capacitor will discharge into the load, in this case the regulator and load, when the input AC voltage drops below its peak value.

At point B of Fig 2, the capacitor has discharged to a voltage whose value is equal to Vmin, at the same time that the next half cycle reaches the same value. The time AB in milliseconds is equal to

$$5 + 1/18 \quad \text{Sin}^{-1} \frac{V\ min}{V\ max} \quad \text{in degrees}$$

For practical values, this time AB is around 7 milliseconds.

During this 7 milliseconds or so, the load is discharging the capacitor at a constant rate of, say 1 amp. The charge lost by the filter capacitor in this time is equal to (1 amp x 7 milliseconds). The charge remaining in the capacitor at point B is equal to (CxVmin). Therefore the charge lost is equal to Cx (Vmax-Vmin) and also equal to (1x7). This gives a formula . . .

1 amp x 7 milliseconds

=C farad x (Vmax-Vmin) volts

= C farad x (1.4xVrms — Vmin).

Thus for a given value of Vmax or Vrms and a required value of 1, the value of C necessary can be calculated.

For example, given . . .

Vrms = 19 volts AC

Vout = 13.8 volts DC

1 = 15 amp

Vmax = 1.4xVrms = 1.4x19 = 27 volts

Vmin = 13.8 + 4.4 = 18.2 volts

Vmax — Vmin = 27 — 18.2 = 9 volts apx.

C = 1x7/(Vmax — Vmin)x1000

= 15 x 7/(9 x 1000) farad

= 12,000 microfarads approx.

If a fixed value of capacitor is available, the transformer voltage can be calculated from the above formula.

The range of output voltage variation can be adjusted by changing the values of the resistors in the x voltage divider across the output. For more details the uA723 data sheet is very helpful.

A note about heatsinks for the power transistors. Whilst having a power dissipation rating of 117 watts at 25°, C when mounted on a six inch length of Miniwatt 35D heatsink a single 2N3055 will safely dissipate only 60 watts approx, and the heatsink and transistor case when continuously dissipating this 60 watts will reach around 80° C above room temperature. This may sound alarming, but the transistor will not be damaged under these conditions. However, the human finger makes a painful thermometer when trying to measure this 80° so be careful.

The wiring method on the prototype was "rats nest" which is much easier than other methods, but not as neat. All wiring carrying heavy currents was done with automotive type wiring capable of handling the required current. All of the jointing in this heavy cable was done using a crimp tool and crimp type terminal lugs. These make for quick assembly and joints in heavy cable are easier to make than soldering.

The authors supply was built in a wooden box, or rather a box was built around the supply. The front panel is made of aluminium however, and contains all the controls and output terminals. The ammeter used was an 0 to 20 disposable type and the voltmeter was a similar type from the junkbox modified for 0 to 15 volt FSD.

The prototype has already proved very useful in tracking down a voltage sensitive fault in a mobile transceiver and has been used as a power source for aligning gear which has been modified in frequency. And of course it is the best regulated 15 amp battery charger I have seen for a long time and I sincerely hope that this article will generate some interest in the subject.

The Transformer used in the prototype, T1, was a disposable type transformer rated at 3 times 6.3 volts at 8 amp, but in practice it happily runs at 8 amps all day and runs up to 15 amps on transmit without overheating. Unfortunately demand far exceeded supply and these transformers are no longer available from the source quoted, but other transformers will, of course, be suitable.

I used the MJE340 for Q1 but the 2N3055 would probably be cheaper.

The prototype has now been in operation over 12 months. About half a dozen other units are now in operation around the town, one of them operating about eight hours a day for six months without troubles. ●

Oriental FM

George Francis, VK3ASV
31 Donald St., Morwell, 3840

FM IN JAPAN
REPEATERS ARE NOT PERMITTED IN JAPAN

The main calling channel is 144.48 MHz.

After the contact is established, the operator moves to another working channel, although some operators QSO on the main channel, and cause a lot of grief to everyone.

The Japanese 2 metre band extends from 144 to 146 MHz.

A1 and F1	144.00-145.48
A2, A3, SSB	144.10-145.48
F2, F3	144.32-145.48

JARL 2m beacon on 145.48

All modes 145.48 and above

All Japanese simplex FM channels are planned with a 40 kHz separation up to 145.44.

Australia	50 kHz channelling
USA	30 kHz "
Europe	25 kHz "

Some Clubs have so-called "private channels" between 145.48 and 146 MHz. These clubs have regularly scheduled Roll Calls; On Air Meetings; or "Gab Fests" on these channels. e.g. The Toyota Motor Club for instance meets on 145.62 MHz.

2m JAPANESE FM CHANNELS

CH	MHz	
1	144.36 MHz	•
2	144.40	•
3	144.44	•
4	144.48 NATIONAL Calling	
5	144.52	
6	144.56	
7	144.60	•
8	144.64	
9	144.68	
10	144.72	•
11	144.76	
12	144.80	•
13	144.84	
14	144.88	
15	144.92	
16	144.96	
17	145.00	•
18	145.04	
19	145.08	
20	145.12	
21	145.16	
22	145.20	
23	145.24	
24	145.28	
25	145.32	
26	145.36	
27	145.40	
28	145.44	
F2 & F3	144.32	145.48 MHz

• Main Channels fitted.

JARL plan

FM IN HONG KONG

Japanese 2m FM simplex channels are used, mainly

Channel A 144.480 MHz
Channel B 144.600 "

Hong Kong has one repeater going.

144.480 MHz IN
145.640 MHz OUT

Note: "Ken" hand held 2m transceivers that are sold in Australia are fitted with 144,48 and 144.60 MHz crystals. ●

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

TWO METRE FM REPEATERS — FACTS AND FALLACIES (Part 1)

Recently two amateurs were discussing the operation of their respective commercial rigs on the FM repeaters. One was heard to say the following:

My rig shows 0.6 on the scale when I transmit on both channel 1 and 4 but I cannot understand why on Channel 1 I get a reading of one on the meter scale but on Channel 4 I only get a reading of 0.3. There must be something wrong with these crystals for the new channels as the local agent has just tuned up the set.

This amateur was firmly convinced that both repeaters should give the same limiter current reading on the two repeaters even though they are about 10 miles (Channel 1) and 40 miles (Channel 4) away and also have a similar power differential. Apparently he believed that the repeater should in fact cause his receiver to show the same meter readings.

It is only logical to assume that signals from distant stations will be weaker than those much closer, when the terrain is similar and more so when the local station In this case Channel 1 is about 4 times the strength of Channel 4. The other amateur in the discussion endeavoured to point out these facts. I might point out, the amateur with the problem was not a newcomer having been licenced for many years. It is obvious that this amateur is and has been for many years an appliance operator who does not know what goes on inside his equipment. He has a certain prestigious brand of commercial gear on the HF bands.

I am not against people owning and operating commercial equipment — but I am quite critical when they obviously know nothing about the workings of it. As an Interested newcomer you will learn how your equipment works and will gain a lot of valuable knowledge. It is so much more Interesting, this hobby of amateur radio, when you understand your equipment.

Another common misconception often heard when two amateurs are giving each other frequency checks on the various channels: **You are off frequency a bit on channel B Joe, but you are okay through the repeater showing spot on the zero of the discriminator. You are a bit distorted on the repeater perhaps you've got the wick wound up too far.** The wick of course is the common slang for deviation or modulation. Joe's mate has fallen into another of the traps where repeaters are concerned, In that the output frequency of the repeater transmitter bears no direct relationship to the frequency of signal that the repeater receiver picks up. Joe's mate is actually comparing the repeater output frequency with the general receiver alignment and particularly the alignment of his FM discriminator. The discriminator can only tell whether a signal is higher or lower than the frequency that It Is tuned to.

If Joe's mate really wants to check his friend's transmitting frequency he would need to use reverse crystals and virtually act like a non-repeating repeater. Normally you can get the frequencies of your crystals set reasonably well by adjusting the trimmer across or in series with each for the best sounding signal at the other end. Make sure that the frequency standard station does in fact have his crystals accurately adjusted or you may be in trouble as you shift from area to area, and you will be told by the various groups that you are off frequency. You can be fairly certain that the repeaters Input and output frequencies are accurately set so just adjust your receiving and transmitting crystals until you get the best reports and don't worry unduly about the discriminator readings.

If you are told you are chopping either through a repeater or direct after adjusting the crystals for best performance, It could be that you are over-deviating. This over-deviating gives the signal a chopped up sound as the transmitter frequency excursions extend outside the selectivity limits of the receiver IF strip; hence no input to the IF and therefore the receiver cuts off. If this appears to be the trouble reduce your deviation until the reports indicate that you are quite readable. The normal deviation through repeaters is about ± 10 kHz.

Next month I hope to show you in block form how the average repeater operates.

If anyone wants duplicated information on things I can assist with, please enclose stamps — low denominations — or postal note to cover costs of postage, and duplicating at about 10 cents per sheet. ●

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

SOME ADDITIONS AND IMPROVEMENTS FOR THE KEN KP202

The little Ken KP202 has really caught the imagination of dozens of two metre operators. Don Paice VK3ADP has made some natty changes to his Ken which are worth following if you are lucky enough to own one of these fabulous sets. Over to Don.

A BNC ANTENNA CONNECTOR FOR THE KEN

The versatility of the Ken KP202 can be significantly increased by replacing the existing antenna connector with a single hole mounting BNC connector. This modification is easily done and in no way detracts from the appearance of the unit. A suggested method is as follows: Remove the back of the Ken case but leave the control panel in place. Remove the meter by the use of a small instrument type screw driver. Unsolder coax to antenna connector.

Unscrew nut on top of connector and withdraw from unit.

Insert BNC connector after smearing a small quantity of Araldite under the flange. Tighten nut with small pliers and lock in position with a **small** drop of araldite.

Solder coax to BNC connector with the outer braid going to the nut.

WARNING. That nice solid satin chromed top of the Ken Is plastic and will melt if you apply too much heat.

Replace the meter — It might be necessary to remove a small portion of the meter mounting leg to clear the BNC socket nut.

Modify the whip by driving out the pin and removing screw locking assembly.

Replace pin through whip and end assembly.

Drill out centre pin of BNC plug to size of conector pin on the end of the disassembled whip.

Insert and solder pin on the end of the whip to male pin of BNC plug. Assemble BNC connector and Araldite whip into connector.

Gentle application of heat from a soldering iron will ensure that the epoxy flows into the top of the connector.

Allow to set for 24 hours.

You now have a unit that can readily be used in your car with an external whip or portable with the telescopic whip. ●

Try This

with Ron Cook VK3AFW and Bill Rice VK3ABP

It seems that the supply of items from our readers for this column is beginning to "dry up". So for the next few issues each of the Technical Editors will discuss ideas or techniques which may be of current interest. Hopefully, by the time 3ABP and 3AFW have "dried up" there may be a few more contributions on hand to keep the ball rolling!

For this month, we would like to acknowledge a suggestion from Jim VK4CN for a frequency-multiplying vacuum tube. This came in late last year, but has been held over while we attempted to find if such a tube had been proposed before. It does appear novel and may be of practical value, but would have to be evaluated by a tube manufacturer.

Developing from the idea of the beam-deflection tube (e.g. type 7360, a popular balanced-modulator a few years ago) Jim suggests building a tube like an electrostatic CRT, but having a number **n** of anodes in ring formation rather than a phosphor screen. The anodes would all be electrically common and connected to an output tank circuit. Quadrature voltages on the deflection plates at frequency **f** would scan the beam around the anode ring, thus producing **nf** pulses of anode current per second in the output circuit (tuned to **nf**).

In concept the device somewhat resembles a magnetron, with its strapped anodes, but is intended purely for multiplication rather than oscillation. We would expect it to be of most use for ouput frequencies in the GHz range, but its efficiency might be low. We would welcome comments from anyone able to evaluate its capabilities either in theory or practice. ●

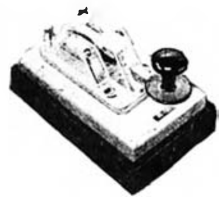
Technical Review

HI-MOUND MORSE CODE HAND KEY

This key combines pleasing appearance with robust construction. The metal work has a bright finish and moving parts are protected by a plastic cover.

The key is set on a block of white poly-marble which in turn has a rubberised base that compresses sufficiently to render the instrument rigidly self-mounting on the bench. This mounting makes the key stand somewhat higher than usual and thus is more suitable for the style of keying that involves flexing of the wrist and forearm rather than wrist only.

The knob has a platform for a comfortable finger placement. The pivots are mounted between two sets of ball bearings. Pressure on these is adjustable. There is a precisely adjustable back contact.



Under test, the return spring and pivot pressure were adjusted so that keying required only a pressure of 85 grams to make contact. At this adjustment, the release was smooth and immediate, making the key a delight to handle.

On the other hand, for the beginner or the heavy fisted, adjustment can be varied to give a wide range of tension and contact spacing.

The writer considers this key highly satisfactory. The price, though apparently high, compares favourably with that of hand keys produced for commercial and shipboard use.

Test key supplied by Ball Electronic Services.

VK3XB

VHF UHF an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RSG, Macquarie Island	52.160
	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	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.3015
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato x	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

x — denotes change or addition

The only alteration to the list this month is the addition of ZL1VHW on 145.150 MHz. Incidentally, the New Zealand SSB calling frequencies are 52.2, 144.2, 432.2 and 1296.2 MHz. It would be well to bear in mind that similar conditions exist in New Zealand to Australia where the majority of VHF SSB stations are likely to be operating transceive, so not on his frequency if you are operating split tune equipment. Remember also, experience has shown that a good AM signal is received quite well on the average SSB transceiver providing your percentage of modulation is high, and the signal stable. If in doubt about the capabilities of your AM modulator, back of the loading and radiate less RF, and the audio will be much more effective. Reducing power output from 50 to 25 watts when only 20 to 25 watts of audio is available will make your signal readable much more readily and more often. For phone operation we don't listen to the carrier, we want the audio.

NET OPERATION

This is a touchy subject with some people, I fail to see why, but I guess we are made up of all kinds of people! However, a letter from John VK3ATQ raises a few interesting points, you might care to think about them. He mentions 53.032 is very popular in VK3, to the extent that two other mutually or generally agreeable frequencies are being used, the first and more popular being 53.100 MHz which corresponds to the VK5 AM net. The Mawson beacon VK0MA is also on this frequency. The other is 52.900, and occupied by VK6RTT, the beacon in Carnarvon.

John would like to make the point that net operation plays an important part in the usage of our bands, apart from the actual increased usage of particular frequencies. If they can be set up in all States similarly, they can act as a "sort of beacon", giving an indication of band openings to other areas, with more people listening, the more the chance of an opening being used. This was particularly true of the 2 metre openings in February, when the FM nets around 146 MHz certainly advised some operators of what was going on.

One regret of course is that so many operators graduate no further than the nets, and John agrees with this. Balanced thinking on this matter should produce a person with both net and tuneable equipment. The tendency to now go to SSB for serious VHF work is making openings available which were not workable before. Indeed, if you don't feel up to building your own SSB gear, "Amateur Radio" carries advertisements for 10 watt SSB transceivers at reasonable prices, complete with noise blankers and the works for 52 MHz, and before long 144 MHz. This sort of gear is suitable to run barefoot in Channel 0 territory and with this power plenty of contacts will result. It's no real problem to make up a linear using a QQE06/40 or similar (or solid state) and your signal will be very respectable on the VHF bands.

John mentions there are proponents for a net on 53.995 MHz, adding that tests indicate a 6 dB lower interference factor than at 53.032. Whether this will hold good for all TV sets is debatable and much of the internal circuitry of a car phone or similar would need to be made adjustable if operation is required at both ends of the 53 MHz range. Antenna compromises are also necessary, and anyone using a yagi cut for the low end of 52 MHz will find very little gain left at 53.995. Gain falls off quite rapidly on the high frequency side of the optimum frequency for which the antenna is designed, but will still have useful gain 1.5 MHz below the band.

The point has been made however, that John seeks to widen the interest and activity of net operators, particularly for AM on six metres, with a view to having more people around in different States using 6 metres, so observing DX openings, but with a plea that such increased operation should also be followed by an increase in capability to work on the tuneable sections of the band. What do you think?

SIX METRES

This ever popular band doesn't really ever go completely quiet, only the operators do! To give you some idea of what can be heard during other than the generally accepted "DX season", the following list comes from the log book of Roger VK2ZRH, kindly submitted by Roger Harrison, VK2ZTB. It makes interesting reading, and covers only a fortnight during the equinoxial period, 1st to 14th April, 1974. It's now a bit dated, but read on.

1/4, 0908 to 0930. E.S.T., 50.75, ZL TV S9; 2/4, 1100, 52. VK5ZEG. VK6 beacon S9+. 4/4, 1100 — 1135 VK5VF S8; 1122, 52.05, VK5MT; 1235, 50.75 ZL TV; 1835 — 1935, VK4ZIM, VK4EN, S9. 5/4, 1135, 52. VK5MT, S8. 6/4, 1135 — 1150, 53.00, VK5VF 9 beacon) S8. 7/4, 1110 — 1130, 52. VK5, 7. 8/4, 1110, 50.75, ZL TV S8. 9/4, 1830, 50.75, ZL TV, S8. 1830 — 2128, 49.75, TV video S8 fading. 2030 — 2100, 52., VK4. 10/4, 1100, 53.00, VK5VF, S8. 1204, 52.1, VK6ZBM, S5. 1214, 52.010, VK4GS, S8. 11/4, 1505 — 1540, 49.75, TV video, S9+. 2100, 52. VK7AW S7. 12/4, 1150, 52., VK5 and 7. 1715 — 1725, 49.75, TV video, S3 fading. 1840, 49.75. TV video, S6. 13/4, 1115, 52., VK5. 1355, 52., VK4RO, S8. 1900 — 2100, 49.75, TV video, S6 fading. 1930 — 2030, 52., JA3, JH3, JR3, 4, 6, 9, 5 and 2. VK4EN heard calling CQ same time. 14/4, 0810, 50.1 AM, unidentified American calling CQ. Rapid fade. Lasted for about 10 secs. 0815, 50.15 CW. Too fast to copy. Same fade. (Both signals peaked N.E.). The openings to JA etc. on 13/4 all had trans-equatorial type flutter on the signals.

Now that's quite a presentable list. Not everbody can be around during the morning times, but does indicate that those who are home might listen and call more often. Roger VK2ZTB adds that the JA signals heard and worked on 13/4/74 were the first recorded instance of Class 2 (night time) T.E.P. being worked in the Sydney area. As VK4EN was heard at the same time, it appears that Es extended the T.E.P. path down to Sydney. A series of recurrent magnetic storms brought the good Es and T.E.P. conditions during late March and through April.

Over the years I have found the TV video from Vladivostok on 49.75 MHz quite a good indicator for band conditions, and when this signal rises to S9 as it often does, lots of other signals are to be found on the 50 to 51 MHz portion of the band. There is no doubt we do miss many rare contacts due to the 2 MHz band separation with the rest of the world, and reluctance of many VK's to tune below 52 MHz. And conversely the reluctance of other areas to tune up to 52 MHz.

Typical of what there is to hear if you are around and listening carefully was indicated by Roger VK2ZTB when in May he heard a station on 52.160 peaking broadly S.W. to S.E. at 2255 E.S.T. with distinct auroral "growl" on it, S1 to 4 with slow deep QSB. Occasionally the growl would disappear and a clear heterodyne could be heard. CW ident was obvious on the signal but too difficult to copy owing to extreme roughness. During the time Roger listened he copied several distinct "pings" and one good "burst", quite reminiscent of meteor scatter signals. If you are at all keen on looking for the rare signals this is the type of thing you may hear, and often monitoring the signal for a while will result in identification. Of course, if you only want to work the S9 signals, this type of reception is not for you, but the true DX-er hunts around in the noise for the weak ones and sometimes lands a good one. He also monitors a beacon frequency of some area when in the shack and not specifically operating.

Incidentally, if you are not sure of your frequency readout to a few hundred cycles, and you will need to be this close for monitoring purposes, the R.S.G.B. handbook has a circuit of a crystal calibrator especially designed for V.H.F. operation, at least to 144 MHz. It provides 1 MHz, 100 KHz and 10 KHz marker points up to 2 metres, the addition of a 52 MHz coil to the circuit would provide similar signals for that band. Only requires a 1 MHz crystal. Take a look at it.

VK5 REPEATER

A message from Ian VK5WB advises he and Garry VK5ZK have been doing some additional work on the Adelaide repeater with the aid of a diplexer built by Colin VK5HI. The repeater has been successfully fired into a single antenna using the diplexer, antenna gain 6 dB.

The repeater ran well, no detuning effects noted. Later a high gain antenna was installed, consisting of a ¾ wavelength collinear followed by a phasing section and a ⅝ wavelength above that. Good reports have been received, so an increased potential now exists for long distance stations to hear or work through the repeater. An article will probably appear in "Amateur Radio" on the construction work. At present there are more than 200 stations in Adelaide and surrounding areas using the repeater.

MOONBOUNCE

The Dapto Moonbounce Group have continued their tests with RTTY equipment. The receiving system constant-current teleprinter magnet driver was made to work and is an improvement over the use of polar relays. A new transmitter oscillator interface was made up to go with the receiving unit, and tests on 7 MHz have proved the system to be operational.

QSL cards were received from G3LTF to confirm the E.M.E. contacts on 30/3 and 31/3, which received world wide publicity for VK2AMW.

E.M.E. tests were carried out on 27th April with K2UYH, W4NUS, W0YZS, W8YIC, and W0EYE. A good CW contact was had with K2UYH but he did not have RTTY equipment available. However, he taped some of the VK2AMW RTTY transmission, and advice is now awaited if there is any printout. A signal was copied at one stage during the tests with W4NUS but not good enough to make a contact. The others were not heard.

Operators at VK2AMW during these tests were VK2ALU and VK2ZEN, whose CW is getting better as the result of moonbounce CW practice. Thanks to Illawarra Branch of WIA Newsletter for this information.

While still on moonbounce, a few words from Ron VK3AKC indicates he has not been idle. During April an attempt at E.M.E. was made with W9WCD. He was not heard, and since then Ron has found out he is horizontally polarised, instead of circular. A sked with G3LTF on 27/4 did not materialise as he was not on. On 28/4 Ron heard two PA0 signals. Another interested station is OZ9CK in Denmark. Ron's dish antenna on 1296 MHz has a beam width of only 3 degrees, so accurate aiming is very essential.

STATE OF THE ART CONTEST

Amateur Communications Advancements, publishers of 6 UP, are again sponsoring a VHF/UHF/SHF Contest, duration 0001 hrs. 20/7/74 to 2359 hrs. 17/8/74, operating period for scoring purposes being any 20 days in that period. One division, transmitting open, available to fixed, portable or mobile stations. All VHF/UHF/SHF bands, including net frequencies, may be used. No crossband contacts for scoring purposes, excepting via Oscar satellites, cross mode contacts permitted. Contacts via terrestrial and satellite repeaters are permitted as are EME contacts.

One contact per band per station per day permitted for scoring purposes. (Exceptions: Oscar, SHF stations, UHF/SHF field stations). A station working through an Oscar satellite may work the same station on not more than 2 different orbits/day. A station operating on an SHF band (2304 MHz and above) may work the same station on the same band twice in one day provided 2 clock hours have elapsed from the start of the first contact to the start of the second. A UHF/SHF field station is defined as a station operating with a portable power supply and antenna systems and would NOT be considered a mobile station in the normal manner. Scoring as for SHF band stations for 2 contacts/day.

The usual RS/RST report followed by three digits is to be used. Serial numbers NEED NOT commence at 001 and need not be consecutive. The usual method starting at 001 and increasing by one for each contact may be used or the non-consecutive system at operator's discretion. All clock times to be E.A.S.T. and distances in miles (for 1974). Contacts via Sporadic-E and Tropospheric duct propagation will be disallowed, the judges decision being final.

All logs to be sent to "6UP State of the Art Contest Manager, 4 Tiranna Place, Oyster Bay, N.S.W. 2225", not later than 16/9/74, and contain the following information: date and time of contact, band, emission, callsign of station worked, report and serial numbers sent and received, distance, points claimed. A comment on antennae/power/field QTH would be of interest.

SCORING for all contacts above the minimum distance appropriate to the band, with the exception of repeaters, will be based on the mileage between stations multiplied by a band factor. Where the stations (not using a repeater) are within the minimum distance contacts score at the numerical value of the band factor, no mileage.

TERRESTRIAL REPEATERS: The minimum distance station-to-repeater-to-station to be 3 times the minimum scoring distance for a direct contact, otherwise scoring at the band factor per contact, no mileage. (Note: No direct distance station-to-station is laid down for a valid greater-than-minimum distance repeater contact, but the stations must each be operationally independent of each other.)

OSCAR SATELLITES: Scoring is based on geographically adjacent and non-adjacent call areas. VK7 and VK3 are considered to be adjacent; VK9, VK0 and all other prefixes except ZL are all considered mutually non-adjacent. VK to ZL and vice-versa are non-adjacent.

EME. Contacts via the moon score at the rate of 3000 points regardless of frequency, prefix etc.

OSCAR: Geographically adjacent call areas 100 pts/contact. Non-adjacent call areas 200 pts/contact. Contact to or from a call area not VK1 to VK8, or ZL1 to ZL4 inclusive, 500 pts/contact.

SCORING TABLE:—

BAND MHz	Direct minimum distance	Band factor
52	50	1
144	50	2
432	25	8
576	25	16
1296	25	24
2304 and above	10	50

The indirect minimum distance for 144 MHz is 150 miles (3 x 50 — see under Terrestrial Repeaters above).

Enhanced meteor shower activity should be evident 27/7/74 through to 1/8/74 (IGY Calender 1974).

First and second prizes are to be awarded, all other entrants will receive a suitable certificate with their score and overall place inscribed.

I commend this Contest to VHF/UHF operators. If it does no more than to bring on some extra stations it will be worth while, but in so doing we may learn just how much can be heard on 52 MHz and above at a period when there usually is not a great deal of activity. Maybe some of the former active Western Victorian stations of a few years ago could be induced to brush the cobwebs from their 2 metre equipment and give a few early morning contacts to others. A station may be heard in VK5 on 2 metres as well, because there haven't been any lately! Apart from all the f going, it will be a good lead into the Remembrance Day Contest, the last six hours of the State of the Art Contest runs parallel with the R.D Contest first six hours.

REMEMBRANCE DAY CONTEST

I am sure the Contest has been getting friendlier every year, and I view with pleasure the greater participation by VHF stations. The Federal Contest Manager Peter VK4PJ made this point in his comments on the 1973 RD Contest: "This is the year that the VHF fraternity showed their ability with some effect. Note the number of VHF scorers, generally the point score is close to the number of contacts, in VK5, 6 and 7. Apparent to me was the number of HF operators who also scored many single points on VHF, realising that every VHF contact was two points to their State." There is sufficient justification for the VHF gang to get right into it. Last year VK5ZGZ scored 191 points for 191 contacts, he also gave 191 points to other VK5's as well. I now note VK5ZCP had 207 contacts, and VK5 had 8 other Z calls with 100 or more contacts. What a magnificent score these chaps provided for their State, the same applying to other States too but to a lesser extent. So get into it chaps, it's a great contest on the third weekend in August 1974.

VK2ZQJ

Since moving to Sydney from VK5 several years ago, Rod VK2ZQJ continues to keep the VHF/UHF scene operating, and is probably as well set out as any other station around the country. Equipment is as follows: 52 MHz, 300W out SSB to 4 over 4 at 55 feet. 144 MHz: 300W out SSB to four 10 elements at 65 feet; 432 MHz: 250W out SSB to four 11 elements at 75 feet.

Also on 144 MHz a pair of 10 element yagis crossed are switchable from the shack for LH, RH, vertical and horizontal, steerable both azimuth and elevation. This is used for Oscar and with 80W of FM on nets instead of a dipole.

On 1296 MHz a six foot dish at 50 ft. is fed with Heliax, only receiver at present, but transmitter underway. The receiver will be in the next issue of 6 UP. The new Tx will use a more conventional SSB approach and run 250W into a pair of 3CX100A5's.

Down on 29.5 MHz Rod uses a quarter wavelength, or sometimes quad fed dipoles, for Oscar. For RTTY a phase locked loop and solid state printer driver are used . . . from VK6 VHF Bulletin.

In addition Rod has a crystal set for B/C listening!

That's all for this month, so will close with the following thought: "To go against the dominant thinking of your friends, of most of the people you see every day, is perhaps the most difficult act or heroism you can perform".

The Voice in the Hills.

Rules for the 1974 Rememberance Day Contest 17 & 18 August

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 (including Australian Mandated Territories and Australian Antarctica) and P2 (Papua New Guinea) will endeavour to contact amateurs in other VK, P2 and ZL areas on all bands.

Amateurs may endeavour to contact any other amateurs on the authorised bands above 52 MHz, (i.e. intrastate contacts will be permitted in the VHF/UHF bands for scoring purposes).

CONTEST DATE: 0800 hours GMT on Saturday 17th August, 1974, to 0759 hours GMT on Sunday 18th August, 1974.

All amateur stations are requested to observe 15 minutes silence before the commencement of the contest on the Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

LES

1. There shall be four sections to the contest —
   (a) Transmitting, phone.
   (b) Transmitting, CW.
   (c) Transmitting, open.
   (d) Receiving, open.
2. All Australian Amateurs and those in Papua/New Guinea may enter the contest whether their stations are fixed, portable or mobile. Members and non-members are eligible for awards.
3. All authorised Amateur bands may be used and CROSSMODE OPERATION IS PERMITTED. Cross-band operation is not permitted.
4. Amateurs may operate on both "phone and CW during the contest", i.e. 'phone/'phone, CW/CW, or 'phone/CW. However, only one entry may be submitted for sections (a) to (c) in Rule 1.
   An open log will be one in which points are claimed for both phone and CW transmissions. Refer to rule 11 concerning log entries.
5. For scoring only one contact per band per station is allowed. However, a second contact on the same band using an alternate mode is permitted. Arranged schedules for contacts on the other bands are prohibited. All CW/CW contacts count double.
   On bands 52 MHz and above, additional contacts may be made with the same station provided that two hours elapse after the previous contact with that station on that band.
6. Multi-operator stations are not permitted. Although log keepers are permitted, only the licensed operator is allowed to make contact under his own call sign. Should two or more wish to operate any particular station each will be considered a contestant and must submit a log under his own call sign. Such contestants shall be referred to as "substitute operators' 'for the purpose of these rules and their operating procedures must be as follows:
   PHONE. Substitute operators will call "CQ RD, or CQ Remembrance Day" 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".
   CW. Substitute operators will call "CQ RD de followed by the group call sign comprising the call of the station they are operating, an oblique stroke and their own call", e.g. "CQ RD de VK4BBB/VK4BAA".
   Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.
7. Entrants must operate within the terms of their licence.
8. 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) report plus 3 figures that will increase in value by one for each successive contact. If any contestant reaches 999 he will start again with 001.
9. 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 1974" on the envelope and must reach the Federal Contest Manager, WIA, Box 67, Post Office, East Melbourne, Vic., 3002 in time for opening on Friday, 20th September, 1974. Early entries will be appreciated.
10. Scoring will be based on the table shown.
    Portable operation: Log scores of operators working outside their own call area will be credited to that call area in which operation takes place, e.g. VK5ZP/2. His score counts toward VK2 total points score.
11. All logs shall be set out as in the example shown and in addition will carry a front sheet showing the following information:
    Name ....
    Address ....
    Section ....
    Callsign ....
    Claimed score ....
    Number of contacts ....
    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 shown in the log submitted — See Rule 4. If an invalid contact is made it must be shown but no score claimed.
    Entrants in the "Open" sections must show CW and phone contacts in numerical sequence.
12. 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.
13. 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) to (c) of rule 1 above, in each call area, and will include top scorer in each section of each call area operating exclusively on 52 MHz and above. VK8, VK9/1, VK9/2, P2, ZL1, ZL2, ZL3, ZL4 and ZL5 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
six logs
+ Logs entered
State licencees
X Total points from
all entrants in
Sect. (a, b, c).

VK8 scores will be included with VK5, VK0 with VK7 and P2 with VK4. Also VK9 logs and score will be added to the Division which is geographically closest. ZL scores will not be included in the score of any WIA Division.

Acceptable logs for all sections shall show at least five 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 as set out in the example. The scoring table to be used is the same as that used for transmitting entrants and points

SCORING TABLE FOR PHONE CONTACTS — ALL CW/CW CONTACTS COUNT DOUBLE

From	To VK0	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9/1	VK9/2	P2	ZL1	ZL2	ZL3	ZL4	ZL5
VK0	—	6	6	6	6	6	6	—	6	6	6	6	2	2	3	4	1
VK1	6	—	1	1	2	3	5	4	6	5	1	5	1	2	3	4	6
VK2	6	3	—	1	2	3	5	4	6	5	—	5	1	2	3	4	6
VK3	6	4	1	—	2	1	4	3	6	5	4	5	2	2	3	4	6
VK4	6	3	1	2	—	3	6	5	4	3	3	—	3	3	3	4	6
VK5	6	5	2	1	3	—	4	3	—	6	6	6	4	4	4	5	6
VK6	6	6	2	1	4	2	—	3	5	—	6	6	4	4	5	6	6
VK7	—	5	1	1	3	2	5	—	5	6	6	6	2	2	3	4	6
VK8	6	5	1	1	2	—	6	4	—	3	4	3	4	4	6	6	6
VK9/1	6	5	1	2	3	4	—	6	1	—	6	3	5	5	6	6	6
VK9/2	6	1	—	2	2	4	5	4	4	6	—	3	1	2	3	4	6
P2	6	5	1	2	—	4	5	6	1	3	3	—	5	5	6	6	6
ZL1	6	1	1	1	2	2	5	3	5	6	5	6	—	—	—	—	—
ZL2	6	1	1	1	2	2	5	3	5	6	5	6	—	—	—	—	—
ZL3	6	3	3	3	4	4	6	4	6	6	5	6	—	—	—	—	—
ZL4	6	4	4	4	5	5	6	5	6	6	5	6	—	—	—	—	—
ZL5	1	6	6	6	6	6	6	6	6	6	6	6	—	—	—	—	—

Read table from left to right for points for the various call areas. VK9/1 means VK9 stations on Indian Ocean Islands. VK9/2 means VK9 stations on the Pacific Ocean Islands. In addition, all instrastate contacts on 52 MHz and above are worth one point per band.

EXAMPLE OF TRANSMITTING LOG

Date/time GMT	Band	Emission Power	Call sign Worked	RST Sent	RST Rec'd	Points

EXAMPLE OF RECEIVING LOG VICTORIAN SHORT WAVE LISTENER

Date/time GMT	Band	Emission	Call sign heard	RST sent	RST recd	Station called	Point claim
Aug. '74							
18/0612	7 MHz	A3	VK5PS	58002	—	VK6RU	1
18/0615	7 MHz	A3	ZL2AZ	59103	—	VK3KI	2
18/0700	52 MHz	A3	VK3ALZ	57012	—	VK3BQ	1
18/0723	52 MHz	A3	VK4AZ	56013	—	VK5ZDR	2

must be claimed on the basis of the State in which the receiving station is located. A sample is given to clarify the position. It is not sufficient to log a station calling "CQ" — the number he passes in the contact must be logged. It is not permissible to log a station in the same call area as the receiving station on the MF and HF bands, (1.8-30 MHz), but on bands 52 MHz and above, such stations may be logged more than once per band, for one point on each occasion. See example given.

4. A station heard may be logged once on phone and once on CW for each band.
5. Club receiving stations may enter for the receiving Section of the Contest but will not be eligible for the single-operator award. However, if sufficient entries are received, a special award may be given to the top receiving station in Australia. All operators must sign the declaration.

AWARDS

Certificates will be awarded to the highest scorers in each call area. Further certificates may be awarded at the discretion of the Federal Contest Manager.

Contests

with Jim Payne, VK3AZT

Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST DIARY CALENDAR

July 20th-21st—Colombian Contest Phone & CW
July 27th-29th—County Hunters CW Contest (USA)
August 10th-11th—Argentina phone contest
August 10th-11th—European CW Contest
August 17th-18th—REMEMBRANCE DAY CONTEST
August 24th-25th—All Asian CW Contest

(THE FRIENDLY CONTEST) NOTES FOR 1974

At the Federal Convention held in Sydney during Easter, 1974 the rules for the RD Contest were altered to provide for CW/CW contacts to score double the points set out in the scoring table. It was also decided that repeaters could not be used and that for the purposes of this contest, operators in Papua/New Guinea (P2) would be included as for VK9 operators. VK1 is now a separate Division.

We received 719 logs after the 1973 RD contest and as comment generally favoured the rules no other alterations were made. Some changes in the scoring table have been made.

FOR 1974 RD

Make sure that everyone you contact enjoys the Contest and there will be no doubt that you will enjoy it.

Make sure that we achieve at least 800 log entries by talking about the contest with all your friends, on and off the air.

Make sure that your Division puts up a good show. Help the ZLs with their MEMORIAL CONTEST 80 metres on 6th/7th July.

Awards Column

with BRIAN AUSTIN VK5CA

P.O. Box 7A, Crafers, SA, 5152

DXCC (ARRL)

1. The ARRL has decided that confirmations of contacts with both VK9JW and VK4FJ/Mellish Reef will be accepted for DXCC credit. QST March '74.

2. Because of the continuing rise in postal rates in the USA, all new DXCC applications must be accompanied by US$3.50 (or the equivalent in IRCs). This covers the cost of returning the cards by registered first class mail as well as a certificate and DXCC lapel pin. New DXCC applications received 1st July 1974 and after will, if the $3.50 is not sent with the application, be delayed in processing until the applicant has submitted the necessary amount.

FIVE-BAND AND SIX-BAND WORKED ALL CONTINENTS AWARDS

The International Amateur Radio Union announces the availability of five-band and six-band versions of the popular Worked All Continents award. These new awards are intended to promote the more uniform use of the high frequency amateur bands for international communication and to recognise outstanding achievement by amateur stations in establishing two-way communication with the six continental areas of the world on each of the amateur bands available for such communication.

The following rules apply:

1. The basic award shall be known as "Five-Band Worked All Continents" ("5BWAC"). An endorsement for "Six-Band Worked All Continents" ("6BWAC") shall be available upon submission of proof of this additional accomplishment.

2. Applications shall be sent by the applicant, accompanied by the originals of the required confirmations, to the headquarters of the member-society for the country in which he resides (VK hams contact the Awards Manager). The Awards Manager shall then examine the application and, if it is found to be satisfactory shall so attest to the Headquarters Society, ARRL, which shall issue the certificate and deliver it directly to the applicant. If the applicant resides in a country not represented in the Union, the application shall be sent directly to ARRL.

3. Where the applicant resides in a country which is represented in the Union, it shall be necessary for him to hold membership in the representative member-society in order to be eligible for the award.

4. The continental boundaries defined in the WAC rules shall apply to 5BWAC and 6BWAC.

5. To be used toward the award, contacts must be made from one station (in terms of licence and call letters, but not necessarily of equipment) operated at one location. The term "location" shall be construed as representing one metropolitan area, or, alternately, an area not exceeding 25 miles (aout 40 km.) in diameter.

6. Contacts must be made on or after 1st January 1974 to be used in qualifying for this award.

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 a problem. On page 10-40 of "Radio Communication Handbook" it says "a peak in screen current indicates tank circuit resonance". I tried measuring the screen current of my final, a pair of 6146s, and found it behaved the same as the plate current.: It dipped on resonance of the final tank circuit. No grid current was flowing either. Can any of your readers assist me.

J. Kitchin, VK6TU

Albany House, Goonown
St. Agnes, Cornwall TR5007

The Editor,
Dear Sir,

I have been a reader of AR for some years and find it most interesting. Its now 30th May and I have just received my April issue. I was very interested in VK3AVO's article on the G5RV. I have used this aerial for many years and having tried many others I have always come back to the G5RV. I have not slotted my feeders but I spray them with a water repellent such as used for car ignition and wiring. I do this about every three months. Unlike VK3AVO I do use an ATU in the form of a "Z Match' and can load up on 80.40 and 20 with very low SWR. I have found trimming the 300 ohm stub better than the top, cutting it back ½ inch at a time. My 300 ohm stub is 29 foot 3 inches. On 160 I use it without the ATU but seem to get just as good reports with the feeders open as when strapped. I use a small AM & CW rig on this band.

I have a very good take off. My QTH is ¾ mile from the Atlantic Coast and 350 ft ASL. The aerial is about 36 ft above ground. I find the G5RV as good an aerial as any (excluding beams of course). Providing it is adjusted and matched properly. When conditions are right I have not any trouble in working DX on 80 including ZL, W, VE, PY, in fact most of South America. I have worked all over the world on 40 including many VKs but 20 is my best band.

I have quite a few awards including the WIA Cook Bi-Centenary Award. VK3GS and myself have worked one another 277 times in the last 3½ to 4 years. I think this goes to prove the G5RV is quite a good aerial. What is my gear 500 watts? No! A little "National NCX3", 120 watts pep. I have never used any higher power on any band.

Yours sincerely,
J. E. Bowden
(Ted) G2AYQ

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

People who write for magazines can always tell if their stuff is being read because their readers write in and tell them they are wrong in what they have said. Following my comments about the location of the key near (or not near) the edge of the table, I have been told that I implied that the correct method of using the key is to have the forearm resting on the table. Re-reading what I wrote, I did not think I had implied that, but perhaps the point is worth a further comment anyway — based on my ignorance. I was under the impression that the recommended British Post Office method, and which is (should I say has been?) the Australian practice, is to place the key near the edge of the table and to operate with the upper arm hanging loosely from the shoulder. I am also under an impression that the technique of resting the forearm on the table, with the key some 20-30 cm from the edge, is popularly called the 'American' method, though no doubt with as much justification as calling it 'French cricket' or 'Dutch auction'. If that is not an invitation for ten people to rise up against me then I'll go he.

I imagine there will be some who think the matter of no consequence; who uses a hand key anyway? Well, apart from the exam problem, I will show myself to be very old fashioned by saying that, even if you usually use an electronic key, I think you ought to be able to at least use a hand key. Before leaving hand keys I should also perhaps mention that Bail Electronics thought I had given a slightly misleading impression about the height of their HK-701 key. I think they may be right, and refer you to the report on the key by Ivor VK3XB; I passed on a comment from Ivor received by phone and as is usual in such cases distorted the facts without meaning to.

Congratulations to Bill, VK2YB, who won the 6-hour section B, and to VK3ANU who won the 24-hour section B, in this year's national field day contest. There is something ominous about the fact that there is only one entry in section C (transmitting open) — no doubt we will be more broadminded in the RD next month?

The Townsville Amateur Radio Club tell me they are starting slow morse transmissions. These may be heard on Mondays at 1930h on 3580 kHz. A good service I would think as the tropical static must make a terrible mess of the ever-faithful VK2 transmissions. I had QSO with VK3WS, who had just given one of the Western Suburbs Radio Club broadcasts on 1806 kHz, and he told me he thought that service was also attracting enough support to make it worth while.

Historical Section wants old mags, papers, articles, photos, drawings—up to W.W.2—for copying or as donations. Please write VK3ZS, QTHR or WIA Executive office.

Product Review

DICK SMITH ELECTRONICS CATALOGUE, 1973/74, 3rd EDITION

Back in March 1973 issue of AR we reviewed Dick's 2nd Edition catalogue. It contained 44 pages of the good oil, and this issue is even better having 64 pages, an increase in size of 45 per cent in under 18 months.

I believe that every aspiring or established amateur should have a copy of Dick's catalogue as it contains so much general information for both the audio man and the electronics experimenter-amateur operator. There are photographs of many of the items for sale, as well as general information on applications of various components.

I have not had a great deal of time to thoroughly peruse the catalogue, as I had back in 1973, but everything looks as good if not better. I commented on a few things in the previous catalogue. For instance that the Gippsland repeater was not on Mt. Bess but on Mt. Tassie. One point I made in particular was about the advertising of transmitting gear, namely 27 MHz equipment. Dick has taken the trouble in several places in his catalogue to point out that not only must this type of gear be **PMG approved but must be licenced before being put into use.** Possibly Dick is unique in the business world of bringing these points to the customers' notice. Could save many innocent people much heartache later on.

Page 41a is general information for the SWL or amateur on bands, nets, magazines, etc. For the 2 metre FM man Dick has a complete RF amplifier system with an output of 25 watts advertised on page 38a, information on the transistors and he does have printed boards for this unit.

There is much I could say about the catalogue — but there is no substitute to having your own. Dick is offering them free to readers of Amateur Radio complete with the free vouchers. What better offer could you get. I personally have been quite satisfied with the service I have received from Dick. Remember when you write to Dick, say you saw it advertised in Amateur Radio.

VK3UG

WARNING

In terms of PMG directions*
from 1.3.1974
UNDELIVERABLE and UNDELIVERED A.R.'s
WILL **NOT** BE RETURNED TO SENDER

Unless you advise your
CHANGE OF ADDRESS
to the Executive Office
P.O. Box 150, Toorak, Vic., 3142
at least one month in advance
you may miss your A.R. No replacement can be sent to you unless accompanied by 70 cents per issue (subject to copies being available.)

The above applies only when you change your address

* Letter V 228/1/17 of 30.11.1973 (services)

Book Review

"THE WHAT WHERE WHO HASSLES AND HOW MUCH BOOK" Edited by Roger and Valerie Harrison

Where can you get a length of FHJ4 "Heliax?" Who has wind driven power supplies? Where can you see an Aardvark?

Anybody who is a serious amateur (or professional) experimenter will from time to time require something that isn't stocked at the local TV repair shop or supermarket. The Harrisons, with their "The W.W.W.H. & H.M.B." have provided us all with a valuable directory to those firms in Australia, N.Z. and overseas, that can help us in our quests for chart recorders, Q meters and coax. The 24 headings include Aardvarks, AR, Antennas, Books, Cables, Disposals, Kits, Media, PCBs and Tools and cover over 270 Firms.

If you are content only to operate then forget it, but if you are into any kind of project or experimenting, then the $1.50 will be very well spent.

ROLY ROPER

MAGPUBS

Please note that reciprocal subscriptions to **"Break-In"** will cost **$4.20** per annum for renewals and new subscribers from 1.7.1974 onwards.

MAGPUBS — P.O. BOX 150
TOORAK, VICTORIA 3142

Hamads

* Eight lines free to all W.I.A. members.
* Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150 Toorak, Vic., 3142.

FOR SALE

Frequency Meter BC221T(Q), AC Power Supply and Calibration book, Perfect condition, $35. **Panoramic Adapter BC1031A,** 455kc/s IF, mint condition, $35.

3APC Transistor Receiver and **2m Converter,** tunes 3-5.1 Mc/s, $35. **STC 121 FM** carphone, almost modified for 6m, circuits and xtals, Runsa 3/20 Final, $25. VK3ZBD, QTHR. Ph.: (03) 892117.

Eddystone EC10, Lafayette HA 600 receivers, frequency meter BC-221-E, very good condition. Command transmitter covering 3.5 MHz CW, excellent condition. All offers considered. VK4WR, 6 Olive Ct., Nambour, Qld., 4560.

Yaesu FTDX400 with Yaesu blower fitted and matching FVDX400 external VFO, mint condition, $430, O.N.O. VK2WD, QTHR. Ph.: (02) 42 6080.

Swan 350 SSB Transceiver, AC and DC (mobile) PS, excellent condition, with manual. What offers? VK3ADN, QTHR, but Post Code 3324. Phone Lismore 139 (evenings).

FT101 Transceiver, 160-10m complete with fan mic., manual, AC/DC plugs, excellent order and condition. Recent model with FB noise blanker. $450. VK3BM, Box 724, Swan Hill 3585. Ph: (050) 32 4102.

Yaesu FT200 with FP200 power supply and manual, as new condition, $350. VK3RD, QTHR. Ph: (03) 57 8272.

Yaesu FT-101 with matching speaker and remote VFO, used few hours only, $450. 18AVQ vertical, $40. Vinton 2m fm base 90w transceiver, $35. VK3CH, QTHR. Ph.: (03) 91 1030 anytime.

Galaxy GT550 transceiver with matching speaker cabinet, built in PSU. Excellent order and condition, $400. VK7MG, QTHR. Ph: Swansea 220.

Yaesu FT-2F. 2FM with A, B, C, R1 and R4 plus 3 other channels. Complete with 240 volt power supply and battery, $200. **Trio TR-2E.** 2 metre AM/FM 12 volts/240 volts. Fully tuneable transmitter and receiver. 10 watts out., $120. Both complete with microphones, brackets, manuals, etc., Contact Ray VK3ZRG on 80-2636 or at 1/2 Thomas Street, Kew, Vic., 3101.

WANTED

Does Anyone know a source of supply of Biltong or Pemmican. VK3CIF, QTHR.

FT200 or similar transceiver. Price and particulars to G. Noble, 32A King St., Bellerive, Tas., 7018. Include Ph. No.

Hallicrafters sx62A radio receiver. Details to F. Hill, VK2HQ, QTHR.

Conversion Data and circuit diagram of AWA Model LJ59434 FM mobile transceiver. Contact David Green, WIA SWL L40501, 258 Tooley St., Maryborough, Qld. 4650.

DC/DC Converter, suitable FT200. 12V or 200 club transformers or core and winding details for 2N3055. VK2ATI, QTHR.

EXCHANGE

Yaesu FL200B and **FR50** in good cond. for **FT200** with **FP200** AC PSU. Cash adjustment, prefer **VK3** enquiries only, you deliver and collect. VK3ACM, (ex VK3YBO, QTHR). Ph: (061) 68 2260 AH only.

Magazine Index

With Syd Clark, VK3ASC

This month the series of magazines are recent and consecutive except for 73 which appears to have been waylaid for about four or five months. Reading these mags is an interesting pastime and some excellent gear is described for "Home-brewers".

BREAK-IN. March 1974
Ideas for Building Transceivers; A Simple Receiver for the New Amateur; Kingsford Smith and the "Southern Cross"; Bench Power Supply.

BREAK-IN. April 1974
Ideas for Building Transceivers (Ends).

QST. March 1974
The Half Square Antenna; A Competition Grade Receiver, Part 1; A Complete FM Transceiver, Part 2; The Constant Impedance Trap Vertical; A Receiving Loop for 160 Metres; Making Your Own Satellite Tracking Nomograph; A Simple Method of Raising Large Antennas; Pulse Modulation — A New Look at Old Theory; A Frequency Extender for Electronic Counters.

QST. April 1974
A Four-Band Whopper; A Simple and Efficient Mixer for 2304 MHz; Another Look at Reflections, Part 5; A Tone Burst Generator for Repeater Access; A Competition Grade Receiver, Part 2; Modernisation of an old favourite; Monitoring an SSB Amplifier Chain for Linearity; Learning to Work with Semiconductors, Part 1.

RADIO COMMUNICATION. April 1974
Conversion of Storno Viscount VHF Radiotelephones for Amateur Service; Using the Heathkit SB610 Scope with the Drake Line; Building Blocks for the Novice; Technical Topics and other features.

73 MAGAZINE. December 1973
IC Code Speed Display; 2 Metre Linear Amplifier; A Simple IC Keyer; Precision Waveform Generator; Helical Resonators; Sensitive RF Voltmeter; The Greenie; Rapid Receiver Control; Increasing SSB Efficiency; Identifying unmarked IC's; The QSL from BY Land; Sequential 2-Tone Decoder; A Satisfying Minimum Regulator; Take-Apart 2 Metre Beam; Making the Most of Auto-ID; Choosing and Using an Electronic Calculator; Optimum Design of CW Filters; Amateur Rules and Regulations, Part 7.

CQ.TV. The Journal of the British Amateur Television Club. December 1973 and February 1974
The Dec. issue; A Synchronising Pulse Generator. Feb.: Some Notes on the SM0BUO Slow Scan TV Monitor; A Programme for the Future; ATV Contest News; Fourth Worldwide SSTV Contest. ●

Y.R.C.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

An item of special importance will be presented to the meeting of State Supervisors at Maitland, N.S.W., concerning the appointment of a Federal Education Officer. It has been suggested that his duties should be as follows:—

(1) To advise the Federal Co-Ordinator and YRCS Council on matters relating to training, examination standards, training publications and related affairs;

(2) To be responsible to the Federal Co-Ordinator for the implementation of training policies and related affairs decided by the YRCS Conference;

(3) To maintain constant consultation with State Supervisors, State Education Officers, Instructors and Club Leaders on matters relating to training, examinations and standards, training publications and other related affairs;

(4) To establish an Australia-wide system of examinations to maintain standards of uniform level in all States;

(5) To maintain a system of records and statistics in order to supply such information as required by the Federal Co-Ordinator and/or YRCS Conference;

(6) To furnish to the Federal Co-Ordinator such information, reports, statistics as may enable him to prepare a comprehensive report on educational and training matters prior to and for submission to the YRCS Conference;

(7) To undertake duties as Chairman of Educational Committee(s) as may be convened by direction of YRCS Conference from time to time.

(8) To submit recommendations, suggestions, opinions as may be required by the Federal Co-Ordinator and/or YRCS Conference;

(9) To carry out such other duties as may be required by the Federal Co-Ordinator and/or YRCS Conference.

It will be seen from the above that the position of YRCS Federal Education Officer will require the appointment of someone with time and the necessary expertise for this very important office.

Another matter which involves our constitution is that of the appointment of the Federal Co-Ordinator. No tenure of time is mentioned in the constitution, and it is my opinion that the office should be declared vacant at each General Meeting, following which a nomination should be made and a name submitted to the Federal WIA Executive for approval.

With these and other items the Maitland Conference should not be dull. ●

Silent Keys

HENRY S. KING, VK2ASU

Henry was born at Tumbarumba, NSW, and joined the RAAF during World War 2 as Wireless Operator/Technician. Post war he was a PMG Technician until June, 1956, when he resigned to join the staff of Mullard Australia Ltd. to set up their Valve and Semiconductor Service Centre at Petersham, which he conducted, along with their interstate Service Centres, for a number of years. He rejoined the PMG's Department as Technician at Kempsey in February 1971 and remained there until his sudden and unexpected death on Sunday, 5th May, 1974, aged 56 years.

During 1950/51, Henry was Honorary Secretary to the WIA (NSW Division) and while holding this office, both he and his wife (Betty) spent many months updating the Division's Registers. Subsequent heavy workday commitments precluded his taking further active office with the Institute. Henry was a true Amateur, and although over the past few years his time on the air was confined to short periods on the 3.5 and 7 MHz bands, he continued to be an avid experimenter in aspects of semiconductor technology in both RF and AF fields. The quality of his workmanship was exceeded only by his deep knowledge of the theory behind it.

To all and sundry, Henry gave a lot of himself, and he will be sadly missed by his many friends to whom he had so often rendered so much personal service and advice.

We extend our deepest sympathy to his wife, Betty and to her family.

G. T. Slawson, VK2AFN

20 Years Ago

with Ron Fisher VK3OM

JULY 1954

The introduction of the Limited AOCP brought forth a bit of crystal gazing in the Editorial page of July 1954 Amateur Radio.

"There is no doubt that the VHF bands will be the universally used bands for future emergency communications networks and the introduction of the limited operators into these regions will ultimately benefit the amateur service and the country to a greater degree than is as yet realised". It might be well to remember that the Limited AOCP was gained directly by Institute representation as will be the yet-to-come Novice licence. Reports of contacts using transistorised transmitters came from England and New Zealand. The G's claimed 90 miles on 80 and 9 miles on 160, while from ZL a contact of 200 miles and reports from as far as 720 miles. The DX bands were in general erratic, with only 20 showing any signs of stable conditions. Only a single W6 was heard on ten metres.

Technical articles for July included, The Complete Amateur, part seven, function and master switch panel. Selectivity and Phone Reception. Some tricks with your present receiver, reprinted from QST. A Transmitter with AC/DC Power Supply, by Hans Albrecht VK3AHH. Ten watts output from AC or DC mains. Hetrofil. Chris Cullinan VK7XW shows how the Wien Bridge can be used to null out heterodynes in short wave reception. A full page spread describes the latest Eddystone receivers available from William Willis & Co. They include the 680X, 750, 740, and 840. ●

JULY 1974
VOL. 42, No. 7

amateur radio

AUGUST, 1974

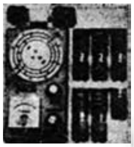
CONTENTS

COVER PHOTO
At the recent Youth Expo at the Moorabbin Town Hall, a member of the Moorabbin and District Radio Club shows a youthful visitor how to use a morse key.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION



Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR SPECIFICATION — Model HE-22D

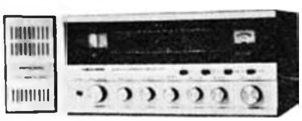
Model TE-22D

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
Printed Circuit for uniform Characteristics
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg

Price $49.50
P & P $2.00

DX150B REALISTIC with SEPARATE SPEAKER



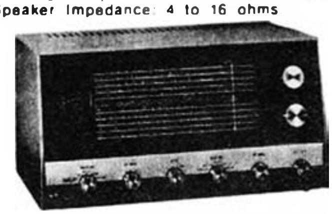
The popular REALISTIC DX150B which has gone from strength to strength with amateurs, short-wave and broadcast listeners alike, now has a further improvement, A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast. Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells if current fails or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical band-spread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

Price ~~$229.00~~
now price — **$189.00**
P & P $2.00

LAFAYETTE HA-600A SOLID STATE GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes.
- Product Detector for SSB/CW.
- Edge illuminated Slide Rule Dial with "S" Meter.
- Continuous Electrical Bandspread Calibrated 80-100M Amateur Bands.
- Variable BFO, Automatic Noise Limiter.
- Speaker Impedance: 4 to 16 ohms



Price $215.00
P & P $2.00

Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration **facility: $210.00. 100kHz** Xtal Extra **$10.75.** P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402

This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

P.M.G. TYPE TELEPHONES—DIAL TYPE EXTENSION

Ericson Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50** Tested. p&p 75c
Black Phone. Chrome Dial Standard type. Robust construction. **$7.95.** Few only p&p 75c
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amateur radio

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AIR WAVE ANARCHY

Listening on 14 MHz during early July you would probably have heard, around 14250, a very strong broadcast signal "jammed" by an even stronger station, swinging over 25 or 30 kHz.

Many "intruders" have appeared on the amateur bands in the last 25 years or so. It is many years since a "jammed" commercial, particularly of such signal strength, has appeared in exclusively amateur allocated frequencies. The origin of the commercial and its jammer is, at time of writing, undetermined but this is currently under investigation.

Intruders and pirates are nothing new to us but one wonders why many of the pirates do not hold or have not bothered to apply for a station licence.

Early in July, I received an overseas telephone call from an irate ZL who rang my office from New Zealand and abused me for not having sent him a QSL for the electorate of Phillip. Since I had not worked this ZL station and, in addition, live in the electorate of Flinders, he reluctantly accepted my explanation for not having QSL'd. Over the last 12 months I have received 18 QSL cards for contacts on 3.5 MHz CW from stations which I have never worked — being essentially a 14 MHz RTTY/Phone operator.

Surely a person who can receive 599 reports on CW, and on back-check, at speeds of 20 to 25 wpm, should be able to qualify for an amateur licence.

Not only are pirates of this type proliferating but so also are those operating in the "Citizens' Band". A recent printed sheet distributed in Melbourne indicates a growing political lobby by those CB operators who claim a "right" to operate in the public interest.

"Public Interest" be damned! The Institute is well aware of the activity of pirates both in the 11 metre band and elsewhere and has consistently pressed for firm action to be taken against the law-breakers by every possible means.

Furthermore, the Institute has made officially known its feelings and taken action to draw attention to two additional considerations; namely: the conservation of the frequency spectrum and the disrepute of the "Citizens' Band" radio in certain overseas countries where it is authorised.

Reports reaching the Institute appear to indicate that CB operations in the USA are now so extensive that little or no control can be exercised over them. Unlike the amateur and many other services which are largely self-policing, the CBers (and pirates) are known to exercise less control, if any, over their own activities.

It is to be hoped that the authorities are alert to the severe dangers inherent in legalising this kind of radio communication without the necessity to comment on the alternatives such as the use of the telephone and similar public services, keeping in mind the aspects of safety relating to the use of electrical apparatus and the fear of potentially great interference to other services and facilities.

JOHN McL. BENNETT VK3ZA

STOP PRESS
Project Australis report that the call up date for Oscar 7 is now 3rd October, 1974.

AMATEUR SECT

AMATEUR SECTION ENLARGED

Call in soon and see some of these super new lines at the Gore Hill Centre.

TRANSCEIVERS H.F.

Kenwood **TS-520** 160W, SSB transceiver covers 80 to 10 metres. Features noise blanker, VOX, DX switch, 8 pole crystal filter, CW filter etc. Has fully transistorised receiver power supplies. This is a really deluxe job in diecast case, not the usual pressed metal construction. Deliveries due in September, but order now as demand will be heavy at **$550.00** (Road freight extra).

Yaesu Musen **FT 101B** the famous 160-10 metre, AC/DC transceiver is now available direct from us. Indent price is just **$525.00** (Road freight extra).

Yaesu Musen **FT200/FP100** combination also at only **$370.00** (Road freight extra).

TRANSCEIVERS 27 MHz

Hi Gain SSB/AM, 23 channels gives 5W on AM and 15W on SSB. All channel crystals included. Features ANL and noise blanker. PTT mike. Operates on 12V dc and has rf output and S meter. Indent price is only **$200.00** (normal retail is $275).

VHF EQUIPMENT

Icom **IC22** 144-148 MHz, FM transceiver has power outputs of 1W and 10W. The 22 channels all have separate trimmers. Deviation 5-15 kHz. Features solid state Tx/Rx relay, large built-in speaker, MOSFET front end with 5 helical filters, noise cancelling mic., quick disconnect mobile mount. And if the spec doesn't grab you, the looks will. Soft green back lighting, special transmit light and and even a light to tell you of incoming signals if the volume is turned down. Supplied complete with workshop manual and accessories right down to a silicone cloth to keep the set like new.

Sideband NC310 1W hand-held units. PMG approved. 3 channel capacity. Squelch. External aerial jack. Provision for external supply etc. Supplied with 27.24 MHz crystals (see below) **$49.75** each.

CB78 Pony 5W AM, 23 channel complete with all channels and ideal for the novice licence when it starts. Mic. included for only **$99.00.**

Fitted with one set of crystals for 146.00 or 146.5 MHz (please specify). Normal price is **$245** but we are introducing them at only **$189.00**, freight anywhere for only $3.50 including insurance).
Crystals are also available at **$9.00** a pair as follows:

		Tx	Rx
Old Channels	Channel 1	146.1	145.6
	Channel 4	146.1	145.9
	Channel B	146.00	146.00
New Channels	42/45	146.1	146.7
	48/60	146.4	147.00
	50	146.5	146.5

Ken KP202 146-148 Hand-helo transceiver, has 5 channel capacity with 2W output. Telescopic aerial, squelch, provision for external aerial and PL259 adaptor plug supplied. Operates on penlight cells. Crystals included for 3 channels. A very popular unit that we are introducing at **$150.00** (P&P $2).
Crystals included as follows (please specify):

Alternative A

	Tx	Rx
1 Channel 50	146.5	146.5
2 Channel 42/54	146.1	146.7
3 Channel 48/60	146.4	147.00

Alternative B

	Tx	Rx
1 Channel B	146.00	146.00
2 Channel 1	146.1	145.6
3 Channel 4	146.4	145.0

Special KCP-2 NiCad battery set and charger with 10 cells to suit the KP202 available at **$35.00.**

QSP

Keeping up good communications between city-based Councillors and country zone members is a problem which besets all Divisions. In an attempt to bridge the gap, Victorian Division Councillors have embarked on a scheme to regularly visit and hold Council Meetings in the Zone centres. In addition, "Advisory Council" meetings — subsidised by the Division — are held in Melbourne, with representatives attending from all country zones. The move has been an instant success.

VK3 Councillors on a weekend flying trip which took in Horsham, Mildura and Canberra. L to R: Pilot, Russell Kelly (VK3NT) Fed Councillor, Mike Goode (VK3BDL) Treasurer, Phil Fitzherbert (VK3FF) Secretary, Peter Williams (VK3IZ) President. Remaining passenger — Mike Trickett (VK3ASQ) V. President, took the photograph.

AR COSTS
Ever thought what it costs to bulk post AR to you in Australia? A year ago the average annual cost per member was a little over 42 cents. Today it is 84 cents, next year it will be $1.08. The cost of printing AR has been comparatively steady during the past year at about $3.42 per member but with rising costs of wages and paper this could be as much as $4.25 by next year. All the other costs inicidental to getting AR into distribution are also rising.

EROSION
Jack Hum G5UM in Rad. Communications, May 1974, includes in his Four Metres & Down column a note from 9M2DQ saying "since last October the 9M2 men had lost the whole of the 2m band, an action apparently the work of a combined Brunei-Malaysia-Singapore frequency allocation board". This is a little near to us and bodes ill for amateurs at the next ITU Conference. Pressures from the 'Third World' powers might already be manifesting themselves.

IARU FINANCES
QST for Mar. '74 quotes "The International Amateur Radio Union has operated since its foundation in 1925 without any treasury or funds of its own. ARRL has underwritten the administrative costs of a headquarters operation, and most work elsewhere has been an a volunteer basis. With the establishment of regional organisations, however, it was decided that each area should finance its own activities, and this has been done by an assessment of a nominal amount per individual licensed amateur member levied on each member society . . . It is only natural that many ARRL members appraise the worth of their dues mostly on the basis of tangible returns — primarily recepit of QST. More discerning individuals additionally recognise the necessity of supporting those further services which are of collective benefit to all amateurs — regulatory representation, information sources, public relations activities, training aids, code practice and such. But it is unlikely that many are aware our ARRL contributes each year (towards) the operation of the Region II organisation. The purpose remains closer liaison between our organised groups for a stronger amateur radio — one better able not only to retain our bands at future frequency conferences, but enhancing the likelihood of some additional HF space to provide for growth".

AMATEUR FREQUENCIES
"However, in the vital omnipresent role in our lives which communications and electronics involve us on a national basis, would you believe that amateur radio ranks close to the bottom". Excerpt from an address by W4BW, A. Prose Walker, Chief of the Amateur and Citizens Radio Division of FCC, as quoted in QST March '74. Later on in his talk W4BW quoted the "box-score" of allocations to major service categories between 3 and 30 MHz as follows—

Radio Astronomy	20 kHz	—
Aeronautical	1770 kHz	8%
Broadcasting	2150 kHz	10%
Amateur	2600 kHz	13%
Maritime	3650 kHz	18%
Fixed	10157 kHz	50%

"It is up to us", he said, "to find every way conceivable by which amateur allocations may be not only preserved, but improved throughout the HF spectrum".

LICENCES — VR1
If you should ever visit the Gilbert & Ellice Islands it is interesting to observe that the Colony is tied to the United Kingdom with regard to the issue of amateur licensing. This also includes Ocean Island under the call sign group VR1.

VHF PENETRATION INSIDE BUILDINGS
Brian Austin ZS6BKW writing in Technical Notes for Radio ZS, April '74, quotes from a CCIR Study Group Document 8/179-E relating to radio paging systems and initial experiments done by the BPO from the London Post Office tower 176m a.s.l. The relative media field strengths, normalised for the same effect radiated power at each frequency are shown under MHz, dB inside buildings and dB outside buildings as 60 MHz 0 and +13, 160 MHz) and —14, 460 MHz —4.5 and —15, 960 MHz —5.5 and —10.5, 1500 MHz —15 and —3 (reference level — 0 dB). These figures represent the trend rather than as absolute figures but still indicate that for equal erp's signals around 460 MHz penetrate into buildings with greater signal strengths than those at any other frequency quoted.

DEPARTMENT OF CUSTOMC & EXCISE
Quote C.G. 72/78684
5 June, 1974

Dear Mr. Dodd,

I refer to your letter of 8 May concerning Amateur Radio Transceivers.

As advised verbally by Mr. Collins, the Department also realised that the reference referred to in my letter of 18 April imposed restrictions not intended to transceivers of a kind used by amateur radio operators in the 10 metre band which may go to an upper frequency limit of 30 MHz. Action has been taken to adjust this matter and attached for your information is a copy of the relevant Consolidated By-law Reference page which includes the amended reference.

In regard to by-law admission of transceivers not covered by the reference, the position is as outlined in my letter of 18 April. There will not be any necessity for importers to submit amateur licences, as applications received will be considered under normal by-law criteria.

As this letter supersedes that of 18 April I would prefer that it be used in the magazine and I have no objection to it being used in this regard.

Yours sincerely,
P. A. Murphy,
Director, By-law Operations

FREQUENCY BAND LOSSES
Writing in Microwaves in Rad. Communications, May '74, Dain Evans, G3RPE comments — "The news from France is bad. They have recently lost the use of the 1215-1220 MHz and 1260-1300 MHz parts of the 23cm band. The allocation 433-434.5 MHz has also been withdrawn. Operation in the whole of the 13cm band from 2300-2450 MHz is no longer permitted except with special authorisation, and then only from specified sites. There are also geographical limitations on the use of the 5750-5770 MHz sub-band".

17,000 new amateurs in Australia? That's how many there would be if everyone who received brochures on amateur radio at the mid-May "Sydney Morning Herald's" second annual hobbies exhibition applied for a license. The brochures contained information on soldering, kits and amateur radio and were provided by Dick Smith, a leading electronics centre in Gore Hill, Sydney.

Tom, VK2ATJ/T /WA7DPO, left, manned the booth for 70 hours along with members of the University of New South Wales Amateur Radio Society, VK2BUV. Several hundred genuine enquiries concerning amateur radio license procedures were answered as well as dscribing amateur radio in general to several thousand individuals. Numerous individuals had never even heard of amateur radio showing that considerable publicity is needed for the hobby.

An SL600 series SSB tranceiver

BRIAN D. COMER, G3ZVC
Plessey Semiconductors, Wiltshire, England

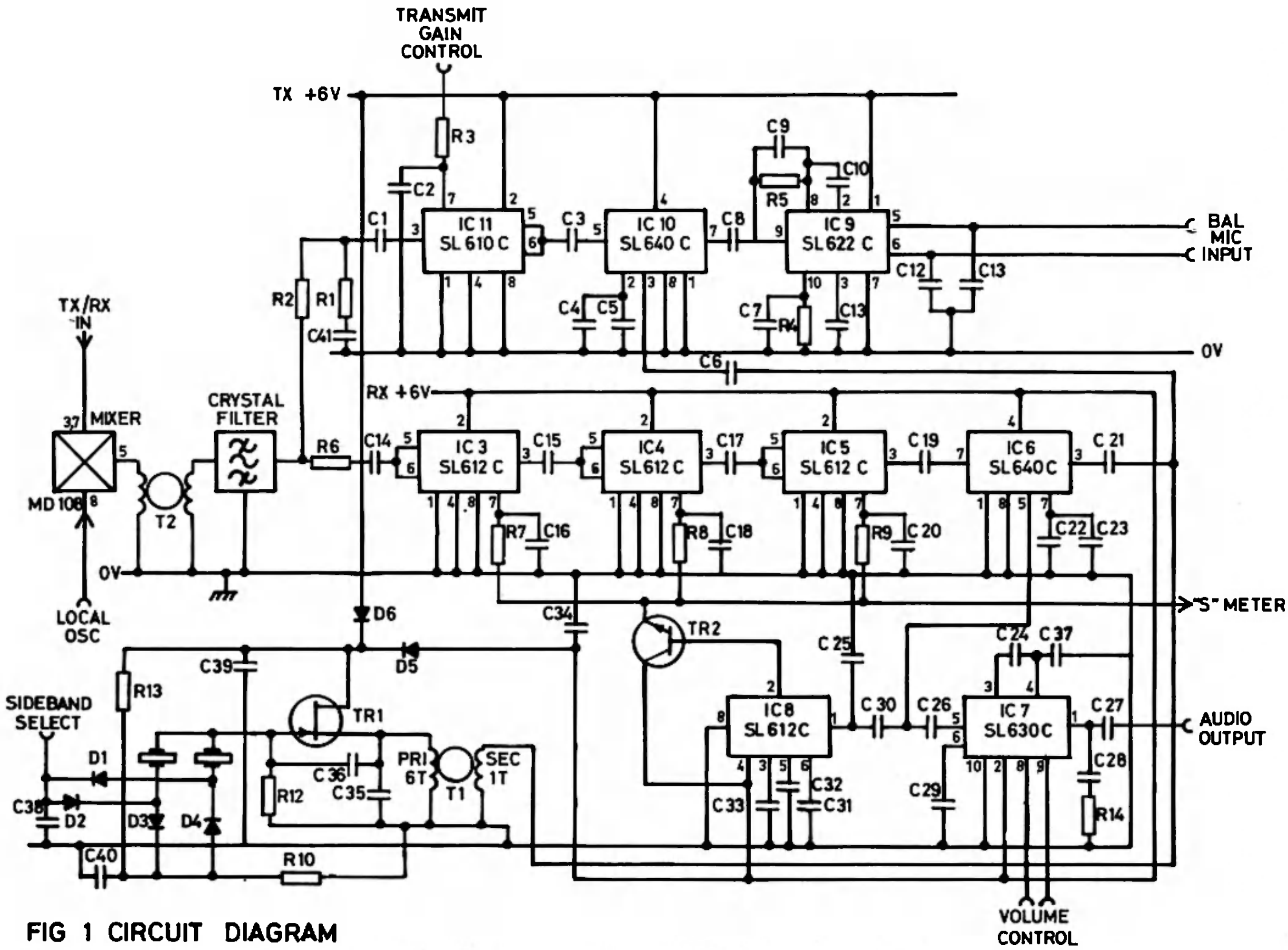


FIG 1 CIRCUIT DIAGRAM

Component List:

IC3, IC4, IC5	SL612C	IC6, IC10	SL640C
IC7	SL630C	IC8	SL621C
IC9	SL622C	IC11	SL610C
D1, D2, D3, D4, D5, D6	IN4148 or similar low capacitance Silicon switching diode.		
Q1	2N3819 or similar N channel JFET.		
Q2	2N706 or similar low cost Silicon NPN transistor.		
Filter	S.E.1 QC1246AX with sideband crystals (or K.V.G. XF-9B)		
R1, R3, R7, R8, R9, R11	100 ohms		
R4	30 K.	R2	430 ohms
R6	51 ohms	R5	1 K.
R12	100 K.	R10, R13	330 ohms
C1, C2, C3, C4, C11, C12, C22	1 nF WeeCon.	C5, C8, C23, C26	10 uF Bead Tantalum
C6, C14, C15, C17, C19, C21	100 pF Ceramic	C7, C32	47 uF Bead Tantalum
C9	47 nF WeeCon.	C10	2 uF Bead Tantalum
C13, C25, C37, C39	100 nF WeeCon.	C16, C18, C20	4.7 nF WeeCon.
C24, C28, C38, C40	10 nF WeeCon.	C27	150 uF 6v Al Electrolytic
C29, C30	1uF Bead Tantalum.	C31, C33	100 uF 6V Bead Tantalum.
C34	500 uF Al Electrolytic.	C35, C36	68 pF Ceramic.

Mixer. Anzac MD108 Hot carrier diode ring mixer.

This article describes the IF and AF signal circuitry of a single-sideband transceiver designed by the Applications Department of Plessey Semiconductors using their SL600 Series Integrated Circuits. The transceiver may be used at any frequency from a few kHz to 500 MHz.

The unit described in this article consists of a single printed-circuit board which requires only the addition of a local oscillator, a preselector, a linear amplifier, volume control, microphone and loudspeaker to make a complete transceiver.

RECEIVER

The receiver consists of a single-conversion superhet with a 9 MHz IF. In order to optimise its intermodulation performance there is no RF amplifier and the incoming signal is fed directly to a hot-carrier diode ring mixer and then to the crystal filter. The IF sensitivity is such that at frequencies of 30 MHz or less no RF amplification is required if a reasonable antenna is used (as it would be with a transceiver) but if the receiver is used at frequencies of over 30 MHz, or with a less than ideal antenna, some RF gain may be necessary to obtain the necessary noise figure. The RF amplifier used should have the lowest gain consistent with the frequency and antenna to be used and must have good large signal handling capability if the receiver performance is not to be degraded.

The mixer is an Anzac MD108 hot-carrier diode ring. This was chosen for its conveniently small size, high performance and low cost, but doubtless similar devices from other manufacturers could be used. All the ports of this ring are 50 ohms and two have a frequency range of 5 MHz to 500 MHz while the third has a frequency range of DC to 500 MHz. The input from the antenna is applied to this DC to 500 MHz port via a preselector, and the local oscillator at a level of +7 dbm (500 mV rms) — is applied at pin 8. The mixer output from the last port passes a ferrite toroidal transformer to match it to the 500 ohm input impedance of the filter. If other filters are used the impedance-matching transformer may need to be altered.

Once the signal has passed the crystal filter, a 2.4 kHz bandwidth 9 MHz filter with 90 dB stopband suppression (the SEI QC1246AX), there is little further risk of cross-modulation or intermodulation. The IF strip consists of three cascaded SL612C IF amplifier circuits followed by an SL640C product detector. Without agc applied each SL612C has 34 dB gain, and 15 MHz bandwidth. A broadband IF strip of three SL621Cs has over 100 dB gain and 15 MHz bandwidth and can very easily become unstable. The circuit board layout used for this transceiver is critical if the IF strip is to be stable. It is relatively easy to make a three stage broad-band strip on double-sided printed circuit board if the component side is left as a plane of grounded copper, but on single-sided board the layout used in this article should be rigidly adhered to.

The beat frequency oscillator for the product detector is a FET crystal oscillator. It delivers about 100 mV rms to the SL640C product detector and also supplies the carrier for the transmitter modulator. One of two crystals for upper or lower sideband is selected by diode switches.

The detected audio from the product detector drives an SL630C output stage, which is capable of providing about 65 mW to headphones or a small loudspeaker and also drives an SL621C agc system. The SL630C has voltage-controlled gain so the volume control consists of a potentiometer providing a control voltage to the SL630C. If 65 mW is insufficient output (it is worth listening to it before deciding as it is usually adequate for domestic listening) an external higher power audio amplifier may be driven either from the SL630C output or directly from the product detector.

The agc is provided by an SL621C audio derived agc system. Its output is buffered by a transistor Q2 to enable an 'S' meter to be connected if required. Since Q2 reduces the available agc voltage swing, agc is applied to all three IF stages to ensure that the agc can cope with the receiver's 114 dB dynamic range. If R7 is replaced by a germanium diode there will be a delay to the first stage agc which may improve the receiver noise figure very slightly on small signals — this is barely worthwhile. The capacitors C16, C18 and C20 are kept down to 4700 pF in order to retain the ignition suppression characteristics of the system.

TRANSMITTER

The transmitter is also single conversion. It generates single-sideband at 9MHz by the filter method using the same crystal filter as the receiver. The 9 MHz SSB is then converted to the final frequency by the MD108 ring mixer with the unwanted product being removed by the preselector. This system entails no signal switching between the antenna side of the preselector and the transmitter/receiver side of the crystal filter on the change-over from receive to transmit. All the transmit/receive switching on the board is achieved by turning on the appropriate power line (transmit or receive) and grounding the unused line. The grounding of the unused line is most important and instability can result if it is not done.

The audio input from the microphone is amplified by an SL622C agc amplifier which will give a constant 100 mV rms output for a 60 dB range of input. If a single-ended input is used rather than a balanced input this dynamic range is reduced to about 46 dB. In most systems 60 dB input dynamic range is too large, 40 dB being sufficient, so R5 has been included in the circuit. If 60 dB is required R5 should be omitted and C9 reduced to 4700 pF.

The audio output from the SL622C goes to the SL640C double-balanced modulator. The carrier input to this modulator is fed by the BFO (which works on both transmit and receive since its power may be derived from either line via diodes D5 and D6). The output of the SL640C consists of double-sideband with low carrier leak (usually —40 dB on signal) which is amplified by an SL610C which may have its gain controlled either by an ALC signal derived from the transmitter linear amplifier or manually by a DC gain control. This amplified DSB is applied to the filter to yield SSB. Resistors R1 and R2 ensure a correct match to the filter both on transmit and receive.

The SSB output from the filter passes to the diode ring via the impedance-matching transformer and is mixed with the local oscillator to give the final transmitter frequency (and an image which is removed by the preselector). This is amplified by the linear amplifier and transmitted. The output from the preselector is about 70 mV rms.

CONSTRUCTION

The system is built on a single-sided printed circuit board with two wire links — one in the receive supply, the other in

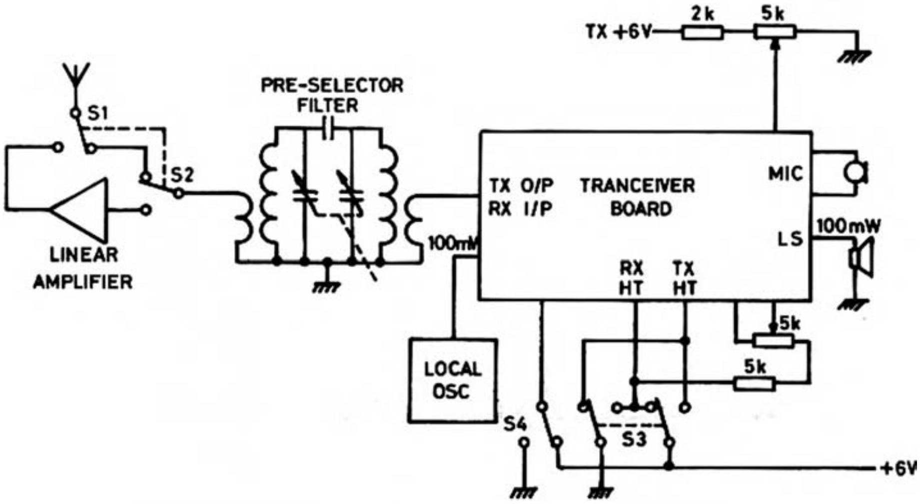


FIG 2 BLOCK DIAGRAM OF TRANCEIVER

the transmit supply. If only a receiver is required the components R1 and R5 inclusive, C1 to C13 inclusive, C40, and the semiconductors IC9, IC10, IC11, D5 and D6 must be omitted, a wire link connected where D5 was, and a 500 ohm resistor connected from the filter end of R6 to earth.

The layout of the board is critical and changes of printed circuit design will almost certainly lead to instability unless double-sided board is used. The design shown may be built on double-sided board quite safely.

The components used in the original are given in the list below. Bead tantalum capacitors are used where possible for their small size but since they are hard to obtain in high capacitances at high voltages aluminium electrolytics have been specified in three places. The WeeCon capacitors specified may be replaced with other miniature high-K ceramic capacitors but the values of any components should not be altered without very good reason. The resistors are all ⅛ W 10% types.

Transformer T2 is made on an ITT CR 071-8A ferrite core.* Four 5 cm lengths of 26 swg wire are twisted together and two turns are wound on the core with the twisted wire. The ends are then opened and three windings are connected in series for the filter winding and the fourth is used as the winding connected to the diode ring. Transformer T1 is wound on a core of the same type and has a 6 turn primary and a single turn secondary.

CONCLUSION

The circuit diagram of the system is shown in Fig 1 and a block diagram of its use in a single band transceiver in Fig 2. Obviously it may be used in many different transceivers, the one in Fig 2 being the simplest. Fig 3 is the printed circuit master and Fig 4 shows the component placing.

This transceiver is probably the simplest which may be made using the SL600 Series but its performance is not compromised. It has a sensitivity of better than 0.5 uV for 10 dB S/N, it can handle signals of over 200 mV rms at the diode ring with minimal intermodulation, and the board uses less than 500 mW on transmit or receive. It has been designed so that anyone with basic technical competence but without previous experience in SSB transceiver design can build a successful SSB transceiver. Probable users are both amateurs and small firms wishing to enter the SSB transceiver market. ●

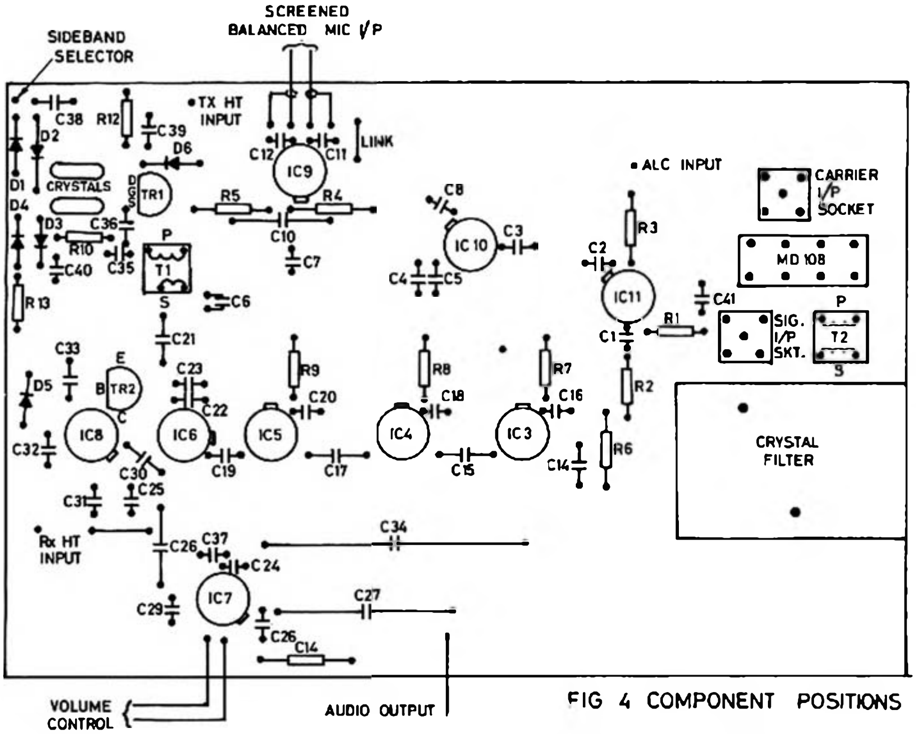


FIG 4 COMPONENT POSITIONS

*Any small ferrite or iron dust toroid with cross-section greater than 3 square millimetres and diameter between 7 and 12 mm, capable of working at 9 MHz, may be used. Square-loop materials, however, are not suitable.

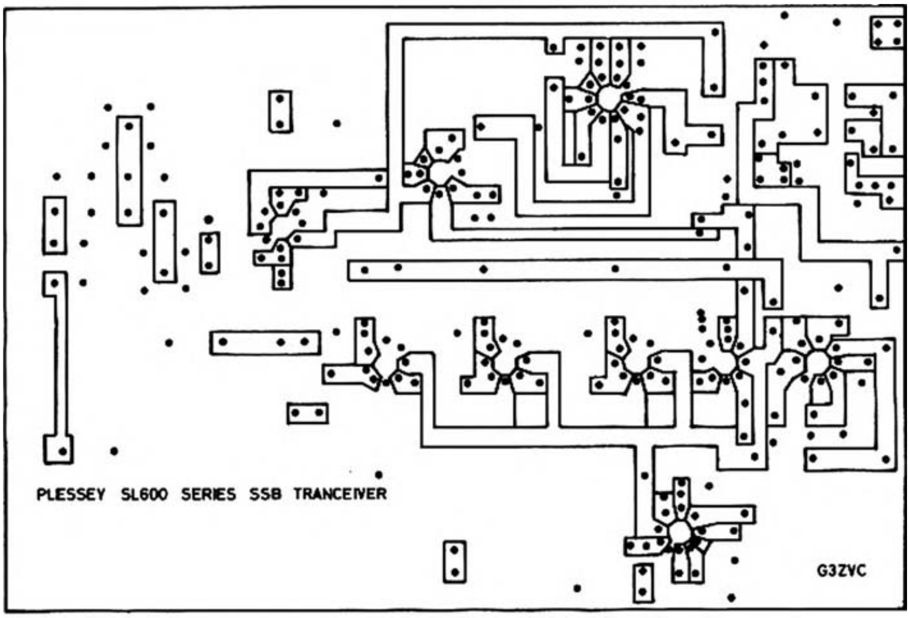


FIG 3 PCB LAYOUT

DX adventure on Willis Island

The following is a resume of a six month stay at Willis Island Meteorological Station by Kevin Collins, VK4TU/VK9ZC.

Willis Island is the southernmost of the three small islands comprising the Willis group. It is approximately 280 miles ENE from Cairns, past the Barrier Reef towards the centre of the Coral Sea.

It was originally manned in 1921 and used as an OTC Coastal Radio station. Over the years its role was changed to a weather station under the control of the Commonwealth Bureau of Meteorology.

The island is only 13 acres in area, 500 metres by 150 metres. It is abundant with bird life and king size turtles sometimes come ashore.

The weather station is manned in six-monthly shifts by four MET officers, comprising an OIC and three observers. One of the observers is a Radio Technical Officer (RTO) and it was in this capacity that Kevin served. He was on the island from June 1973 to December 1973 and operated on the amateur radio bands with an FT101 in his spare time.

Before commencing the 'expedition', a familiarisation course was held in Melbourne. This covered the Radar installations, communications and other electronic instruments on the island. This was followed by a week with the Commonwealth Department of Works in Townsville for maintenance procedures to the refrigeration, electrical and power installations.

From Townsville, Kevin travelled to Cairns, where he met the other three members of the crew. They were the OIC, John Goonan, and MET observers Trevor Haslam and Jim Milne. The ship, the 'Cape Morton' took them to Willis Island from Cairns.

Kevin had obtained permission to operate Maritime Mobile on the journey to the island. Despite the 'last night' on the land revelations, he was up on the After Deck at noon the next day. Power on board the Cape Morton is 220V DC, but this was overcome temporarily by borrowing a 12V battery from the ship's radio officer. Unfortunately, the battery was only partially charged, but it kept the FT101 on the air for six contacts before it flattened. The antenna used was an ex-tank ¼ wave whip.

With so much to do on arrival at the island, it was a week before Kevin was able to get on the air. Initial amateur contacts from Willis Island were made with the tank whip, then dipoles for 20, 40 and 80 metres. He had taken the materials for a spider quad on 20, 15 and 10 metres, and this went into service in late July. Approximately one month later, the SWR on the quad climbed appreciably, to over 3 to 1. The quad was taken down and an inspection showed that the balun windings had eroded, due to the salt water atmosphere.

Kevin had decided on a single coax feed within the balun attached to the 15 metre loop. Two short lengths of 72 ohm balanced line were attached to the 20 and 10 metre loops. This system worked quite well and the SWR on the three bands was not greater than 1.5 to 1.

After repairs and sealing of the balun were carried out, the quad was mounted on a wooden tower with the centre approximately 10 metres above the ground. Rotation of the quad was by means of a very crude "Armstrong method".

The whole system performed with excellence until about 2 weeks before the end of the tour, when the 15 metre loop collapsed. A further victim of the corrosion problem on the island.

Kevin's operating times were somewhat erratic, having to fit in around the TV programmes. TV reception was spasmodic, to say the least, relying on "Ducting" from the mainland. It was found to be best with a medium level Temperature Inversion.

An idea of what quality the night's programmes could be expected was ascertained from the daily Radiosonde Plot of the upper atmosphere, temperature and humidity.

TV reception was primarily from CH3 Townsville, using a VK9ZC "home brew" 6 element Yagi with a mast head preamplifier. A similar design 11 element Yagi was cut for CH9 to try reception from Bellenden Kerr (Cairns). This proved that a useable signal was present if about another 10 dB gain could be achieved. After much experimenting with long wires, V's etc., good TV reception was obtained by using a stacked Rhombic with approximately a 200 foot long axis.

Theoretically, this gave about 24 dB gain at 200 MHz, and was found to be by far the best for long range weak signal TV reception.

The stacked Rhombic gave watchable signals about 5 nights per week.

The "friendly contest", the RD, really proved itself on the island. Kevin was relieved of his duties for the 24 hours, provided he stayed at the microphone. It was this 100 per cent support from the rest of the crew that enabled him to win the VK9 segment of the contest.

Apart from TV and amateur radio, the only other recreation on the island is a BC band radio, a stereo record player, bird watching and swimming.

There is no contact with the families of the men on the mainland except for a weekly 100 word radio Telegram link with Townsville. This proved to be futile.

A supply plane flew over each 3 months to drop newspapers and essential supplies. On the first drop, the newspapers landed in the 7 foot high surf approximately 100 yards off shore. A successful swimming retrieval was made, and the slightly moist, but readable newspapers had arrived.

Once word got around of the new DX station operating, it was only a matter of time before the dogpiles started. Sometimes for an entire evening through until dawn.

As can be appreciated, that with the heavy QRM, Kevin reported that it sometimes took 15 minutes to extract a callsign and work a station.

Kevin states emphatically that he was

very fortunate to have a QSL manager in the person of Ken McLachlan VK3AH, who was ably assisted by his wife Bett. Many pleasant QSOs between the McLachlan QTH and Willis Island helped to make the tour a very enjoyable one, and their generous assistance was greatly appreciated by the lone operator.

Kevin and Ken had arranged daily schedules on 14200 for transcribing of the VK9ZC log. Most of the QSL cards for the entire log have been sent out.

In all, 2440 QSOs were made with other amateur stations and 112 countries were worked.

As the lonely weeks went by, John Goonan asked Kevin if it would be possible to arrange for his wife Jane, who was living in Melbourne, to talk to him on the amateur band.

It was so arranged by Ken VK3AH to make contact with Mrs. Goonan and organised a local station near her home at Oakleigh, to make the contact.

Bruce VK3ASE in Aspendale, volunteered to allow Jane Goonan to talk to her husband on the Island.

A check with the local PMG Radio Branch confirmed that the transmission could take place provided the provisions of Section 83 of the PMG Regulations Handbook were strictly adhered to. This was duly done.

On Sunday the 29.7.73 Jane and John spoke to each other for the first time in 2 months. Although band conditions at the time were not brilliant, 5 x 5 signals were exchanged and the QSO lasted for 20 minutes.

Both parties were elated at being able to converse in this manner, and subsequently a regular Sunday morning sched. was arranged for the remainder of the Willis Island tour.

Power on the Island is continuous 240V AC supplied by 1 of 3 20KVA diesel alternators.

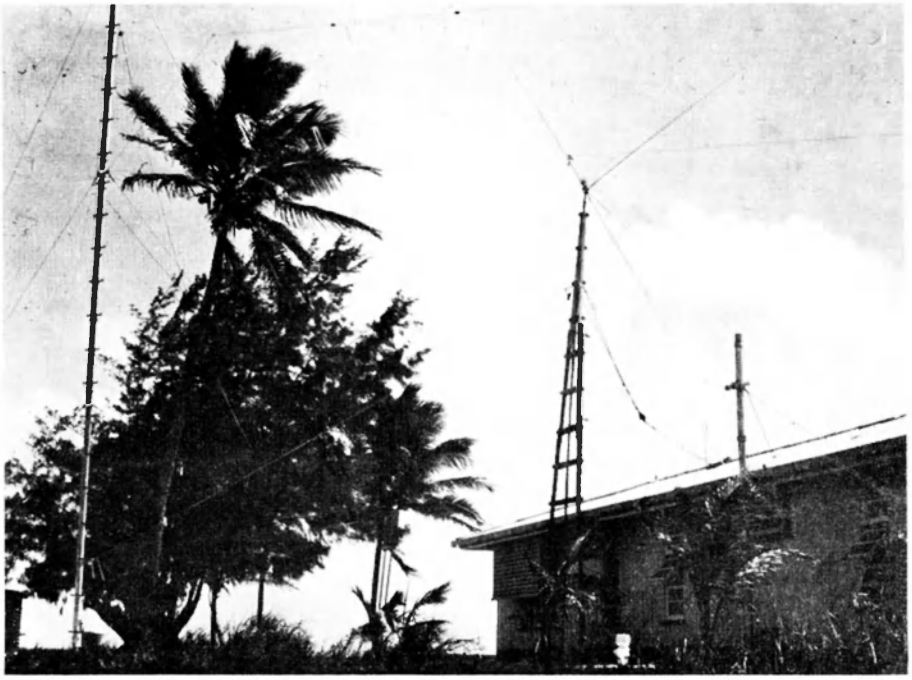
Commercial HF equipment is 2 x 500 watts PEP Racal Transmitters and RACAL receivers, and a 100W PEP emergency transceiver. The main link is with Townsville, but during the tour, an experimental "V" approximately 300 feet long was erected beaming towards Gladstone/Brisbane and brought Willis Island into the coastal cyclone emergency net.

The wind tracking Radar, a Decca WF-2, is used 4 times daily at 6 hourly intervals to collect wind data in the upper atmosphere. The radar tracks corner reflector targets tied to hydrogen filled balloons. The hydrogen is generated each day from caustic soda and Ferrosilicate.

On returning to the mainland, Kevin said that all in all, the tour was a great success, Amateur Radio wise.

He hopes to make a special return journey to the island for one week as a DXpedition, but the dates have yet to be arranged.

At the present time, there are no licensed amateurs on Willis Island. — VK3ASE ●



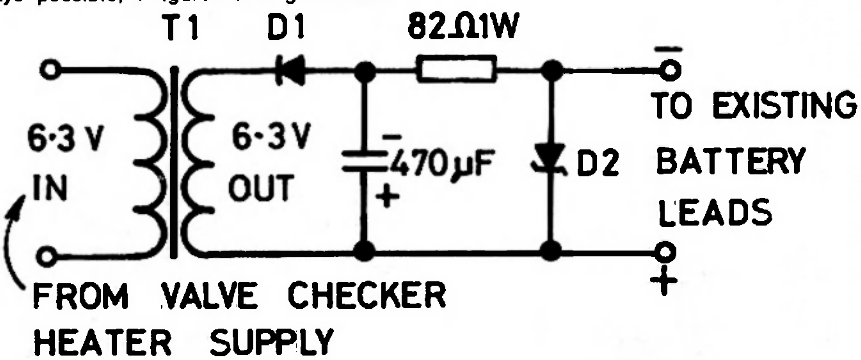
Some of the antenna used by VK9ZC on Willis Island.

PALEC VCT MODIFICATIONS

JOHN H. McCONNELL, VK3RU
23 Stewart St., Ormond, 3204

In the AR issue of April 1966 on Page 2, an excellent article by G. Wall, on the modernising of this instrument to accommodate the emission testing of modern valves was presented. The modification was carried out at this QTH on my "VCT" and has certainly updated and extended the usefulness of this function.

Since most of the functions of the instrument require it to be connected to the AC mains, and complete portability is not always possible, I figured it a good idea to energize the "Ohm x 1", "Ohm x 10" and "Low Ohm" ranges from the instrument power supply because the 4½ volt dry battery used for this purpose always seemed to be flat when these ranges were required. A very low resistance supply source must be used and the circuit shown in the diagram is completely satisfactory and can be accommodated in a convenient corner or space within the instrument case. ●



T1—Isolating transformer. Wound on small speaker transformer core. Both windings use No. 30 B & S enamel wire. No. of turns for both Primary and Secondary given by formula:—

$$\frac{8.0}{6.3 \times \text{core area in square ins.*}}$$

Interleave laminations when assembling.
*middle leg of core taken for core area.

D1—Low voltage silicon power diode (25 PIV minimum).

D2—4.7 volt Zener diode (low wattage type).

Adding FM to the FT200

J. W. K. Adams, VK5SU
34 Lambert Street. Ceduna. 5690

During the 1972 VHF DX season an FT200 transceiver was used with transverters to transmit CW, AM, SSB and FM modes. The word soon went around that an FT200 was producing FM and many questions were asked by interested amateurs. In response to requests for information (and after much arm-twisting by the Editor) the following article has been prepared. This deals specifically with the FT200 but could be applied to other transceivers in the Yaesu Musen series.

Circuit

The modification is very simply achieved and involves the varicap diode clarifier circuitry associated with the 5-5.5 MHz VFO and normally used for offsetting the receiver frequency from the transmit frequency by up to ± 5 kHz. This is achieved by varying the dc voltage on a IS1007 varicap diode (D104) by means of the receiver clarifier control. When transmitting, fixed bias is provided for the varicap diode from a voltage divider network and the clarifier control is inoperative.

Transceiver Modification

The clarifier circuit and the modification for FM are shown in Fig. 1.

First mount an RCA chassis type phono socket or a Jabel spring loaded terminal post in the vacant hole marked "AUX" on the rear of the FT200 chassis. Mount a three tag, tag strip at the socket and solder in the .0047 uF RF by-pass disc ceramic capacitor and the .1 uF polyster capacitor. The latter isolates the external audio driver amplifier from the dc voltage present on the varicap diode.

Next, run a short length of PVC covered shielded microphone cable from the tag strip round and through the chassis to the clarifier connection point on the side of the VFO box (Fig. 2). Earth the cable shield to the VFO earth tag and at the three tag strip.

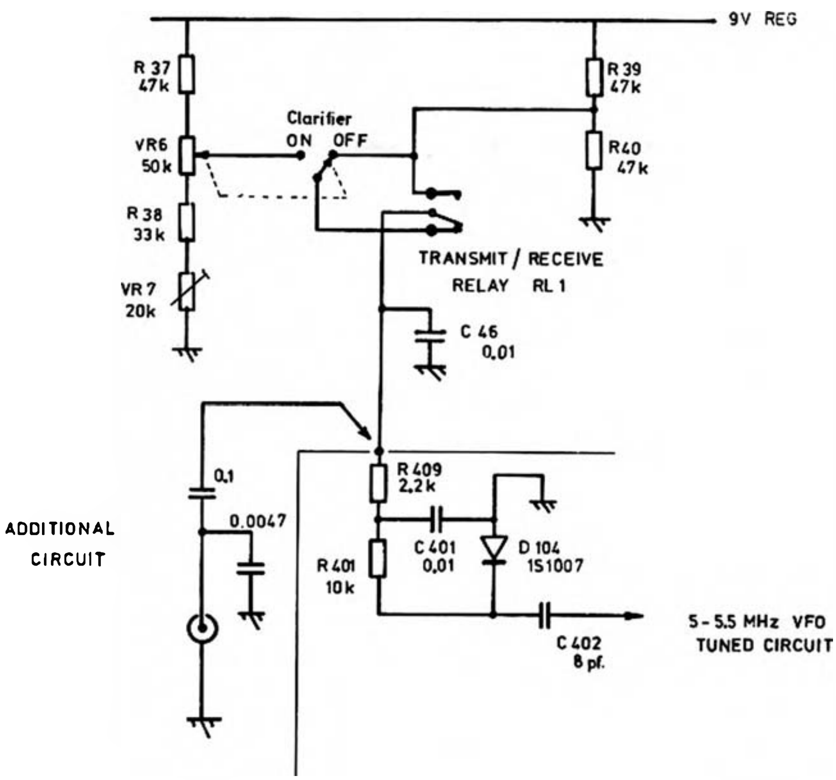


FIG 1 FT200 CLARIFIER CIRCUIT

This completes the modification to the FT200.

External Audio Amplifier

There is plenty of scope here and individual requirements will dictate the complexity of circuitry and whether valves or transistors are used.

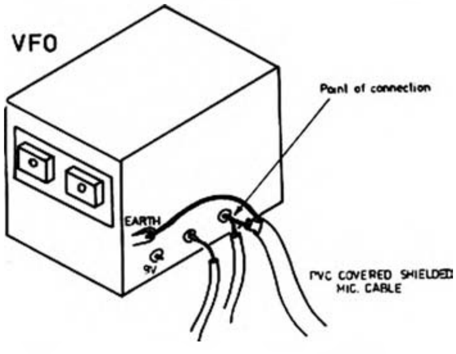


FIG. 2 FT200 VFO CONNECTIONS

It is important that the amplifier has a low impedance output as the audio frequencies are shunted by .01 uF by-pass capacitors in the varactor diode circuit. Originally, to be operational in time for the 1972 DX season, the three ohm output from a tape recorder monitor amplifier was used as a source of audio.

The valve mic amp shown in Fig. 3 is currently in use (lots of valves still in the junk box), and is built into an FM/AM tuneable IF receiver. Carrier deviation of ± 10 kHz is easily obtained and the audio quality is excellent.

The output transformer used came from the popular disposals SCR-522 VHF transceiver. The characteristics and pin connections are as follows:

Audio Output Transformer 296:
Primary — pins 1 and 2; plate load.
DC resistance — 870 ohms.
Impedance — 15,000 ohms.
Secondary — pins 4, 5, 6 and 7; audio output.
DC resistance — 390 ohms.
Impedance pins 4-7, 4,000 ohms.
Impedance pins 4-6, 300 ohms.
Impedance pins 4-5, 50 ohms.
HT choke — pins 2 and 3; HT filtering.
Dc resistance 340 ohms.
Rating 6H/50MA.

Some power is wasted in the terminating resistor but this is included to maintain a load on the transformer.

The output should be shorted or disconnected when the FT200 is used for CW/AM/SSB otherwise unwanted FM of the carrier can occur on transmit and receive.

Operation

Tune up and operate, as for AM operation.

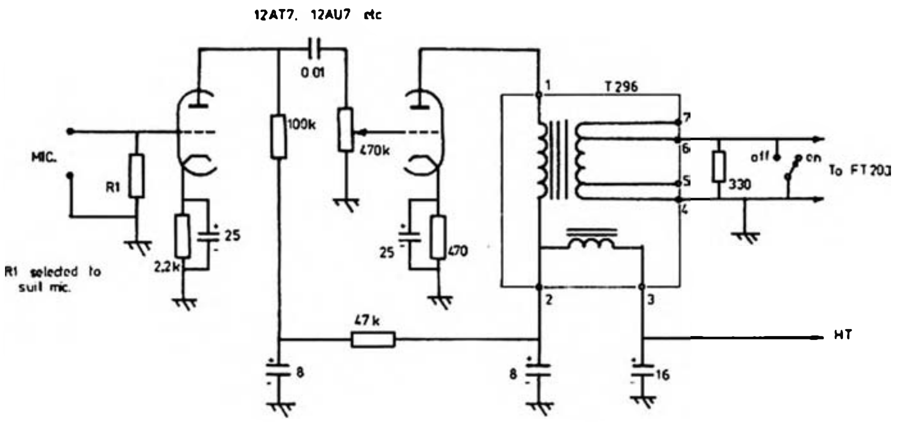


FIG. 3 MICROPHONE AMPLIFIER

Turn down the FT200 microphone gain control to prevent unwanted modulation.

Receiving FM

The FT200 has not been modified to receive FM. A transistorised audio driver amplifier and a 9 MHz IF strip with discriminator or phase lock loop detector could be incorporated without too much difficulty. The 9 MHz IF signal should be taken from the 6U8 receiver mixer, before the sideband filter. I take the 28 MHz IF output from the FTV650 6 metre transverter to a minimum loss resistive splitting network so that the FT200 (receiver) can be used simultaneously with the tuneable IF AM/FM receiver or other tuneable IF receivers.

One advantage of this multiple receiver/mode set up is the ability to monitor amateur beacons, TV stations and net frequencies whilst in QSO on another frequency. VOX or PTT operation is used.

Reference

1. "Adding FSK to the FT200". VK3ASV "AR" September, 1972.

Gleanings from a trip to ZL

From GREGOR COX, VK3ZCG
Per GEORGE, VK3ASV

After much deliberation and farming out of harmonics, together with the XYL we boarded a DC10 on 9th of February and arrived three hours later in Auckland.

Friends met us at the airport and then drove south a distance of 60 miles to Huntly, a major coal winning district. Prior to leaving VK we had determined the various repeater and simplex frequencies in use in the area of our proposed visit, and had acquired the crystals necessary for operation. Repeaters are prefixed with letters A, B, C, D, and for those interested, operate with the following frequencies:—

	Output	Input
A	145.6 MHz (Old. Ch.1)	146.30
B	145.65 MHz	146.35
C	145.7 MHz	146.40 (Ch.4)
D	145.75 MHz	146.45

Simplex channel 146.00 MHz is also used quite a lot.

For operation in ZL it is necessary to obtain a licence, which is issued upon production of normal **Operator's Certificate and current licence,** plus a fee of $3.00 together with the application form filled in. Any intending visitors who wish to operate, and save time, should write for the application form to: Chief Radio Inspector, 150 Hobson Street, Auckland, New Zealand. Return completed form and fee, and normally within a few days the licence is issued.

Some important points: All "Z" calls are issued with a "T" call which unfortunately does not allow operation below 144 MHz (No 6 Metres). Unless Full Calls have obtained a licence in the days of 14 WPM Morse, nothing better than a "T" Call will be issued. The gear used on the trip was an STC 131 Carphone, with AC pack for portable operation. While portable in Huntly, with a ground plane nine feet above the ground, 20 separate stations were worked through Channel (as above) situated in Auckland and running 15 watts into vertical dipole. By moving the ground plane a few feet we were able to operate through a channel "B" repeater some 30 miles away in the Walkato area, also running 15 watts but using collinear dipoles.

A car being made available, we set up the gear for mobile operation, using a gutter mount 5/8 whip. We had hoped to operate through another Channel "B" repeater in the Palmerston North area during a trip around the southern section of the North Island. However, a slight mishap not discovered in time prevented any communication; feeding coax through the door does not always work, particularly when the door chops it in two.

Later, we moved north, about 170 miles above Auckland, and had access to another vehicle, and found operation very satisfactory. The repeater at Whangarei is on channel "B" frequency and runs 6 watts. Contact was made with only 2 operators, as most were away during the day time. All told we worked 33 separate stations during the brief visit, and part of the time was spent near Kaitaia which is well out of range of any repeater.

A few days before our return, we did work a ZL2 from Nelson (South Island) who was getting to the Auckland repeater during a brief period of inversion. All repeaters mentioned were FM, although we understand there are still a few AM systems on the South Island, which are eventually to be phased out. During an eyeball with a Full Call operator in Auckland, mention was made of interest in and listening on 144.1 MHz ssb. Apparently contacts have been made with VK2s on this frequency, and contact with any stations would be welcomed.

Visitors are made most welcome, on the air and by personal contact. There were many meetings we could have attended, had there been time.

Apart from radio, the place is very scenic. The roads we saw were very good, although sometimes slow because of the many curves. The Government's absolute speed limit of 50 mph was brought in as an economy measure, together with the closure of service stations over the weekends. It has been indicated that during the winter period all weekend travel will be barred apart from road users with permits, so we may spare a thought for our friends across the Tasman who rely on us for their fuel supplies. Duty free shopping on a range of items is available in Auckland City as well as the Airport, however articles are not made available immediately but placed on the ship or plane of your journey and made available at destination. Authority to purchase is recognised by production of travel ticket and Australian Currency.

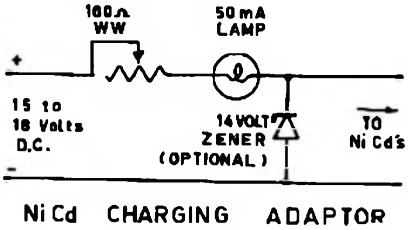
Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

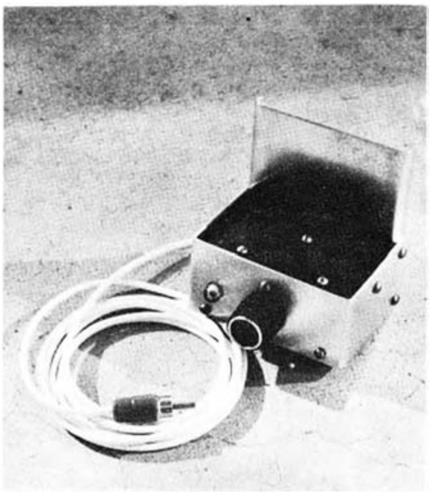
Continuing with our series devoted to the KEN KP202 hand-held two metre FM transceiver, this month some ideas on chargers and charging adaptors for nickel-cadmium batteries.

First, a charging adaptor designed and constructed by Bob VK3BU. This little unit is ideal if you already have a DC supply capable of delivering 15 to 18 volts at about 100 milliamps. It would also be suitable to use with a twelve volt car system under charging conditions. Another source of voltage often found around the home is junior's model train or slot car power supply. Make sure that the polarity is right and perhaps a series diode might be good insurance. Also a 1000 mFd. electrolytic across the output of the power supply would be worth while. The series globe in the adaptor serves two purposes. It acts as a charging indicator and also as a current limiter. In operation the rheostat should be adjusted so that the globe lights to about half brilliance with the batteries in a discharged condition.

The KP202 sitting in the VK3BU charging adaptor.

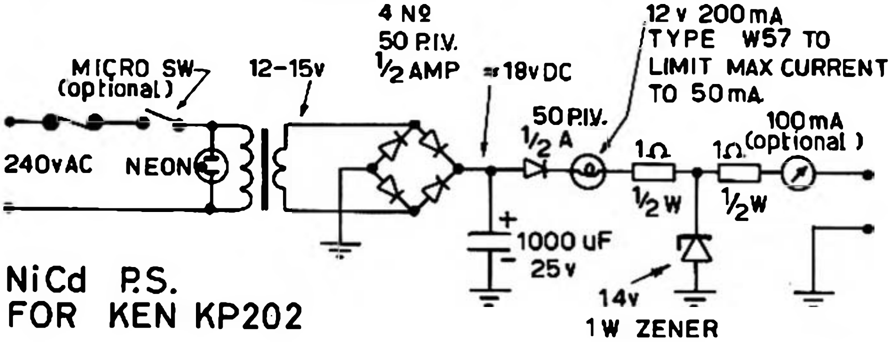


The mechanical construction of the adaptor should be fairly clear from the illustration. It was bent up from light gauge aluminium, the contact studs are simply two ⅛ inch round head screws mounted on a piece of bakelite or similar insulating material.



A close-up of the VK3BU charging adaptor.

The KP202 in the VK3ADP charger.

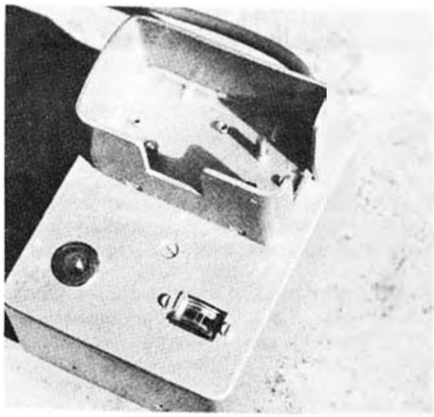


Now to the second of the two chargers. This was designed by Don VK3ADP and is completely self contained with built-in power supply. The mechanical basis of this is a medium size die-cast box with the KEN holding bracket bent from a piece of perspex after careful heating with either boiling water or a blow lamp. After attaching to the diecast box the whole assembly was sprayed with silver enamel.

Don's unit features quite a few deluxe items. Firstly, a micro switch in the AC line actuated when the Ken is placed in the cradle. A small meter salvaged from an old Japanese tape recorder serves to indicate charging current. The zener diode across the output conducts when the battery voltage reaches 14 volts and thus prevents overcharging.

In conclusion, a few words about charging nicads:

When on charge, battery temperature should never exceed 38 deg. C (100 deg. F) Check on published data for your particular batteries for maximum allowable charging current.



A close-up of the VK3ADP charger clearly showing the AC micro-switch actuator.

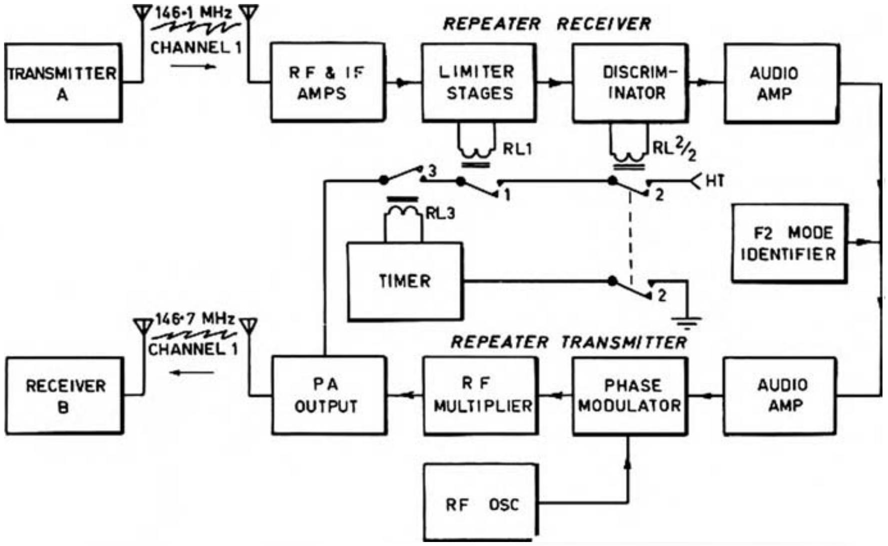
The required charging time can be calculated by dividing the amp-hour rating by the charging current, then multiply this by 1.25.

Batteries in series should not be charged unless they are of the same type and in the same state of discharge. ●

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155



TWO METRE FM REPEATERS — FACTS AND FALLACIES (PART 2) HOW THEY WORK

The two metre FM repeater shown in block form in the diagram may or may not exist in Australia, but the general principles still apply. The repeater consists of a receiver and transmitter co-sited and designed to operate with one another at the same time — when a signal comes in of course. The receiver operates all the time and it controls the operation of the transmitter.

The repeater receiver is similar if not the same as the one that you might use to listen to the repeater on. It has the normal RF and IF amplifiers, followed by the limiter, discriminator and audio stages. The limiter and discriminator are shown modified in my diagram. The limiter stages provide a negative voltage at their grids if valved, which can be sampled to drive a relay switching stage. When a reasonable signal is received this relay stage operates because quite a high negative control voltage is developed in the limiter stages. When relay 1 pulls in it closes the first of the series switches in the transmitter HT supply line.

At the same time or nearly so the noise amplifier associated with the discriminator switches on the audio amplifier and also causes relay 2 to pull in. As a signal is received into the discriminator the internally generated noise of the receiver amplifiers is quitened down and causes this noise amplifier circuit to work. So that the good work of the noise amplifier is not spoilt by the received audio on the signal, which can be considered to be audio noise, the band pass of the noise amplifier and the communications audio amplifier are different. The noise amplifier only responds to audio noise above about 3 kHz whereas the communications audio amplifier only responds to audio below 3 kHz.

The discriminator relay once it pulls in switches on the interval timer causing the third relay to operate and so completes the HT line to the transmitter. The input signal to the repeater is now fed to the transmitter which now radiates a signal modulated by the audio signal fed to it from the receiver. This output signal by necessity must be on a different frequency to the received signal otherwise the receiver would not be able to hear any signal other than its own transmitter.

After a predetermined time, say 2 to 5 minutes the timer circuit releases relay 3, so causing the transmitter to go off the air as it now has no HT. This is the ideal thing of course to train the chaps who like long monologues, to give other users a fair go. It is also valuable should some carrier come up on the input frequency from a defective service or through someone sitting on their microphone. The transmitter will stay off air until there is a break in this continuous carrier.

The F2 mode identifier is a device fitted to some repeaters to indicate periodically which repeater is being worked through. It sends out the callsign in morse code. To my knowledge only one of the VK3 repeaters has an automatic identifier, but I understand repeaters in other States do have these fitted.

As can be seen, a repeater is not such a complicated device as many might have thought — in principle anyway. Repeaters incidentally are designed with the notion that they must have safeguards inbuilt so that should anything go wrong no damage will occur to the equipment nor will it lock onto the transmit mode. Therefore more care is necessary in the design and construction of a repeater than perhaps the average piece of amateur equipment.

The input and output frequencies on the 2 metre band are spaced 600 kHz which is quite close in frequency relatively, if the transmitter and receiver are co-sited. To overcome this problem many of the repeaters are fitted with cavity resonators or filters in their transmission lines. These filters have a high Q and are used as either rejectors or acceptors of signals. It may be that acceptors are used, in which case the receiver has a filter fitted to its transmission line which only accepts its receiving frequency and the transmitter has a filter that only lets its intended transmission frequency out. If these filters are not used the transmitter tends to block the receiver and make it insensitive and so defeats the whole reason for having the repeater.

I hope this short discussion has been of some help to you in understanding FM repeaters. The operation of individual repeaters will vary from that described but not basically.

Next Month, the EMC edition — **Electro Magnetic Compatibility.** ●

Intruder Watch

with Alf Chandler VK3LC

1536 High Street G[illegible]s [illegible]

The following is a precis of the main stations reported in my quarterly summary of intruders as at 30th June, 1974, and forwarded to PMG, RSGB, ARRL, HARTS, Singapore RC and K6KA:—

21044-6	A1	4XZ — sending letter code, 0500-0730Z.
21155	A1	KLW — sending "CQ de KLW".
14009	F1	XYZZ — Teletype read-out submitted.
14023	A1	NAP — sending calls.
14035	A1	PBJ — sending calls.
14050-64	A1	QEBL — calling CBFN and sending 4 letter code.
14075	A1	UHF3 — calling CQ and sending 5 figure code.
14250	A1	BCX24 — sending news in English.
14335	F1	BZP54/BZR66 — Teletype read-out submitted — "Hsinhua news agency Peking".
7010-3	A1	9QNF — calling WXJ4.
7015	F1	"HMR56/HMF21/HME28/HMK71 freq. 11230/7015/13780/9404 kcs Pyong Yang vvvv . . ." followed by facsimile.
7029	A1	KDL — sending "CQ de KDL".
7040	A1	UQB — sending "CQ de UQB"
3508	A1	6MFS — sending "ZJPT de 6MFS hj k".
3608	A1	UQB — sending "CQ de UQB".

Any station sending "hj" can be identified as being in Red China. The MHR56 series situated in Pyong Yang in North Korea is annoying many Observers and I am endeavouring to persuade our authorities to institute a complaint. Unfortunately, the FCC in the US cannot initiate any complaint because the United States does not have diplomatic relations with North Korea, otherwise they would definitely issue a manifesto. The second harmonic of the above is heard at strength in the US, but I have had no reports of it being heard in Australia. The frequency would be 14030, and reports would be appreciated; as also would identification of signals heard on the following frequencies — A1 — 21140, 21150, 14050, 14140, 14163-7, 14210.

While travelling around the Orient recently I was fortunate in contacting and meeting personally some of the boys in Singapore, as well as in Darwin. I have promises of co-operation in intruder matters from both these districts. However, I was unable to see anybody in Japan or in Hong Kong.

With the departure of Bill, VK2ZO, to Nauru, a vacancy has been made available for a Co-ordinator in VK2. I am hopeful that this will be filled in the near future. ●

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

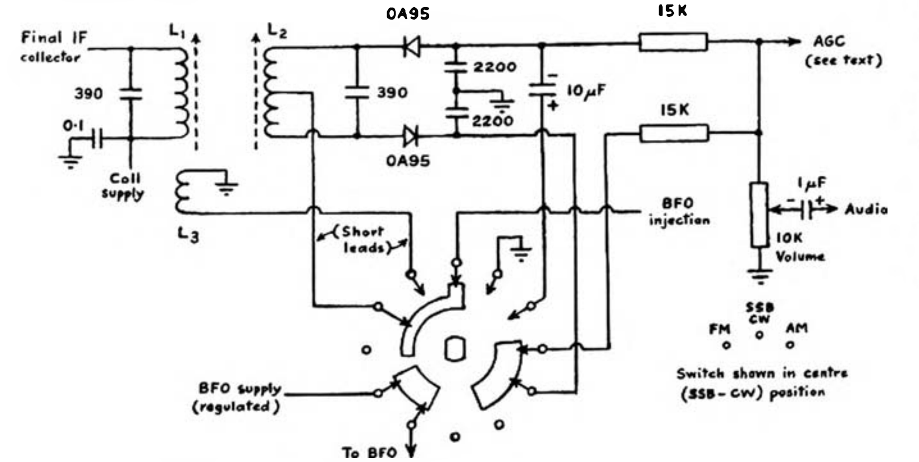
A MULTI-MODE DETECTOR

Some years ago the author built a moderately complex general coverage receiver. During the last few years it has been used mainly as a tunable IF for VHF converters, and may equally well be needed to listen to AM, FM, SSB or CW. The 455 kHz IF amplifiers can be switched to give bandwidths of 3, 10, or 30 kHz, as desired for the chosen mode. The multi-mode detector used has interested all who have seen the receiver, so it was thought worth publishing a description for the benefit of other receiver-builders.

Basically, it uses a diode envelope-type circuit for AM, changes it to a balanced-diode product detector for SSB and CW, and then to a ratio detector for FM. This is all achieved with one slightly unorthodox switch wafer which should not be too hard to duplicate. AGC may be obtained as shown, for AM only, via a suitably long time-constant filter. There will be no AGC voltage at the correct FM tuning point, thus giving maximum limiting. However, the author preferred to use a different amplified AGC system which was effective on SSB also.

IF TRANSFORMER DATA

L_1 240 turns 38 SWG enamel scramble-wound length 3-16 inch
L_2 2 x 120 turns bifiliar as above
L_3 60 turns wound over L_1
L_1 and L_3 are on one former, L_2 on the other, of a small Neosid dual transformer assembly. All windings are secured with beeswax.



Marconi and others

A reprint from the special issue of the Daily Telegraph devoted to the new Commonwealth of Australia. This is a portion from the section devoted to topics by current specialists.

THE DAILY TELEGRAPH
WEDNESDAY, JANUARY 2, 1901
WIRELESS TELEGRAPHY

J. Y. NELSON
Chief Electrician, G.P.O.

Wireless telegraphy in a practical form is the result of experimental research of very recent years. In the earlier experiments upon this fascinating problem, carried out by Sir William Preece between 1881 and 1894, with a view of telegraphing through space without the medium of a conducting wire, the electro-magnetic method was adopted. Early in 1894 two parallel wires were erected, one on each side of Loch Ness, with an object of ascertaining the minimum length of wire necessary to transmit signals by means of induction from one wire to the other. Mr. Gavey who was carrying out the experiments proved that it was also possible to transmit speech through space, and trials showed that speech was possible across the lake a distance of 1.3 miles, between parallel wires, whose length was four miles each.

In 1888, however, Hertz carried out his famous experiments upon electrical waves, which have since been known as Hertz waves, but, owing to the absence of a sensitive detector or receiving medium for such waves, was unable to apply his discovery to practical purposes by the transmission and detection of these waves through considerable distances. Mr. Branly, in 1890, discovered the principle of such a detector in his "radio-conductor", which was subsequently renamed "cohere" by Oliver Lodge, in 1893, who had been working on the problem and hit upon the method of destroying the temporary conductivity of the coherer by tapping it with a hammer driven by clockwork. Many others had also been investigating the subject, amongst whom Mr. Popoff rendered the decoherence automatic by placing the hammer in a relay circuit controlled by the cohere.

In 1897 Marconi appeared in the field, and caused considerable sensation by claiming to have solved the problem of practical telegraphy without wires over long distances. The English post office authorities took the matter up in conjunction with Marconi, and experiments were carried out in different parts of England, but with only partial success. Later Mr. Marconi applied M. Popoff's vertical wire "feeler", his previous experiments having been carried out by means of reflectors and tuning wings; he also improved the coherer and other details of the apparatus with a view of increasing its sensitiveness and power. He is still engaged on this work, and is by latest advices also reducing the height of the vertical wires whilst maintaining the effective distances. As indicating the practical advances which Marconi has made in this direction it is interesting to note that in 1897 he signalled between vessels in the Italian navy nine miles apart, using vertical wires 70ft to 100ft. long, in 1899 between Dover and Boulogne, 26 miles with a vertical wire of 110ft. and in the same year he signalled between two vessels of the English navy 64 miles apart, with vertical wires of 160ft. and 180ft., whilst he has since covered 77 miles with 140ft. of vertical wire.

Although Marconi has during the last few years almost monopolised the attention of the public in connection with wireless telegraphy, other experimenters have not been idle. M. Tissot, in France, signalled 35 miles over sea with vertical wires of 90ft., and M. Popoff, in Russia, also covered this distance, but used higher wires. As up to the present the height of the vertical wires at the sending and receiving stations have an important bearing on the distance which can be covered it was only natural that captive balloons and kites should have been used as a means of obtaining the necessary elevation, and Dr. Slaby, in 1897, by this means signalled 12 miles with wires 910ft. long. Marconi also last year signalled from Salisbury to Bath, 31 miles, using high kites to support his vertical wires at each place.

"SILENT KEYS — IN CONTEMPLATION"

In spirit they have not died,
But have simply QSY'd.
Old soldiers may just QSB.
But the Ham's appointed place
Is on a higher frequency.
Where DXers need no mode, rig
To communicate a sig,
Where QRN and static rife
Is absent — as is QRM.
Cause of such ignoble strife.
— And while Earth's ops, contemplate.
They, 'from up the log', await
On the infinite band.
Where DX is eternal,
And brotherhood, the kinship grand.
Alan Shawsmith — VK4SS

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233

Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RG, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.002
VK3	VK3RTG, Vermont	144.700
VK4	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.3015
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

No advice of any alterations or additions to beacon list received this month. At this stage can only guess the VK0 beacons are as listed; no one disputes, confirms or denies their existence.

In fact, there seems nothing outstanding to pass on to you this time whatever, which is not unusual for this time of the year. However, don't forget to take some part in the "6 UP State of the Art Contest" which runs from 20/7/74 to 17/8/74, details of which were in the last issue. If you monitor 6 metres at least you might be surprised what can be heard at any time of the day or night. The 30th June was a case in point. It rained at this QTH for most of the day, so some constructional work was undertaken for 432 MHz, and the 6 metre receiver left on 52.050 MHz At about 0930 two weak signals were observed peaking east, but not identified. Channel 0 from Brisbane up to strength 7 at times throughout the day, but no signals, no responses to calls. But I'm not fretting, something may have come out of it, that's the luck of the DXer, you must be there to work the DX when it comes through!

The other contest of importance is certainly the fairly well supported Remembrance Day Contest on the weekend of 17th and 18th August. I hope to see a big VHF log submitted from all States this year, remember, every VHF contact is worth 2 points to your State, and some operators overlook this fact. The HF gang might think about this one too. Plenty of you have at the very least FM equipment capable of VHF operation in the shack. Stoke it up and give the VHF boys a go. After all, in most cases adjoining States on HF are worth only one point to a State, but VHF to VHF is worth two points to the State — I won't tell you why, you work it out for yourself. My suggestion to VHF operators and HF alike is to listen and call on the recognised calling frequencies if you are operating on the tuneable portions of the bands. Leave your receivers on 52.050 and 144.100 if operating HF and grab the VHF boys as they come up on the frequency. VK5 will be well organised this year for an attempt at three times in a row for a win, and by the general interest shown in the R.D. by the VHF boys they will win it!!

As information is so scarce this month, I feel this is a chance to reprint a very good article from the "Victorian VHF-er" which concerns all VHF DXers, whether they operate tuneable or FM. The article is headed "VHF, UHF, DX & ALL THAT" and reads as follows:

"There is an aspect of tropospheric propagation, over which some confusion may arise as to when the band is said to be 'open'. It may be true to say that most DX contacts by amateurs occur during band openings, on the other hand, it is equally fair to say that simultaneous band openings and DX are seldom the same situation. When the band is said to be "open" it should be interpreted to mean 'broadly open' and can be predicted with a reasonable degree of accuracy, conversely, very long haul DX results from a combination or blending of several distantly situated conductive mediums and occurs quite suddenly at no particular time, however, the both categories of DX have one thing in common, that is at each end of the path, close to the line of sight distance, there exists a medium with the right amount of refractive index enabling propagation enhancement. For the purpose of further explanation, it can be assumed that the 'broadly open' band condition results from a single pattern situation and occurs relatively frequently as compared to the very long haul DX which depends on several more factors such as multiple ducting accommodation and specific distance medium separation. It might be said the rarest DX depends on ducting accommodation in which case it will be frequency dependent. When such DX is detected, it is advisable, if a contact is desired, to transmit as near in frequency to that of the calling station. If conditions are such that the signals become perfectly readable without fading, it would be feasible to assume contact at some other wavelength is possible.

"**WHEN TO CALL DX.** Probably the surest way of contacting a DX station is to have foreknowledge that a certain time the other 'end of the path' will be searching around a nominated frequency. This should be arranged between the interested parties and experiments carried out as often as possible. This type of DX, as indicated above, is highly unpredictable and necessitates many hours of observation and perserverance. CW or SSB are the most appropriate modes of transmission to use as this allows the receivers at both ends of the path to be adjusted for maximum sensitivity and selectivity thus providing for the best signal to noise ratio should conditions prevail. As already mentioned in several paragraphs throughout this series of articles the weather or movement of air and moisture masses will be the determining factor regarding tropospheric propagation over distances beyond 4/3 Earth's radius. The atmosphere (and weather) is bound to the earth by gravitation and moves naturally in the same direction as the Earth's rotation, and the degree of moisture and turbulence determines the actual weather movement; a very stable atmosphere is either good or bad for DX hunting, good when the normal refractive index of dry air masses changes, and bad when the normal atmosphere and its enveloped gasses remain static. Practically all coastal regions enjoy plenty of change nearly all the year round, but, the significant change which is most prevalent during the warmer months occurs when the warm (lower density) air temperature over the land rises considerably above that over the sea. The warmer air over the land rises and is replaced by cooler air from over the sea and this cycle of events causes the well known sea breeze, whereby, the warmer air over the land moves out over the sea, descends to near sea level, cools, and moves out over the sea, descends to near sea level, cools, and moves inland to complete the cycle.

"**THE DAILY WEATHER MAP** is a worthwhile study for the keen DX hunters. It will indicate with fair accuracy the intensity of cold fronts, pressure boundaries, areas of instability etc. On a synoptic chart, a collection of complete weather reports at a particular time from observing stations throughout an area are plotted, therefore, they are actually a record of what has passed, nevertheless, they do indicate the processes taking place over a horizontal extent of possibly 1500 kilometres. The words 'High', 'Ridge', 'Low', 'Trough' and 'Col', are used to describe pressures even though strictly speaking one pressure is 'greater', not 'higher' than another. The 'isobaric patterns', no matter how complex they may appear are combinations of basic pressure systems. During the warmer months of the year, a 'Blocking High' is the most interesting situation for possible band openings. This High appears to block the normal west-to-east migration of the systems upstream from it; these migratory systems move at normal speed toward the Blocking High, then decelerate, the Lows and Troughs usually weakening and moving southward, while the migratory Highs appear to merge with the Blocking High. The only indication on the surface chart is a very large area covered by the High with well above normal pressure centres, and may persist over an area for several days — it is the trailing edge of this suitation which interests the long haul DX hunter, particularly when this edge exhibits a very long taper. Any sudden intrusion by an active cold front, squalls, thunderstorms, etc. have a disastrous effect on the propagation characteristics beyond line-of-sight, although, the extent of the mixing ratio at the boundary will be the determining factor; mostly, but not always, a fall in the barometric pressure indicates a fall in mixing ratio.

"Optical phenomena in the atmosphere is a definite sign that an inversion exists. The existence of a stable layer of air is often indicated by clouds with their level tops just below the stable layer — haze is also limited in vertical extent, and those with portable equipment can use these situations to best advantage by choosing the right elevation of site; most cases of this condition will be frequency dependent in the early hours of a hot day and reaching a maximum in vertical extent near mid-afternoon. Halos around a setting sun indicate a fairly large mass of moist air exists to possibly 3 kilometres in altitude in a high pressure system. If the pressure is great enough winds will result, such as an exhaust system, near the Earth's surface causing the bottom of the moist air mass to be sheared off. The air mass sinks to replace the sheared off portion and in this process becomes subject to greater pressure, resulting in a temperature rise due to compression. When the temperature gradient or lapse rate is less than three degrees C per 300 metres an inversion is said to exist, even though the upper air temperature may be below that at ground level. The winds that are caused during the events of a subsidence inversion move in the direction of lesser pressure and are termed 'Cols'. 'Troughs' may be well developed to the north and south of the 'Col' and ridges to the east and west. The effect of all this is general weather and cloud. References: 'Engineering Training', Miscellaneous note, MLR 051, issue 2, 1968. 'Manual of Meteorology', Bureau of Met. issued April 1966. 'Amateur Radio', August 1959."

PORTABLE OPERATION

Each year from about Christmas to the New Year a number of groups around Australia go out portable to their favourite mountains, braving the elements, and the vagaries of the DX season! Now this year could be a very good one for 144 MHz in particular, and it could be well worth while making some concerted efforts to get more groups out portable. It's not too soon even now to think about your equipment, power supply, bands to be covered etc. Compatible personnel are a must, it's not much use going out with someone who sulks if things don't work out, someone who drinks too much, smokes too much if you're allergic to smoke and so on.

I will be quite happy through this column to give any group as much publicity as possible in the coming period up to the end of the year, providing you give me the information in time. To start the ball rolling I hereby indicate that I propose going out on one of my favourite mountains from 26/12/74 to at least 1/1/75 inclusive; I will have SSB and CW on 52,144 and 432 MHz, and possibly 576 MHz. FM on 52.525, plus the usual 2 metre FM coverage. HF bands will also be available for any liaison required. I would expect to be using beam antennas, with OUTPUT powers of the order of 150 watts on 52, 100w on 144, 40w on 432 and 20w on 576, 50w on 52.525, 80w on 146 FM. Standard operating frequencies, over and above the recognised Australian calling frequencies, will be 52.110, 144.110, 432.110 and 576.110. Australian calling or monitoring frequencies during slack periods would be 52.050 and 144.100.

The above indicates the type of information I believe will be of use to others, and if you send me such information I will see that it gets around. Don't forget to say where you will be operating from as well; I can't tell you just yet because this has not been determined, and will not be so until I have another look at some sites in August, but I'll tell you all when I know!

So be in it chaps, let's get cracking on the equipment and be ready when the time comes. And what about those who cannot go out, but have VHF gear gathering dust in the shack, what about supporting the field boys by coming on the air. Whatever happened to all the western Victorian stations of years ago on 2 metres? What about the Albany boys getting into the act this year with a vengeance, how about some 432 contacts across the Great Australian Bight and down to Tasmania. I'll stir up the gang in New Zealand as well, and see if we can get some more on the air over there. One thing for sure, if you don't work several States on 144 this year, you may wait for quite a long time to do so, so have that gear purring along in top gear by no later than November.

That's all for this month, must leave you now and look at the portable equipment! Ending with the thought for the month: "Sometimes you think the whole world is falling, and it's only yourself that's leaning".

The Voice in the Hills.

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

Cyrillic		Roman	
А	а	A	· —
Б	б	B	— · · ·
В	в	V	· — —
Г	г	G	— — ·
Д	д	D	— · ·
Е	е	E	·
Ж	ж	ZH	· · · —
З	з	Z	— — · ·
И	и	I	· ·
Й	й	Ĭ	· — — —
К	к	K	— · —
Л	л	L	· — · ·
М	м	M	— —
Н	н	N	— ·
О	о	O	— — —
П	п	P	· — — ·
Р	р	R	· — ·
С	с	S	· · ·
Т	т	T	—
У	у	U	· · —
Ф	ф	F	· · — ·
Х	х	KH	· · · ·
Ц	ц	TS	— · — ·
Ч	ч	CH	— — — ·
Ш	ш	SH	— — — —
Щ	щ	SHCH	— — · —
Ы	ы	Ȳ	— · — —
Ь	ь	'	— · · —
Э	э	É	· · — · ·
Ю	ю	YU	· · — —
Я	я	YA	· — · —

I mentioned in this column last year that Don, VK3AKN, had been experimenting with Russian morse. I thought the topic of keying codes other than the International version which we use might be of interest, even if you do not intend working UA or JA in their own languages, so here are a few comments on Russian morse to whet your appetite. I am grateful to Don for help with the preparation of some of this material.

The Russian alphabet now consists of about 32 letters. The script with which the language is written, like our own, is derived from the Greek script. The letters you are reading have passed through the hands of the Romans first. The legend is that the Greek alphabet was taken to Russia by Saint Cyril, and the legend is respected in English because the Russian characters are called "Cyrillic" after him. His alphabet had 43 characters, but a number of purges have occurred, the last of them in the Revolution of 1917 which have reduced the number. I am bound to say "about 32" because different lists differ in how many of the rarer characters they use.

Because few places outside of the USSR are in a position to type or print the Cyrillic alphabet it is not unusual to "transliterate" or write in Roman letters the Russian ones. When I came to look this matter up I was a little disconcerted to find there are several sets of such equivalences available, though to be fair it is only a few of the rarer letters that are different between them. If you are merely interested in copying call signs, names and the like the set of equivalences given below, which happens to be that recommended by the British Standards Association, will probably be adequate for your needs. If you are thinking of having a QSO in Russian I imagine you will already be familiar with the Cyrillic alphabet.

I would be interested to hear from anyone experimenting with this, or with the Japanese morse.

AARTG

with Ken Kelly VK4MJ

285 Monaco Street, Surfers Paradise, Qld., 4217

TELEPRINTER OPERATING SPEEDS IN AMATEUR SERVICE

G. DENNY

VK6NT Chairman A.A.R.T.G.

The A.A.R.T.G. has received a request from the Chairman of the British Amateur Radio Teleprinter Group, (B.A.R.T.G.) for the views of those interested in RTTY in Australia and surrounding territories on the question of signalling speeds on the HF and VHF bands.

It is apparent from copies of letters received from the B.A.R.T.G. that the Scandinavian Amateur Radio Teleprinters Group (S.A.R.T.G.) under the Chairmanship of OZ4FF and the PA0 RTTY Group (headed by PA0YZ) would like to speed up operations on all bands to 50 bauds on a world-wide basis.

The German Amateur Radio Teleprinter Group, D.A.F.G. (DL6VX, Chairman) are also keen on the change to a single speed of 50 bauds.

Enquiries are being made in Canada and the U.S.A. whether they are willing to change to 50 bauds by the B.A.R.T.G. also.

Some Amateurs in the U.S.A. and Europe favour 75 bauds (not permitted under present licensing regulations in Australia) and the Americans are beginning to operate on yet another speed, 56 bauds.

The standard for speeds on the amateur bands, has in the past, been governed by the types of machines available on the surplus market in large quantities, and the U.S.A. took the lead when large numbers of machines became available from the Western Union telegraph service which originally operated at a speed of 45.45 bauds, often driven by synchronous motors from 60 Hz mains supply. This set the speed standard of 45.45 bauds for International working.

Commercially, in the U.S.A., most printer operation is either 56.88 or 74.2 bauds and in Europe and Australia (including New Zealand) commercial operation, e.g. the Telex service, is at a speed of 50 bauds as recommended by the C.C.I.T.T., the International Telegraph and Telephone Consultative Committee of the International Telecommunications Union, hence the strong bias towards 50 bauds in Europe, added to which, the majority of machines available on the surplus market are 50 bauds.

Military and fixed link services are tending towards 75 bauds as their standard, this being close to the limit at which a mechanical printing mechanism will stay in one piece for any length of time.

In Australia, almost 100 per cent of the machines that are in amateur hands come from a 50 baud service, and the speed has had to be reset to 45.45 bauds to work overseas stations.

The most common machines in VK and ZL are the Teletype 14 and its derivatives, the Creed 7B and the Creed 54. These are almost always fitted with governed motors, thus enabling a change of speed with relative ease, provided some means of checking the final speed is available.

Regarding the speed of 75 bauds, none of the above machines are capable of being pushed that far without disastrous results, although they would reach 56 bauds without too much difficulty.

Having endeavoured to explain some of the speed saga, maybe it would be wise to voice your opinion as to the 'standard speed' as soon as possible, and you are invited to write to me as the Chairman of the A.A.R.T.G. to enable some correlation of views and the consensus of opinion in VK and ZL to be made known on a world wide basis via other groups.

Please don't put this one aside as your views are important to the rest of the world, if you know of any other Amateur interested in RTTY please pass along this information as soon as possible, so that all may be heard and PRINTED out at the right speed.

QSP

INFLATION

"The Council of ARSI in its meeting held in Dec. 1973 discussed the rise in the cost of paper, printing, etc., etc., and decided to reduce the periodicity of "the Indian Radio Amateur" (magazine) from 6 issues as at present to 3 issues in 1974". The Editorial in March/April '74 issue of Mobile News carries a similar story "we have carefully reconsidered our estimated income and expenditure for this year, and with no advertising revenue, we can only afford 8 issues of Mobile News in its present format".

REPEATERS, U.S.A.

As of the end of January, FCC had issued 555 repeater authorisations under the new rules. Some 218 requests are still pending. QST Mr. '74.

Contests

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

REMEMBRANCE DAY CONTEST 1974

The names and call signs of those who paid the supreme sacrifice:—

Royal Australian Navy

J. E. MANN	VK3IE
A. H. G. RIPPIN	VK6GR

Australian Military Forces

C. D. ROBERTS	VK2JV
J. McCANDLISH	VK3HN
S. W. JONES	VK3SF
J. G. PHILLIPS	VK5BW
J. D. MORRIS	VK3DQ
R. P. VEALL	VK3PV
D. A. LAWS	VK4DR
K. S. ANDERSON	VK6KS

Royal Australian Airforce

F. W. S. EASTON	VK2BQ
W. ABBOTT	VK2YK
T. STEPHENS	VK3GO
J. F. COLTHROP	VK3PL
J. E. SNADDEN	VK3VE
R. ALLEN	VK4PR
B. JAMES	VK5BL
P. P. PATTERSON	VK6PP
V. J. E. JARVIS	VK2VJ
G. C. CURLE	VK2AJB
M. D. ORR	VK3OR
J. A. BURRAGE	VK3UW
F. J. STARR	VK4FS
C. A. IVES	VK5AF
J. E. GODDARD	VK6JG

Merchant Marine

M. E. GUNTHER	VK3NG

LEST WE FORGET

REMEMBRANCE DAY CONTEST 1974

Please think of the Contest Manager thumbing through all the logs and racing to get results ready for the next AR, and help him a great deal by simply putting a FRONT SHEET on your log, be it ever so humble a log, and in large clear letters showing the CONTEST SECTION, your CALL SIGN, and your SCORE.

Of lesser importance at this time but important later on, is your address/name, and your comments.

You realise, of course, that logs need be sorted into call areas, as VK3, VK4, etc. and sections as phone, CW, open, VHF, SWL etc. . . by name or letter, and the score has to be listed.

Please forward your log as soon as possible.

I wonder if you realise that contest logs must be in by **September** to be processed by the end of the month for **November** AR. From closing date to the end of September is the crucial time. If logs are early much of the work has been done before the closing date.

A little thoughtfulness on your part may enable the contest staff to have some peaceful meals.

Remember where the logs go this year?

Check your log for duplications . . . our most common fault . . . some contestants lost hundreds of points last year apparently not looking for duplications.

If you make a VHF interstate contact you may count as HF but can only make the one contact as in HF.

One contact per band for HF means just that . . . **not** one contact per band per mode.

Try and find time to exchange names . . . it helps make the contest really friendly. You can help make it a friendly contest other ways also.

VK4PJ tips that VK4 will be well to the fore this year with perhaps VK5 resting on their laurels. He would like to see the 800 log barrier beaten also.

1973 CQ.WW.WPX.SSB CONTEST
Top scores

Single Op all band	Australia		Oceania Scores	QSO Pfx
9Y4VU — 1,198,832	*VK4VU	A	997,338	1437.226
LU5HFI — 1,130,268	*VK1AOP	A	50,572	197. 94
TE2CF — 1,075,464	VK4PJ	A	4,872	65. 29
VK4VU — 997,338	*VK3SM	21	31,840	274. 40
	*VK2APK	14	536,182	791.236

*certificate.

For those interested in DXCC, note the number of prefixes that were contacted from VK land. Some hard work on one of these contest weekends would put one well on the way to the certificate.

ALL ASIAN DX CW CONTEST

1000 GMT Saturday August 24th to 1600 GMT Sunday 25th August. The exchange is between Asians and the rest of the world, on all bands 1.8 through 28 MHz.

EXCHANGE. For OM stns, RST plus age of op. For YLs, RST plus 00.

SCORING. One point per QSO. Use prefix of Asian countries (CQ WPX list) for multiplier. Final score is sum of QSO points from each band X the sum of multiplier on each band.

Logs to J.A.R.L. Contest Committee, Box 377, Tokyo, Japan, by 30th Nov.

THE 16th SCANDINAVIAN ACTIVITY CONTEST 1974

CW: Sept. 14th (1500 GMT) to Sept 15th 1800 GMT

PHONE: Sept 21st (1500 GMT) to Sept 22nd 1800 GMT.

Non-Scandinavians call CQ SAC on CW & CQ Scandinavia on phone. 3.5 through 28 MHz. Separate logs required for CW/CW and phone/phone. Scandinavian prefixes are LA/LJ/LG, JW, JX, OH, OHO, OX, OY, OZ, SM/SK/SL, and OJO.

(a) Single op, (b) Multi op, single tx, (c) Multi op, multi tx (ALL Clubs). Class (c) separate serials for each band. Usual RS, RST & 3 serials.

One point per QSO. Multipliers . . . Max 10 per band, of prefixes above.

LOGS to EDR Contest Committee, Box 335, Aalborg, Denmark. Post before Oct 15th.

ALL SAC participants are requested to confirm each QSO with QSL card.

CONTEST CALENDAR

Aug 10/11	Argentina Phone Contest
Aug 10/11	European CW Contest
Aug 17/18	Remembrance Day Contest
Aug 24/25	All Asian CW Contest
Sep 14/15	European phone Contest
Sep 14/15	SAC CW Contest
Sep 21/22	SAC Phone Contest

VK/ZL OCEANIA CONTEST 1973

VK operators forwarded 33 logs for the phone section and 28 CW logs. Including the 3 check logs only 52 operators were involved. We should do a lot better in our only international contest, so how about marking your calendar for Oct 5/6 (phone) and Oct 12/13 (CW) this year, 1974.

COLOMBIAN INDEPENDENCE DAY CONTEST

The 1973 contest was won by UK5IAZ with 755.194 points. The World winner receives a sterling silver cup and sterling silver plaque is awarded to each of the 6 continental winners. Only 1 entry was received from Oceania and ZM3NS won with 22.908. Eligible logs must contain at least 50 QSOs. You are too late now for 1974 but a future effort could be very worthwhile!

S.A.R.T.G. WORLD-WIDE RTTY CONTEST 1974

August 17th (0000-0800Z, 16.00-24.00Z) and 18th (08.00-16.00Z), all bands, 2-way RTTY, 4 classes exchange RST & QSO number, logs to Carl, OZ2C., Melanersgade 5, Randers, Denmark. Carl also sends a reminder about the WSRY RTTY Award. Details available from AARTG.

1974 VK -ZL - Oceania DX contest rules

NZART and WIA, the National Amateur Radio Associations in New Zealand and Australia, invite world-wide participation in this year's **VK/ZL/ OCEANIA DX CONTEST.**

OBJECTS:

For the world to contact VK/ZL/Oceania Stations and vice versa.

WHEN?

Phone: 24 hours from 1000 GMT Saturday, 5 October to 1000 GMT Sunday 6 October.

CW: 24 hours from 1000 GMT Saturday 12 October to 1000 GMT Sunday, 13 October.

RULES:

1. There shall be three main sections to the contest —
   a. Transmitting phone.
   b. Transmitting CW.
   c. Receiving — "Phone & 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 callsign 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 callsign. Should two or more operate any particular station, each will be considered a competitor and must submit a separate log under his own callsign. This is not applicable to overseas' competitors operating Club Stations.

7. Entrants must operate within the terms of their licenses.

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 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:** 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.

(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 & ZL on **80 ONLY.**

(e) **160 metre Segment:** For 160 metres, contacts between VK/ZL, VK/VK, ZL/ZL and VK/ZL 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, callsign 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 callsign, name and address in BLOCK LETTERS; details of station; and, for **EACH BAND** — qso 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, callsign 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, callsign, 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.

— **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.

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 31 December, 1974;
from **Overseas' Stations** — to the above address OR —

NZART,
Box 489, Wellington, New Zealand —
to arrive **not later** than 28 **January**, 1975.

SWL SECTION:

1. The rules are the same as for 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.

2. 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.**

3. 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.

4. Scoring is on the same basis as for the transmitting section and a summary sheet should be similarly set out.

5. 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.

6. Awards will be made as listed in the section under "Awards".

Jock White ZL2GX
Contest & Awards Manager, NZART

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

ALL COUNTRIES IN ZONE 15

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 1st January 1955 are valid.
3. Applicants who are members of an IARU Affiliated Society should submit their QSL cards, along with full details of the contacts, to the Awards Manager of their locally affiliated IARU Society. All other applicants must submit their QSL cards to the sponsors.
4. The fee for the award is five IRCs.
5. The address for applications is:

PZK
Awards Manager,
Postbox 320
Warsaw 1
Poland.

Requirements: Confirmed contacts are required with 23 or more of the following countries and call areas:

OH (3 call areas) UP2 UQ2 UR2 UA2 SP (4 call areas) OK OE (2 call areas) HA YU (3 call areas) ZA I MI(9A) IT IS FC HV ZB1(9H1)
Contacts with SP (Poland) are obligatory.

LION CITY AWARD

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 10 September 1969 are valid.
3. Do not send QSL cards. A list, showing full details of the contacts should be certified by a club official or two amateurs.
4. The fee for the award is ten IRCs.
5. The address for application is:

Singapore ARTS
Postbox 2728
Singapore.

Requirements:

Stations in CQ Magazine Zone 28 require 40 stations in Singapore.
Stations in all other Zones require 20 stations in Singapore.

MG5 AWARD (AHC AWARD)

The MG5 Award is issued by the JA5 DX Radio Club to licensed transmitting amateurs all over the world.

For the award you need contacts with stations whose suffix call letters are the same as your suffix letters, not necessarily in the same order, however. Stations with two-letter suffix may work also three-letter suffix stations by using the last two letters of their calls. Examples: JA1ABC may submit cards from JA2ABC, JA3ABC, JA4BAC, JA5BCA, WA6CAB, WB7CBA etc. W5KG may submit cards from W1KG, W2GK, JA3AKG, JA5BGK etc.

Class A requires 10 QSLs, Class B 5 QSLs.

The contacts may be made with any amateur station anywhere in the world provided the suffix letters match with your own call.

Application, including a certified list and 8 IRCs, should be addressed to:

Award Manager, JA5MG,
Akira Inage
571-1 Okadashimo
Ayauta, Kagawa-Pref., 761-24 Japan.

WORKED AFRICAN CAPITAL CITIES (AHC AWARD)

The V.C.R.C. in Vasteras, Sweden, issues the WAFCC Award. It is available to any amateur and SWL in four classes: AA for 45 Capital Cities, A for 30, B for 20 and C for 15.

Endorsements will be made for any single band or mode. Fee: $1.00 US, 10 IRCs or equivalent. QSL cards need not be sent. However, a certified list of claimed contacts, signed by two amateurs of an official club is required.

Address for the application: Urban Eugenius, SM5BTX, Patrullgatan 6, S-723 47 VASTERAS, Sweden.

African Capital Cities: Algeria/Algiers, Angola/Luanda, Botswana/Gaberones, Burundi/Usumbura, Cameroons/Yaounde, Central African Republic/Bangui, Chad/Fort Lamy, Congo/Kinshasa, Congo/Brazzaville, Dahomey/Porto Novo, Egypt/Cairo, Equatorial Guinea/Santa Isabel, Ethiopia/Addis Ababa, Gabon/Libreville, Gambia/Bathurts, Ghana/Accra, Guinea/Conakry, Ivory Coast/Abidjan, Kenya/Nairobi, Lesotho/Maseru, Liberia/Monrovia, Libya/Tripoli, Malagasy/Tananarive, Malawi/Zomba, Mali/Zomba, Morocco/Rabat, Mauretania/Nouakchott, Mauritius/Port Louis, Mozambique/Lourenco Marques, Niger/Niamey, Nigeria/Lagos, Rhodesia/Salisbury, Rwanda/Kigali, Senegal/Dakar, Sierra Leone/Freetown, Southwest Africa/Windhoek, Somalia/Mogadiscio, Sudan/Khartoum, Swaziland/Mbabane, South African Republic/Pretoria, Tanzania/Dar-es-Salaam, Togo/Lome, Tunisia/Tunis, Uganda/Kampala, Volta/Ouagadougou, Zambia/Lusaka.

20 Years Ago

with Ron Fisher VK3OM

AUGUST 1954

Short Wave Listeners. Sometime around August 1954 Federal Executive decided that these people should be encouraged within the frame work of the Institute. Federal Notes of the time stated: "These people for the most part have been unable to join in our activities in as full a measure as they might desire. It is with this in mind that Federal Executive has suggested that Divisions might find it expedient to form a Listener Section, with particular facilities of its own".

Apparently for some years around this time, a small portion of the 3.5 MHz band was shared with glider aircraft. They used 3.505 MHz as a communication frequency. Federal Executive approached the Department to have their channel shifted outside the amateur band without success. I do not know if they are still there or not.

The VHF column reports on the successful attempt by several VK5s to contact Victorian stations on 144 MHz from a portable location on Mount Lofty. Contacts were made with VK3ATN in Birchip while signals were copied from VK3LN in Melbourne. Equipment used at Mount Lofty included 522 transmitters with 6J6/6J6 converters feeding a BC348 receiver and a sixteen phased array antenna.

Technical articles for August included: The Complete Amateur, part two, the receiver. Sure Fire Crystal Oscillator-Multiplier, by J. Hutchison VK2JH, and a New Modulator for the Type 3 by E. A. (Doc) Barbier VK5MD.

Included in the new call sign section was the first listing of the new limited licence 'Z' calls issued during the previous June.

PROJECT AUSTRALIS

with David Hull VK3ZDH.

OSCAR 7

As these notes are written (early June) there still has been no call-up for the weather satellite launch on which Oscar 7 will fly. This means a minimum of 2 months before Amateur Radio's seventh satellite will be with us and so there is still plenty of time to get that 432 SSB gear ready.

OSCAR 6

As regular users of Oscar will know, the last six months of operation has been very reliable from the users point of view. The satellite is invariably on when it is supposed to be and, equally important, has been off at the appropriate times. Despite some rumours to the contrary the author does not live in his shack and does not have an especially well trained XYL. The reason for the continued reliability has been the complete automation of the major command centres in the world, Australia and Canada. These command stations VE3QB/VE2BYG in Canada and VK3ZDH in Australia have carried the major responsibility for Oscar since their automation with co-operation of a very high order from Bruce ZL1WB. A paper covering the automated systems of both areas was read to the recent PMG Radio Research Symposium in Melbourne and part of this paper will shortly appear in AR.

RTTY TEST GENERATOR

The Project Australis group developed some time ago an RY generator combined with a phase coherent AFSK generator. This unit will generate 60 RYs CR Lf 60 more RYs etc. at standard 850 Hz shift and will interface as well to a standard RTTY machine output. If sufficient interest is shown in this the circuit will appear in AR and the printed boards made available through normal channels.

You and DX

DX NOTES

From the log of Ken VK3AH, here are some unusual DX stations with their listed QSL managers. Should some amateurs be experiencing difficulty in obtaining a QSL from a rare DXer, Ken may be able to offer some assistance if a S.A.E. is forwarded to him with details etc.

Ken's address as per 1973 call book is ok.

DX Station	QSL Information
HR1RSP	Via W5GTW
A35AF	Direct to P.O. Box 19, Vavau, Tonga.
VP1B	Via W3FVC or G4RS
FO8DI	Via P.O. Box 928, Papeebe, Tahiti
FK8BB	Via DJ9ZB
HR1JAG	P.O. Box 372, Tegucigalpa, Honduras.
G3VBK/MM	Via ZL1TY
TG9GI	c/- PO Box 762, Guatemala City
TG9KZ	c/- PO Box 762, Guatemala City
TG9KV	c/- PO Box 762, Guatemala City
OX3EA	c/- Mr E. Stormo, 3970, Dundas, Greenland.
KL7MF	4036 Balchen Dr, Anchorage 99503
EA7EM	PO Box 1086, Seville
KA8JN	W7PHO
WS0SUB	US Navy, PO Box 291, Omaha, Nebraska, 68081
KU0ITU	WA0TKJ
KY9ITU	W9JUV
KH6IDI	KP4DMZ
KD1ITU	WA1RDN
KF2ITU	WB2OEU
KX4ITU	W4REZ
KY5ITU	K5RWK
KX4ITU	W4REZ
VR1AA	K3RLY
HI8LC	PO Box 88, Santon
EA6BG	W1RLV
PY2CPK	PO Box 22, El Salvador
YN1AZ	PO Box 2485, Menayarare
JH3TKM	JA3GZN
JD1ACH	JA3GZN
HK4DDT	PO Box 1948, Medellin
HC2VL	PO Box 5757, Guayakuil, Equador
YS1AG	Box 06/517, El Salvador
TF5TP	DL7MQ
VS5LH	Box 91, Kuala Belight, Brunei
JA1WMS/JA8	JA8BPN
KZ5BC	Box 409, Albrook Air Force Base, Canal Zone.
9G1DY	N. Price, c/- Barclays Bank Ghana, PO Box 2949, Accra, Ghana.
A4XFF	Box 981, Muscat, Sultanate of Oman, Arabia.
9H4G	"Dar-Ghall-Kwiet", Ghajn Melel St., Zebbug, Gozo, Malta.
VK2BKE	Dr K. Hicks, Lagoon Rd, Lord Howe Island, NSW 2898
HS4AGN	W5LUJ
KP6PA	W6WX
YB1KW	Box 314, Bandung, Indonesia

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.

36 Pleasant Street,
Ballarat 3350

The Editor,
Dear Sir,

I am writing in reference to the Norfolk Island VHF Dx-Pedition planned for the end of this year.

Subject to PMG approval, the station should be on the air from 10th December 1974 to 20th January 1975, using 52,144 and 432 MHz

At this stage one system of equipment is ready for use, however on receipt of the cargo charges from the private airlines serving the island, we would like to somehow cut down on weight.

I therefore desire to purchase a second-hand FTV-650 sideband convertor for 52 MHz and similarly if someone has a 2 metre item with lightweight characteristics, then we will negotiate to buy or lease said items.

I have had no problems securing a back up receiver, but we will be relying on the FL50 as the sole generating source of SSB.

A carphone on 52.525 and 52.656 FM will provide an early warning system for 52 MHz I note with interest that 52.525 is a national calling frequency in the U.S.

Antennae at present appear to be identical to that used with success at Learmonth during the Ross Hull.

One 7-element Yagi (heavens knows how we will fix it in the hold of the aircraft),
3 + 3 vertical for 52.525,
4 + 4 vertical for 146 MHz FM,
10 EL long Yagi 144 MHz SSB,
12 + 12 Slot fed 432 MHz.

Power on 6 & 2 will be only 100 watts PEP or so with the eye to reliability, not super-signals.

On 432 MHz a solid state line up will probably be left transmitting during operation on 6 metres, along with the audio identifications, so if anyone hears us then come onto 6 metres. Frequency 432.450.

The next comment is a calling frequency and at the risk of being unpopular, I cannot see a valid reason to appear above 52.100 MHz, or 144.100 in the light of Geoff VK3AMK's comments re long distance DX.

Some of the blame for the non-2 way to SW1AR was due to locals chatting to me on .05 when the tape specifically said "CQ DX!" Enough said.

Please support this expedition because as a student, the $500 I am spending will give you VK9 this season, not me. Operating times ZULU! (Norfolk Island has N.Z.S.T.) 1800Z onwards.

Any donation of an old QQE06/40, QQE03/12, etc. would be gratefully received with promise of return of items aftery January 20. The basis here is for a reliable continued coverage of the VHF spectrum during the dx-pedition.

Any suggestions as to calling procedure, frequencies etc. would be gratefully received.

Yours faithfully,
Stephen R. Gregory, VK3ZAZ

Hopefully callsign will be VK9ZAZ or VK9ZWI. More details later.

The Editor,
Dear Sir,

I would like to make a few comments after reading the letter by Cyril Maude VK3ZCK in June 1974 AR.

Cyril seems to be rather scornful of those amateurs who will not or cannot design and build their own equipment. I think I can understand his viewpoint, he is apparently young and has had the benefit of a modern education, also he is not interested in DX or in CW, this I deduce from his callsign.

Now in my case, I obtained my licence in 1932, so you can make an educated guess as to my age. When I started the amateur game it was still in the "depression days", transmitting gear was just about unobtainable or priced out of our reach, so we built everything from the power transformer to the final tank coil and aerial, using mainly receiving type components and valves, very often second hand. I was just one, there were hundreds of us doing the same.

Cyril, you are young and keen and apparently capable of designing and building high frequency equipment, this is good, but please remember that this is only one phase of an activity that has many branches. Your licence and the frequencies you operate on confine you to comparatively short range QSOs, a lot of amateurs are interested in this, but there are an awful lot who are not. I spend a lot of time on the 14 MHz band, also the 21 and 28 MHz bands when they are open, and the number of stations all over the world who claim to use "home brew" would be somewhere round about 1 per cent or less at a guess. The biggest average of "home brew" gear would probably be among the Russians, although most of them do not say what they are using.

I am writing from the angle of the "Old Timer", we have had our share of improvising with what was available and we managed to keep amateur radio going, mainly with the help of the U.S. amateurs and the A.R.R.L., without their numerical strength, amateur radio would probably not now be in existence.

Amateur radio is a rewarding hobby, UHF is only one small part of it, and although the technical side of it is important, the wonderful feeling of comradeship and goodwill that is evident on the DX bands is probably the most important aspect of amateur radio. I have had QSOs with almost 200 countries, covering all shades of political philosophy, but every contact has been friendly and pleasant, surely this must mean something, if there was more of it, the world would be a better place to live in.

So keep it up, you younger members of the amateur fraternity, design and build your own gear, this is as it should be, and there will always be a place for you in the amateur game, but perhaps as you get older you will tire of this side of it, take out a full licence and get into the DX side of it.

You have only to hear the terrific "dog pile" on a rare bit of DX to realise how many amateurs all over the world are interested in this side of amateur radio. I have had contacts with men and women of all walks of life, from Chief Justices, Computer designers, Electrical and Radio Engineers to other more lowly professions, covering about every occupation there is, doesn't this mean something.

There is still a place, and a big one, for the operators of "black boxes" (most of which are grey,. not black) in this great hobby of ours.

73,
Gordon Read, VK2OW

WHAT'S AROUND THE CORNER IN A.R.

Following our appeals for articles it is pleasing to report that a number of articles (technical, non-technical and humorous) are now at various stages of preparation for publication.

Title	Author
A Transistorised RX for Top Band	VK3ANY
FT200 for AM Use	VK3ASV
A Digital Readout for Transceivers	VK3AOH
A Monitor Scope	VK5YH
Long Wire Antenna Tuning and Matching Unit	VK6DX
Some Thoughts on Speech Processing	VK3AVO
Modifications to the Trio JR60 Receiver	VK2AGJ
Modifying the TCA675 and 1677 for use on 6 & 2 metre FM nets	VK3ACM
A Keyer for VK3RTG	Roly Roper
Modifications to Vinten MTR15 for 53.032 A.M. Net	VK3ACM
Modifications to Vinten MTR12 for 52.525 FM Net	VK3ACM
Experimenter's Delight (Power Supply)	VK5ZIE
Microstrip Data Curves	VK5TB
The Shack	VK5JG
Fiord Country Expedition	ZL4JP via VK4LZ
FT101 Vox Hints	VK2EP via VK4LZ
Mods to Radio Receiver R390 A/URP (Part 3)	VK3ZRV
Ground Plane for 2 Metres	VK3AOD
VHF — UHF Advisory Committee — 70 cm Draft Band Plan	VK3ZJC
A Simple Pulse Position Modulation System	VK4ZFD
Re-Vamping a VTVM	VK2ARZ
Mobile Output Indicator	VK4IJ
EMP — The Ultimate EMC Problem	VK3CDR
20Mx Quad Tuning Made Simpler	VK2OQ
The 'Pasatest' Communicating Calculator (Humorous)	VK3AOH
Modification to the FT200	VK3CP
Antenna Measurements (Reprint from A5 & Vict. VHFer)	W2IMU
Soldering for Electronics (Reprint from Zero Beat)	VK3AOH
A Sheet Metal Bender (Reprint from Zero Beat)	
What to do with that old receiver (Reprint from Zero Beat)	Harry Roach

WIA—A.A.R.T.G.

Interested in RTTY? Write for details to Secretary, Australian Amateur Radio Teleprinter Group, P.O. Box 16, Morley, W.A., 6062.

A.A.R.T.G. issue the quarterly magazine 'KEYBAUD' for RTTY enthusiasts

CDE CORNELL-DUBILIER

The striking new control box brings operational ease and reliability to antenna rotation. Styled to compliment surrounding communications equipment the CD44 provides all operator controls on the front panel, making access to the back of the box unnecessary. Front panel calibration assures maximum accuracy with minimum effort. The separate off/on switch offers continuous directional indication on the illuminated meter. The lifetime of the control is enhanced by the addition of individual snap action switches for clockwise/counter-clockwise rotation. Finished in tan and brown with a brushed gold anodized front panel, the CD44 will be a welcome addition to any communications center.
Size: 8-1/8"W X 8-1/4"D X 4-1/8"H.

HAM II The rotor continues the tradition of the heavy duty cast aluminum bell-housing, long the trademark of Cornell-Dubilier Electronics' amateur rotors. The inline construction evenly supports the load on two six inch races containing 98 percision ball bearings. An electrically controlled wedge brake is housed in the base, positively locking the rotor in any of 96 segements spaced 3° 45" apart. The high torque motor drives the unit through a machined stainless steel gear and pinion assembly, rotating a full 360 degrees in less than 60 seconds. Designed for antennas of up to 7.0 sq. ft. of wind load area, the rotor promises years of trouble free operation. The rotor accepts masts from 1-3/8" to 2-1/16".

SPECIFICATIONS

INPUT VOLTAGE, STANDARD MODEL:	220 VAC. 50-60 HZ.
TURNING TORQUE:	800 IN.LBS.
BRAKE TORQUE:	3500 IN.LBS.
SIDE THRUST CAPACITY:	6600 IN.LBS.
CABLE:	8 WIRE (BELDEN 8448 or EQUIVALENT UP TO 150 FT.)
SHIPPING WT.:	28 LBS.

CD44

Although similar in appearance to the TV bell housing rotors, the CD44 rotor has over four times as many precision ball bearings in the dual 6" diameter race to provide additional load capacity for medium sized communications antennas. The high torque motor drives the unit through a machined stainless steel gear and pinion assembly, rotating a full 360° in less than 60 seconds. When used with antennas of not over 2.5 sq. ft. wind load, a built in brake on the motor prevents windmilling. Accepting masts from 1-3/8" to 2-1/16", the CD44 promises years of trouble free operation.

SPECIFICATIONS

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SIDE THRUST CAPACITY:	6600 IN.LBS.
CABLE:	8 WIRE (BELDEN 8448 or EQUIVALENT UP TO 150 FT.)

bail ELECTRONIC SERVICES

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 56, Mascot, 2020	Ph. Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide 5000	Ph 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como 6152	Ph 60 4379

Y.R.C.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

Educate! Educate! Educate! is a catchphrase which wins votes and increases taxation. Within recent months YRCS has been deluged with statements concerning our own programme of education, using the term "Professionals". Even the Federal Co-Ordinator has been charged with having had "no experience in the educational field". Obviously the pieces of framed parchment on the walls of my study indicating Vitae Studiosae Operosaeque Laurea, backed by 38 years of teaching seem to have no value to those who assume that the only "professionals" are located in High Schools, Colleges and Universities.

YRCS needs both the "professionals" and the ordinary individuals, many of whom are our instructors, and they teach!

In my report to the Easter WIA Federal Convention, I stated my doubts concerning unreserved reliance on statistics; this has been confirmed by a message received to the effect that the University of NSW Radio Club has been notified of 18 successful AOCP (and/or AOLCP) candidates at the February PMG examinations. Congratulations to this YRCS club, and thank you for negating the opinion that YRCS in NSW is on the decline.

Information has come to hand that the IREE pennants for 1973 in Victoria have been awarded to the Central Gippsland Youth Radio Club and the St. Johns College Radio Club. We commend both clubs on having achieved success in this direction.

Supervisors are requested to ascertain whether your state has a constitution for YRCS, as this matter will be mentioned during the August conference at Maitland.

Book Review

ARRL, THE RADIO AMATEUR'S HANDBOOK, 51st Edition, 1974

The last copy of the Handbook that I bought was in 1971. I bought it then because I felt there was sufficient new material in it to make my '63 copy obsolete. I am going to buy the '74 Handbook for the same reason.

Amateur Radio, like all other fields, is now suffering from "Future Shock"; too much is happening too fast for any one person to keep up with.

As various new techniques have been applied to Amateur Radio, so the Handbook has expanded its coverage to include them. The result of this may be seen in the contrast between the '49 Handbook, which contained a smattering of theory and a lot of constructional projects, and the '74 Handbook with only enough constructional projects to give examples of the techniques in action. There is a leaning toward telling the reader how to design his or her own receiver, VFO etc., rather than a nut and bolt description of how to build one.

Transistors have displaced valves to a large extent, and ICs are also included in many projects (even the humble code practice oscillator). While much time is spent on explaining the finer points of mixer design or methods of reducing front end noise, ICs are regarded as black boxes (connect antenna to pin 1, battery to pin 2, loud speaker to pin 3 and Bingo! instant receiver). Few internal circuits are given and almost no information on methods of operation.

The emphasis throughout is on the practical and it is of credit to the original author(s) of the chapter on electrical laws that this section remains substantially unchanged.

The Handbook has been described as the "Bible of Amateur Radio" and every Amateur or prospective Amateur should have a copy. If your copy is more than a few years old, it might be a wise idea to invest in a new copy.

As the Amateur borrows from the other fields of electronics, so the pressure to include more and more in the Handbook is going to make the editors' job more difficult and it will be interesting to see how they cope. Copies are available from the WIA and are a good buy at $6.50.

Hamads

FOR SALE

Rx: Marconi CR150, 2-60 MHz, complete with P/S and Handbook, in good working cond., $85. **Rx: Eddystone 770R**, 19-165 MHz, in good working cond., $85. VK6WE, QTHR. (092) 46 3232.

Teleprinter, Creed Model 7C, in good working order, $60. VK6ZAL, QTHR.

FTDX400-FV400 VFO, CW filter, 160 m rec. 4-6 KD6 spare valves. Cert. cheque or m.o. $475, fght. extra. **20A SSB/AM/CW/PM** exciter 160-10 m $120. VK6IZ, Unit 32, Harbour Heights, East Fremantle, W.A. 6158.

Self Supporting Steel Tower (4 legs) and **Ladder**, excellent condition. Ring (02) 607-9168 — after 6 pm for full details. VK2SK.

Swan 500CX Transceiver W/VOX & A.C. supply. F L 2000B Linear, mint condition. Ph.: (03) 24 1231, A.H. 20 6135.

1 AWA MR6A, 6 channels with A.B.4, $90.00. **1 H/B Pye Ranger**, unconverted, $20.00. **1 STC L/B Carphone** on 6 FM with xtals, $30.00. **1 AWA & MR3A** going on 2 metres, less xtals, $25.00. Pr.: (03) 92 5687 between 7 and 8 p.m. only.

Communications Rx. Trio 9R 59DS, brand new xtal calibrator V.R. speaker and aerial connector, $140.00. VK2AHR, QTHR. Ph.: (02) 807 6762.

Teleprinter on matching metal table, VGC, $85. **Teletype** character and distortion test generator, $35. **Command Tx** 4 to 5.3 MHz, $10. 3 **CM** microwave equipment including two dishes, signal generator with cavity wavemeter and bolometer bridge, four klystrons and large quantity of plumbing, $35. VK3ZAO, QTHR. (03) 96 4292.

National HRO hotted up as per RSGB modifications, complete with mechanical filter all coils full bandspread for all bands. As new appearance, Eccleston Electronics, 146a Cotham Road, Kew, Vic. 3101.

Trio TS-510 with power supply and accessories, in perfect order, demonstration given, $250. Contact Robert Davey (VK4FM), The Chalet, Mapleton, Qld., 4560.

Palec VTVM $30.00. **3 inch CRO** $20.00. **MR10** 52-525 $35.00. **MR20A** 146M/C $60.00. **ATV or 432 M/CAM TX** with p/supply $90.00. **Sub-Carrier Generator** $20.00. **32 El. 432 M/C Antenna** $20.00. **2 146 Fibre Glass Whip**, base loaded $10.00 ea. VK2AJY/T, QTHR.

Rx General Coverage 0.5 to 30 MHz. AF, IF and tuneable 1 F of 3-6 MHz (from EA240), built from commercial kit with printed/engraved front panel in matching metal cabinet with speaker. Front end is major difference to original giving high selectivity/gain and is crystal locked (circuit available). Parts cost approx. $300 and set has 26 transistors. Best offer. VK4XT, QTHR.

Heathkit HW-7 Transceiver with matching PS and imported Codar PR40 Receiver preselector, all commercially built, as new cond. $120. VK6JF, QTHR or Kalgoorlie 212211.

TR 4 Transceiver with AC ps in excellent condition with spare set of finals and other valves for unit, $375 ONO. VK2AGO, QTHR. Ph.: (02) 43 2427.

Pye Mk II 53.866 Tx Rx, $20. **6Mx Pye Mk IIIA** Tx Rx Tx, modified to DSB, $20. **6 Mx VK3** Dec 71 conv., $20. **ZL 2 Mx** conv. **28 MHz IF**, $20. Incomplete **MR10C** coband, $10. **Type Y** Power Supply 6.3 UAC 250 UDC, $20. **3 in. Oscilloscope**, working order, homebrew, $15. VK2ZSC, QTHR. Uh.: (02) 85-5324.

Drake SPR-4 Receiver, almost new, $475. Also AR 8 Receiver AT 5 Transmitter, Aerial Tuning unit and generator set, $130. Two R 20 type Receivers AWA. One VHF, one HF, fixed frequency, $35 each. Contact John Z. 11/36 Bennett St., Bondi 2026 NSW. Ph.: (02) 387-1078.

Superior VHF QTH C/W House, Shack and Workshop also XYL sized Lawns 12 km South of Adelaide. Available late November 1974. Enquiries VK5ZWW Box 1117, Orange 2800.

Rx AR88, in working order. Copy of Handbook available, $90 ONO, VK6NE, QTHR.

SB300 nameband receiver, 3.5 to 30 MHz, complete with SSB, CW, and AM crystal filters, excellent condition, $235. **Stolle antenna rotator**, excellent condition, 45 feet of control cable, new ruggedised drive shaft, $35. VK3OM, QTHR. (03) 560 9215.

2 AWA MR6A FM carphones, 1 converted to 2 mx FM, 6 channels, xtals for Repeaters CH 1 and Ch 4, simplex ch 40 and ch 50. The other used for spare parts (mic. included, unconverted, all components O.K.). Both units to be sold together for $125.00. B. Bathols, VK3UV, 3 Connewarra Ave., Aspendale, 3195 (03) 90-6424 (evenings).

WANTED

HW 32 or QA/AXY III, FP75, VK2AJY/T, QTHR.

FT75 transceiver and DC 75 mobile power supply. Will pay cash or exchange for above mentioned receiver for sale. VK4XT QTHR, or write PO Box 496, Dalby, Qld., 4405.

KEN 2 meter hand held FM transceiver. VK4XT, QTHR, or write PO Box 496, Dalby, Qld., 4405.

Circuit Diagrams and tuning data on ATR2C RAAF transceiver and also power supply K1 to suit ATR2C. Contact Col Paton, 2 Premier St., Maryborough, Qld., 4650.

Circuit or Handbook for Hallicrafters S27 to buy, borrow or copy. VK5NT, QTHR.

Circuit Diagram or related material for APX-6. Can copy, return of originals guaranteed if requested. VK3TX, QTHR.

STOLEN PROPERTY

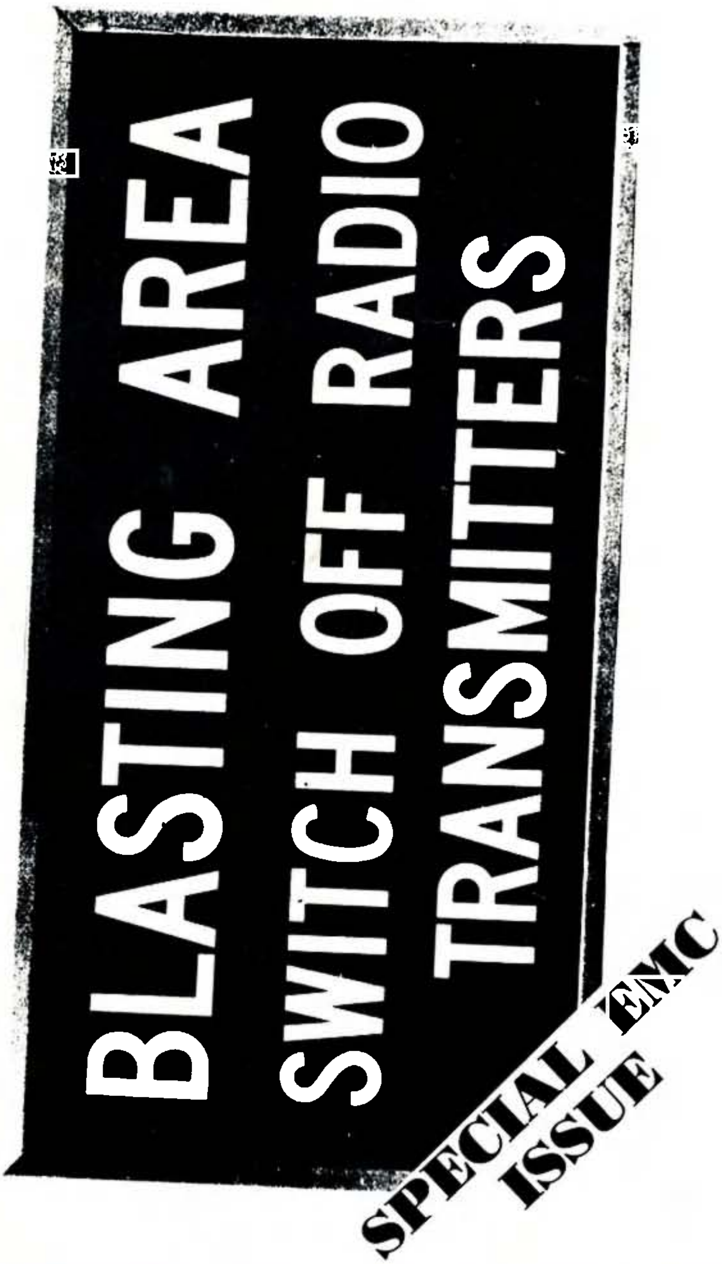
The following were reported as stolen from the Aegis P/L factory in Thornbury, Vic., on 30th May:—

- Tektronic 422 D/B o/scope serial 140
- Sugden Distortion measuring unit SC453 Serial 2128
- Sugden Audio Oscillator S1453 Serial 2059
- and 2 calculators.

If whereabouts are known please contact Victoria CIB.

amateur radio

SEPTEMBER, 1974

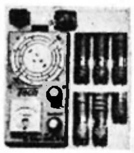


CONTENTS

PHOTO
Sign evidence of a common EMC problem.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER **Model TE-15**
SPECIFICATION



Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Translstor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

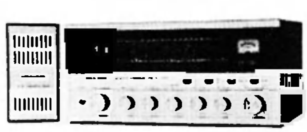
DELUXE **Model HE-22D**
AUDIO GENERATOR Model TE-22D
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
Printed Circuit for uniform Characteristics
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

DX150B REALISTIC with SEPARATE SPEAKER



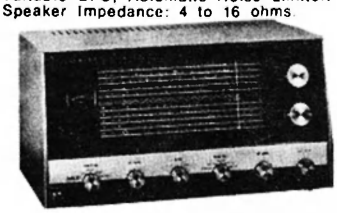
The popular REALISTIC DX150B which has gone from strength to strength with amateurs, short-wave and broadcast listeners alike, now has a further improvement. A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells it current falls or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical band-spread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

Price ~~**$229.00**~~
P & P $2.00
now price — **$189.00**

LAFAYETTE HA-600A SOLID STATE
GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

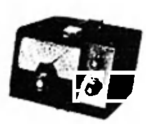
- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes
- Product Detector for SSB/CW.
- Edge illuminated Slide Rule Dial with "S" Meter.
- Continuous Electricai Bandspread Calibrated 80-100M Amateur Bands.
- Variable BFO, Automatic Noise Limiter.
- Speaker Impedance: 4 to 16 ohms



Price $215.00
P & P $2.00

Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration facility: **$210.00.** 100kHz Xtal Extra **$10.75.** P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR
MODEL SG-402



This is an all solid state, wide-band RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES
1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

P.M.G. TYPE TELEPHONES—DIAL TYPE EXTENSION

Ericaron Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50** Tested. p&p 75c
Black Phone. Chrome Dial Standard type. Robust construction. **$7.95.** Few only p&p 75c
Plastic Type. Standard PMK type. Manufactured by L. M. Ericson. As new tested. All phones fitted with standard phone plug and socket. **$17.50.** p & p 75c
Double Phone Plug, 6.5mm 75c
Standard 2 Circuit Phone Plug PMG Type 30c
PMG Type Counters, 4 digit, 48 Volt operation **50c**
PMG Type Telephone Plug & Socket, round type.
PMG Type Phone Plug & Socket, standard Ericson Type White Plastic 95c per pair
PMG Type Telephone Extension Bells, 48V $2.00
230 Volt RVB Horn Tested $7.50

TRIO 3" OSCILLISCOPE DC — 1.5 MHz
MODEL CO-1303A
SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
3. All solid state construction for compact, lightweight portability.
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
5. Direct input to 150MHz for SSB and AM transmission monitoring.

Price $150. p & p $2.00

DISPOSAL SPECIALS

Coax. Cable, 58 ohm Ascand 15 P1/24. Brand new 1/8 outside diameter. 12c per yard. $10 per 100 yeard reel.

MARCONI
VIDEO OSCILLATORS
TF885A 30 KHz — 5 MHz
240 VAC operation P.O.A.

PLESSEY TRANSCEIVERS in stock at present include B47, B48, C42, C45 with power supplies and accessories also available.

Brand new valves and semiconductors

2N3055	$1.00
OA91	15c
807	$2.00
IT4, 6C8, IR5	75c
6BA6-6AK5-6V6G-6J6	$1.00
2E26-QQEO4/7-QQEO4/10	
6SK7-ECH35-6K8G-5763	$3.00
6SJ7GT-12AT7	$1.50

HAM RADIO
(Disposal Branch)

104 Highett Street, Richmond, Vic., 3121 — 42 8136

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286 All Mail to be addressed to above address

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 10.30 a.m. to 5.0 p.m., and on Saturdays to midday.

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

SEPTEMBER, 1974
VOL. 42, No. 9
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QSP

Electromagnetic Compatibility
Electromagnetic Interference

It is doubtful if anyone fully comprehends the full impact on modern society or the interactions of all the technical, economic, social and political complexities resulting from the electromagnetic spectrum.

What is this electromagnetic spectrum? About one-half of all our telecommunications between fixed points, all radio and TV broadcasting, mobile communications, radar and radionavigation services are transmitted by radiation at various frequencies of the electromagnetic spectrum. It is a national resource which costs nothing to use and yet its value at any given time can be drastically reduced by misuse. It is a resource which must be shared nationally and internationally and is absolutely irreplaceable in our present way of life.

Although the electromagnetic spectrum theoretically stretches through many decades of frequency, it is, unfortunately, a limited resource since only a microscopic part can be utilized within the bounds of today's technical know-how. About 80 per cent of the present uses of the spectrum have come about since World War 2.

In short, we are running out of usable spectrum and the proper management of it is of extreme importance.

Part of this management centres around control of equipment design in aspects of Electromagnetic Interference and Electromagnetic Compatibility.

Electromagnetic Interference (EMI) may be defined as causing a degradation in performance of an equipment as a result of its susceptibility to internally generated interference or external fields and voltages generated by other causes. Thus an equipment may be either Radiation Susceptible (RS) or Conduction Susceptible (CS), or it may cause interference in which case the emission may be Conducted Emission (CE) or Radiation Emission (RE).

Electromagnetic Compatibility (EMC) may be defined as the ability of equipments to function without degrading the performance of other equipments by EMI. The two terms EMI and EMC clearly therefore should not be regarded as separate problems but rather as interdependent.

Equipment subject to EMI and EMC may be classified as:

a. Communication-Electronic (C-E) equipment which includes:
   (1) Receivers using antennas;
   (2) Transmitters using antennas; and
   (3) Non-antenna C-E equipment (such as counters and test equipment).
b. Non-Communication Equipment which includes:
   (1) Non C-E equipment in which RF energy is intentionally generated for other than information or control (such as ultrasonic equipment, medical diathermy equipment and uninterruptible power supplies);
   (2) Electrical equipment such as electric motors in all types of appliances; and
   (3) Accessories for engines and vehicles such as alternators, gauges and windscreen wipers.
c. Vehicles and engine driven equipment.
d. Overhead power lines.

EMI is a form of pollution as serious and widespread as other forms. Its presence is apparent in many ways and its seriousness has long been recognised. It has two main causes. The first is unacceptable radiation or conduction at other than the required frequency by electronic equipment such as communications transmitters and radar sets. The second is wide-band random emission by all types of electrical and electronic devices.

The level of EMI/EMC design knowledge in Australia is generally low by overseas standards and being, as it is, as much an art as a science, considerable experience is required before personnel become proficient in this field.

Here then is another challenge for the amateur.

John McL. Bennett, VK3ZA

QSP

The signal reproduced here speaks for itself, and no doubt those WICEN operators who listened for the Quest will be pleased to know that their efforts were officially appreciated. Although the vessel was found eventually not to have been in distress, apart from a battering by heavy weather, the exercise served to point up some of the strengths and weaknesses of the present WICEN organisation.

When Quest failed to meet her sked on ship-shore frequencies, and the Marine Operations Centre was advised that she had amateur radio gear on board and might call for help on 14 MHz, the centre had no formal procedure for requesting a listening watch by amateur operators. It happened that the officer on duty was a retired Commander, RAN, personally acquainted with VK3CDR and aware that the latter is still a serving naval officer and accessible through the Defence communications system; it was also fortuitous that VK3CDR is a member of WIA Executive and was in a position to alert eastern States' WICEN networks with minimum delay.

In this rather minor call-out, the "Old Boy" net operated more effectively than such official arrangements as exist. This in itself is no bad thing; the one great advantage WICEN has over professional emergency services is the way our hobby permeates the whole community, so that amateur radio operators can be found in almost any organisation or walk of life. Nevertheless there is a demonstrable need to maintain an effective formal framework and to improve liaison with other emergency instrumentalities, especially in the Federal area.

A successful approach has already been made to the Director General of the National Disasters Organisation, and Executive is now reviewing the Federal structure of WICEN. As our strength lies in local community effort there is no intention on the part of Executive to interfere in the internal affairs of State networks; however it is palpably necessary to reactivate the position of Federal WICEN co-ordinator, and to define lines of communication with and between Divisional co-ordinators.

ROUTINE 270113Z JUL 74
FROM MARINE OPERATIONS CANBERRA
TO DEFNAV CANBERRA
BT
UNCLAS
FOR SURGEON CAPTAIN LLOYD,
MELBOURNE.
1. NEW ZEALAND VESSEL WAIKARE/ZMCT REPORTED SIGHTING QUEST AT 262100Z IN POSN 3448S 17024E COURSE APPROX 080 TRUE UNDER STEAM AND SAIL.
2. YOUR ASSISTANCE IN ALERTING HAM RADIO STATIONS AND OPERATORS TO ASSIST IN THE SEARCH FOR OVERDUE VESSEL GREATLY APPRECIATED.
3. IT IS REQUESED THAT YOU PASS ON TO ALL CONCERNED OUR THANKS FOR THEIR CO-OPERATION.
BT
END UNCLASSIFIED
ACTION MDG

Jim Lloyd, VK3CDR

JOTA 1974

Please do not forget the 17th Jamboree on the Air on 19th/20th October 1974. It begins at 00.01 Local Time on Saturday 19th and terminates 48 hours later, but stations can operate from the Friday evening if more convenient.

TREES AS AERIALS

The Editorial in Ham Radio for May '74 gives brief details of US Army researches into the use of trees, light standards and other objects as antennas through the use of a flexible, toroid-shaped hybrid electromagnetic antenna coupler called a Hemac which is formed in a circle around the tree. "A 100-foot tree, for example, works best in the 80 metre range. Who will be the first to put this idea to work on Field Day?"

USA NOVICE LICENCE EXAM

"When the amateur Novice licence was first issued over 20 years ago, almost any applicant with no previous electronic knowledge could pass its written examination after reading the questions and answers in Novice study guide a few times without understanding anything he memorised. But not today! Today, trying to pass the Novice written exam simply by studying the questions and answers of the appropriate study guide is doomed to failure on at least the first or second attempt, unless the student already has a pretty good electronic background. The difficulty is that the study guides supply the facts upon which the examinations are based, they do not supply the explanations necessary to understand the facts". From Novice Shack in CQ May '74. Another snippet from the same column reads "The good news is that there is still no fee for the Novice licence" (the basic amateur licence fee was quoted as $10.00 and the CB licence fee is $25.00).

WHAT IS AMATEUR RADIO?

"What Fred Laun's (LU5HFI, ex HS3AL etc.) Kidnappers (in Argentina) may have perceived as a threat to them, was in fact a hobby used by thousands of men, women and children around the world as a means of promoting friendship and understanding. To the terrorists (who) kidnapped him all of this (amateur gear) may have been seen as some sort of clandestine operation designed to pass along information about their guerilla operations." Quotes from a quote in Zero Bias CQ May '74.

NEW CALL SIGN PREFIXES

Radio Communication June '74 carries the information that the ITU have provisionally allocated call-sign series as follows — Bahrain A9A—A9Z and Cyprus (Republic) C4A—C4Z.

"CITIZENS BAND"

"The president of the United CBe:s of America has been jailed for 18 months and the UCBA fined $5000 following conviction on 11 counts of violation of FCC rules and other illegal activities." Radio Communications June '74.

INVENTIONS

Pat Hawker, G3VA, in his TT column Radio Communications June '74, quotes from his reading a booklet "Understanding creativity — a lightning course for executives" by Jack Nickle Smith: "He points out that if you suggested that inventive genius is a combination of intense concentration and pure logic many people would believe you. In practice it is more often the exact opposite. Logic sticks to the rules and inhibits new ideas. This is not to say that orthodox minds are not necessary to society. But innovation is finding a new, creative solution to a problem; not all problems require such solutions, some can be solved logically but these are not the really great innovations . . . . Rather than "an infinite capacity for taking pains" a genius has "an infinite capacity for curiosity and daring thought". Innovators need comprehensive knowledge of their subjects, but not disciplined knowledge."

IARU PRESIDENT

"ARRL Vice-President Noel B. Eaton, VE3CJ, was formally elected president of the IARU — the seventh since the Union was organised at Paris 49 years ago". QST June '74.

TABLE OF FREQUENCY ALLOCATIONS 10 kHz to 275 GHz

A new booklet is now available from the Radio Branches of the PMG's Department which lists all the Australian allocations for the entire usable spectrum. It is a very comprehensive publication and will assuredly interest all those who may need reference material on this subject. The price is 50c (better add 15c for postage) and the WIA copy was obtained from Central Office.

Shortly after Mrs. Whitlam opened the Townsville Pacific Festival she inspected the TARC display. Eventually she took the microphone and spoke to several VK3 stations.

Electronic Pollution - an impending crisis

By WEBB GARRISON
Reproduced from Popular Electronics, April 1973

AN ENVIRONMENTAL FACTOR THAT IS OFTEN OVERLOOKED

"The electromagnetic spectrum is one of our major natural resources. For decades, we have been taking it for granted. We can no longer afford the luxury of such an attitude; there must be a clean-up in spectrum pollution." Environmentalists who did not fully understand what he meant applauded the 1968 address in which FCC Commissioner Robert E. Lee made his plea. Engineers who did understand him agreed that the EM spectrum deserves to be ranked with air, water, and other resources. Most experts, however, took a dim view of the possibilities of a quick clean-up even in the limited part of the spectrum that includes the r-f band.

Today, matters are far worse than they were in 1968. Unexpected effects are becoming increasingly common:

- En route from Miami to San Francisco, a jetliner's navigational system suddenly indicated that the plane was headed for Mexico City.
- A banker wearing an implanted cardiac pacemaker nearly died when he stood close to a commercial microwave oven, and a woman using a similar device was thrown into cardiac crisis by diathermy equipment near her hospital room.
- A Colorado businessman (who should have known better) used properly functioning equipment operating on a licensed frequency to call his office by radio from a construction zone: three members of a work crew narrowly escaped death in the blast and rock slide he triggered.
- Radar systems of a major airport went haywire due to uncontrollable disturbances. The trouble began on Christmas Day. "Now we've learned to expect an annual battle with interference from toy walkie-talkies. Thank God those things break after a few weeks", said an FCC engineer.
- Memory banks of a big Louisiana computer system were crippled when stored information was suddenly erased by radar from a nearby airport.

And so the list goes on and on, pointing up a rapid growth and continued increase in a form of pollution environmentalists often do not even cite. In the U.S. alone, the FCC receives about 1000 complaints per week about interference. Worldwide, the electromagnetic spectrum is becoming unbearably crowded. Simultaneously, proliferation of highly sophisticated electronic devices is multiplying the probability of your receiving unwanted inputs.

The 1971 international symposium of the Institute of Electrical and Electronics Engineers that was held in Philadelphia zeroed in on this problem. Robert D. Goldblum, a supervising engineer at General Electric's Re-entry and Environmental Systems Division, spoke for 500 scientists and engineers from seven nations when he said: "With thousands of radio, television, and radar transmitters throughout the world beaming electromagnetic radiation through the air almost constantly, we are literally polluting the electromagnetic spectrum".

NOISE

During the early days of radio and telephone communication, acoustic filters were numerous and troublesome. It was natural to call such disturbances "noise", and to extend the label to cover electric waves that produced them. Today, interfering waveforms that do not have audible output are encountered in many systems. But "noise" remains the most common name for any kind of interference.

Much noise in a communication system is internal. Some is thermal. Other effects stem from electrons travelling from a heated cathode toward an anode. Such noise is of vital importance in communication, but pollution of the EM spectrum stems from noise caused by radiation external to the systems affected. Much of it is due to natural processes. But man's additons are constantly growing.

International Q signals used to describe r-f interference label nature's noise QRN. At first considered to be rather simple in nature, QRN is now known to be enormously complex. Beyond both ends of the radio band, waves create effects unknown to early radio pioneers.

Atmospheric static is believed to be linked with electrical discharges that take place between water droplets during turbulence. It is especially strong in the AM broadcast band but also affects the VHF band used for TV and FM. Current tests indicate that rainstorms produce broadband noise that extends deep into the microwave region.

Solar flares sometimes cause widespread disruption of radio service. But many faint signals that reach our planet come from more distant sources. Cosmic rays, X-rays from galactic sources, and infrared light shower down on us from every part of the universe.

Radio astronomy was born as a result of studies aimed at reducing noise in telephone conversations sent across the Atlantic by radio. Karl Guthe Jansky of Bell Telephone Laboratories hooked up a 100-ft antenna to study noise. One night in 1932, he picked up a new sound that was somewhat like a faint hissing. Eventually, he identified the source — it came from the stars. Since then, it has been discovered that various types of celestial bodies emit so many different kinds of radiation that most or all of the EM spectrum is affected.

MAN'S CONTRIBUTIONS

QRM — man-made electrical noise — is often called "grass" by radar operators. TV engineers complain about "birdies" and "glitch". Along with a bevy of other man-made effects, these constitute electromagnetic junk.

Motors were the first devices to yield radiant trash. Today, a multitude of household and industrial appliances, from electric shavers to arc welders, produce radiant energy as side effects of their operation.

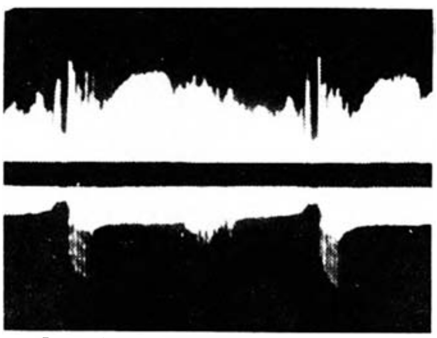
Medical equipment got into the act at least as early as 1905, a decade after Roentgen discovered X-rays. Abundance of X-ray, diathermy, and other machines causes a modern hospital to literally pulsate with radiant energy. Most of it does no harm, but any day, any burst of radiation can create emergency-level noise if it happens to fall upon a system capable of receiving it.

Communication would return to the era of the carrier pigeon if we suddenly stopped using enormous quantities of radiant energy to convey signals. But the proliferation of radio transmitters is a major factor in the production of electronic pollution. In 1949, there were 160,000 transmitters operating in the U.S.; today, there are 36 times as many.

No one knows what happens to individuals whose electrical processes are affected by radio and TV transmission. But Britain's respected journal **New Scientist** has pointed out that a 1.25-megawatt station dispenses so much radiant energy that the daily bombardment one mile away is sufficient to lift the family car 2 ft off the ground. Irrelevant? Not according to growing evidence. Quotes **New Scientist**, "There is some connection between chronic exposure to certain radio frequencies and a wide range of physical and mental disorders".

About all we know positively is that some human organs are more susceptible to radiation damage than are others. "Practically speaking", points out Robert Goldblum in the 1970 edition of **ITEM**, "the human body is a three-dimensional mass having width and depth, as well as height. Therefore, when a man stands erect in an r-f field, he represents an object whose height, width, and depth dimensions can be expressed in terms of wavelength. When the body is so oriented that any of these major dimensions is parallel to the plane of polarisation of the r-f energy, the effects are likely to be more pronounced than when the body is oriented to other positions."

Transportation is more obscure than communication in its role as an EM pollutant, but it is highly important because whenever a spark occurs, a radio signal is generated. Many ignition systems radiate staccato-like bursts of noise over a broad range of the r-f band. Radar, now vital to forms of transportation ranging from measurement of highway speeds to observation of aircraft, emits its own kind of radiant energy at constantly increasing levels.



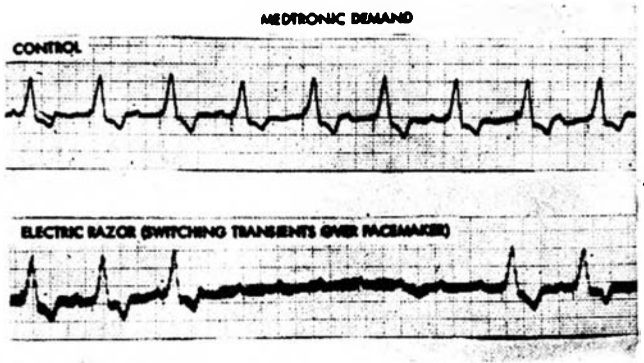
Power-line noise present on visual carrier (TV). (Photo courtesy IEEE)

MAN'S FURTHER CONTRIBUTIONS

Lights of various kinds emit enough radiation outside the wavelength of visible light to be considered serious pollutants. Few ordinary sources of electronic noise give TV receivers more trouble than does a flickering fluorescent tube. Neon advertising signs and other signs that use gases can create a virtual EM blackout for hundreds of yards in every direction.

Nuclear blasts at high altitudes yield radiant energy that interferes with some radar frequencies. Called the "Argus Effect" because it is reminiscent of the Greek creature with 100 eyes, it is being studied as a possible technique for rendering blind enemy radar. And electronic countermeasure (ECM) devices are constantly being developed, adding to the pollution problem.

Microwaves, first put to practical use in World War II radar installations, offer some hope, plus new dangers. Today, microwave relay towers dot the countryside of every advanced nation. With at least 50,000 general-purpose computers



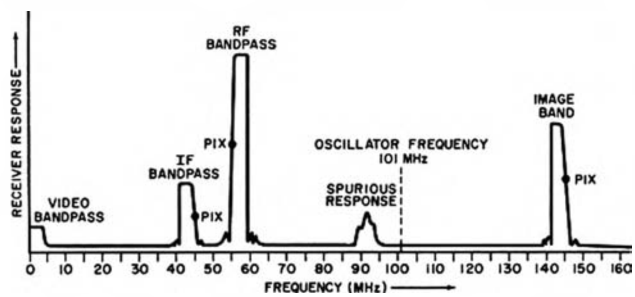
Curve traces show how interference from electric razor affected pacemaker. ("British Heart Journal")

operating in the U.S., it is inevitable that microwave transmission of data will show a dramatic increase within this decade. But microwaves are not limited to the field of communication. They do everything from curing plastics and lumber to warming and cooking food. Relatively innocent as sources of noise during the early years of use, microwaves have now been indicted on many counts.

TV DETECTIVE

More than any other common electronic device, TV receivers reveal pollution. Much of this noise stems from too strong signals. Such interference is a nuisance, but it is not a hazard. However, it points up the complexity of the problem.

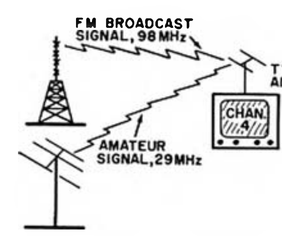
Practically all common sources of EM radiation produce characteristic and readily identifiable patterns of visual disturbance.



TV receiver tuned to channel 2 (54 to 60 MHz) has potential for picking up noise from four additional bands of frequencies. (Photo: RCA "Consumer Electronics & Commercial Systems")

Mild r-f interference creates a cross-hatched or basket-weave pattern. Diathermy creates moving ripples, herringbones, and simlar effects. Power-line noises that can originate at any or all of five sources in normal cable suspension hardware creates pulses that can stop any show. Spark plug interference, usually random, causes fleeting but conspicuous spots. Boats and motorcycles cause much more trouble than do cars since their plugs are less heavily shielded.

Transmitters often radiate energy of several different frequencies with receivers that can frequently pick up two or more frequencies. This factor, coupled with the multiplicity of external sources of noise, makes the chart of sources of TVI too complicated for beginners to read. Every time a TV receiver reveals interference, it can be taken for granted that dozens or hundreds of unseen events are occurring simultaneously. Electromagnetic interference is usually intermittent in a given case. But at any instant, it is taking place wherever electronic devices are being used.



Two signals add or subtract to equal frequency of TV channel (98 − 29 = 69).

AN UPHILL BATTLE

In the war against electronic pollution, progress is being made. But EM interference sits on the shoulders of the electronic age like the Old Man of the Sea on the back of Sinbad the Sailor. With each forward step, the burden becomes heavier.

Upgrading specifications for colour TV receivers has about eliminated excessive X-rays — from properly functioning equipment. Tighter control over manufacturing standards has produced microwave ovens that pose no threat to wearers of cardiac pacemakers — providing that the door seals of the ovens remain factory-fresh.

Passengers on jet airliners are no longer permitted to operate FM radio receivers during flight; they can wreak havoc on navigational equipment. Radio-controlled model airplanes have been outlawed in many cities for obvious and not-so-obvious reasons; one manufacturer, Champion, has spent a fortune developing a resistor spark plug that minimises noise. Too, the FCC is making a real effort to crack down on broadcasters who do not adhere to assigned frequencies.

Meanwhile, the tide of pollution mounts. Gains are more often than not offset by the continuing upsurge in the number and kinds of equipment transmitting or receiving r-f and microwaves. Deliberate jamming is a growing international problem, as is radio and TV piracy.

Most domestic interference is unintentional, but it may occur whenever the right conditions are found. Every increase in radiated EM energy has potential for creating new problems.

Largely unexplored biological effects of EM radiaton are so vast that in some circles there is serious talk of trying to leadshield homes and offices close to powerful transmitters. With the microwave communications industry already billed as the "next big glamour field on the investment horizon", there is little doubt that radiation will increase faster than protective measures can be taken and applied.

Interference now pollutes the spectrum so badly that the man on the street faces an impending global crisis. There is no real hope that interference can be eliminated. The best we can do is try to keep it at tolerable levels. ●

TV Interference from HF stations

R. S. GURR, VK5RG/T
9 Richmond Avenue, Daw Park, 5041

Standard TV aerial installation techniques utilise balanced feed systems, and care is taken to twist the feedline as it runs down a tower on standoff insulators. It is difficult to see how such a well balanced system would pick up even a little HF energy. The balance condition however is often destroyed at the TV tuner, where there may be unbalance introduced. The capacity from each 300 ohm tuner terminal to ground for instance is not always equal.

The unbalance introduced helps put large HF voltages (nearby Police, Amateur, Flying Doctor and Bushfire Nets) including spark plug ignition noises, at the tuner thereby causing overload — intermodulation conditions to be established.

We can overcome these conditions often with the connection of a three or four turn coil of wire across the TV aerial terminals, whereby the HF signals are shorted out, leaving the VHF relatively unattenuated. Unbalance could still prevail, however.

The idea of isolating the balanced feedline from the unbalanced TV receiver was first tried with 300 ohm to 75 ohm baluns used back to back. The effect was so noticeable, that the need for a High Pass filter became redundant. Ignition noise reduction was the most beneficial property of this method, due to the elimination of the high level HF components in the feedline.

Cost of commercial baluns for this technique made it desirable to find a suitable alternative, and the practical way appeared to be to use one balun if possible. The simple means was of course the obvious — use a 1 to 1 isolation transformer — one whose losses were great at HF but low at VHF.

A Neosid Two hole ferrite TV balun core **(such as sold by the Components Division of the WIA.—Ed.)** is wound with two turns primary and two turns secondary of 10/0.0076 plastic hook up wire, with short tails left for connection to receiver and aerial. The result is so successful, even HF ham interference to a TV receiver using an indoor helical aerial is cured.

When I first made one of these for my own TV set, I was able to remove a 20 db resistive attenuator and a high pass filter that were used to overcome interference 10 years ago. ●

Diplomacy for amateurs

R. S. GURR, VK5RG/T
9 Richmond Avenue, Daw Park, 5041

No candidate at an A.O.C.P. or A.O.L.C.P. exam is asked to demonstrate his manners, temperament or tolerance. He is not questioned on his knowledge of the latest profanities — it is apparently assumed by the examiners, that he, being human, is psychologically suitable to have a licence.

Little surprise to anyone, when, one evening whilst working a new rare one, a previously unknown neighbour knocks, and suggests he **get off the so and so air.** Our 100 per cent mature diplomat will of course reply, "Yes mate, I will and may even volunteer to fix the problem!"

Most hams today are happy enough to keep up with the technology of their own rigs, and are entering new fields when they undertake to look at a neighbour's TV, Radio or Record Player. In 99 per cent of cases, touch that set, and you are on for a free service contract for life!

A recommended way to respond to a neighbour is, **"Yes, I will get off the air; however, I would like to continue to use my equipment tomorrow. Do you have any objection to my calling in a PMG Radio Inspector to do some tests".** With a reply like that to indicate he has won his point, neighbour invariably says, **"Yes"**. Following this an exchange of names, nature of trouble, etc., can be made. **NEVER** admit liability or fault. The ham should now watch TV, read a book or play with the kids for the rest of the night. The following day call in a Radio Inspector for an early opinion on the problem.

If your rig is crook, you ought to hang your head in shame, fix it and shut up about it. If it is not, and the trouble is the other fellow's receiver, let the PMG Inspector break the news to him. If it is caused by outside influences, this is also not your responsibility unless the rusty joints, etc. are on your property.

Can you imagine the unfriendly atmosphere you will create if it is you, yourself, who condemns the complainant's equipment — you do not even want to see it — you could not care less whether it is the latest from Japan and uses 6 speakers instead of 2. Why should you have someone else's hobby suddenly thrust at you, and be forced to take any interest at all?

The WIA recommendation is, be pleasant, conduct tests when required by the Radio Inspector, and refrain from antagonising anyone. However, do not establish any undesirable precedents by actually repairing or modifying equipment yourself. Record carefully the days you remain off the air by official direction, so you may seek a reimbursement on your licence fee, if tests prove you were innocent of any breach of licence conditions. ●

Amateur transmitter interference

to tape recorders, record players, electronic organs, etc.

IVOR MORGAN, VK3DH
29 Constance Street, East Hawthorn, 3123

This is a report on a considerable amount of work carried out by Bert Hanson, VK3BAW and the writer. The work is by no means complete as yet but it is considered necessary to supply at least a report in the form of notes only, on the progress.

Introduction in the form of history or lead up to the subject should be quite superfluous so I propose to go directly into the problem.

I have had low level audio frequency valve amplifiers for microphone, record players and later tape decks, but any RF interference resulting in CW clicks clear voice or unresolved SSB, coming from the loud speaker system, can easily be cured.

Since these systems were invariably high impedance low level, design demanded careful shielding to eliminate hum frequencies from nearby mains and power supplies. The shielding also helped considerably to reduce RF detection and all one had to do was to include a resistor of 50 to 100K ohms in the grid lead of the first stage to form, with the capacity of the grid to earth, an integrating circuit. We then no longer had a radio frequency detector in the front end of the amplifier.

Since the introduction of the transistor, two things happened. One, the circuit is so low in general impedance that what we used to call "grid hum" pickup, no longer applies. Second, designers found that shielding was no longer called for.

A smart character once said that "a transistor can do anything a valve can do". This is the understatement of the year. He forgot to add that in addition to the fundamentals that they can both "Oscillate, Rectify, and Amplify", the transistor amplifier is intrinsically wider in pass-band and more readily overloaded and made to detect in a non-linear manner.

Because of these factors, you will have observed that the manufacturers of record players no longer bother to shield the printed circuit boards. With a dynamic cartridge there will be six cascade stages over two printed circuit boards. Four stages including the complementary pair power output stage are usually on one board and a two stage high gain pre-amplifier/equaliser on another board. Neither of these PCBs are shielded as a rule and they are usually fitted to the cabinet in such a way that effective shielding is impossible.

Tape recorders are often not as bad in this respect as more metal shielding seems to be used. Microphone amplifiers vary a great deal but most of them would suffer interference in the strong RF field of a transmitter.

The manufacturers have stated that the percentage of cases where a very expensive record player or electronic organ etc. will suffer from RF interference is small. This is all very well, but I would like to suggest that if a high gain AF amplifier of considerable power was designed to be immune from RF interference, the buying public would certainly appreciate it. The very expensive speaker cones would not be subjected to a damaging pulse every time the refrigerator starts up or a light is switched, and interference from dozens of other normal electrical appliances would similarly be silenced. The taxi car-phone in your street can also often completely ruin a recording you may be copying or listening to.

Commencing at the beginning, we found that a mains filter should be used. This helps considerably to reduce the spark transmitters referred to in the last paragraph. A simple filter consists of a ferrite toroid in the mains lead to the amplifier power supply. We removed the plug and wound as many turns as possible through a ferrite toroid 1½ inches outside diameter using the original flex lead to the amplifier. Much smaller ferrite toroids were used in pickup leads to the pre-amplifier. Medium sized toroids were used in the speaker leads at the amplifier end of these twin leads. Given a large enough ferrite toroid, both left and right hand speaker leads of a stereo system can be wound on one core since the speaker currents cancel in the toroid but the antenna effect of the speaker leads looks into a considerable inductive impedance, isolating the speaker leads from feeding RF into the amplifier.

Shielding speaker leads is useless, since they are almost always unbalanced and a voltage is introduced on the "hot" side, regardless.

Most commercial amplifiers we found, will not tolerate any capacity shunting the speaker leads as it directly affects the negative feed back loop to the early stage of the main amplifier.

So you cannot put capacitors across the speaker leads nor shield them, nor can you increase resistance as the voice coil is usually 8 ohms and any extra resistance will degrade the amplifier. Hence the ferrite toroids using, if possible, the existing speaker leads with no increase in resistance or capacity.

We have found that a small ferrite bead (No. 3, up to 28 MHz or No. 4 above), wound with as many as possible turns of 26 gauge enamelled wire, connected as close as possible to the base and in series with the base lead of the pickup input amplifier then followed by a capacitor of 100 pF from base to emitter and a 0.1 microfarad from emitter to earth, works best. If the latter is not possible due to negative feed back at the emitter point, 100 pF from collector to base may be used.

If having used a mains filter, speaker leads toroids, input leads toroids, amplifier input RF choke and by-passes, the system is not free from RF interference, at least it should be much improved.

I believe the amateur should try mains filter and speaker leads ferrite toroids first, if he is "treating" his near neighbour's record player or whatever, for the simple reason that it alone could be effective. You know as well as I do how you could be expected to service "for life" your neighbour's record player if you inserted a choke in the front end with a SOLDERING IRON!

In some cases I believe the only way to immunise the amplifier would be to build a new one in cast metal boxes with lids and all incoming and outgoing leads carried via feed through capacitors. The amateur must not be expected to do this.

Let us hope that very soon legislation will be drawn up which will develop Electro Magnetic Compatibility between the consumer, the amateur and the legislators. It is urgent that practical implementation of legislation for the protection of both amateur and consumer be made.

In the main, it is clear that standards of performance to be expected by consumers of amplifiers must be defined. Manufacturers will have to meet these standards. The technical aspects of amateur equipment and radiations will be defined and standards set.

A qualified technical arbitrator will be necessary, one who is fully informed as to what standards are reached by the amplifiers and the amateur equipment, either home made or of commercial manufacture.

Finally irrespective of what conciliatory body is nominated, any decision made must be legally binding on both parties.

Particularly the amateur must be freed from the stigma of potential civil action, as for instance, "a public nuisance".

EMP - the ultimate EMC problem

JIM LLOYD, VK3CDR
Surgeon Captain S. J. Lloyd, QHS, RAN,
100 Wimbourne Ave., Mt. Eliza, 3930

WICEN operators! — will your Carphone withstand an input pulse of several thousand volts per metre with a rise-time measured in nanoseconds? If not, you will be of little help to your State Disaster Organisation in the event of a nuclear attack.

EMP — the Electromagnetic Pulse generated by the explosion of a nuclear weapon — is now being taken very seriously by designers of military communications and electronic equipment. It was given scant consideration in the early years of nuclear weapon testing, for example in the Monte Bello Islands and at Maralinga in the 1950s, because the electronic instrumentation was almost exclusively based on valves, which are relatively resistant to transient pulse damage.

The advent of solid-state techniques, although bringing so many other advantages as to become ubiquitous and inevitable, introduced a degree of vulnerability into the nuclear scenario that has only recently been fully appreciated. Semiconductor devices, as well as having low tolerance to high-voltage transients, are susceptible to nuclear radiation damage, and the concept of "nuclear hardening" is well established; that is, designing the apparatus to withstand at least as much radiation as would incapacitate its human operator.

This concept is hard to apply to EMP however, as the pulse is lethal to equipment far beyond the range at which human casualties would be caused by any of the effects of a nuclear weapon. In fact the electromagnetic pulse is not any hazard at all to personnel, except perhaps indirectly if you happen to be wearing an implanted cardiac pacemaker (and it won't do your transistorised hearing-aid any good!)

GENERATION OF THE ELECTROMAGNETIC PULSE

A nuclear explosion liberates a vast amount of energy, part of which appears in the form of gamma rays. If the explosion takes place in the atmosphere, many of the gamma photons interact with atoms of the air, in a number of ways of which the "Compton Effect" is most significant for the production of EMP. In this interaction, the collision of a photon with an orbital electron transfers energy from the photon to the electron, imparting additional momentum to the latter and causing it to recoil. The resultant movement of electrons constitutes an electric current and consequently induces a magnetic field.

If the system is balanced, the motion of electrons is uniform in all directions radially from the site of the explosion, the resultant magnetic fields cancel, and no pulse results. In practice, however, a degree of asymmetry is always present. This is introduced either by the proximity of the ground in a surface or low atmospheric burst, or by the earth's magnetic field in a high-altitude burst. Consequently a net current flows in one direction or another, and a transient magnetic field is produced.

It is to be expected that nuclear weapons would normally be exploded near the ground for maximum destructive effect, but it is nevertheless conceivable that a combatant might deliberately employ a high-altitude burst solely to create long-range EMP and knock out the enemy's communications and weapons-guidance electronics. EMP is no respecter of political affiliations, however, and such action would be feasible only if its initiator could be certain that his own equipment was adequately protected.

QUANTITATIVE CONSIDERATIONS

It is not easy to calculate the magnitude of the electromagnetic pulse to be expected in any particular situation, because of the number of variables involved. On the other hand little experimental data was obtained up to the time of the voluntary ban on atmospheric nuclear testing, no doubt because valve circuitry was still widespread and the significance of EMP was underestimated. Consequently there is not much information available and what there is is highly classified. Perhaps those nations who have defied the test-ban know more about it, but they are not telling.

Nevertheless sufficient information has been released to indicate that electrical failure will occur far beyond the range of mechanical, heat, or radiation damage. At such distances the peak voltage may rise as high as 10^{6} volts per metre and the pulse energy may be several tenths of a Joule. It is **probably** not enough to damage a 6AK5 or 6BA6 in the front-end of a receiver, but sufficient to weld the contacts of an aerial-switching relay and certainly to burn-out any semiconductor device, confuse a logic circuit, or wipe a core memory.

The threshold energy needed to destroy most semiconductors is of the order of 10^{-3} to 10^{-2}J, but circuit malfunction or memory erasure requires only 10^{-9}J. As the total electromagnetic energy released by a thermonuclear bomb may be as high as 10^{13} Joules, it can be seen that only a very minute proportion needs to be coupled into an electronic circuit to create havoc.

Vulnerable as an individual "black box" may be in itself, connection to power cables or aerial feeders greatly increases susceptibility to the low-frequency component of the pulse; damage may extend to vehicle electrics, land-line telephones, and power distribution systems. A couple of examples have been made public; a very small high-altitude test blew the 8 kV circuit-breakers on a transatlantic cable; and quite a modest surface burst has damaged power transformers over 160 km away.

PROTECTION AGAINST EMP

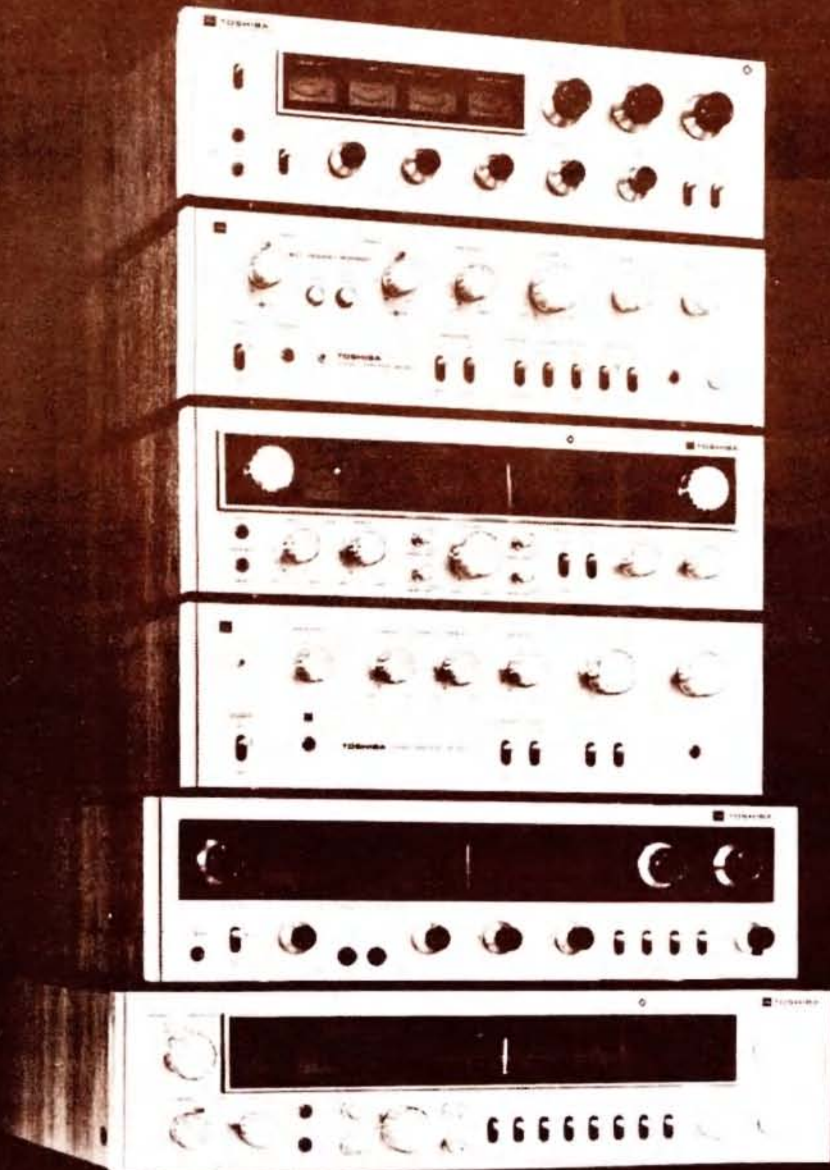
The possibilities of protecting military electronic equipment against EMP has been stated from two viewpoints: one says: ". . . if nuclear weapons are employed . . . then the majority of the Armed Forces involved in the conflict might as well pack up and go home"; the other implies that all that is needed is a bit of screening and filtering. Obviously the truth lies between these extremes, but probably nearer to the former than the latter. Protection is possible but it is expensive and may involve a considerable trade-off in other directions. The extent of filtering and screening that is required is such that retrospective modification would be almost impossible and certainly completely uneconomic. EMP must be given due consideration from the earliest design stages.

Apart from its magnitude, the most difficult characteristic of the pulse to cope with is its fast rise-time of, say, 20 nanoseconds and wide band-width, with most of the energy concentrated in the LF and VLF region. Spark gaps and gas-discharge tubes, as used for lightning protection and in radar T/R boxes, respond too slowly to protect against EMP, although zener diodes may have some application. Screening by copper or aluminium is relatively ineffective against the low-frequency magnetic field, which demands materials of high permeability.

Similarly, the use of RF filters in power supply leads and other external connections is complicated by the low median frequency of the pulse (around 10-15 kHz). Low-pass filters included for TVI and other EMC attenuation are ineffective at the frequencies carrying most of the EMP energy. EMP protection requires good layout design to obviate inductive loops, steel rather than aluminium for cabinets and instrument cases, specifically designed wide-band rejection filters at external connections, good grounding technique, and resonant antenna systems to minimise out-of-band pickup.

To assess the effectiveness of EMP protection, short of resuming atmospheric nuclear testing, it is necessary to use large and expensive simulators. Overseas versions involve such constructions as a cage-dipole antenna 300 metres long and 20 metres high; or a toroidal radiator 45 metres high suspended from a helium-filled balloon. Only laboratory simulators are available in Australia.

Perhaps the simplest answer to the problem for the WICEN operator is to keep that old valve rig in working order, just in case! ●



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Dick Smith Ele

HUSTLER ANTENNAS

Selecting the right antenna is essential for efficient operation of any communications set-up. And it's worth remembering that often the antenna represents only a very small proportion of the cost of a link, yet it has the greatest effect on the overall performance.

The Hustler range is made by New Tronics in the USA and their antennas have proved popular all over the world. Whether you want fixed or mobile, in any of the bands, there's a Hustler that will offer superior electrical and mechanical performance at very reasonable prices.

All antennas are 50 ohm and require no matching. They all handle the legal maximum powers.

HIGH FREQUENCY ANTENNAS

Fixed station, 4 band trap vertical Model 4BTV covers 10, 15, 20 and 40 Metres with one setting for total band coverage. An optional 80M resonator is also available. No switching, no matching and uses only a single feeder. Low SWR over very wide bandwidth (only 1.6:1 at band edges). Heavy duty, low loss mounting brackets. Solid fibreglass traps. Total length 21'5" and weighs 15 lb. Mounts on a vertical support up to 1½" OD. $75.00.

RM80 80M Resonator rated at 400WPEP adjustable between 3750 and 4000 kHz. 42½" long and weighs 1.05 lb. Simply installs on stud of top element of 4BTV. $23.90.

Mobile masts for 6, 10, 15, 20, 40 and 80M

Basic Mast MO-1 is the folding mast that features quick interchange of band resonators. Folds down to only 15" above base for entering garage etc. Simple, shakeproof sleeve clutch keeps antenna vertical while in use. 54" long operates as ¼ wave on 6M. Made in ⅜" OD hard drawn brass and heat treated alloy. Stainless steel base to fit mobile mounts (see later). Weighs 1.9 lb. Low SWR and broad bandwidth. $22.50.

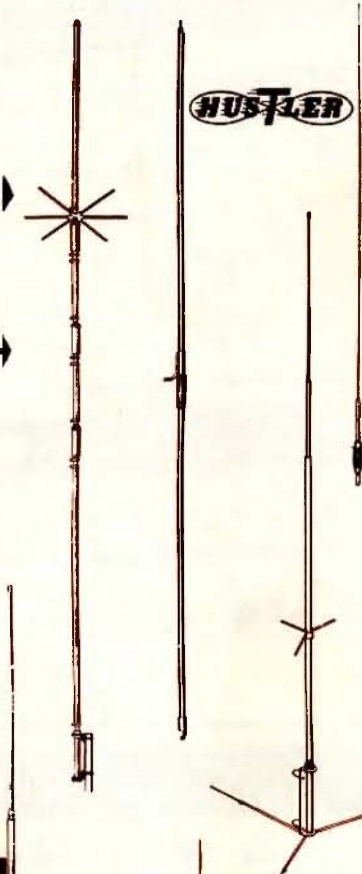
Resonators to extend coverage of MO-1. All precision wound and weather sealed. Adjustable stainless steel tip rod and convenient hand edge marker plus positive lock nut and clutch. See accessories for special resonator spring.

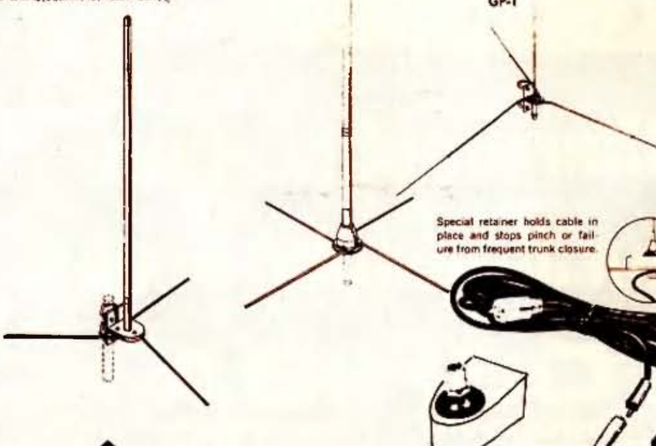
Model	Band	Weight	Price
RM15	15M	0.42 lb.	$15.90
RM20	20M	0.46 lb.	$18.00
RM40	40M	0.84 lb.	$22.50
RM80	80M	1.05 lb.	$23.90

UHF/VHF ANTENNAS

Fixed Station 2M Colinear G6-144 has an extremely low angle of radiation by combining ⅝ and ½ wave radiators. Conservatively rated at 6 db over ¼ wave ground plane, but experience indicates up to 9 db at distances of 20 miles or more. Omnidirectional, field adjustable. Low SWR, typically 1.1:1 at resonance and only 1.5:1 at 6 MHz bandwidth. 250W FM rating measures 119" radiators with 21" radials. SO239 coax connector, mounts on 1" American standard pipe thread. Ideal Repeater antenna. Weighs 4.5 lb. $64.00.

6 db GAIN Two Meter Colinear





MODEL GP-1

Fixed station 2M, 5/8th wave GS-144 has 3.4 db gain over ¼ wave ground plane. SWR better than 1.15:1 at resonance and 2:1 at 6 MHz bandwidth. Rated 200W. Radiators 47", radials 21". SO239 connector. Unique matching system gives complete feedline decoupling. Supplied with double duty mounting brackets. Weighs 3.5 lb. $28.45.

SuperGain Mobile CG-144 is a 2M colinear with 5.2 db gain and 200W FM handling. SWR is 1.1:1 at resonance and 1.5:1 at 6 MHz band width. Low angle radiation as with the G6 144. Tempered stainless steel elements. Fits standard mobile mount 75½" long and weighs 1.84 lb. $37.50.

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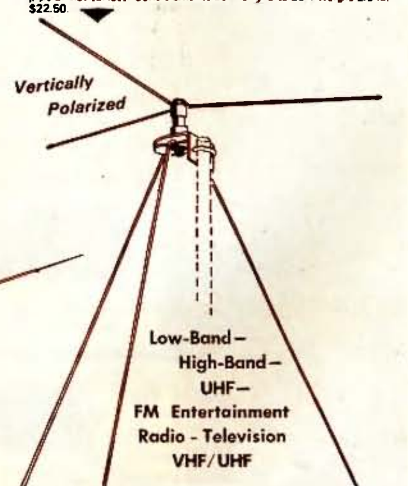

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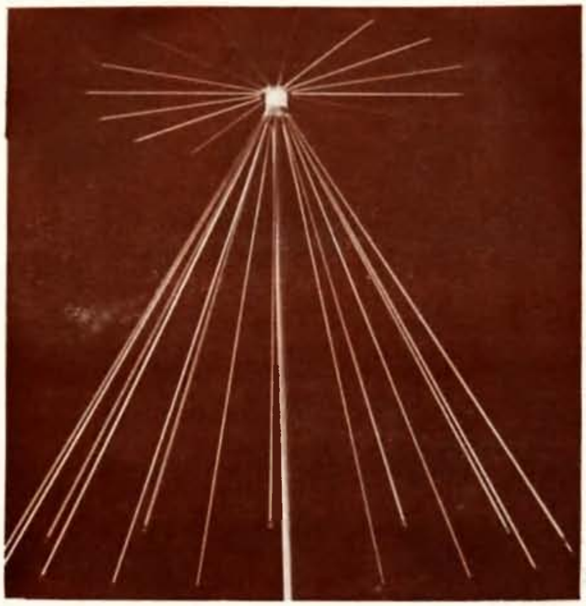

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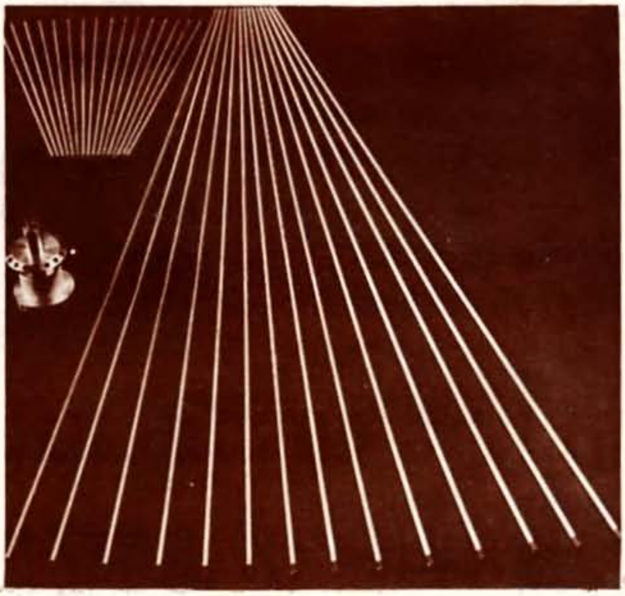

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Audio frequency interference (AFI)

P. W. WATERS, G3OJV
8 Gay Bowers, Hockley, Essex, U.K.
(Reprinted from Radio Communication, April 1973)

THE PROBLEM

The current boom in hi-fi sales has led to an increase in the number of cases of interference caused by radio transmitters operating in close proximity to audio equipment. Almost all audio equipment now being produced for the domestic market is entirely solid state and this changeover from valves to transistors has coincided with a hi-fi boom, making it difficult to assess to what extent transistors are responsible for the increase in the number of cases of interference. Certainly transistorised equipment appears to be far more susceptible than the older valve equipment. Also of significance is the now widespread usage of magnetic cartridges which require amplifier sensitivities of the order of 3 or 4 mV. This usually necessitates one or two additional stages of amplification, whereas the older type of crystal and ceramic cartridges having far higher outputs require far less gain from the amplifier.

Unlike television interference, there is usually very little that can be done at the transmitter end to prevent the trouble. Apart from reducing power, moving aerials or switching off altogether, the cure must be at the complainant's end. Like all kinds of interference this poses a social problem. The average cost of a stereo radiogram is around £80-£100, and for a hi-fi installation comprising separate amplifier, speakers, turntable and possibly VHF tuner the price rises to the region of £150 to £200. Any person having spent this amount of money is not going to take kindly to hearing a burst of CW or "distorted" SSB coming through in the middle of his or her favourite record. Unfortunately, telling your neighbour that the interference is not the fault of the transmitter, but his own equipment, is not going to ease the matter even though it is probably true.

Of course, each case has to be dealt with on its merits and no hard and fast rules can be laid down. It is of prime importance to use tact, patience and common sense. A special mention should be made here of the case of interference from an AM transmitter. A sensitive hi-fi system may well be picking up such a signal and relaying it in "full frequency stereo sound" — a situation which calls for special tact.

THE CAUSE

Before discussing the various ways in which this kind of interference can be prevented, it is necesary to understand how the RF signal reaches the amplifier, is rectified, and emerges at the speaker as an unwanted signal. Fig. 1 shows typical audio amplifier low signal stages. In the case of the transistor version notice the base/emitter junction. This forms a fairly effective junction diode and any RF signal that reaches this stage will be rectified and passed on as an audio signal to the following stages. Similar comments apply to the valve stage. RF energy reaching the grid of the valve is likely to be rectified by non-linear action and the resultant demodulated signal passed on through the following stages as an audio signal. With the modern hi-fi amplifier, having a high overall gain and an output rating of 10 to 15 W/channel or even more, RF breakthrough can be dramatic.

There are a number of paths the radio signal can take to reach the circuitry of an audio amplifier. In high RF fields even direct pickup by the circuit board is possible. Normally, however, the signal is fed to the amplifier via the various connecting cables, which make very good "aerials". Two of the most common sources of trouble seem to be the mains cable and the speaker leads. The mains connection, because of modern ring mains circuits, results in the entire house power wiring being connected to the amplifier and acting as a long-wire "aerial".

As for the speaker leads, stereo reproduction requires a pair of speakers to be separated from the amplifier and turntable unit in order to obtain the stereo effect. In practice this means that the speakers are very often positioned several yards away from the amplifier, the length of twin flex usually used for this purpose making a good "aerial", possibly resonant on or near one of the HF amateur bands. This, of course, ignores the other connecting cables from record turntable, tape unit, VHF tuner etc. It is not surprising, therefore, that a substantial RF signal can find its way into an amplifier several hundred feet distant from the transmitter.

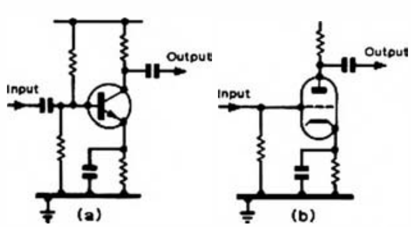


Fig 1. Typical first stages in audio amplifiers which are open to rf interference, (a) transistor, and (b) valve

THE TREATMENT

There are two basic ways of tackling interference in audio equipment. Either the circuit can be modified to prevent the rectification occurring, or the RF signals can be prevented from reaching the amplifier circuitry by fitting filters to the various connecting leads.

Dealing firstly with the rectification problem, it has already been shown how, in a transistor amplifier, trouble usually arises when RF reaches the base/emitter junction of a transistor. Similarly, in a valve amplifier, too much RF energy on the grid can also result in rectification. Clearly, if the RF signal can be bypassed to earth without degrading the wanted audio signal then the problem will be solved. The most obvious solution that comes to mind is to fit a capacitor between input and earth of the amplifier of such a value that while it looks like a near short circuit at RF it offers a high impedance to audio frequencies. Unfortunately, between the input and the transistor base or valve grid may be several inches of wire or circuit board, switch contacts with their associated connecting leads and other components. Bypassing at the remote input socket of the amplifier may therefore not be sufficient. A far more effective method of preventing rectification is to solder a capacitor directly across the base/emitter junction or between control grid and cathode to prevent an RF potential difference between the electrodes.

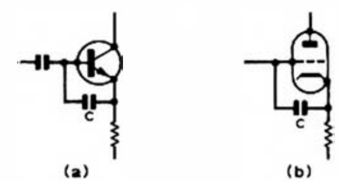


Fig 2. (a) A suitably chosen capacitor connected between the base and emitter of an early transistor stage will bypass the offending rf to earth without affecting the audio signal. Suitable values are discussed in the text. (b) The analogous modification to a valve stage

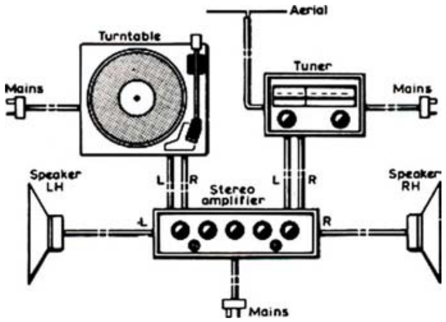
Fig. 2 illustrates the required circuit modification. The capacitance value, C, can be around 1,000 pF, although it is by no means critical. The British Radio Corporation recently recommended values of 2,000 pF for one of their transistorised radiograms. This effected a complete cure without affecting the fidelity of the amplifier. Because of the generally higher impedance of valve amplifiers it would be desirable to keep the capacitance value as low as possible and to include an RF choke or 10k ohm resistor in series with the grid to prevent too much loss of high frequencies.

In some cases it will be found necessary to fit bypass capacitors to more than one stage. An indication as to exactly where in the amplifier the rectification is taking place can be obtained by noting whether the level of the interference changes when the amplifier volume control is rotated. Similarly a test should be made to ascertain whether or not rotating the tone controls has any effect on the response of the interfering signal. If the signal is affected by adjustment of any one or all of the controls then the rectification is probably taking place in an earlier stage. The word "probably" is used deliberately. In a recent case investigated, the RF signal was getting past the first stage and being fed to the following stage via the volume control which was acting as a variable attenuator. Although the control affected the level of interference, the rectification was taking place after the volume control. In practice the fitting of bypass capacitors as shown in Fig. 2 usually results in a complete cure.

Once again there are exceptions to every rule. For reasons which are not clear to the author, there has been a case where the fitting of a capacitor across the base/emitter junction has considerably **increased** the amount of breakthrough. So as an alternative, one or two ferrite beads can be slipped over the base lead of the transistor. However, this can present practical problems if the transistor happens to be soldered very close to the circuit board. In such cases, therefore, an attempt must be made to keep the RF signal out of the amplifier circuitry.

Up until now various ways of preventing RF rectification by modifying the circuitry have been considered, without making any attempt to keep the RF energy out of the amplifier. Very few domestic amplifiers are housed in a sealed metal box, but in a majority of cases the RF signal is introduced into the amplifier by means of the external connecting cables, so this need not be a drawback. For reasons mentioned later it may not be desirable to attempt to effect a cure by working on the internal circuitry. If, as an alternative, a filter can be fitted that will either block the path or short circuit the RF signal to earth, then the interference should cease.

The first step is to find out which lead or leads are acting as aerials. Very often this is likely to be a matter of trial and error, but there are two ways in which identification of the offending lead can be revealed. Firstly, with the AF gain advanced, the various signal-carrying leads into the amplifier should be disconnected. If the interference stops or reduces, then the lead concerned is to some extent acting as an aerial and will require attention as detailed later. Obviously the speaker leads and mains lead cannot be disconnected. The second method adopted by the author, very often revealing which of the leads is causing the trouble, is to couple a grid dip oscillator tightly up against each lead and sweep the tuning dial back and forth. The AF gain control on the amplifier should be advanced so that the background noise of the amplifier can be heard from the speakers. If the lead being tested is conveying RF into the amplifier then an increase in background noise in the form of hum or hiss will very often result when the oscillator is brought into close proximity to the lead. For best results the grid dip oscillator should be modulated by a tone. As amplifiers are very often sensitive to certain bands of frequencies only, it is essential that tests be carried out with the grid dip oscillator tuned across the same frequency range as that from which the interference is being experienced.



Before dealing with the individual leads going to and from the amplifier, a few words regarding the earthing of amplifiers may be in order. Often an amplifier will have a separate earth terminal at the back of the casing. It is sometimes recommended that earthing the amplifier to an earth separate from the mains earth by means of this terminal will help reduce RF breakthrough. Unfortunately the hi-fi installation is very often so situated that a fairly long earth lead is necessary to reach the amplifier. Instead of acting as an earth for RF signals it acts as an extra aerial and will sometimes actually increase the amount of breakthrough by increasing RF energy on the chassis. By all means try the effect of earthing the amplifier but similarly also try **disconnecting** the earth lead if one is already fitted.

The number of separate cables going to an amplifier in a hi-fi installation can be considerable, the actual number varying with the amount of ancillary equipment in use. Fig. 3 illustrates a typical layout.

It has already been mentioned that each cable can be regarded as being an aerial capable of picking up RF signals and feeding them into the amplifier. Clearly a device is needed that will present a high impedance to RF signals while appearing as a low impedance to audio signals. Inductors and capacitors either separately or together in the form of LC networks readily fulfill just this function. The problem with inductors or capacitors is that the former can be bulky items and both often necessitate cables having to be cut and connectors modified during installation.

In recent years ferrite has become a very popular material for use in combating TVI. In particular, it has been found most useful in preventing RF on the outer braiding of coaxial cable finding its way into the TV receiver. In addition to their efficiency, ferrite cores have the major advantage that the existing cable can be used to form the winding, preventing the need to break the cable. One of the most popular ferrite devices is the ferrite ring, on which a very compact winding can be wound. Because of its shape, the cable is self-securing and the complete filter takes only minutes to construct. As a rule of thumb, as many turns as possible should be wound on to the core, with a minimum of 8 or 10 turns.

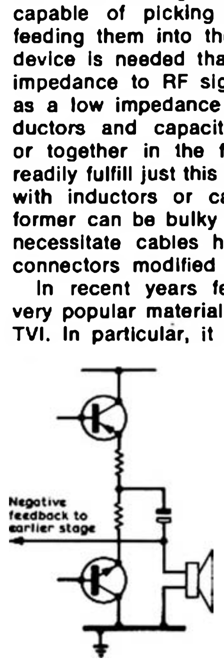
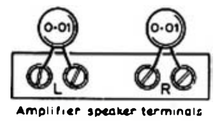


Fig 4. The normal output configuration of a transistor amplifier incorporates a feedback loop to the earlier stages. Thus any rf picked up by the speaker leads can be fed back to the input stages, where rectification and amplification may take place

For combating RF pickup by connecting cables in hi-fi systems the ferrite ring filter is a very effective device. It can be used on speaker cables, leads from the ancillary equipment and main leads. Usually speaker leads and signal leads from record playing units are small diameter cables, and it is quite possible for a common ring to be used for each pair of leads in the case of stereo installations. The actual grade of material does not seem critical and either rod or ring cores can be used. In the author's case great use has been made of Mullard FX1588 rings. It is most important that the filter be installed at the amplifier end of the cable run and as near to the amplifier as possible.

Ferrite inductors are not the only devices for blocking out RF signals although they are probably the neatest and most compact, if not the cheapest. Coaxial cable substituted for the usual twin flex speaker leads will often help considerably where RF is being picked up on the "positive" speaker lead and conveyed back to the early stages of the amplifier via the negative feedback line. See Fig. 4.

Fig 5. To combat mild cases of rf pickup by the speaker leads, 0·01μF disc ceramic capacitors, connected across the amplifier output terminals, can be tried



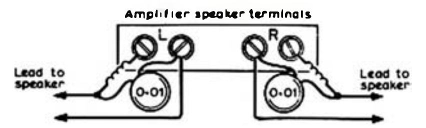


Fig 6. In cases of excessive rf pickup by the speaker leads a combination of capacitor and inductor can be tried

The use of coaxial cable will also prevent the possibility of RF energy being rectified in the transistor power output stage. This can occur even with the amplifier switched off. The author has had one such case and there have been similar cases of interference to transistorised TV receivers reported. Even the nocturnal operator is not clear of this problem! In cases where the RF pickup on the speaker leads is not too severe the use of 0.01 uF disc ceramic capacitors connected across the output terminals of the amplifier can be tried (see Fig. 5). More effective suppression will be obtained if an inductor is also added as shown in Fig. 6.

However, the use of capacitors or coaxial cable cannot prevent RF currents from reaching the amplifier chassis by means of the "negative" speaker lead. In such cases some form of inductance is needed to choke the RF, and the use of a ferrite ring will be found effectively to filter both conductors if twin flex is used for speaker leads.

RF energy picked up on the mains lead can be a problem whether dealing with TVI, BCI or AFI. The solution is the same for all three types of domestic equipment, and a number of different mains filter circuits have been published. Two circuits are shown in Fig. 7. It is most important that capacitors have an adequate AC rating. The inductors can comprise 18 SWG enamel wire on ½ in. former (wood dowel) 2 in. long. Ferrite rod material (such as an old medium wave ferrite aerial with the winding removed) can also be used and will probably be found more satisfactory for the more severe cases. Where a mains filter is used as suggested above, ideally it should be installed inside the amplifier casing, but with the modern tendency to squeeze as much circuitry into as small a space as possible there is very often no room for the inductors required. If this is so, then the filter will have to be installed externally to the amplifier casing and it is most important to make sure that the unit is completely and safely enclosed so that there is no risk of shock. The advantage of the ferrite ring filter mentioned earlier becomes obvious!

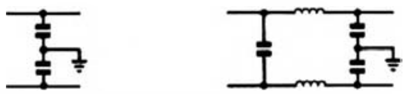
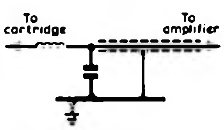


Fig 7. Two circuits for suppression of rf pickup on mains leads. It is important that the capacitors have an adequate ac rating, and if the components are mounted externally from the cabinet they should be well-insulated to avoid any risk of electric shock

Earlier, the popularity of the magnetic cartridge was mentioned. This in itself has brought about a new problem, although it is only likely to manifest itself in very high RF fields. Because a magnetic cartridge contains a small inductance, it is possible for RF signals to be induced in the coil and conveyed down the inner conductor of the screened cable to the amplifier. Unplugging the cartridge head from the arm will confirm whether or not this is the cause of the trouble. Ceramic or crystal cartridges will not suffer in this way. The solution is a small LC network installed either at the cartridge head or at the amplifier input, see Fig. 8. Care should be taken to select as low a value of capacitor as practicable to avoid reducing the high frequency response. If the network is installed in the cartridge head, adjustment must be made to the arm counterbalance weight to maintain the correct tracking pressure (often less than 2 gm).

Fig 8. Cases of rf pickup via the coil of a magnetic cartridge can be solved by a simple LC network, installed either at the cartridge head or the input to the amplifier. The lowest possible value of capacitance should be chosen, to avoid any reduction in the hf response of the system



VHF tuners are susceptible to two different forms of interference. The RF energy can either get into the front end of the tuner causing interference to radio programmes only, or alternatively it can be picked up on the VHF coaxial down lead and conveyed back to the amplifier via the chassis of the tuner to cause audio breakthrough. RF energy picked up on the outer coaxial braiding can be prevented from reaching the amplifier either by inserting a ferrite ring filter or using a 1 : 1 transformer, see Fig. 9. Both are familiar devices for TVI sufferers. If, however, the interference is found to be tunable on the VHF tuner, or only present when it is switched on, then there is a strong possibility that the RF signal is being picked up on the FM aerial and a simple high-pass filter as used for TVI should clear the trouble. The need for the receiver to be provided with an aerial adequate for the area applies just as much to FM reception as it does to TV reception. Normally this means an FM band dipole in the loft or on the roof but in some areas, particularly where stereo reception is required, a three- or four-element beam is needed.

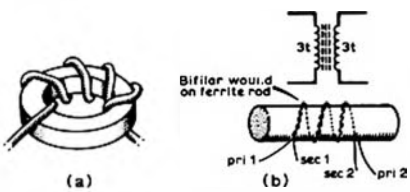


Fig 9. RF pickup on the coaxial braiding of the lead from vhf tuner to amplifier can be cured by either a ferrite ring filter or a 1 : 1 transformer

When dealing with cases of hi-fi interference it is essential to realise the importance of keeping all leads as short as possible and this applies in particular to speaker leads. A problem which has given the author some trouble in the past is the re-radiation of signals from one cable to another (TVI sufferers please note). If a lead has had to be filtered then keep it as far away as possible from other leads. Try moving the various connecting leads to the amplifier about in relation to one another and if a number of leads have been taped together try unwrapping the tape and separating them. Very often a speaker lead will be tacked along the skirting board with the mains cable and RF will be induced from one to the other. In the author's case laying the TV aerial coaxial lead next to the speaker leads results in severe audio breakthrough while separating them a few inches completely clears the trouble. Never allow any excess cable to trail over the floor. It should either be shortened or coiled up and taped. The importance of this point cannot be over-emphasised.

THE SOCIAL PROBLEM

There is virtually nothing that the amateur radio operator can do at the station end to prevent causing audio breakthrough, apart from reducing power, unless he is prepared to change his mode of transmission. The latter option has been taken up by a number of VHF operators by switching from AM to FM. The A1 CW operator has the option to change to F1 but this is hardly likely to find much favour on the HF bands and is likely to confuse some operators who may tune to the space instead of the mark. The great difficulty in handling cases of interference is explaining to the sufferer that the fault is with his equipment and not the amateur's. No hard and fast rules can be given as each case is different and personalities and attitudes vary widely. Basically a combination of diplomacy and firmness is required.

The question of whether or not the job of curing the interference is to be undertaken by the amateur concerned is a matter of personal discretion. The author does not favour the idea of carrying out work involving the opening up of amplifiers. This is fine if the amplifier is one's own, but be very careful before deciding to carry out any work on a neighbour's equipment. Really it is a job to be carried out by a paid service engineer, not necessarily because the amateur involved is not capable of doing the work but because anything that goes wrong subsequently is likely to be blamed upon the amateur. If a neighbour does ask an amateur if he would be prepared to carry out the work he should think very carefully before deciding, and if in doubt — refuse.

The question then arises as to who carries out the work. The listener is not likely to have the knowledge to carry out the work himself. He may also be unwilling to pay to have the work done for him if he considers the amateur at fault. Even if he does decide to employ the services of a paid engineer or dealer the time taken up in tracing the trouble is likely to be considerable and many dealers will just have no idea where to start. A major portion of responsibility must be with the manufacturer who designed and made the equipment. In this respect the British Radio Corporation has been found to be particularly helpful. Unfortunately, many manufacturers seem surprisingly disinterested in the short-comings of their equipment although some do provide a certain amount of help and advice in the way of technical correspondence, circuits and perhaps a few components. We therefore find ourselves caught in a vicious circle with an embarrassed amateur and an unfortunate and possibly irate sufferer.

It is hoped that this article will encourage rather than deter amateurs trying to solve their audio breakthrough problems. During the 'fifties and 'sixties TVI has been a big problem, but through the persistent work of the RSGB local groups and individuals the problem has been overcome by many. Audio breakthrough looks like being an even bigger problem to be faced in the 'seventies. The solution is mainly with the manufacturers but it is up to the amateur movement as a whole to make them aware of the problem with a view to persuading them to raise their standards.

INTERFERENCE BIBLIOGRAPHY

Compilation and comments by Peter Dodd, VK3CIF, and Rodney Champness, VK3UG

Good state of the art design and construction practices allied to correct operating of the transmitter or receiver are sometimes not sufficient to prevent interference from raising its ugly head. The following references could be found useful in following up various ideas to rid yourself of the problem. The list is by no means complete, but even so does cover more than seventy references. Where necessary explanatory notes are included with the article title.

BOOKS

In the amateur field a must book is the **Television Interference Manual** by the **RSGB** and reviewed on page 20 of **AR** May 1973. This must, of course, be read in conjunction with the **PMG's Handbook**, which is at present under examination for revision.

The **ARRL's Radio Amateur Handbook** contains much sage advice on interference. In the 1974 edition this will be found in Chapter 16 beginning on page 484. In the same edition front end receiver overload problems are dealt with in the receiving system chapter (p. 262).

The **RSGB's Radio Communication Handbook** also contains a chapter on **INTERFERENCE** — Chapter 18 beginning on page 18.1 with another bit in Chapter 4 — p. 4.25. Other useful tips can be found in the **RSGB's Amateur Radio Techniques** by Pat Hawker.

Articles from AMATEUR RADIO

Report of the First TVI Field Test. July 56. (Interesting information gained during the early days of TV in Australia).

Anti TVI Filters for the Amateur Transmitter. Nov. 55. (Good design data by Hans Ruckert.)

Low-Pass Filter Home building Simplified. Oct. 56. (Follow up article to the Nov. 55 article.)

Understanding Television Interference. Oct. 56. (A QST reprint.)

Diagnosis of TVI — A system of locating the cause of interference. Jan. 57.

Prevention of Interference by Television Receivers. May 58. (How do we convince manufacturers that this would be a good idea?)

TVI Diagnosis Chart. May 60. (Similar in some points to Jan. 57 article.)

Sideband — Visual Monitor. Sept. 60. (A 913 CRO tube in a simple monitor.)

AM Without Splatter. Feb. 61. (How to run high modulation level without causing interference.)

Recent Trends in Receiver Front End Design. Noise Figure and Cross Modulation Characteristics of Tube and Transistor Front Ends. Jan. 64. (Have you ever wondered why you hear stations that shouldn't be there?)

Considerations in Receiver Front-End Design. March 64. (How to improve the performance of receivers to reject unwanted signals.)

Corrosion. March 65. (The effect of dissimilar metals on one another in a saltry atmosphere. The same types of things can cause external cross-modulation of your signals and perhaps cause TVI. A corroded TV aerial or rusty fence for example.)

Lightning. April 66. (QRN? — QRN5.)

Federal Comment. May 71.

Australian Standards for Electro-Magnetic Interference. May 71. (A few draft interference specifications and E.M.C.)

1974 Easter Federal Convention. June 74. (Section 11 interference. A policy statement well worth reading.)

An Effective Noise Silencer — using a separate noise receiver. April 63. (Good background information. May be obsolete in light of more recent developments.)

Ignition Noise versus Frequency. May 64. (A graphical indication of frequencies worst affected by ignition interference.)

Keeping out of that Modulated Milk Bottle. July 64. (Suggestions on methods of transmitter construction and operation to minimise TVI.)

Some Aspects of Spurious Radiations from Amateur Transmitters (R. Gurr). Dec. 64. (Methods to keep your amateur transmitter clean of HF spurious.)

Some Low Pass Filter designs for Amateurs. April 66. (Three low pass filters for attachment to the output of HF and VHF transmitters.)

Noise Limiter for Mobile use. June 66. (A simple single diode limiter.)

Some Thoughts on Six Metre TVI. August 66. Roy Hartkopf. (Good sound philosophy on public relations as well as suppression methods.)

Interference to Television and Radio Reception by nearby Radio Communications Transmitters. Nov. 66. Gurr and Murphy. (Traps and filters to be fitted to TV and Radio receivers.)

TVI — It can be eliminated . . . well, nearly always. Aug. 69. (A simple cheap filter.)

A Graphical Method for Locating Interfering Beat and Harmonic Frequencies. Feb. 70. (Of use to find out possible spurious outputs from SSB transmitters.)

Two-Stub Notch Filters for TVI. July 71. (Attenuation of unwanted frequencies by up to 80 db. Applicable to transmitters and TV sets that use coaxial cable feed.)

Tackling TVI. April 72. (Methods of suppression and ideas used in England. A reprint.)

Building Modern Filters. Oct., Dec. 72 and Jan. 73. (Designing filters both AF and RF.)

Television Interference Manual RSGB publication, reviewed May 73. (A worthwhile addition to your library.)

A Noise Blanker for the Trio TS510 Transceiver. Jan. 73.

TVI on 6 metres. Jan. 73. (Reasons why you cause TVI, selectivity curves of TV set IFs, etc.)

Constructing a LP filter. Jan. 73 (35 MHz cutoff filter, with 80 db attenuation at 50 MHz.)

Audio Rectification Hints — Interference. Sept. 73. (Keeping out of people's Hi-Fi.)

TVI, BCI and the Irate Neighbour. Newcomers (Notebook. Jan. 74. (Understanding your neighbour, Public Relations.)

Newcomers Notebook. May 74. (Thoughts on shifting the 6 metre net to 53.995 MHz.)

Simple High Pass Filter. March 74. (Similar to the one in Aug. 69 issue.)

Articles from RADIO AND HOBBIES, ELECTRONICS AUSTRALIA

The VHF Bands — what to do about TVI problems. Part 1, 52-54 MHz. May 64.

The VHF Bands — what to do about TVI problems. Part 2, 144-148 MHz. June 64.

Television Interference from Power Lines. March 68. (An extremely interesting article on TVI as caused by power lines. They also cause interference to radios and communications services too.)

Lamb type Noise Silencer using valves. August 69.

A Line Filter for heavier loads. Oct. 69. (1 KW on BC bands and above.)

Noise Silencers — A development model using transistors. Dec. 69. (Lamb type noise silencer.)

Suppressing Impulse Interference. A Reader Built It. Oct. 70. (Thermostat Clicks, contactors, etc.)

Easily Adjusted Low Pass Filter. Nov. 71, page 75. (An extract from **Radio Communications.**)

A Power Line Filter. June 71 (BC band and similar frequencies.)

A Power Line Filter. August 71. (Modifications to the unit described in the June issue. Smaller value suppression capacitors.)

EA240 Communications Receiver. Jan., Feb., and March 70. (An interesting and apparently quite successful Lamb Noise Silencer. Not all Silencers are what they are cracked up to be.)

Toroid filter minimises Radio, TV Breakthrough. June 74.

Articles from ELECTRONICS TODAY INTERNATIONAL

RF Interference. Nov. 71. (A general article.)

Articles from BREAK IN

Ignition Interference in New Zealand. Oct. 70. (A general article by the New Zealand Post Office.)

How to Handle Hi-Fi Interference. Nov. 70. (A helpful reprint from QST.)

Radio and Television Interference from Electrical Appliances. Dec. 73. (An article showing many methods of alleviating interference to receiving equipment caused by electrical appliances.)

Articles from HAM RADIO

Noise Radio-Frequency Interference. Dec. 70. (A general article dealing with a wide spectrum of problems.)

Eliminating Engine Interference. March 74, page 63. (A book review of what appears to be an interesting book that may well be a desirable addition to the mobile amateur's library.)

Arc Suppression Networks. The Ham Notebook. July 73. (For contactors, etc.)

Articles from RADIO COMMUNICATIONS

Cross-Talk. In the beginning, and Start off outside peak viewing hours. July 72. (Public Relations ideas on living with your neighbours.)

Cross-Talk. Friends and Neighbours. June 72. (Public Relations Ideas.)

Cross-Talk. RFI — Don't go it alone. May 73. (Public Relations Ideas.)

Audio Frequency Interference (AFI). April 73. (An extremely interesting and informative article.)

Practical Braid-Breakers using Stock Materials. Nov. 72. (More applicable to British TVI problems where coaxial cable feeder systems are used.)

Article from TELEVISION

Curing RF Interference. Jan. 74. (Similar to the last two Radio Communications articles but attacking the problem from a slightly different direction.)

Article from POPULAR ELECTRONICS

Electronic Pollution . . . An Impending Crisis. April 73. (A very interesting article on the ever increasing level of total noise. Even country areas are becoming polluted this way.)

Article from THE FIREMAN

RF Noise and Vehicle Mobile Communications. March 72. (This is a small section of information presented by Mike Russell-Clarke of the Country Fire Authority at an IREE (Aust.) Radio Interference Workshop.)

Articles from QST

Exit Ignition Noise — Eliminating Automotive Noise by Shielding the Car Ignition System. May 59.

Hi-Fi and Electronic Organ Interference — How to Clean It Up. June 66.

A Noise-Locator Receiver. June 66.

Electrical Interference. Part I — Causes and Identification. April 66.

Electrical Interference. Part II — Tracking and Cure. May 66. (The follow-up article of April 66.)

Recent Equipment — Shielded Ignition Systems. Aug. 64. (A run down on various commercial shielded ignition systems available in the United States.)

TVI is Still With Us. Dec. 66.

Beginner and Novice — How to Handle TVI — Useful information on what to look for. April 67.

Absorptive Filter for TV Harmonics — and a Novel Filter Construction Technique. Nov. 68.

Beginner and Novice — How to Handle Hi-Fi Interference — A cautious approach to a sticky problem. June 70. (This was reproduced in Break In in Nov. 70.)

Power-Line Interference — Its Causes and Methods of Location. July 70.

Beginner and Novice — RFI. July 72. (Designed mostly for those who suffer with AFI.)

Hints and Kinks for the Experimenter. Locating Sources of Man-Made Noise. Feb. 74.

If you count the number of references shown in this article you will see over 70 separate articles listed. It is believed that this list contains more than sufficient information for the average amateur to make a success of clearing up interference within his jurisdiction. Naturally enough many of the listed articles overlap one another, each carrying a slightly different slant on common problems.

The IEEE Transactions on EMC are published quarterly at $6 per copy for non-members, and may be of interest to some as reference material.

There are many other magazines which have had articles on interference. For the suppression of motor vehicles (including suppressing specific models of cars) probably as detailed descriptions as anywhere appear in **Mobile News** the journal of the (British) **Amateur Radio Mobile Society**. Detailed suppression requirements for specialised equipment often appear in publications referring to the apparatus concerned — e.g. for RTTY machines see the **RSGB Teleprinter Handbook** page 2.3. There are two firms who may be able to help with information and components for vehicle suppression namely — **Joseph Lucas (Aust.) Pty. Ltd.**, of Cheltenham, and **Robert Bosch (Aust.) Pty. Ltd.**, of Clayton, both of Melbourne — there may be branches in other States, however.

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

AUDIO FREQUENCY INTERFERENCE — HOW IT HAPPENS

You could be excused for not understanding how a piece of audio equipment such as a Hi-Fi amplifier responds to the RF signal from a radio or television transmitter. The reasons for an audio amplifier responding to RF are simple. A manufacturer should have little problem in making his equipment immune to RF signals if proper tests and corrective action are taken at the design stage. The actual cost of making the equipment RFI proof should not increase production costs more than about a dollar per unit. Most manufacturers seem more interested in total sales than in producing an item that a customer will be completely happy with.

In Fig. 1 a typical rudimentary transistor audio amplifier stage is shown. This stage will act as a RF detector if any RF signal which exceeds about 50 mV or so is present on the base lead. Once again you could be excused for saying that this is not possible as the transistor is biased on with a voltage of 0.6 volts between base and emitter. Regrettably 0.6 volts is not the voltage that is necessary to cause this transistor to act as a diode detector instead of a linear audio amplifier. I have deliberately shown this transistor as a high

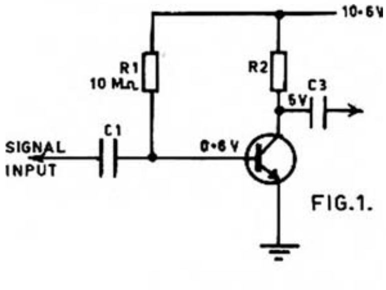


FIG.1.

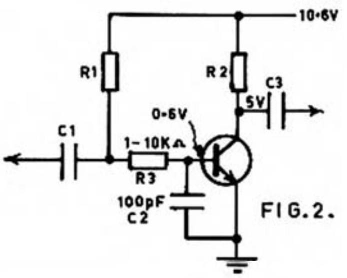


FIG.2.

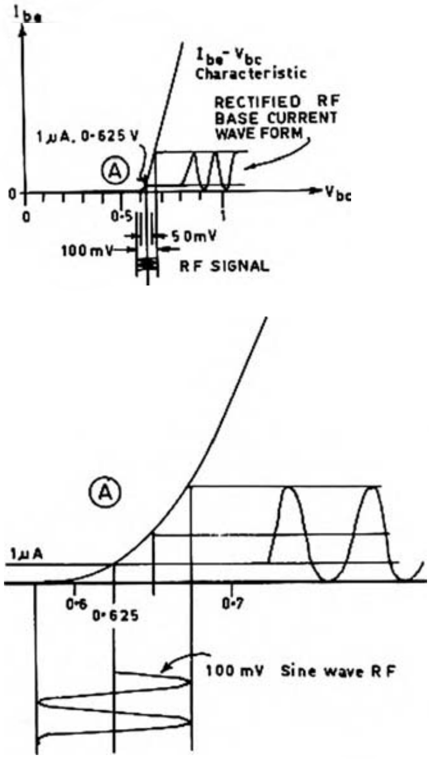


FIG.3. BASE RECTIFICATION. Collector current will vary at modulation rate.

gain type running very little collector current; the base current is very low at 1 uA. The base emitter junction can be considered as a forward biased diode. A diode of the silicon type requires a forward bias in the region of 0.6 volts to cause it to conduct. In this particular circuit in Fig. 1 the **diode** (emitter-base) is just turned on with 1uA of forward bias current.

This means that very little variation from this 1 uA current, 0.6 volt forward bias will cause the diode to rectify the signal applied to its base whether it is AF or RF. It is in fact a high impedance very low level audio amplifier and, as such, very susceptible to high level signals of any sort. If, for example, this transistor has a switch on voltage of exactly 0.6 volts and with 1 uA base current the voltage is only 25 mV more than this, it means that signals with a peak to peak level exceeding 50 mV or an RMS level of 17.5 mV will cause this transistor to act like a diode detector — a crystal set! The leads to the base of the transistor should it be in the front end of the amplifier will probably be quite long, up to several feet. These leads usually go via switches and long, sometimes unshielded, leads to the pick up head of the record playing turntable. These long leads are ideal for picking up RF signals from nearby transmitters and in some cases not so nearby transmitters. These signals do not need to be very strong to cause trouble, in the order of 17 mV in this hypothetical case. A broadcast station can easily produce an RF field of several mV at a distance of several miles. An amateur station at a 100 feet may well induce an RF field of several hundred millivolts. Several hundred millivolts would certainly cause a sensitive AF stage to act like a crystal set detector.

Fig. 2 shows how an audio stage can be RFI proofed by the addition of 2 additional inexpensive parts. These two components short circuit the radio frequency component to earth. They form a basic low pass filter, with a loss factor of 3 db at frequencies varying from 150 kHz to 1500 kHz. If R3 is 10k ohms the response of the audio amplifier will be down by 3db at 150 kHz, the response at 1.8 megahertz is down by about 22db, at 14 megahertz the response is down by about 39 db on the audio response. At 14 megahertz the critical level instead of being about 17 mV as in the unsuppressed amplifier is now a figure of something like 1.5 volts. That is some difference. It does help in the first instance if all likely critical leads are shielded so that the actual RF brought into the case of the amplifier is at as low a figure as possible. At times a small ferrite bead worth a cent or two slid over the base lead of the transistor can help considerably to reduce interference pick up particularly at VHF. The ferrite bead acts as an RF choke.

I hope this short article has helped you to understand how AFI suppression is achieved. The suppression of interference is not the impossibly hard job that many people would have you believe. They probably think it is hard because they have not taken the time to really find out how interference is caused, and how it can be cured. There is these days less reason for not being able to fix interference as much more sophisticated equipment is available than previously. ●

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

ANTI-TVI TRAPS

You know (we hope) that your 6 or 2 metre transmitter is correctly modulated and harmonic-free. But the neighbours or the XYL complain of TVI on channels 0, 1,5A, and perhaps others. Try this very simple, sharply-selective trap which can be fitted to the TV set. The idea is old but there may be newer amateurs who are unaware of it.

Take a length of 300 ohm TV ribbon (between 12 and 20 inches for 6 metres, 3 to 4 inches for 2 metres). Solder the conductors together at one end, and across the other end connect a stable screw-adjusted (i.e. multi-turn) trimmer capacitor. The mica-compression type is not recommended, but may do for 6 metres. Use 3-30 pF for 6 metres, preferably 1-10 pF for 2 metres. This combination of ribbon stub and trimmer forms a very high-Q tuned circuit.

The trap circuit is now coupled into the

TV feeder ribbon (**but not connected to it**) simply by placing their flat sides adjacent and taping together with a few pieces of PVC tape. The trimmer end of the trap should be near the TV antenna terminals. A possible refinement is to fasten the trimmer physically to an insulating bracket (or the cabinet back, if non-metallic). With the transmitter operating, carefully adjust the trimmer, **using a plastic adjusting tool**. At one critical setting the TVI should disappear.

These traps are sharp enough to have no effect on TV reception when tuned to the adjacent amateur-band frequency. For this reason they do not permit you to QSY far from the set frequency; perhaps 100 kHz on 6 metres. Also they may need periodic readjustment, particularly if the trimmers used are not highly stable. But they do work! Unfortunately, if too many are needed in your vicinity you may also have to reduce power, go mobile, use another band, or shift QTH!

VK3ABP

VHF UHF an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

VK0	VK0RG, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.002
VK3	VK3RTG, Vermont	144.700
VK4	VK4WI/2, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.3015
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400
JA	JA1IGY, Tokyo	52.500

No advice of any alterations, additions etc. to above list. Everyone must be satisfied, no one complains!

SIX METRES

"The six metre band never closes." So said Rod VK2ZQJ some years ago; seems he has been proved right plenty of times. On 2nd July around 0250Z for about 3 hours band open between VK2, 5 and 7, signals around S9. Strong TV signals from Brisbane on 4/7. On 14th July, open between VK2, 3, 4, 5 and 7, with northern VK4's very strong. MUF well up, probably approaching 100 MHz. Conditions continued into next day again with northern VK4s strong. By Monday 16th, signals had dropped off but still VK4s around. Plenty of Channel 0 activity at odd times throughout remainer of July, little else heard. Weak CW on 52.050 from VK2 one occasion, riding in and out of the noise, nothing positive, may have been Wally ex VK5ZWW testing!!

Nothing to report on two metre scene. Rod VK2ZQJ still looking for 2 metre M/S contacts, no takers so far.

DAPTO MOONBOUNCE PROJECT

Lyle VK2ALU sends along his usual information about the workings of VK2AMW. Appears calculations giving a 2 hour time error did not help the proposed tests on 22/6/74, with ZE5JJ in Rhodesia, and G3LTF.

VK2ZHU recently placed the transmitter cubicle heater box in position in an effort to stop corrosion of relay contacts which has been a source of trouble, and construction of a new transmitter frequency source is proceeding.

The Dapto Group has received advice from the PMG Department that their high power permit has been extended until April 1975, and provision made to cover the use of the F1 and F2 modes (RTTY) in addition to A1 and A0 modes.

G6JP

George Jessop, G6JP, is the President of R.S.G.B. for 1974. Licensed in 1929 as 2AYP and granted a radiating permit as G6JP in 1930, George was one of the pioneers of VHF communication in 1933 and was one of a team which demonstrated the feasibility of VHF air to air and air to ground communication, a factor of considerable importance in World War 2. George has written many articles and books on VHF of which the R.S.G.B. VHF/UHF Manual is but one. (From Break-In, June 1974.)

Well, that's it for this month. Overall activity close to nil. Closing with the thought for the month: "With man's great ability to think and reason and compute, we can now pinpoint most of our current problems. The trouble is we can't solve them."

The Voice in the Hills.

Y.R.C.S.

with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

The July issue of a Newsheet published by the University of NSW Amateur Radio Society gives the names of 20 candidates who have passed the full and limited Amateur Licences. We offer our congratulations to the successful students, and to the Society which is a member of the WIA — Y.R.C.S.

The Newsheet also includes a letter submitted to the WIA the contents of which should be read by Amateurs, not only in NSW but also throughout Australia.

With a population of over 3 million people here in Sydney and with the Youth Radio Club Scheme (Y.R.C.S.) having been established in 1962, one would think that in 1974 there would be thousands or at least hundreds of people actively studying through clubs or correspondence here I Sydney. This is not the case. Its not the fault of Y.R.S. They have an excellent syllabus and guide for clubs and individuals wanting to study. It's up to us all to start supporting the dedicated few at Y.R.S. in an activity which has been long neglected by the Sydney Amateur. We all listen each week of each year to the effort put into Y.R.S. by the Maitland Radio Club in serving the people of that town and district. Yet what are we doing for the people of Sydney? It's up to the amateurs in this city to do something about the situation. We at NSW University have formed an amateur radio club affiliated with the WIA and hope to organise displays and encourage Y.R.S. courses to be established in local schools, and in our own University. Please give some serious thought as to how you, as an amateur can assist the community. We at NSW University are trying our best but with over 3 million people out there much more needs to be done."

On behalf of WIA—Y.R.C.S. I thank the University of NSW Amateur Radio Society for sharing our aims and concerns.

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

A HELICAL WHIP FOR THE KEN KP202

If you have trouble getting tangled up in the standard telescopic whip on your KEN, perhaps you might like to try this six inch helically wound whip. Designed by Don Palce VK3ADP, the performance is in every way comparable to the standard length whip.

Before commencing construction of the helical it is necessary to modify the KEN to take a BNC antenna socket as in the previous section. The whip is wound on a section of fibreglass rod, ¼ inch diameter at the base and tapering to 5/32 inch at the top. The length of the rod should be 5½ inches to allow 5 inches for the antenna plus ½ inch to fit into the BNC plus Winding data for the antenna is as follows. Using 26 gauge enamel copper wire 47 turns are wound close spaced over the top 1½ inches with 15 turns spaced over the bottom 3½ inches.

The actual adjustment to frequency is quite critical, and of course should not be attempted on the KEN. Best connect the antenna through an SWR meter to your old valve transceiver or transistor final that has high SWR protection. The final adjustment will be to less than half a turn at the top of the whip.

When completed, the winding should be coated with an epoxy resin such as "Araldite". The finished job should look like the one illustrated.

SPURIOUS RECEIVE SIGNAL WITH THE FT2FB

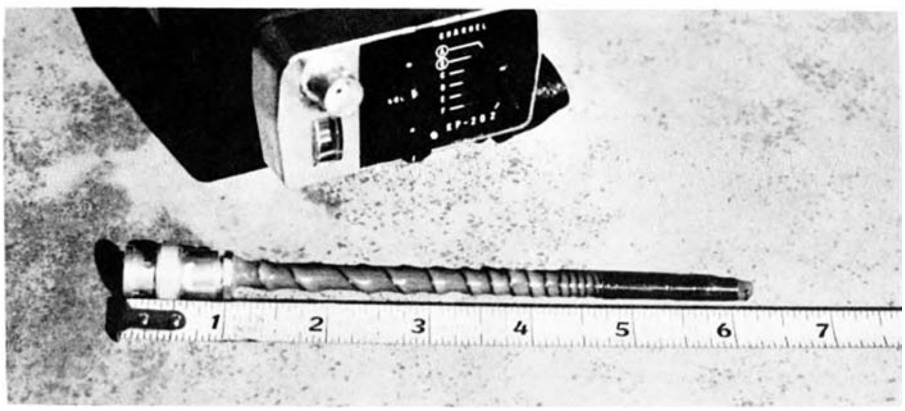
With the change to 147.0 MHz for the receive frequency of repeater channel four quite a few FT2FB owners have run into trouble with a spurious signal on this channel.

It appears that the trouble is caused by a beat between the second harmonic of the first conversion oscillator beating with the third harmonic of the second conversion oscillator. This occurs when the second conversion crystal is on 10.245 kHz and not on 11.155 kHz as indicated on the FT2FB circuit.

Correspondence with Yaesu indicates that they use both frequencies in order to avoid spurious responses on particular frequencies. They do not state however which spurious responses are avoided by using 10.245 kHz.

So, if you are in trouble with the new channel four, check your transceiver and see which frequency the second conversion crystal is on. Do not rely on the circuit as these are all shown as 11.155 kHz. Check the actual crystal.

The cure is to change to 11.155 kHz. It seems that Yaesu might exchange crystals. They have offered to do this in my case, however, I suggest you contact them before sending off your crystal.



Contests

with Jim Payne, VK3AZT

Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

Sept.	14/15	European Phone Contest
Sept.	14/15	Scandinavian CW Contest
Sept.	21/22	Scandinavian Phone Contest
Oct.	5/6	VK/ZL/Oceania Phone Contest
Oct.	12/13	VK/ZL/Oceania CW Contest
Oct.	12/13	RSGB 21/28 MHz Phone Contest
Oct.	19/20	RSGB 7 MHz CW Contest
Oct.	19/20	SCOUT JAMBOREE
Oct.	26/27	CQ WW DX Phone Contest
Nov.	2/3	RSGB 7 MHz Phone Contest
Nov.	10	Czechoslovakian CW & Phone Contest
Nov.	23/24	CQ WW CW Contest.

WHEN IS YOUR CLUB OR DIVISION HOLDING A CONTEST?

EUROPEAN PHONE CONTEST

0000 GMT 14th Sept. — 2400 GMT 15th Sept.

Only 36 hours operating for single operator stations. Rest period of 12 hours may be taken in not more than 3 periods. QSO numbering starts with 001.

Multiplier is number of EU countries worked. In addition the multiplier on 3.5 may be multiplied by 4, on 7 MHz by 3 and 14/21/28 by 2.

Logs to WAEDC Contest Ctee, D-895, Kaufbeuren, Box 262, West Germany.

RSGB 21/28 MHz PHONE

0700 GMT 12th Oct. to 1900 GMT 13th Oct.

VK stations may only claim points for contacts with stations in the British Isles.

Scoring — 5 points each contact plus 50 points for first contact on each band with prefixes G2, 3, 4, 5, 6, 8, GC2, 3, 4, 5, 6, 8, GD2, 3, 4, 5, 6, 8, GI2, 3, 4, 5, 6, 8, GM2, 3, 4, 5, 6, 8, GW2, 3, 4, 5, 6, 8. GB prefixes do not score bonus points.

Awards to highest score each VK area. Entries to RSGB HF Contests Ctee, 123 Clensham Lane, Sutton, Surrey SM1 2ND, England to arrive before 9th Dec. 1974.

RSGB 7 MHz DX

CW 1800 GMT 19th Oct. to 1800 GMT 20th Oct.

Phone 1800 GMT 2nd Nov. to 1800 GMT 3rd Nov.

Scoring — VK stations may only work prefixes as listed in RSGB 21/28 phone contest above. 50 points per contact plus bonus 50 points for first contact with prefixes listed above. Awards to highest score each VK area.

Entries to reach HF Contests Committee, c/o J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, England, by 16th & 30th Dec. for CW & Phone respectively.

CONTEST INFORMATION

Details of most contests are received some months in advance of the events and a photocopy of rules etc. will be forwarded if a SASE is sent to the F.C.M. at his home QTH in the call book.

ROSS HULL CONTEST

Bob VK3AOT has suggested some alterations to the scoring table which could be considered concurrently with metrification. Some of the "Champs" have been requested to comment and replies to date are most informative but unfortunately suggest more alternatives. One is "That a bonus of 1000 points be claimed by any station breaking an existing record on any band. (Page 19, AR, June 1974). This is just another incentive; after all the purpose of the contest is "to perpetuate the memory of Ross Hull, who did so much to Further the VHF/UHF". The last words should be the key in weighing a scoring system in favour of activity rather than solely on the chances of a contact being made.

Another reply states "I think Bob's modifications will help to give most operators a better chance of winning the contest and should be implemented for the coming contest. The modifications (alternative C) are not the complete solution to the problem but should be regarded as an interim measure for the 74/75 contest as time does not permit thrashing out any drastic changes. I believe that a far better system of scoring would be to remove all distance boundaries as they exist at present! Unforunately space does not permit publication of a very carefully prepared scoring table which was received with that letter.

Another letter sets out what I hope is the general attitude towards this contest. "The Ross Hull Contest is held to commemorate the name of a great Australian amateur who was an individualist so the aim of the contest is to reward individual effort for the advancement of the art in the VHF/UHF spectrum — to this end the scoring table set out by Bob is a fair thing for the effort required and conditions that prevail on 6 m during the Ross Hull contest. I do not necessarily agree with the reasons that have been submitted as to why the change in scoring should take place but like in horse racing, now and again the handicaps are corrected so that all may have a fair chance at the stakes. I enjoy the contest and enter into the spirit of things chasing everything that makes a noise so I may be blased; but whatever the final rules for the 1974/5 Ross Hull contest, I will be there trying and hope this will give you some assistance and guidance for the final outcome of your dilemma. P.S. QRX 6m To hell with TV . . .

1974 B.A.R.T.G. CONTEST RESULTS

G8CDW, the BARTG Contests and Awards Manager, has kindly sent forward details of their RTTY contest which was won by SM4CMG notching 215080 points from 178 contacts to 39 countries on all bands except 10m. The first Australian participant was VK3KF 40th on the list with 40620 points followed by VK5IF 45th with 39016 points. No other VK appears in the 97 participants and there seemed to be only a lone PY to make up the total Southern Hemisphere contestants of 3 stations.

Book Review

TEST EQUIPMENT FOR THE RADIO AMATEUR.
H. L. Gibson, C.Eng, MIEE, G8CGA.

Every now and again a book appears which so completely meets the needs of its readers that the old cliche, "Should be in the Library of every licensed Amateur", is a valid remark. To sum up one's feelings about such a book in a few words is difficult and I am sure I cannot better the remarks of the author who says in his introduction: "There are measurements which must be made in every amateur station, so a certain amount of test equipment is essential. This may be limited to relatively simple items in order to satisfy the licence conditions, but if equipment is to be home-constructed on any scale, the range of desirable instruments grows considerably. This book describes a range of test instruments and measurement methods sufficient for most stations operating in the hf and vhf bands. It includes both simple instruments and those using the latest techniques so far as they are reasonably economic".

Publisher: Radio Society of Great Britain.

Available from Advertising bookshops.

VK3ASC

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN May 1974

Ideas for Building Transceivers; The Merits of AM v SSB; A Magnificent Rig in a Flying Machine. The NZART Callbook has also come to hand.

RADIO COMMUNICATION May 1974

Practical 10 GHz Gunn Oscillators; Downward Modulation and Business Mobile Transmitters; Loop Aerials Close to Ground; A Transistor Linear Amplifier for 160 M Mobile; Building Blocks for the Novice and usual features.

SHORTWAVE MAGAZINE May 1974

Traps for a Dipole; Fabricating B7A Valve Holders; Transistor Test Unit.

RADIO ZS April 1974

Erosion of Soldering Iron Bits; A VFO for 5-5.5 MHz; Medium Current Polarity Invertor; How to Solve Transistor Heatsink Problems.

May 1974

An SL600 Series SSB Transceiver; A Sample Low-pass Filter for Audio; Aluminium Soldering.

CQ April 1974

A Solid State Scaler for Frequency Counters; A Coax Fed Trio for 160, 80, 40 and You; Antennas; (General discussion by W6SAI). A Surplus Story; A Sloping Quad for 80 Metres; A One-Chip, Two Tone Generator; Simple Super-Regulated 12 Volt Supply; CQ-75.

QST May 1974

Instant Oscar 6 Locator; A Satellite Timing Mechanism; CB Reformed — To 160; The SSB Crud-o-ject; The VE3GSD Transceiver; A Tone Beep Keyer for Repeaters; Learning to Work with Semiconductors, Part 2.

June 1974

Putting the G Line to Work; A Directional Indicator for the Hy-Gain Model 400 Rotor; More Receiver Design Notes, Part 1; A Tuning Control for Digital Frequency Synthesisers; A Hybrid Gate-Dip Oscillator; A High Power SCR Inverter; Learning to Work with Semiconductors, Part 3.

HAM RADIO February 1974

Solid State Transmitting Converter for 144 MHz; Digital Capacitance Meter (and 20 MHz Frequency Counter); How to Design L-Networks; RTTY Message Generator; Universal Frequency Standard; 455 kHz I.f. Alignment Signal Generator; Multi-Channel FM Receiver for Six and Two.

March 1974

Simple SSB Transmitter and Receiver for 40 metres; Automatically Controlled Access to Open Repeaters; Six Metre Frequency Synthesiser; Performance Characteristics of Vertical Antennas; Lowpass Filters for Solid-State Linear Amplifiers; Simple Digital Readout System; New FET's Simplify Bias Problems.

April 1974

Communications Techniques for Oscar 7; Simple Active Filters; Telefax Transceiver Conversion; The Argomate; Low Cost Receivers for Two-Metre FM; Broadband Amplifier; Nonresonant Antenna Impedance Measurements; Vertical Antenna Radiation Patterns; CW Regenerator.

73 MAGAZINE April 1974

A Delayed VOX for Repeaters; The FM "Auto-Start"; The New Breed on 2 Metre FM; A Black Box Frequency Converter; How to Make the How-To's Work; A Two Metre Hybridised Transmitting Converter; Operating from a Sauna Bath; Control Panel for Your Scanning Transceiver; A CBer's Glossary of Amateur Terminology; Rock Solid Sub-Audible Tone Generator.

May 1974

Adding dBs to the Audio Compressor; Finding a New Home for the Mobile Rig; Interference Suppression for Amateur Boat Owners; Heath HW-202; A Simple Mobile Alarm System; Reducing Mobile Noise; The Newtronics CGT-144 Antenna; Another Burglar Alarm; Two High-gain RF Stages in One IC for Two Metre FM; An Oscar Special Converter; Toothpaste in the Ham Shack; Toward Mobile Security; Improving the Pearce-Simpson, Gladding 25; Putting Yourself on TV.

Awards Column

with BRIAN AUSTIN VK5CA

P.O. Box 7A, Crafers, SA. 5152.

GOLD COAST AWARD

A Certificate will be awarded to any amateur station or shortwave listener on receipt of their Standard Logsheet by the Awards Manager of the Gold Coast Radio Club, P.O. Box 588, Southport, Queensland 4215, listing contacts with FIVE member stations of the Gold Coast Radio Club and ONE additional contact with the Official Club Station, VK4WIG. A list of member stations will be forwarded on receipt of a s.a.e. by the Awards Manager of the Gold Coast Radio Club.

LIST OF MEMBERS OF DXCC AS AT 31.7.74

First number denotes Current Countries; second figure denotes Total Including Deletions.

PHONE			
VK6RU	315/347	VK4UC	288/293
VK4KS	314/333	VK4FJ	287/314
VK5MS	313/343	VK3JW	283/290
VK3AHO	304/328	VK4TY	279/288
VK6MK	302/329	VK2AAK	272/279
VK2APK	300/313	VK3ACD	266/274
VK4VX	300/304	VK2AHH	265/280
VK4PX	294/301	VK3TL	264/277
VK5AB	291/314	VK2SG	263/269
		VK4RF	254/259

VK4DO	244/261	VK4NQ	120/124
VK3AMK	239/243	VK4LZ	119/123
VK4CZ	238/242	VK3IP	118/122
VK3VK	234/238	VK3BBA	117/121
VK3HL	228/240	VK6DR	115/118
VK7DK	227/231	VK3APU	110/114
VK3JF	225/230	VK2ZA	109/112
VK6LK	213/216	VK3BCY	108/110
VK3SM	203/210	C21AA	108/113
VK3ALM	200/204	VK2AEB	103/108
VK3TG	198/206	VK3LC	103/107
VK4MY	198/202	VK5QI	103/106
VK3XM	196/201	VK5ZB	103/107
VK4XJ	192/200	VK6HE	102/104
VK5BB	188/193	VK8KP	102/106
VK5WV	187/192	VK9WD	102/106
VK7LZ	173/184	VK3XD	101/104
VK4FH	161/172	VK4ZK/9	101/104
VK3ZD	152/156	VK3SO	100/104
VK4PJ	150/153	VK4JS	100/102
VK1VP	148/152	VK5QB	100/103
VK3SX	143/148	VK6WY	100/103
VK3JM	139/143	VK2AXI	99/103
VK8CW	139/142	VK2GV	99/102
VK2AGO	137/142	VK3ADO	99/102
VK6KK	134/138	VK3AKZ	99/105
VK4SD	127/130	VK3OR	99/102
VK7JV	127/130	VK2KK	98/101
VK4QA	126/130	VK3CR	98/101
VK3QV	125/127	VK3WW	98/101
VK3ZY	121/125	VK2NM	97/100
VK6TW	121/123	VK2AMU	95/103

C.W.

VK3AHQ	308/331	VK4DO	196/218
VK2QL	299/328	VK4SD	187/206
VK3YL	292/315	VK4UC	171/177
VK2APK	291/304	VK5BO	163/181
VK4FJ	290/322	VK3AX	149/162
VK3XB	280/300	VK4MY	147/152
VK3NC	268/297	VK4XJ	147/157
VK4VX	263/268	VK2QK	142/146
VK6RU	262/291	VK2SG	139/146
VK3YD	258/281	VK2AHH	137/150
VK4TY	253/272	VK4KS	128/138
VK3TL	248/260	VK3SR	127/133
VK3RJ	245/265	VK3LV	122/128
VK3KS	243/254	VK3HL	116/121
VK4KX	234/239	VK5XK	114/122
VK4RF	231/252	VK4PX	104/112
VK7LZ	203/229	VK2GR	101/105
VK3AXK	200/218	VK4FH	98/105
VK3JF	199/210	VK8HA	97/101

OPEN

		VK3QV	141/145
VK4KS	315/339	VK4NQ	132/136
VK6RU	315/345	VK3LV	127/131
VK4SD	314/335	VK5QI	127/130
VK2APK	311/329	VK9LV/G5RV	127/140
VK2VN	311/336	VK2AXK	125/132
VK2EO	306/335	VK6JK	125/136
VK4VX	306/312	VK6TW	125/127
VK6MK	302/329	VK4LZ	120/124
VK4PX	301/312	VK8KP	116/121
VK4FJ	300/332	VK3APU	112/116
VK4TY	300/321	VK4DV	111/115
VK2SG	299/309	VK9TB	110/114
VK4UC	297/303	VK3ABA	108/115
VK3XB	286/306	VK3YS	107/121
VK3TL	280/293	VK6AI	107/110
VK2AHH	273/292	VK3AXQ	106/110
VK4RF	273/290	VK4EZ	106/110
VK3NC	269/298	VK5EJ	105/108
VK3ACD	266/275	VK5FY	105/112
VK3JA	262/289	VK3OG	104/107
VK3JF	256/268	VK3SO	104/108
VK4DO	255/279	VK3XD	104/107
VK3HL	253/268	VK9BA	101/104
VK4KX	238/243	VK2PA	100/112
VK7LZ	233/259	VK1QL	98/101
VK4XJ	223/234	VK2AND	98/102
VK4MY	221/226	VK2PF	98/103
VK6HD	186/191	VK8ZZ	98/100
VK4FH	183/196	VK4JI	87/100
VK3SX	151/157	VK4QF	96/100
VK3HE	148/153	VK5EF	95/100
VK6KK	145/151	VK3ACS	93/101

Where two stations have the same Current Countries total, the position in the above list is decided by numerical and alphabetical order of the call-sign.

The above list does not include a number of members in whose tally there has been no movement for a number of years. ●

W.I.A. (W.A. Div.)

RAFFLE RESULT

1st Prize — YAESU TRANSCEIVER
VK2ZZV, G. O'Brien, N.S.W.

2nd Prize — $60
C. Harper, Balga Balga, W.A.

3rd Prize — Typewriter
VK6EB, F. L. Bradshaw

4th Prize — $30
A. Pike, Alfred Cove, W.A.

5th Prize — $25
Morley, Cannington, W.A.

6th Prize — $25
VK6KY, A. M. Keightley

7th Prize — $25
D. Patchin, Como, W.A.

8th Prize — Steam Iron
VK6ZK, T. Stanicic

9th Prize — $20
J. Kitney, Donnybrook, W.A.

10th Prize — $15
VK7TE, W. Tanner

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,

After the discussion in previous ARs, some may be tempted to try (or be put off trying) direct conversion sets. The following has been based on my experience with this type of receiver, and my remarks should be viewed in the context of VHF and UHF receivers, where noise figure (NF) is a meaningful figure of merit.

Low-noise audio amplifiers without transformer impedance matching to 50 ohms have about —70 dBm noise level. Thus a system using a mixer with about 5 dB conversion loss directly following the antenna will have a NF of 5 plus 5 plus (130 — 70) equals 70 dB, since a 10 kHz bandwidth, 5 dB NF system has a noise level of about —130 dBm. Thus gain of 70 dB is required at the signal frequency to attain adequate noise figure. This is not difficult if the stages do not require tuning — though cross-modulation may rear its ugly head.

The direct conversion receiver's real difficulty comes at this stage. The inevitable LO feedthrough caused by imperfectly balanced modulators, an by LO pickup in the front-end, gives a DC signal on the demodulated output. Variations in LO level (due to vibration or power supply) are resolved as audio output, and regeneration is virtually assured unless headphones are used. Even then, microphones are troublesome.

Thus high performance direct conversion receivers are "not on". Similarly, any stage which product detects to give audio must be balanced to minimise microphonics. 40-50 dB of LO suppression should be found adequate.

Chris Horwitz,
81 Prospect Rd., Summer Hill, N.S.W., 2130

The Editor,
Dear Sir,

There is no effective legal provision in Australia for the regulation of radiated, induced or conducted electromagnetic energy from sources other than licensed wireless transmitters, but it must be stated many utilities who are responsible for unavoidable noise-producing equipment do try and co-operate when advised by the PMG's department. The provisions of the Wireless Telegraphy Act and the Broadcast and Television Act control the licensing and conditions of operation of radio communication services in this country. It is difficult to comprehend that statutory powers exist which are binding on licensed operators of radio equipment, but which do not apply to operators of equipment or machinery that cause pollution to the R spectrum. In Australia, as in the USA and the UK, commercial radio transmitters and associated equipment are 'type approved' and are licensed subject to the most stringent, almost state-of-the art specifications. Industrial and medical users can run RF oscillators or diathermy units, with a power of up to several kilowatts. These may be constructed with the absolute minimum of parts, little or no filtering, and can radiate interference for many miles, sometimes thousands of miles. The same with vehicle generated Electromagnetic Interference. It was stated (1) at the 1971 IREE workshop meeting (2) on radio interference "It is very evident that the need for a statutory authority exists with the power to lay down standards for the control of unnecessary emissions of noise with at least equivalent standards as are applied to the licensed users of the spectrum". Not only must the emission of 'noise' be reduced, the immunity of appliances and equipment must be increased by regulation. The general attitude of the manufacturers is that until we have approved technical performance standards for equipment, with each installation subject to approval and inspection by a government authority (3) no one manufacturer can afford design improvements. We must start treating industrial and commercial radio frequency equipment on the same basis as any other licensed communication service, or we must suffer a steady increasing amount of interference which seems likely to threaten each one of us and other communication services.

In New Zealand it is now a statutory obligation for manufacturers of electrical equipment to limit radiation and interference from their equipment to within certain limits, and a user obligation to do likewise in the event of complaints.

Prevention is better than a cure. In 1934 an 'Internation Co-operation in the Suppression of Radio Interference' committee was formed called CISPR (4) who have laid down well defined limits as a standard.

Although air pollution is drawing more attention nowadays, prevention of pollution of the other end of the power supply systems is just as important in a world that will use more and more electric and electromagnetic energy for domestic and industrial purposes. Not all manufacturers, importers, and users of radio and electrical equipment in the past in Australia have exhibited a social conscience. Rules should be made to cover unapproved type or unlicensed radio transmitters, transceivers, and walkie-talkies entering the country by the thousands, and sold to innocent, and not so innocent unlicensed owners or operators.

Why is there this anomaly in regulations, allowed by the government? Earlier this year, responsible amateurs at Federal Level at the 1974 Federal Convention held in Sydney over Easter moved that the PMG be asked to consider the introduction of legislation to require purchasers of radio transmitters to produce evidence that they have a licence for the transmitter.

Let's hope this motion will prove just as successful as the recent WIA Submission to the Independent Enquiry into FM Broadcasting by the VHF/UHF Advisory Committee.

W. George Francis, VK3ASV

(1) See Page 25, Australian Electronics Engineering.
(2) "Second workshop on Radio Interference", March 1971, by Mr. M. Russell-Clarke, of the CFA.
(3) Electromagnetic Interference caused by industrial users of RF generators by MONDEL, page 250, Proceedings IREE Australia, August 1970.
(4) CISPR — Comite International Special des Perturbations Radiophoniques.

The Editor,
Dear Sir,

On Sunday, December 1, 1974, between 6 am and 4 pm Queensland time (no daylight saving), the Brisbane VHF group will hold another field day for its members. In the past when field days have been held around this time of year, it has so happened that other clubs in other parts of Australia have also had field days at the same time. This has resulted in many more contacts for stations in the field, particularly on 6m, and has brought about some real competition. Might I suggest every club in Australia thinking about a field day around this time choose December 1 this year.

Organisers could consider offering more points for channel 50 operation than channel 40, perhaps double points for 432 MHz and up contacts, distance multipliers to be changed to kilometres from miles, and writing to local Channel 0 stations well in advance to seek their co-operation in not coming on the air until 15 minutes before programme time.

A note to me from each club running a field day that day could help our members pointing beams from their favourite mountain tops.

D. I. Marshall, VK4ZAF

The Editor,
Dear Sir,

Under the heading of equipment reviews could someone write up some of these portable 240V AC generators currently available?

I have heard that some perform well with a steady load but can't handle TX/RX type operation. Also it is said that frequency control of some is quite difficult.

As these units could open up new fields of portable and public service operation, what is the chance of getting some of our members with special skills to test a few of them.

Mike, VK3WW

(Any takers? — Ed.)

Editor,
Dear Sir,

As one who is foolish enough to remain in the WIA in the hope that justice may some day prevail, may I express my disgust at the continuing victimisation of the Associate member by the Victorian Division.

While not wishing to dispute the relative cheapness of the $17.00 proposed for Associate membership from June, 1974, what I do dispute is the nearness of this sum to the $17.50 required of a full member.

In 1970 the Associate paid the already unrealistically exorbitant figure of 94 per cent of full membership. In 1972 we saw 95 per cent and in 1973 up to 96 per cent. Now we have 97 per cent — and in three years, undoubtedly, the decimal places of 99 per cent.

As justification for the high figure the unbiased council (of full members) reminds one that both amateurs and associates receive the benefits of AR (how much associate based content?), must pay the Federal Levy, the IRU levy, and help subsidise that complexity of three legged fuses which has trouble alloting and collating short wave listeners numbers (but manages to generate accounts). Thus the gap is larger than it seems, so we are told.

On the other side what about the no voting rights for associates, no call book listings, no new member listing in AR, and a low priority for disposals equipment (despite the protests that no bias exists). In other words why should a 3 per cent difference entitle the full member to the extra benefits. (And please don't ask why we therefore don't become full members — some of us are happy just to listen and should be entitled to do so at a reasonable membership cost).

So Victorian full members — be proud of your Council and please, accept our subsidy towards your subscriptions.

P.S.—This is not a stab in the back to the Victorian Executive — they were advised of my feelings in July, 1973 after I discontinued attending the monthly executive meetings.

Brian J. Hannan, WIA L3185
Lot 64, Heroes Avenue,
Emerald, Vic. 3782

FM and 2 m REPEATER DETAILS

The ever-busy George Francis, VK3ASV has sent in a wealth of information (regrettably too much to print . . . Ed.) on his researches into 2 metre channels for his directory.

The details now given are mainly from his material with other data obtained from various sources subsequent to the date of his letter. For channel frequencies see March 1974 AR, page 23.

VK1 Considerable activity going ahead to build their 46/58 repeater.

VK2 (a) Sydney repeater VK2RAS (R1) on **old** Ch 4 and located at Hornsby (Dural) with 5 minute auto ID. Repeater officer VK2ZPJ.

(b) Hunter river area repeater VK2RAN (R2) on **old** Ch 4; located on Mt. Sugarloaf 96 km North of Sydney. Repeater officer VK2BSC.

(c) Central Coast repeater VK2RAG (previously VK2AFR/R) on **old** Ch 1. Located at club rooms Karlong 6 km SW of Gosford. Ident on MCW. Repeater rx operates continuously, if repeater tx is not heard send steady unbroken flutter free carrier for 5 secs. then wait 40 secs. for tx valve filaments to warm up. Tune up signal facilities available. Auto change-over emergency power supplies. Normally allow ½ sec. for relays to operate before speaking. Auto ID F2 860 Hz. Repeater group VK2ZRQ, VK2ZUX.

(d) Orange and District repeater VK2RAO (ex VK2AOA/R) on Mt. Canobolas 146.1 MHz input 145.854 MHz out. Known as "FRED" (Frequently Ridiculous Electronic Device) and first (experimental) repeater in VK. Range up to 160 km. Repeater officer VK2ZKN.

(e) Illawarra repeater (ex VK2AMW/R) on **old** Ch 1 located (temporarily at Figtree) at Mt. Robertson. 10W o/p. CW ident every 5 mins. Workable from Sydney southwards. Repeater officers VK2AGV; VK2BHY.

(f) Mt. Kaputar. Ch 46/58.

VK3 (a) Melbourne repeater VK3WI/R1 on Mt. Dandenong Ch 42/54. 60W o/p. 120 km useful mobile to mobile service area. Verbal ident. Chairman Repeater Committee VK3BX.

(b) Geelong repeater VK3RAG on Mt. Anakie 18 km NNW Geelong. Ch 48/60 25W o/p. 6 min. timer verbal ident. 65 km range. Repeater officer VK3AQR.

(c) Latrobe Valley repeater VK3RAB on Mt. Tassie. 12W o/p Ch 44/54. 160 km range verbal ident. Repeater officer VK3QZ.

(d) Greater Bendigo area repeater VK3RAM (Midland Zone) on Flora Hill (to shift to Mt. Alexandra) Ch 44/54. 10W o/p. 5 min lock-out. Auto ID FSK. Repeater Gp VK3AAA, VK3ACT, VK3ZKV.

(e) Projected repeaters on Mt. William Ch 42/54, Mt. Macedon Ch 46/58 and Mildura Ch 48/60.

VK4 (a) Gold Coast repeater VK4EI/R2 on Mt. Tambourine, 60 km SW of Brisbane, proposed Ch 42/54. 25W o/p. Repeater Gp VK4ZDA, VK4ZFD.

(b) Ipswich projected repeater on Denmark Hill Ch 46/58.

(c) Northern Brisbane repeater project, perhaps on Mt. Cootha Ch 48/60.

(d) Projected Townsville repeater Ch 42/54.

VK5 Adelaide repeater VK5RAD (ex VK5WI/RI) at Crafers near Mt. Lofty. Ch 48/60. 15W o/p MCW auto ident. 5½ min lock-out. Range 80 km mobiles WICEN priority. Repeater Gp VK5ZK, VK5WB. See AR April/May 1972.

VK6 (a) Perth repeater VK6RAP on Tuart Hill. Ch 42/54. CW ident. Range 160 km S, 80 km N. 50 km inland.

(b) Albany repeater on Mt. Barker 50 km N of Albany. Ch 44/54. Southern Electronics Gp.

VK7 (a) Mt. Barrow repeater (NE Tasmania) Ch 48/60 60W o/p. 13 wpm MCW ident. each 2½ min. Lock-out 5 min. Repeater officer VK7PF.

(b) Hobart repeater on Mt. Wellington. Ch 42/54.

(Due to the efflux of time some details may be dated by the time this is printed.—Ed.)

NOTHING NEW

The following extract from THE ELECTRICAL TRADER February 1933, has a very familiar sound.

RADIO INDUCTIVE INTERFERENCE

In some Electricity Supply Undertakings a great deal of interference is experienced from the Electric Supply Mains and the various types of apparatus used in the system. This has been very marked in the recent broadcasts of the Test Cricket.

Interference may arise from a large and varied number of causes. It is an inherent fault in many of the older types of apparatus and systems of supply, in fact, it may be said to be inseparable from these systems.

At the Local Government Association Conference held last month the subject was discussed and the suggestion that the responsibility for interference of this kind should be determined by an Act of Parliament was mooted.

While engineers know quite a lot about the causes of interference from inductive sources, there are still quite a lot that is not known about it and it is manifestly impossible for regulation by law.

In a great many cases the system of supply must be entirely revolutionised if inductive interference with radio apparatus is to be eliminated while in others the fault lies in consumers' apparatus and not in the supply system.

Radio Engineers are working in conjunction with supply engineers to track down the trouble and great progress is being made in this way. Much benefit has resulted to the public supply undertaking from this co-operation, because the interference has shown up faults, which would have cost the undertaking a lot of money, that otherwise would have gone undetected for a considerable time.

The Department which deals with interference is that branch of the PMG's Department, the Radio Inspector's branch. Any fault or interruption to radio reception should be reported to this department and the trouble will be tracked down.

In some towns local listeners-in have banded together to overcome the trouble and in Lismore there is a "Listeners' League", which has done good work and removed a lot of worry from the shoulders of the local Electrical Engineer and the Radio Inspector's Department, at the same time ensuring for themselves better reception.

The subject of Radio Inductive Interference is down for discussion by Electricity Supply Engineers at their forthcoming Annual Conference in March next. This will form a cross discussion between supply engineers and radio engineers of the Radio Institution. Mr. W. T. Crawford, Radio Inspector, will, it is hoped, also be present.

More good will come from discussions of this kind than from the framing of new legislation which while, perhaps, conferring a benefit on one section will hamper the development of a growing industry. ●

Hamads

FOR SALE

Chart Recorder 3 channel (2 plus timing channel), 5 speeds, 4 inch wide tape, $80. **SYNC Generator,** Marconi BD637D, $40. VK2ZTY, QTHR. Ph.: (02) 30 4312.

FT200, 4 months old, sell $370 or trade in on FT401, similar condition. VK4IJ, ex VK4ZHM, QTHR. Ph.: (072) 56 2610.

Colour TV, brand new, all solid-state, 18 in. PAL-D. Tunes VHF and UHF (including 430 MHz.) $600. David VK2ZZJ. Ph.: (02) 44 3036.

57 ft. Hills Crank-up Tower. 12 months old, as new, $120. G. Stern, c/- P.O. Box 330, Hurstville, 2220.

AWA Carphones FM TX and RX 70-85 MHz with power supplies. Some cables and Handsets. $15 as they come or offer. See L. D. Sykes, 6 Somme Parade, Edithvale, 3196. Disabled Radio Amateurs' Club, VK3ZZ.

COSSOR pulse oscillograph, Model 1065, 15 MHz bandwidth, complete with handbook and two CRO tubes, both faulty, $55. Small **tape recorder,** ideal for Morse practice and specially adapted for this purpose. Complete with key, oscillator, professionally recorded tapes and earphone, $15. VK3AOH, QTHR.

Nivico 4DD-5 Discrete 4 channel Demodulator, 6 ICs, 6 FETs, 27 transistors. New, complete with manual and test record. $95 or offer. Colin Baldock, VK3ZEF, 71 Enfield Ave., Park Orchards, 3114. Ph.: (03) 870 3987 after 19.00h.

Signal Generator, Marconi TF801A 10-300 MHz, calibrated output, $160. **R. & S.** VHF Voltmeter, $20. VK3YAZ, QTHR. Ph.: (03) 25 2689.

Yaesu FTdx 560 transceiver, excellent condition, with Yaesu SP-560 matching speaker, manual, set spare 6KD6s, $425. VK4UG, QTHR. Ph.: (072) 84 6098.

HW 32A Heathkit 20 M. SSB Transceiver with HRA-10-1 100 KHz Calibrator and Turner 350C MIC. Extra switched x-tal to tune to 14.05. Home brew mains supply. Also 12 volt mobile supply with in-built 50 ohm forward and reverse meters. L-Match 20 M. base loading coil for 12 foot whip, $170 the lot. **Bendix Freq. Meter** LM-7 with 240V supply, $30, **Prop. Pitch Motor,** $30. Ring Ted VK3XT (03) 560 5051 evenings.

AR7, all coil boxes, AC/DC P/S, speaker, alignment instructions, spare tubes, $60. Also **Pye Mk III** Reporter with x-tals 53.032 MHz, transistor P/S, spare final tubes, $30. **Pyrox** Tape Recorder 7 inch reel 7½ I.P.S. $10. **Command** TX BC-459 inc. spare tubes, $10. VK3ZPN, QTHR.

60W AM/CW TX. 160M to 10M. Geloso VFO. 807 final 6L6's mod. Complete, $25. VK3CV. Ph.: (03) 82 6431. QTHR.

Pye 734 Solid State 25 Watt FM Transceiver, converted for 2 metres, includes: x-tals for repeaters 1 and 4 also 146.00 Megs, Cradle and Mike. $125. Ring 467 2131 bus. hours. VK3YBE/T.

Pye ranger FM carphone, converted to 2m. Transistor power supply, 3/12 output. Complete with x-tals, fet preamp, 5/8 whip and circuits. I think it still works, $25 or exchange for handful of 40/80m rocks for my type 3 mk 2, or combination of above. VK3AQQ, 5 Duncan St., Box Hill. Ph.: (03) 288 4324 (A.H.).

62 Transceiver, 2-10 Megs., 5 Watt output, set contains 12 Volt DC-DC convertor, $55. VK3EB, QTHR. Ph.: (03) 82-1769.

2m TCA1677 Transceiver, fully converted, mint condition, with x-tals for Ch B, 4 and X, complete with manual. Price $130 or offer. **Electronic Keyer** with power supply. RF stage (3 tubes) to cover the whole of the 2 m band, with power supply. What offers? VK2BJK, QTHR. Ph.: (02) 449-1598.

Superior VHF QTH C/W House, Shack and Workshop, also XYL sized lawns, 12 km south of Adelaide. Available late November, 1974. Enquiries VK5ZWW, Box 1117. Orange 2800.

Silent Keys

VK2EH Mr. E. P. HODGKINS

TED CHANDLER VK4EJ

The members of the Townsville Amateur Radio Club paid a final tribute to Ted VK4EJ on Thursday 13th June, 1974. Ted, a foundation member of the Club and a pioneer of radio in North Queensland will be remembered by many old timers for his distinctive "fist" on either key or bug.

When Ted finally came on phone on a homebrew SSB rig, he regularly made his presence felt on the "Meatworks Net".

A great number of people were started off in pursuit of electronics by Ted, and a number continued on to make their career in this field.

Ted will be sorely missed, both on the Amateur Bands, and by his friends in Townsville.

QSP

IARU REGION 3 CONFERENCE

The W.I.A. has received notice that the next IARU Region 3 Association Conference will be held in Hong Kong from 4th to 13th March 1975. The theme of this Conference will be the World Administrative Radio Conference, Geneva 1979 and member societies have been asked to submit Agenda items as early as possible.

AERIALS, TREES, DRAIN-PIPES, ETC.

"Fat, heavy people, it is claimed, are better aerials than slim, small ones! Generally the efficiency of the body corresponds to that of a matched, centre loaded whip 1.2m long at 4.2 MHz. Apparently you cannot couple a transmitter to the belly but only to 'other parts of the body'." From Pat Hawker's Technical Topics in Rad. Communications, April '74. Match that one!

AMATEUR SATELLITES

"William Eitel WA7LRU/W6UF and Herbert Hoover III W6APW have generously offered to match, dollar-for-dollar, up to a total of $25,000, donations to the ARRL Foundation earmarked for use in the Amateur satellite programme. Funds are urgently needed to support the construction of AMSAT-OSCAR 8 which is estimated will cost on the order of $100,000. The ARRL Foundation Inc., 225 Main Street, Newington, Conn. 06111 U.S.A. Extracts from AMSAT Newsletter, June 1974.

SATELLITE 1000 AWARD

IARU Region 1 News for April '74 lists 185 winners of the Satellite 1000 Award at 22.1.74. The list includes 2 VK7s and 1 VK5, no ZLs, no ZSs or indeed anyone from Africa except ZE7JX. Most interesting though was the listing of 18 JA stations, VU2UY and a 4X4 in the whole of Asia. In the Pacific Area DU1FJ and DU1POL are listed as well as KX6HK and 4 KH6s. Almost the whole of the remainder were Ws or Europeans. Brief details of the Satellite 1000 Award were listed on page 11 of July '73 AR. ●

WANTED

Incomplete MTR13, and pin connections and data on an EG-651 cathode ray tube. John Lancaster, VK3ZCX. Ph.: (03) 62 0201 ext. 2486 B.H. or 89 9017 A.H.

455 kHz Mechanical Filters, AM, SSB or CW bandwidths, with or without carrier crystals; prices and specifications to Bill Roper, VK3ARZ, 12 Explorers Court, Vermont South, 3133.

Selsun Receiver or pair of Selsuns. Details to VK6LT, 19 Errinbee St., Riverton, W.A. 6155.

Circuit Diagrams and tuning data on ATR2C RAAF Transceiver and also Power Supply K1 to suit ATR2C. Contact Col Paton, 2 Premier St., Maryborough, Qld. 4650.

TH3 Jr (or similar) and Rotator. Melb. Uni. Radio Club. VK3ATM, QTHR. Ph.: Sec. (03) 47 5968 A.H.

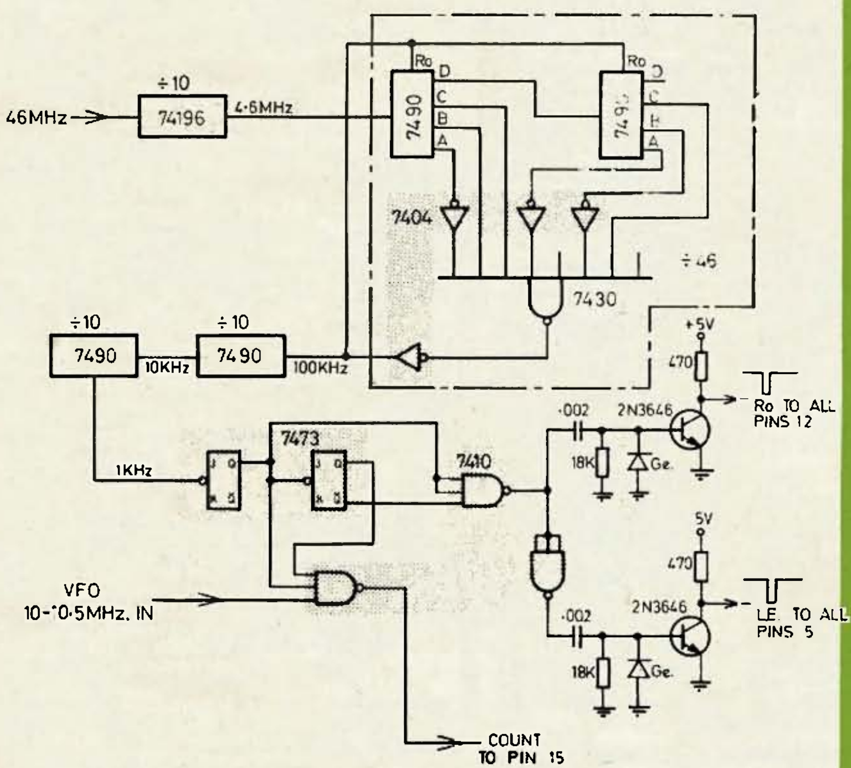
Loan or buy Inst. Book or Diagram RAAF sig. gen. TA101C. VK2AJ, QTHR or ph.: (02) 579 5718.

Two Metre Mobile Transceiver wanted by new amateur. Details to Ph. (03) 328 4148.

RX General Coverage or Amateur Bands. Miniature tubes. Star, etc. VK3 preferred. A. L. Mac Farlane, Lardner Rd., Warragul, Vic. 3820.

amateur radio

OCTOBER, 1974



CIRCUIT SCHEMATIC

CONTENTS

FRONT COVER: Schematic diagram of the logic circuitry for digital readout for an SSB transceiver. Coming shortly in AR

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER **Model TE-15**
SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

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AUDIO GENERATOR **Model TE-22D**
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

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Printed Circuit for uniform Characteristics.
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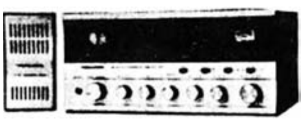

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Price ~~$229.00~~
P & P $2.00
now price — **$189.00**

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GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes.
- Product Detector for SSB/CW.
- Edge Illuminated Slide Rule Dial with "S" Meter.
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1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
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SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation. AC DC operation & wideband frequency response from DC to 1.5MHz.
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2E26-QQEO4/7-QQEO4/10	
6SK7-ECH35-6K8G-5763	$3.00
6SJ7GT-12AT7	$1.50

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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

AUGUST, 1974
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QSP

THE WIA YRCS

Maitland Radio Club were hosts to the WIA Youth Radio Clubs Scheme triennial conference over the week-end of August 31st-September 1st.

The YRCS is an activity which ought to involve every member of the Institute. It is not an activity which should gladly be handed over to professionals within the confines of the State educational curriculum. It is an activity requiring the support of amateur operators.

In considering the YRCS it must be remembered that so many of us entered the ranks of amateurs through some interest kindled in our younger days. It should also be remember that YRCS exposes the youngster to amateur radio amongst other subjects. Many fall by the wayside. Some get through to a licence.

Today the day-to-day exposure of a youngster to amateur radio is probably less than ever before. The development of SSB has assisted in this decline. The ready availability of other sports and pastimes, broadcast-band transistor radios, pre-occupation with the television and the relative paucity of publicity on amateur radio have all conspired to keep our hobby so little known.

Here is YRCS exposing the young to amateur radio. It is an Institute-supported activity operated mainly by amateurs as a band of dedicated people. It needs more support both in people and finances.

Their 1974 Conference dealt in great depth with a standardised syllabus and allied subjects relative to various grades of intake and progression.

The kind of study material and the provision of certificates all were examined. In most instances the availability of finance was a limiting factor. The conference also received with regret the resignation of Mr. R. Black VK2YA as the Chairman of the Syllabus Committee and expressed thanks for his work for the Scheme. Rev. Guthberlet and Jack Flynn were re-nominated for a further term as Federal YRCS Co-ordinator and Federal YRCS Secretary respectively.

Let us hope the YRCS, with our help, will advance from strength to strength. Let us remember that our work on training the youth of today in electronics and amateur radio activities must count in the ultimate question at the next WARC in 1979 "of what value is amateur radio to the community."

A. G. MULCAHY, VK2ACV
VK2 President &
Federal Councillor.

SCOUTING

Please do not forget the 1974 17th J.O.T.A. 19th/20th October. The Australian Scout net is now on the first Sunday of each month on 7070 kHz from 0930h to 10.30h and on 14290 kHz thereafter to 13.00h E.A.S.T. — net control VK4QH. The Asia Scout net is on 14290 kHz Thursdays 11.30 hZ.

LICENSING DELAY IN VK3

If you have passed the Examinations and have made application in Victoria for a licence (or if you want a change in call sign or wish to reserve a call sign) you must expect to face a normal delay of about three weeks before getting your licence — assuming all the paperwork is in order. Remember that for any of these things you have to write in. Telephone applications are not accepted. You will get notification of all call sign allocations only via the issue of the licence. Letter VR4/4/5 of 6.6.1974 refers.

SEANET CONVENTION

Mr. Carlos M. Tryes DU1CMT, President of PARA, writes to advise that the 1974 SEANET Convention will be held in Manilla on November 8th/9th. Anyone wanting reservations, etc., please write to Mr. James G. Ong DU1JO, P.O. Box 386, MCC Makati, Philippines.

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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: 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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The new Lloyd's Accumatic 999 is like having an "electronic slide-rule" at your fingertips—only *better* because it does even more than a slide-rule! And it's faster too. The Accumatic 999 can solve a complex scientific problem with split-second accuracy. It's really the perfect calculator value for the scientist, engineer, mathematician, accountant, banker, teacher, architect, or *any* math-using professional.

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▲ EXPONENTIAL FUNCTIONS Natural logarithms (ln x), natural antilogarithms (e^x), common logarithms (log x), common antilogarithms (10^x), square roots ($\sqrt{x}$), reciprocals ($\frac{1}{x}$), and powers of numbers (x^y) are all easily computed on the Accumatic 999 at the touch of a button.

▲ FULLY ADDRESSABLE MEMORY BANK In addition to its "display" register and its separate "constant" register, the Accumatic 999 has a fully addressable memory bank that is the most advanced available to date. An ($m + x^2$) key automatically squares a number and enters it into memory – very handy for finding the hypotenuse of a right triangle when the other 2 sides are known. It also has 5 additional memory keys to perform other memory functions.

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Multiply (X)	YES	YES	YES	YES
Divide (÷)	YES	YES	YES	YES
Square (x^2)	YES	YES	YES	YES
Reciprocal ($\frac{1}{x}$)	YES	NO	YES	YES
Square Root ($\sqrt{x}$)	YES	YES	YES	YES
Change Sign (+/−)	YES	NO	YES	YES
Add (+)	YES	NO	YES	YES
Subtract (−)	YES	NO	YES	YES
Scientific ($X10^{xx}$) Notation	YES	NO	YES	NO
No. of Digits Readable	8	3	10	8
Pi (π)	NO	YES	YES	YES
Exponent (x^y)	NO	NO	YES	YES
Natural (Ln x) Logarithm	NO	YES	YES	YES
Natural (e^x) Antilogarithm	NO	YES	YES	YES
Common (Log x) Logarithm	NO	YES	YES	YES
Common (10^x) Antilogarithm	NO	YES	NO	YES
Trig. Functions	NO	YES	YES	YES
Memory	NO	NO	1+Stack	1 + x→m 2 x→m
Radians/Degrees	NO	NO	NO	YES
Display Recall	NO	NO	NO	YES

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QSP — YRCS Convention

ADDRESS BY THE FEDERAL PRESIDENT, DR. DAVID WARDLAW, VK3ADW

I had been hoping to attend the Conference this year but I fear that family commitments for the holiday season made me feel that I must devote some time to them. Those of us who try and give some service to our leisure activities sooner or later find that our families are also entitled to our attention. So please accept my apologies for non-attendance but I am sure that you will receive equally as expert guidance, if not better, from Mr. Tony Mulcahy, the President of the NSW Division.

In this day and age the amateur radio operator is beset by as many problems, if not more, than in his father's day. Dad did not have colour television over his head. He could play with towers and not worry too much about Town Planners' laws. He could use full power without fear of getting into the transistorised front-ends in his neighbourhood. He could even pursue his hobby without the newspapers condemning him as a public nuisance.

We are in a world where a vast amount of additional knowledge is essential if we are to live in harmony with our neighbours. If we are to regain acceptance as a beneficial activity useful to the community we must all act as responsible people of sound behaviour, jealous of our hobby and ever keen to publicise its merits. We are under constant scrutiny not solely by our licensing authority.

In 1979 there is to be a World Administrative Radio Conference at which every frequency allocation will be examined under an electron microscope. The world's top amateur radio experts all agree at present that the outlook for amateur radio at that conference is gloomy.

Amateur radio cannot exist without frequencies. We have only five years to do something useful and constructive to demonstrate that amateur radio is worthy of retaining the frequencies we now have, never mind any hopes of getting more.

In common with other Societies in the IARU we are giving these matters very careful thought. We can legitimately point to our work in emergencies and preparedness through our WICEN activities. We can proudly point to our work with satellite operations. We can make much of our work in training youth for electronics and, in the process, demonstrating that amateur radio is a potent force in retaining interest in what could otherwise be rather a dry subject.

This is an area where the WIA YRCS movement possesses an importance vital to amateur radio as a whole. We need an expansion of YRCS activities. This is a field which should have much more support from amateurs throughout Australia. We must get through to the youth of today in every way we can. Through YRCS. Through Jamboree on the Air with Scout groups. Through active promotion by WIA members to every school and youth group we can reach.

This is my message for you today and the message which will be publicised in the pages of our journal "Amateur Radio" and whenever we can through the media. I wish you success in the conference hall.

ADDRESS BY THE FEDERAL YRCS CO-ORDINATOR, THE REV. BOB GUTHBERLET

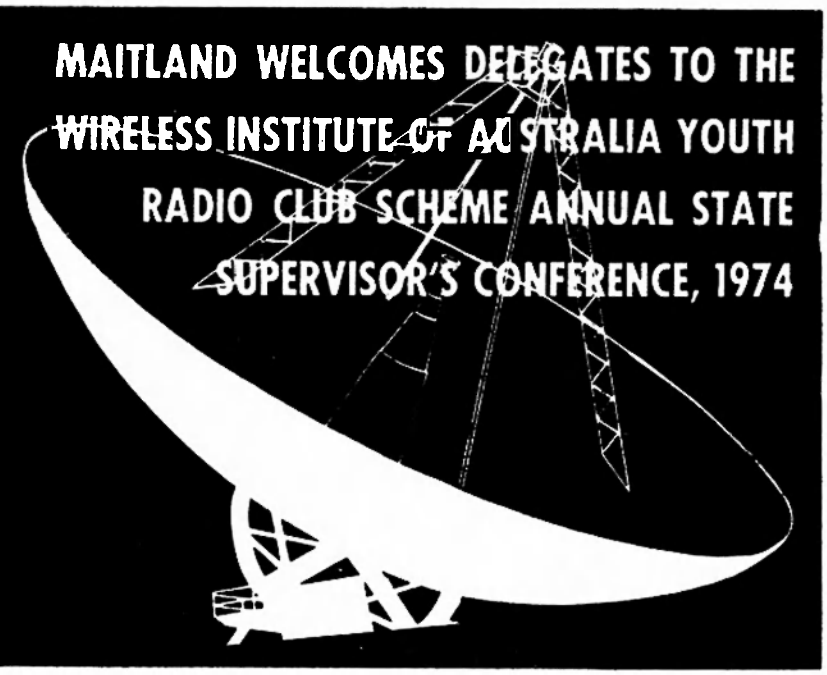
As a preface to this address I would emphasize that YRCS is a voluntary organisation, served by voluntary workers, and used by young persons who are free to participate in the Scheme, and free to reject it. I would also emphasize that within the ranks of those who give time and substance to the fulfilment of its aims there is a diversity of talent and a variety of service, without which the Scheme would fail.

When the Scheme was inaugurated, the state of society and the attitudes of young people were totally different from the pattern which we are seeing in this present day. The revolt by youth is such that like many organisations serving the younger generation, YRCS is experiencing a decline in overall membership, although it must be acknowledged that many former club members are now adults, some of whom have found their vocation, thanks to our training, in the various industries associated with Electronics. Many former members are licensed amateurs, and in this sense they are not lost to us but have fulfilled some of our hopes and plans.

I do not subscribe to the negative outlook that the decline in membership is a sign of the slow demise of the Scheme, rather I see it as the present tendency for some young persons to break away, not only from organisations directed by adults, but also from the restrictions of home-life and discipline. This movement by youth is not confined to YRCS — it is a world problem. Indeed, if it were not for the fact that governments decree that every child shall have a formal education, there would be many children, who by personal choice, would become absentee pupils or drop-outs!

Because of changing standards, new discoveries and demands, education has become so involved that any attempt to complicate our curriculum from the 'hobby angle' to the sheer 'professional' basis of education will bring about a serious decline in voluntary instructors, many of whom sacrifice much time and effort to promote the basic requirements of our aims and objectives. By this I do not suggest that we should lower our standards. We need the professional approach to our system of education in YRCS provided that such is offered in terms which can be understood and used by non-professionals.

When YRCS started it was solely under the control of State Divisions, upon whom we continue



The conference will be officially opened by the Mayor of Maitland, Ald. N. Unicomb, at 11 am Saturday.

Patron of the club, Dr. R. H. K. McKerihan, will also officiate at the opening.

The conference will continue all day Saturday, Saturday night and Sunday morning.

Visitors from near and far

Some people will travel from widely separated parts of Australia to attend the conference in Maitland.

They will include—

- Federal Manager of the Wireless Institute of Australia, Mr. P. Dodd, of Melbourne.
- Federal Co-ordinator of the YRCS, the Rev. Robert Guthberlet of Kadina, South Australia.
- Federal and State Secretary, Mr. J. Flynn of Sydney.
- President of the Wireless Institute of Australia (NSW Division), Mr. A. Mulchay of Sydney and Mr. Don Miller of Sydney.
- YRCS Correspondence Supervisor, Mr. W. Tremewen of Ferntree Gully, Victoria.
- State Supervisor for Tasmania, Mr. R. Emmett of West Launceston.
- State Supervisor for South Australia, Mr. A. Dunn of Adelaide.
- State Supervisor for Victoria, Bro. F. Whitton and Assistant State Supervisor, Mr. D. Titford of St. John's College, Braybrook.
- State Supervisor for NSW, Mr. K. Watson of East Maitland.
- Mayor of Maitland Ald. N. Unicomb, and club patron, Dr. R. H. K. McKerihan.

Mr. Mulchay and Mr. Miller will chair sessions of the conference.

Reprinted by courtesy of "Maitland Mercury" to rely for guidance and support; also the Federal WIA has encouraged and fostered our efforts. In order to achieve some degree of maturity, we have endeavoured to formulate policies and guide-lines to achieve self-support, and although our constitution may be inferior in terms of documentation, it is a basis upon which something better can be drafted.

With constitutional matters in mind, I would urge supervisors whose State committees do not have a constitution, to have such framed in terms of local WIA Divisional requirements and relevant to Australia-wide YRCS uniformity.

Novice Licensing remains incomplete, and although we have made provision for its inclusion in our syllabus programme, a matter of concern has been raised by several YRCS leaders that the topic-list for Novices goes far along the subjects required for the AOCP theory course. This theory structure could encourage candidates to by-pass the Novice Licence and with a little extra knowledge to sit for the AOCP. Should this occur, it could neutralize the aims of the Novice Licence.

To conclude, I would express my thanks to the Executive of the WIA, State Divisions, and to a faithful and efficient YRCS Federal Secretary; to the State Supervisors, and through them to the officers and instructors in the individual clubs for the unstinting manner in which they have performed their duties.

The WIA-YRCS will continue to serve the youth of Australia, providing for them a useful and interesting hobby, an outlet for life's vocation, and the opportunity to enjoy social activities, all of which will befit them to take their places in the future life of the Nation.

For ourselves, the task is to return to our respective areas of responsibility with greater enthusiasm, to keep the lines of communication open between ourselves and club leaders, to publicize the Scheme, and to guide, advise, and wherever possible, to improve the standards and methods of efficiency and thereby increase our membership.

"CITIZENS BAND" — CORRESPONDENCE

The Hon. Post Master General, 16th July, 1974
Parliament House,
CANBERRA, A.C.T. 2600

Dear Sir,

Reference is made to a circular, copy attached, put about by a group labelling themselves "Australian Citizen's Radio Movement".

The Wireless Institute of Australia opposes any and all steps designed to establish a radio communication service for or on behalf of unqualified persons under uncontrolled conditions.

The Institute is aware of the activities of pirates both in the 11 metre band and elsewhere and has consistently pressed for firm action by every possible means to be taken against these law-breakers.

At the same time the Institute recognises that some inducement should be provided for such persons to qualify themselves in a comparatively elementary manner to achieve entry into the amateur service as a first step towards more advanced levels. Consequently, in conjunction with the Controller, Regulatory and Licensing of the Radio Branch, a system of Novice Licensing was devised and agreed. It is regrettable to observe that these proposals appear to have been deferred or abandoned.

Furthermore the Institute wishes to direct attention to two additional considerations, namely the conservation of the frequency spectrum and the disrepute of the "Citizens Band" radio in certain overseas countries where it is authorised.

The frequency spectrum is a limited natural resource which is well known to be under intense pressure caused by overcrowding of the stations and increasing demands for additional services. The creation in Region 3 of a new service could be achieved only by the reduction of frequencies already allocated to another service. The 11 M band 26.96 MHz to 27.23 MHz is allocated in this Region to radio amateurs on a shared basis with ISM services, with radio control of model aircraft and similar services. These services enjoy frequency allocations exceeding those granted to the amateur services therein.

In the USA, the pioneer of "Citizens Band" operations, the CB band is almost identical in width to the Region 3 amateur allocation. Since the CB service is known to embrace nearly one million licensees and an unknown number of unlicensed operators the world market is naturally geared to produce suitable equipment for these massive numbers, surpluses are therefore available for sale in other countries. It would be natural to expect that the protagonists of establishing a CB-type service in Australia would automatically select this band.

Reports reaching the Institute appear to indicate that CB operations in the USA are now so extensive that very little control can be exercised over them. Unlike the amateur and many other services which are largely self-policeing, the CB-ers (and pirates) are known to exercise scarcely any control over their own activities. If licensing authorities cannot be provided with adequate staff to exercise continuous monitoring, warning and prosecution services in all places where CB-ers are likely to be active it is believed that the terms of any CB permits or licenses would soon be grossly exceeded both in respect to power limitations and to forbidden subjects, language or comment.

The Wireless Institute of Australia trusts that this brief review of "CB" activities serves to alert all authorities to some of the severe dangers inherent in legalising this kind of radio communication. There would be little necessity therefore to comment upon the alternatives such as the use of the telephone and similar public services, the aspects of safety relating to the use of electrical apparatus and the fear of potentially-great interference to other services and facilities.

Yours faithfully,
P. B. Dodd, Secretary.

AUSTRALIA

315/1/63

POSTMASTER GENERAL
CANBERRA, A.C.T. 2600

1 3 AUG 1974

Dear Mr. Dodd,

I refer to your letter of 16th July, 1974, in which you outline the views of your Institute on the question of the operation of a citizens band radio service in Australia and on the activities of the group styling itself the "Australian Citizens Radio Movement".

As you know my Department, in keeping with your views on the matter, has been firm in its opinion over the years, based largely on the experiences of overseas countries, that it would not be in the public interest to amend the licensing rules to provide for the operation of a citizens radio service in this country.

The operation of illegal stations as mentioned in the circular which you forwarded could not be condoned even though, in isolated circumstances, they may have assisted in rescue operations.

Apart from the steps which are being taken to tighten the control over the operation of such radio services in this country, it is considered that the introduction of the proposed "Novice" Amateur licences will help to alleviate the problem by providing an easier means of entry for interested persons into the Amateur service.

The introduction of "Novice" Amateur station licences was agreed to some time ago and it is now merely a question of the necessary amendments being made to the Wireless Telegraphy Regulations. I can assure you that there is no intention to abandon the proposal.

I would like to thank you for your interest in this matter and for the information which you furnished which I believe will be most useful.

Yours sincerely

(R. BISHOP)

Mr. P.B. Dodd,
Secretary,
The Wireless Institute of Australia,
P.O. Box 150,
TOORAK, Vic., 3142

VHF-UHF Advisory Committee 70 cm draft band plan

JOHN MARTIN, VK3ZJC
3 Vernal Avenue, Mitcham, 3132

This draft band plan is now offered for comment by all interested amateurs. Please note that this is not a final or "official" plan: it is being circulated for comment only at this stage, and it can be modified. The VHF-UHF Advisory Committee feels that it makes best use of the available spectrum space, but if any individual or group has any suggestion on how the plan could be improved in any respect, please let your opinion be known.
You can't complain of being ignored unless you speak!

1. **COMMITTEE ACTIVITIES DURING 1973**
The main activities of the Committee during the past year have been:
- the processing of the Band Usage Questionnaires;
- the preparation of a draft band plan for the 420-450 MHz band; and
- the preparation of the Institute's submission to the Independent Enquiry into FM Broadcasting.

Work on the FM submission interrupted progress on the 70 cm. band plan, but this has now been completed and is ready for comment.

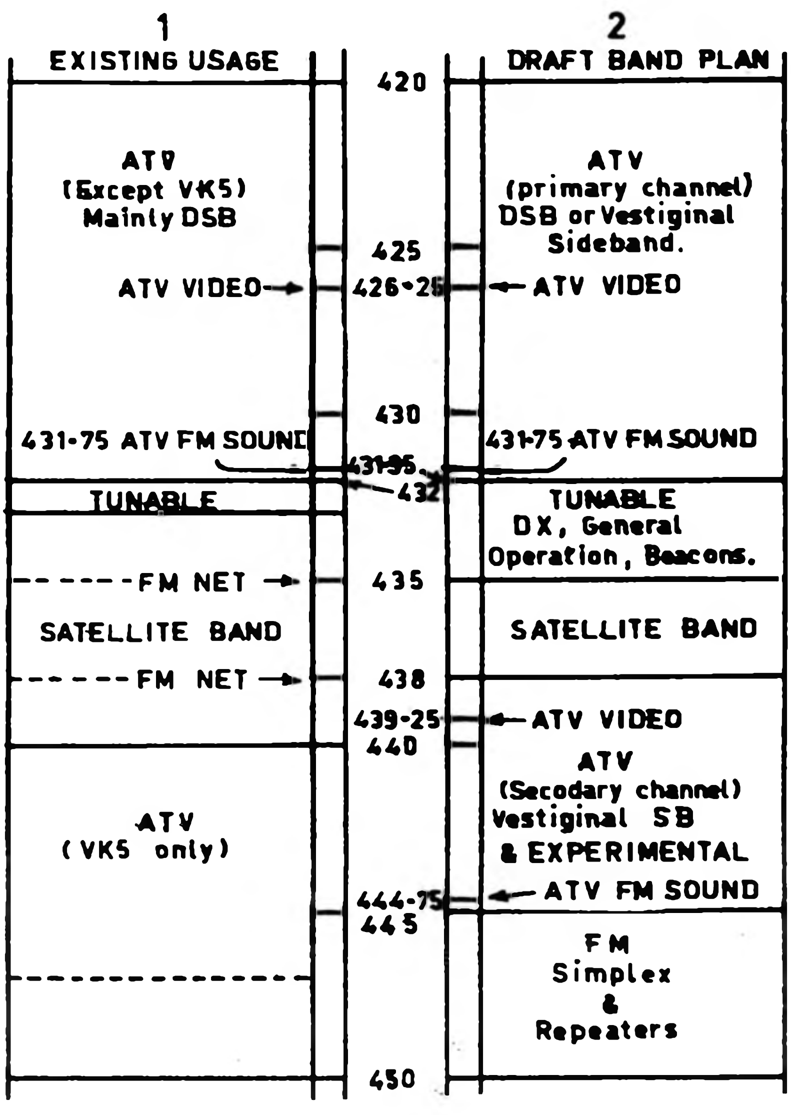
2. **QUESTIONNAIRES**
Much of the time spent by the Committee during the year was devoted to the collating and analysis of the Band Usage Questionnaires. A summary of existing band usage was prepared, the assumption being that any band plan should be based on existing usages—wherever possible. Comments and suggestions made in the questionnaires were evaluated, and it was possible to see a general consensus emerging in most areas.

3. **EXISTING USAGE OF THE BAND**
1. summarises the existing usage of the 420-450 MHz band, as revealed in the questionnaires. Most activity is in the tunable segment (432-433 MHz), and in the ATV segments (425-432 MHz in eastern states, 440 MHz in VK5). There are also some FM nets, mostly on the spot frequencies of 435 and 438 MHz The band 435-438 MHz is allocated to the Amateur Satellite Service, although it is not being used as yet. Apart from the ATV operation in the Adelaide area, there appears to be very little use of the segment 440-450 MHz. There are no unattended beacons or FM repeaters in use, as the PMG does not yet permit these in shared bands.

Activity in the band has increased rapidly in recent years, especially in the fields of ATV and FM nets. A similar increase in SSB activity could be expected, with the forthcoming launch of Oscar 7.

4. **DRAFT BAND PLAN**
The draft band plan is shown in 2. It conforms in general to existing band usage.
(a) **ATV:** All ATV operation (except in Adelaide) is on or near the national channel established by the Wodonga Conference in 1968 (video carrier 426.25 MHz, intercarrier sound channel 431.75 MHz). This has been allocated as the primary national ATV channel. Since most existing ATV operation is DSB, the segment 420-425 MHz has also been allocated to ATV. With the expected increase in ATV, and the possibility of ATV repeaters, a secondary ATV channel of 438-445 MHz is provided for (video carrier 439.25 MHz, intercarrier sound channel 444.75 MHz). Adelaide ATV stations could transfer to the national channel or use 438-445 MHz as their main channel, as their operation is already very close to this frequency.

Since the lower sideband of ATV transmissions in the secondary channel could possibly interfere with future satellite operations, it is suggested that this channel be used for vestigial sideband transmissions only.
(b) **Tuneable Operation:** The segment 431.95-435.0 MHz is allocated to tunable operation. A 50 kHz segment below 432.0 MHz is reserved for "exotic DX" operation, such as scatter, EME etc., and 432.0-432.05 is set aside for DX working (including "Exotic DX"). General tunable operation is given 432.05-432.75 MHz, for modes such as SSB, AM, CW, NBFM, RTTY and SSTV.
(c) **Beacons:** Since tropospheric propagation is the main mode on this band, it is not essential to locate beacons near "bottom band edge" as on 6 or 2 metres. Most of the comments in the questionnaires favoured an exclusive beacon segment be-



tween 432.5 and 433.0 MHz. The plan provides a segment from 432.75-433.0 MHz for beacons. The concept of a beacon requires that it be as free from interference as possible, and a segment 250 kHz wide is not too large a slice of the band, considering the immense value of beacons.

(d) **General Use**: The remaining part of the tunable segment, 433-435 MHz, is not allocated to any particular purpose at this stage. It could be used for "semi-private" nets, experimental purposes, and possibly for such things as linear translators, in-band or crossband. Most important, it provides space for the future expansion of tunable operation. It was thought that it could be possible to accommodate FM nets here, but the possibility of future repeaters (even though they are not permitted now) arose, and it was felt that a segment only 2 MHz wide would not provide adequate separation between repeater input and output frequencies. Assuming that it would be wise to plan for the possible future establishment of repeaters, and that it would be necessary to have both simplex nets and repeater channels located in the same segment of the band, it was thought best to locate them elsewhere in the band where adequate space could be found.

(e) **Satellite Allocation:** The ITU regulations allocate the band 435-438 MHz to the Amateur Satellite Service. Although it is not yet in use for that purpose, the majority opinion in the questionnaires was that it should be left clear for that purpose, rather than letting a clash arise (as occurred on 2 metres).

(f) **Experimental:** The segment 438-445 MHz has already been mentioned as a secondary ATV channel, but it was also thought necessary to set aside a portion of the band where experimental transmissions could be made without causing interference to normal communications. The band 438-445 MHz is therefore marked "Experimental" as well as "ATV".

(g) **FM Nets:** At first, it appeared a good idea to place the FM nets in the range of 438 MHz and above, on the third harmonics of the 2 metre simplex nets and repeater input frequencies. However, the questionnaires showed that most people who had tried this had problems. Local harmonics from 2 metre stations interfered with their reception, and those using varactor triplers also had 2 metre leakage which interfered with local reception on 2 metres. FM nets and repeaters have therefore been located in the range 445-450 MHz. How these 5 MHz can be used is quite flexible. For example, using 100 kHz channel spacing and 3 MHz input-output spacing for repeaters, there could be 10 repeater channels (inputs and outputs) and up to 30 simplex channels accommodated between 445 and 450 MHz. If 50 kHz channel spacing were used, there could be twice as many of each. Considering the immense popularity of 70 cm. FM in some other countries, it was assumed that there will be considerable expansion in this field in Australia in the near future, and that adequate space should be provided. ●

Amateur Operators Certificate of Proficiency Examinations — August 1974

Through the courtesy and co-operation of the Pastmaster General's Department we reproduce the August 1974 AOCP examination papers.

SECTION M (Theory)

(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) With the aid of a **block** diagram describe the operation of each stage of a single-sideband suppressed-carrier transmiter.
(b) Explain how the transmitted sideband may be changed from upper to lower sideband.

2 (a) Assisted by a circuit diagram describe a variable-frequency-oscillator (V.F.O.) suitable for use in the 7 MHz amteur band.
(b) With reference to a V.F.O., discuss the factors upon which the stability of the generated frequency depends.

3 The antenna coupling network of an amateur transmitter is designed to match an antenna whose impedance lies between 50 and 80 ohms. Assisted by a diagram, describe an antenna which will meet this requirement on at least two amateur bands. Show dimensions and state the frequencies involved.

4 (a) With reference to a radio-frequency amplifier stage, explain under what circumstances neutralisation is necessary.
(b) Aided by a circuit diagram, explain the theory of one method of neutralising a single-ended output stage.
(c) Explain why it is necessary to neutralise a frequency multiplying stage of a transmitter.

5 (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 H.F. bands.
(b) Explain why communication over long distances as described in (a) is not possible using the V.H.F. and U.H.F. amateur bands.

6 (a) Discuss features you consider desirable in a microphone which is to be used in a mobile capacity.
(b) With the aid of a sketch describe the construction and theory of operation of a microphone which you consider meets these requirements.

7 (a) With the aid of a sketch show the construction of a cathode-ray-tube and explain the theory of operation.
(b) Show a method of connecting a cathode-ray-oscilloscope to a telephony transmitter to indicate its depth of modulation.
(c) Sketch the pattern obtained when using the connections shown in (b) if the carrier is modulated to a depth of 100%.

8 In relation to a communications receiver explain what is meant by the following terms:
(i) signal-to-noise ratio; (ii) selectivity; (iii) image rejection; (iv) cross modulation; and (v) automatic gain control.

9 (a) Find the total capacity when three capacitors of 3, 6, and 9 microfarads respectively are connected:
(i) in parallel; and (ii) in series.
(b) Calculate the capacitive-reactance of the **series** combination in (a) when connected across a 50 Hertz supply.

SECTION K (Regulations)

(Time allowed — 30 minutes)

NOTE: THREE question only to be attempted. Credit will not be given for more than **THREE answers. All questions carry equal marks.**

1 What action should be taken by an amateur station licensee when informed that transmissions from his station are causing interference to the reception of television or broadcast programmes?

2 State the regulatory requirements concerning the recording and re-transmission of another amateur station's transmissions.

3 (a) State the maximum power which may be used in an amateur radio station using:
(i) amplitude-modulated double-sideband emission (A3);
(ii) single-sideband suppressed-carrier emission (A3J).
(b) Briefly describe the method for determining the peak envelope power of a single-sideband suppressed-carrier transmitter.

4 Give the "Q" code abbreviations for the following:
(i) Shall I send faster?
(ii) The name of my station is ....
(iii) Your signals are fading.
(iv) I have nothing for you.
(v) When will you call me again? ●

A Monitor Scope

Cor Hagoort, VK5YH
16 Gilbert Street, Ingle Farm, 5098

Monitor scopes are still regarded as luxury items by many amateurs. Even by those operating SSB equipment. This perhaps explains why there are many distorted SSB signals on the air.

If we want to adjust our transmitters for optimum working conditions however, a scope is a must. Being a home-brewer I decided to make my own.

The monitor scope that resulted is suitable for monitoring AM, DSB, and SSB, on both receiving and transmitting. There is a choice of either the wave-envelope or the trapezoidal pattern. It has a five position bandswitch which covers the following bands:

Receiver:
- 1-455 kHz

Transmitter:
- 2-160 and 80 m
- 3-40 and 20 m
- 4-15 and 10 m
- 5-6 m

A 3BP1 cathode ray tube was used, although a DG 7-5 is to be preferred, because it is physically smaller and the internal electrode connections are shorter.

To obtain sufficient brightness about 800V EHT is needed. A transformer from an old 6V vibrator power supply was used. This transformer has a 300V secondary; the centre-tap was not used, and with a full-wave voltage doubler —840V EHT was obtained.

The HT needed for the EF91 Miller-transitron sawtooth time base generator is taken from the —420V point of the voltage doubler, filtered and reduced to —330V. The anode side of the EF91 has to be grounded to enable the use of this negative voltage.

This system necessitates the use of a 6.3V filament winding which should be left floating. The 6V vibrator primary yielded 8V, which was reduced to 6V by means of a 6.8 ohm 1W resistor.

Flyback suppression is achieved by taking a negative pulse from the screen of the EF91. This pulse is limited by the OA210 and the resulting flat topped waveform fed to the grid of the 3BP1 to blank the retrace of the time base sweep.

Horizontal deflection is controlled by the 1 M linear pot marked "HOR". Vertical deflection is controlled by the 500 pF tuning capacitor. An OA81 germanium diode was used for detection of the horizontal sweep, because there was one in the junk box, but an OA91 would be preferable.

Due to the fact that the horizontal plates D3 and D4 are more voltage sensitive than the vertical plates D1 and D2, the trapezoidal pattern appears slightly pulled out vertically. In practice this does not matter very much.

The trapezoidal pattern can be reversed, by reversing the polarity of the OA81.

Connecting the scope to the receiver and transmitter:
Coaxial cable must be used for these connections.

Receiver:
Connect a 5 pF capacitor from the plate of the last IF tube to the inner conductor of the coax lead.

The monitorscope can be seen on top of Cor's all-band phasing rig.

Transmitter:
Mount a 1 turn loop near the cold end of the PA tank coil and bring the signal out through a piece of coax cable.

Construction hints:
Do not mount the power transformer next to the CR tube. The transformer's magnetic field will influence the electron beam. It is better to mount the transformer behind the CR tube. The layout is not critical. One important point is to mount the 500 pF tuning capacitor with its associated circuitry as close as possible to the 3BP1 base. By keeping the connections between D4 of the 3BP1 and the tuned circuit as short as possible, this monitor scope will work up to 80 MHz.

Preferably the CR tube should be shielded with a mu-metal shield. I must confess to once making a 144 MHz monitor scope using a DG 7-5 without a shield. It worked ok!

Information on the coils in the RF section:
Coil 1 is an IF transformer with one coil shorted. The other coil is used with the fixed capacitor, which is normally soldered across it, removed.

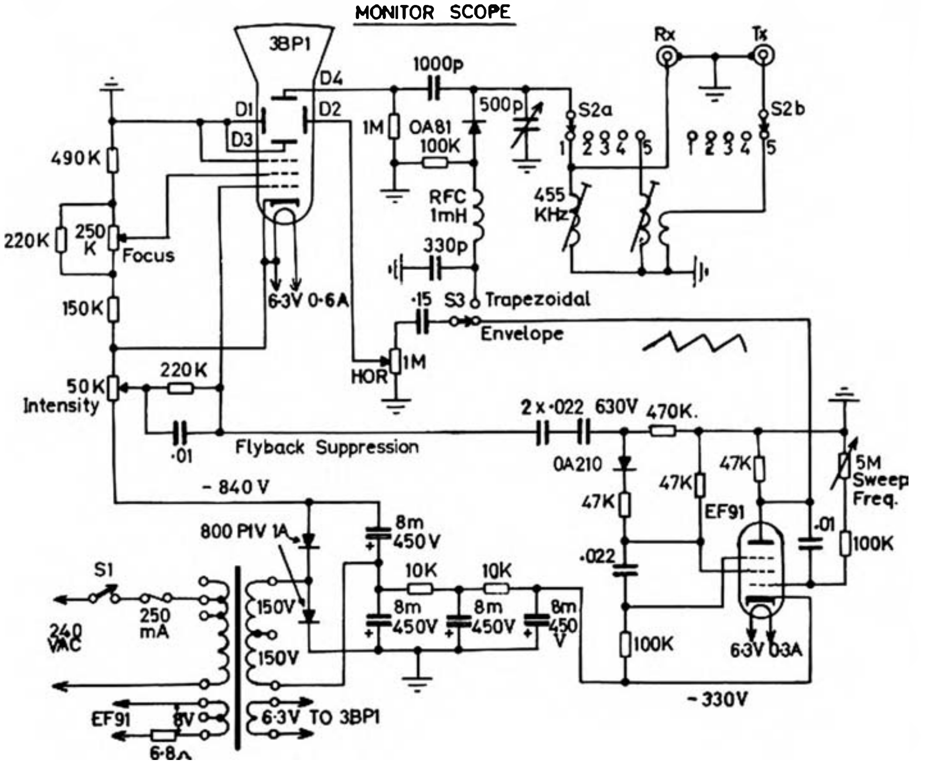
Coils 2, 3, 4 are slug tuned. They are omitted from the circuit diagram for clarity.

Coil 5 is a hairpin loop.

All are link coupled, except the 455 kHz coil.

Note:
If a DG 7-5 or some other CR tube is used, the EHT resistance chain should be altered to supply the correct voltages to the CR tube.

MONITOR SCOPE



Some thoughts on speech processing

Maurie Evered, VK3AVO
13 Sage St., Oakleigh, 3166

The purpose of this article is to discuss some aspects of speech processing and to present the circuit of a speech clipper that has been used successfully at this QTH for many QSOs both local and DX.

Speech processing consists of compression, clipping or a combination of the two. It can be applied to the audio stages before modulation takes place or to the RF signal after side band generation. My comments will be confined to the former where the signal from the microphone is modified, usually through the use of an outboard unit, before it is applied to the transmitter proper.

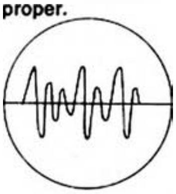


Fig 1A

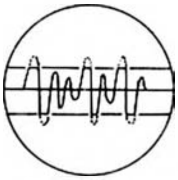


Fig 1B

Speech waveforms normally have a high peak to average value, Fig. 1a, but it is the peaks that determine the "100 per cent modulation" point and if this value is exceeded then the all too obvious distortion and splatter is the result. The amount of audio recovered from an RF signal however is determined by the average value so that if the peak to average value can be lowered, Fig. 1b, a worthwhile increase in signal "punch" can be obtained.

For an excellent discussion of this topic see the ARRL Handbook 1971, p. 258 or QST, January 1969. The only point I wish to emphasize from these texts is the advantage of using audio clipping instead of audio compression. 15 dB of audio clipping gives a 4 dB improvement in the signal to noise ratio of the received signal. Audio compression is useful for maintaining a relatively constant speech level but contributes only 1-2 dB to the signal to noise ratio.

Now to the clipper itself. Like all VK3AVO projects to date the circuitry is not original nor even unusual. It uses an orthodox audio amplifier followed by an orthodox twin triode clipper. This stage clips both positive and negative signal peaks. If run below the clipping level it acts as a low gain amplifier with good distortion characteristics. This clipping stage is followed by a single RC filter to remove the harmonics produced by the clipping process. The circuit requires but few comments—

1. It uses an old fashioned feature, valves. This was done to make it a true "junk box" project and more importantly, that in my experience audio equipment that uses valves is less prone to RF feedback troubles. (I can see the axes falling at a statement like that).

2. Component values are not highly critical in the amplifier stage but I would recommend closely following those in the clipper.

3. V_1a does not use a cathode by-pass capacitor. This "negative feedback" effect resulted in a cleaner output signal.

4. It is wise to include the 100K bleeder resistor in the power supply. The large value electrolytics used to ensure a low hum level can deliver quite a "kick", hours after switchoff.

My particular unit was built on a 6 x 4 x 2 inch chassis and includes the power supply. It is possible of course to "borrow" the necessary power from your transmitter or transceiver. The requirements are very modest.

Now to the most important step of all, adjustment of the unit. It is best to first check with a tape recorder or speaker system so that any distortion or undesirable frequency response can be detected and corrected before any on air tests are performed. If these tests are satisfactory you are set for the real test under operating conditions. If a CRO is available then —

1. With the clipper "out" adjust the mike gain on the rig for normal output without flat topping with normal speech input. A prolonged "h-e-l-l-o" gives the desired effect.

2. Switch the clipper into circuit with the clipping and output controls set just high enough to give a readable pattern.

3. Slowly increase the setting of the clipping control till the CRO shows no further increase in output; this shows that the clipping level has been reached.

4. Increase the setting of the output level control until the same output is reached as in 1.

If a CRO is not available you can use the procedure that I used in conjunction with an FT200 —

1. With the clipper "out" adjust mike gain on the rig for normal output, leave it in this position.

2. Switch the meter to the ALC position and note the reading obtained in 1.

3. Switch the clipper into circuit with both controls set low and increase the clipping level until no further increase is obtained in the ALC reading.

4. Increase the output level till the same ALC reading is obtained as in 1.

This procedure will give a considerable increase in the final plate current, so

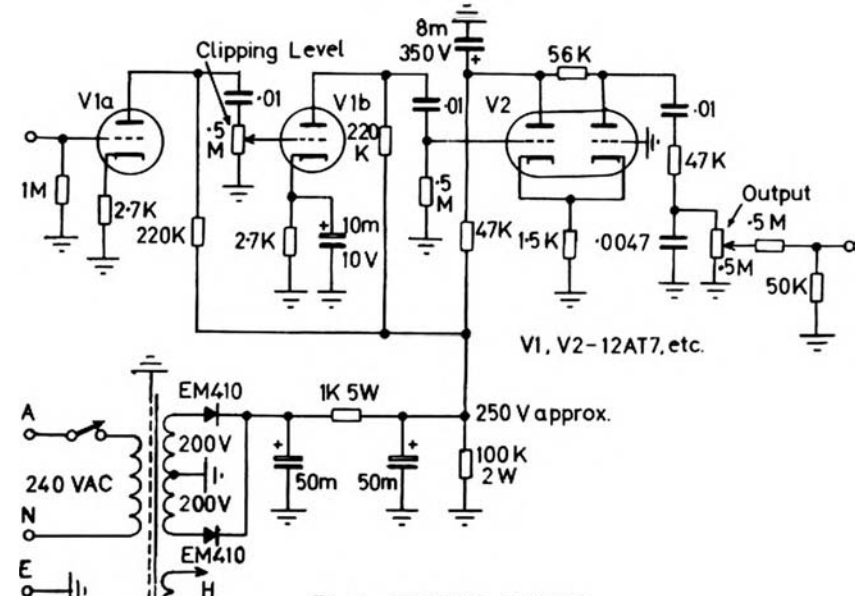
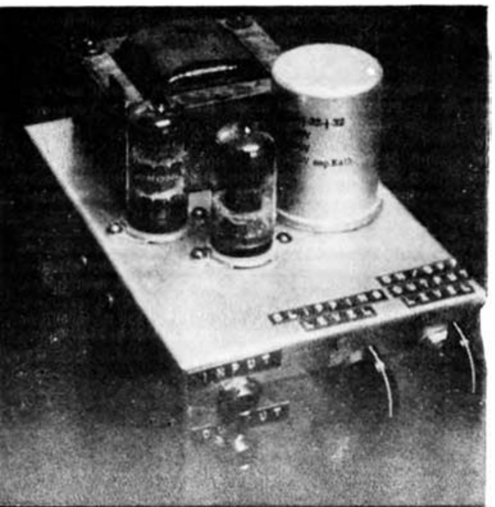


Fig. 2 CLIPPER CIRCUIT



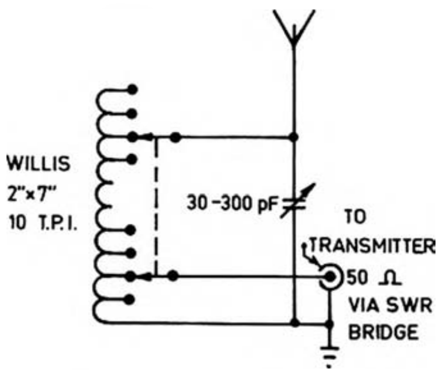
Long Wire Antenna Tuning and Matching unit 80 - 15 metres

D. L. SMITHDALE, VK6DX
12/10 Walter Road, Inglewood, WA 6052
and
H. E. CHRISTENSEN, VK6ZEH
21 Pollard Street, Glendalough, WA 6016

A problem encountered by most apartment-dwelling amateurs is that of radiating a good signal on all bands, without causing TVI, when facilities are available only for a wire antenna of random length. The authors have achieved this very successfully by adaptation of an antenna-tuning circuit previously used by VK6ZEH in commercial installations.

The necessary components were obtained as shown in the figure and the tuner assembled with the exception of the taps from the switches. A point worth mentioning here in construction, is that the coil should be accessible to enable taps to be soldered on at any point around it.

It is essential that a good earth is available. Fortunately, at the 6DX apartment the water system was all copper and its earthing properties good. Adjacent to the apartments was a filling station, with a very convenient tree at the back of the block. Permission was obtained from the flat owners and with the co-operation of the service station proprietor, 125 ft of wire became airborne at around 30 ft up. The length of wire is of no importance, anything more than 30 ft can be made to work on bands 80 m to 15 m. It is essential that the wire is placed in position and the end brought to the point where the tuner will be located. Any subsequent rearrangement will upset the system.



TUNING PROCEDURE

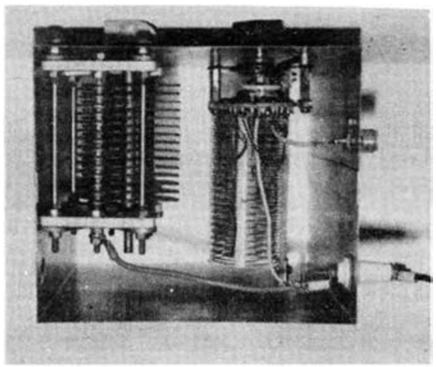
The 80 m band should be adjusted first. Place the capacitor in half mesh, the input tap about 10 turns up from the cold end and the transceiver at midband. Feed a signal from a loosely coupled signal generator and run the top tap down the coil until a maximum S meter reading is obtained, then solder the tap in place. Now place an SWR meter between the transceiver and tuner, using 50 ohm coax. Apply low power from the transceiver and check for minimum SWR. If it is necessary to move the capacitor considerably, re-centre and adjust lower tap until the minimum SWR is achieved. This can be done two ways, by switching off, moving, and re-checking, or by holding the lower tap with WELL insulated pliers and running up and down the lower section of the coil until the exact spot is found (WARNING — high voltages can be expected here, proceed with caution). Once the optimum position is found, by a very slight adjustment of the condenser, an SWR of near 1.0 can be had from one end of the band to the other. If this cannot be achieved, select the lowest possible and re-adjust the top tap half a turn either way as necessary to lower the SWR. When operating at the extreme end of the band the SWR should be no more than 1.2 and can be reduced by a slight adjustment of the capacitor.

The remaining bands are tuned in a similar manner. 28 MHz has not been included, as it is felt a suitable separate antenna can be erected and a separate tuner using smaller capacity and inductance constructed.

FEATURES

One of the advantages of the tuner is that it can be adjusted to match any impedance offered by the long wire. It should be noted that in some instances, e.g. the writers' on 20 m, the input tap is above the output tap due to the impedance being less than 50 ohms.

No specific tap positions can be given as they are entirely dependent on the length, height and properties of the antenna. With a little patience, the ultimate can be achieved, all your signal generated being radiated and not wasted heating up the antenna.



The photo clearly shows the construction and the heavy duty components used.

Good construction practices should be followed, using heavy duty switches and variable capacitor. The wiring should be bare copper wire and firm enough not to sag. Plastic covered wire, if touching, and the wrong tap selected for tuning up, will result in fusion of the wires together. The whole assembly should be enclosed in a well bonded and EARTHED metal box. By leaving off the earth the SWR will rise to as much as 2.5 to 1.

The system can be used to match a vertical antenna in the same way. Tests to date have shown the system to work very well, and the comment of DX stations is often of surprise when they hear that the antenna is only a long wire. Working portable in the NW, Europe has been worked with ease using a 60 ft wire 12 ft up and a fair ration of DX using a 125 ft wire 30 ft up. Good DX!

CONTINUED FROM OPPOSITE PAGE

keep it at a safe level as far as plate dissipation is concerned. Normally there is no reason to increase the level of clipping beyond this setting unless your signal is being received very weakly then you may find it an advantage to increase it slightly but not too much. Too high a level of clipping will produce excessive distortion which **decreases** signal readability and so defeats the whole purpose of speech processing to say nothing of overheating your final tubes. It is this practice of running speech processors, compressors and clippers alike, into the distortion level that has given them a bad reputation with many operators who, quite rightly, cannot tolerate the awful racket.

For further information regarding the theory and practice of speech processing I would suggest, in addition to the two earlier references —

1. RSGB Handbook, 1968, p. 9.25.
2. Radio Communication, January 1973, p. 36.

I will finish with two acknowledgements:

1. Ron VK3OM for several suggestions regarding the circuit, particularly the 10 : 1 attenuator in the output stage. Without this the output control is far too coarse in adjustment.

2. The many operators, both VK and DX, who tolerated my requests for comments on my signal with the clipper in and out of use.

I hope anyone who builds this little unit will find it as useful as I have.

A Transistorised Receiver for 160 metres.

JIM WALLICH, VK3ANY
154 Balwyn Road, Balwyn, 3103

If your station is adequately equipped for fixed operations and you feel the need for a portable receiver which can be used outside the shack then this article is for you.

It was decided to build a receiver rather than to convert a broadcast band "tranny" as it was considered that the normal cheap transistor portable would lack some essential refinements as well as sensitivity. What was aimed at was a set of such design that could be easily duplicated and therefore was not too complicated and did not require critical adjustment. Sensitivity was to be comparable to any good communication receiver and selectivity to be adequate for present activity in the VK3 area.

With these standards in mind a design which appeared some time ago in a British magazine was used as a basic format. By certain modifications and by leaving out what were regarded as superfluous refinements, an excellent "birds nest" was produced on the bench and in due course this was drawn up and built on a printed circuit board. The final circuit is shown in Fig. 1. Tests carried out by VK3GK were so successful that the design is offered for the consideration of other amateurs.

CIRCUIT DESCRIPTION

Firstly, it was decided to use germanium transistors as a number of these were available and had to be used up. Secondly as an audio strip was also available this was incorporated into the unit although the enterprising builder can readily build his own. The space on the board will easily accommodate one of the audio ICs now available. A little circuit designing is all that is required together with some modification of the PCB. A small (2½ inch) speaker could, it was discovered, be fitted to the board.

As will be seen the circuit follows conventional design. VC1A, VC1B and VC1C are ganged. Additionally, as shown, there is a small peaking capacitor across L3. This was found most useful as it compensates for any poor tracking that may occur when exact component values are not used. This capacitor may be 10 to 15 pF.

It has been suggested that VC1A could be separate from the other two tuning capacitors in view of the difficulty and expense that may be encountered in obtaining a 3 gang unit. In practice such an arrangement does leave quite a lot to be desired as when it is off tune it really masks signals and consequently weaker signals may be missed. If a 3 gang cannot be obtained then one may be made up from a 2 gang and a single gang.

The IF transformers came from discarded broadcast receivers and are the small 5 pin type. It will be observed that in the case of IFT1, 3 and 5 the collectors are connected to the tap nearest to the cold end of the primaries. The resistance from tap to coil is about 1 ohm and the resistance from the tap to the other end is 2 to 3 ohms. There are several different configurations for these transformers as shown in figure 3. IFT1 and 5 used in the receiver are type A whilst IFT3 is type B as illustrated. The constructor will have to check this point when selecting his IFTs.

At first sight the AVC circuit may appear very light weight. However it is in fact very effective and no blocking occurs even on the strongest signals. The "S" meter uses a tuning indicator/battery level indicator from an old transistor set. Even when purchased new they are cheaper than ordinary meters; they are small and give a perfectly satisfactory indication of signal strength. The meter is adjusted to read half scale for an S9 signal and zero with no aerial connected. The BFO presented quite some difficulty as it was found that the fourth harmonic of the oscillator came out on 1820 kHz. Eventually a cure was found by tuning the IF transformers to the lowest possible frequency with the aid of a signal generator. This worked out to about 448 kHz. The fourth harmonic of the BFO thus moved to 1792 kHz — below the amateur band. Consequently no screening or special care is required and the BFO works very well. The BFO uses the same type of IFT as the IF except that the resonating capacitor is removed. (Gouged out is the only way I can think of describing the operation.)

The section reserved for the audio strip can be changed to suit the builders own requirements particularly if he makes up his own audio stage. Remember that a screened lead must be taken from VC2 at the front panel to the PCB. The —10 v. supply and earth wire must also be taken to the audio strip and wires run to the speaker from the audio output. The audio strip is fixed to the PCB with nuts and

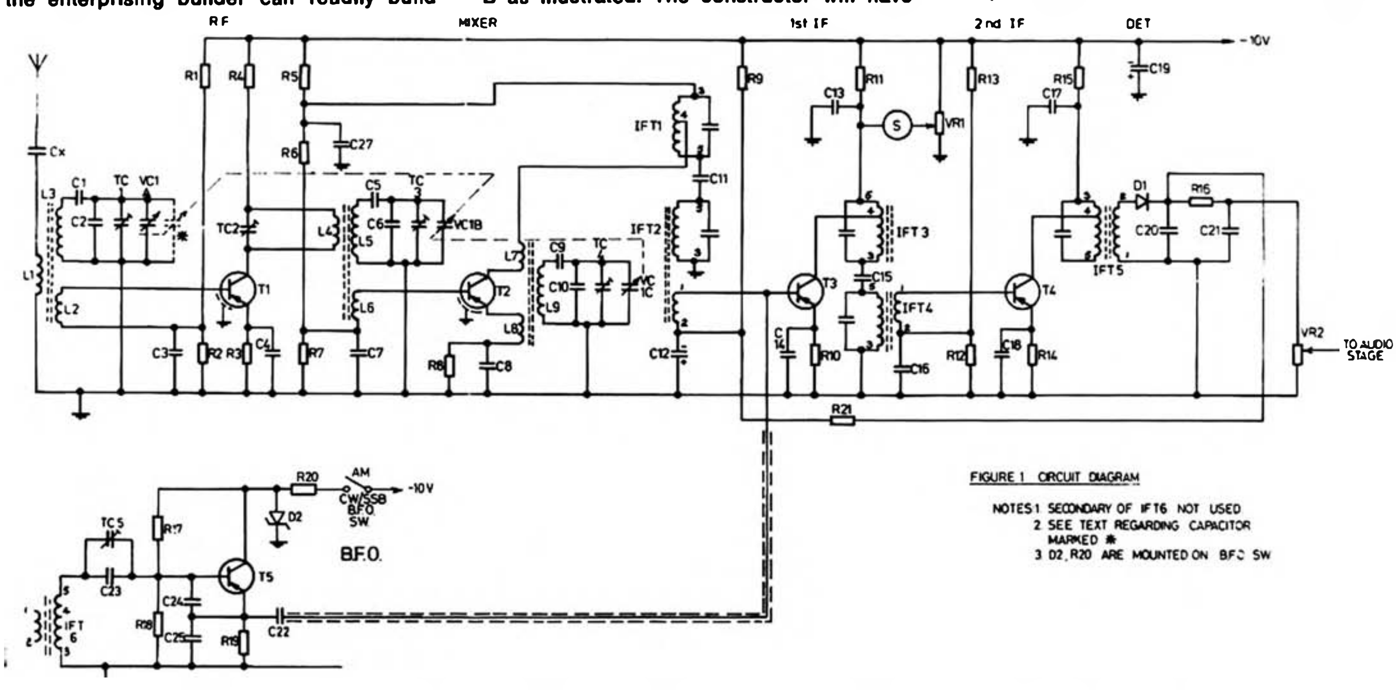
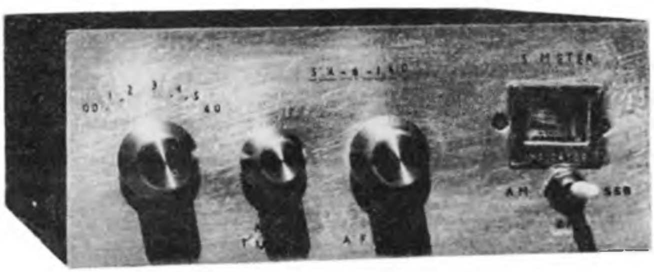
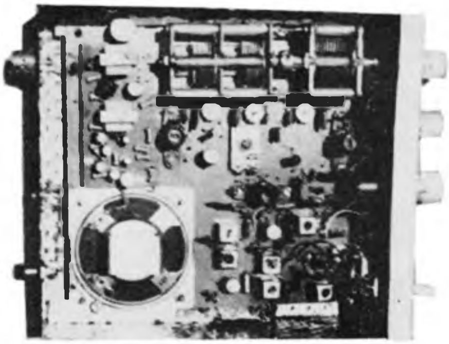


FIGURE 1 CIRCUIT DIAGRAM

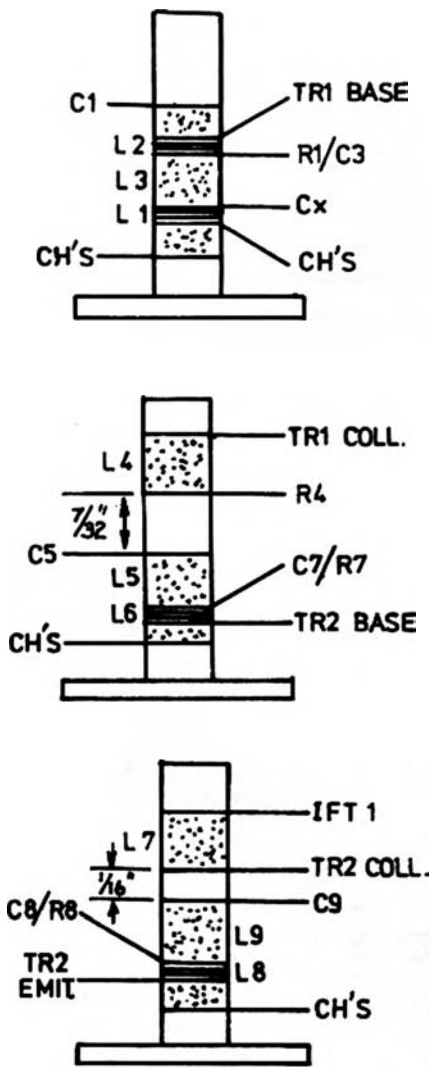
NOTES 1 SECONDARY OF IFT6 NOT USED
2 SEE TEXT REGARDING CAPACITOR MARKED *
3 D2, R20 ARE MOUNTED ON BFO SW



Front view of the completed receiver.



Top view showing placement of major components.



Aladdin 804 Formers. Coil Wire 32 SWG enamelled. L7 18 turns, L8 3 turns, L9 45 turns, L4 25 turns, L5 45 turns, L6 3 turns, L1 3 turns, L2 3 turns, L3 45 turns.

bolts together with spacers. The speaker is mounted on the component side of the board so that when the board is laid copper side down the cone faces downwards.

CONSTRUCTION, ADJUSTMENT AND TUNING

Location of the main components on the PCB is the first step. Obviously a decision has by now been made on the ganged capacitor. Coil formers (Alladin F804) are screwed to the board and the coil terminal pins either passed through holes in the board or soldered to pins as used on veroboard. The construction of the coils is not too critical, however the dimensions should be followed as closely as possible. Above all ensure that the coils are connected properly. TC2 is soldered into circuit. A hole must be drilled through the board to allow the screw protruding from the underside to pass through.

Special care is necessary in drilling the holes for the IFTs. There seven holes to each, which includes 2 for the solder tags on the can. Make all holes somewhat oversized as this simplifies the job. Do not overlook the fact that the can tags pass through holes in copper "lands" left to ensure an earthed soldering point. Wherever possible mount resistors (all ¼ watt) in a vertical position to reduce space usage.

Once all components have been fixed in and a thorough check has been made, connect VR2 and switch on the supply voltage. **DO NOT** connect the BFO at this stage. Check that the current drain is not excessive and that the base, emitter and collector voltages are satisfactory. Obviously, if all is well, some kind of noise should emanate from the speaker, though this may be only a click when a screwdriver or probe is touched in a sensitive area.

If a VTVM is available confirm that T2 is oscillating. A lead brought from the antenna terminal of the station receiver to the vicinity of L9 will give an indication if the receiver can tune around 2.3 MHz or a harmonic of this. The oscillator should cover 2240 to 2310 kHz.

Autodyne mixers can be tricky sometimes even when correctly wired. If difficulty is experienced and you are certain that the wiring has been correctly executed it will be necessary to fiddle around to get the stage to "fire". Once it does it will be a "goer" ever after and give no trouble.

Adjustment of the rest of the receiver follows standard practice, but remember what was said about the BFO earlier. Line up the IFTs using a signal generator on a frequency of 450 kHz or lower.

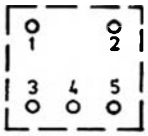
Injection of a signal from the signal generator in the area of L5 enables the mixer stage to be aligned. The same applies to the RF stage.

Alignment of L4, L5 and L6 together with TC2 requires some explanation. The positioning of L4 is arranged to give a limited degree of coupling. If the slug of L5 is unscrewed too much it increases the coupling to a point where oscillation occurs. Therefore once the basic alignment has been achieved, set TC3 to mid capacitance, screw in the slug of L5 pratically all the way to the bottom of the coil, and adjust TC2 for maximum signal. Then unscrew the slug to peak the signal and again adjust TC2. This procedure should be followed until the stage oscillates. Screw in the slug to restore stability and readjust TC2. It should be possible to vary TC3 through maximum signal without oscillation occurring.

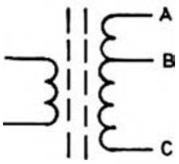
Initially C14 was 0.1 uF. It was found, however, that when IFT2 was peaked there was instability. By changing C14 to 0.001 uF the stage became docile.

It should now be possible to receive a signal though it may be necessary to wait for an amateur station to come on. Good results can be obtained even using a poor antenna such as a few feet of wire.

Incidentally no mention has been made of the coverage of this unit. This depends on the builder who can spread the band as much as he likes depending on (a) the capacity of VC1A, B, C, and (b) the values of C1, C5, and C9. The padding capacitor used in the prototype enabled the receiver to tune the band over about 60 degrees



IFT. VIEWED FROM BELOW



PIN No.					
1	2	3	4	5	
SEC	SEC	A	B	C	TYPE A
SEC	SEC	C	B	A	TYPE B
SEC	A	C	B	SEC	TYPE C

which is quite adequate.

The BFO may now be switched on. A VTVM RF probe at C22 will indicate whether the stage is oscillating. With the receiver tuned in to a signal generator at 1820 kHz, set TC5 to mid capacity and adjust L6 until a good beatnote is heard. Set it to zero beat. This beat should tune from high pitch through zero beat to high pitch. Check that removing the signal removes the beat as it is quite possible that the 4th harmonic of the BFO itself may be tuned if the IF frequency was not set below 450 kHz. The harmonic will still be heard below the amateur band with the correct IF frequency.

Unforunately, there are so few SSB stations working on the band that it has not been possible to establish with certainty that the level of injection is optimum. With the coupling to T3 base there is plenty of injection available. More or less can be had by adjusting C22. If trouble does arise, C22 could be connected to T4 base or into its collector. These options are simple to experiment with but can only be tried with a regular and reliable SSB signal. This is left to the constructor.

There is only a slight tendency for the BFO to drift in the first few moments. The constructor may prefer to mount TC5 on the front panel as a BFO tuning control. As such it should have a value of about 10 pF. For the CW enthusiasts who like to vary the tone this is certainly a must.

PERFORMANCE

Originally the RF transistor was an OC170. This came to grief and was replaced with an OC44 without other changes. No instability was noted during tune up so, if available, the OC44 is recommended.

As for performance it compares favourably with an FRDX400 on sensitivity. The latter is better (and I should hope so as it costs a lot more), but not to the extent that I could not work anyone that anyone else was working. Selectivity is adequate for the present degree of activity on the band. For mobile working an external speaker is used as the small inbuilt speaker is a bit "hissy" and doesn't combat noise as well. Stability is very good, even dropping it a small height does not detune a signal.

To conclude it has proved to be reliable, effective, simple to build, rugged and easy to get going. I couldn't see myself without one.

PARTS LIST

R1 18K R6 47K R11 470 ohm R16 470 ohm R21 8.2K
R2 3.3K R7 10K R12 4.7K R17 4.7K VR1 10K pre-set
R3 1K R8 1.8K R13 22K R18 3.9K VR2 5K Log pot
R4 470 ohm R9 50K R14 1K R19 2.2K
R5 1K R10 1K R15 470 ohm R20 100 ohm
C1 69pf C6 150pf C11 2pf C16 .047uf C21 .047uf
C2 150pf C7 .1uf C12 10uf 6V C17 .1uf C22 2pf
C3 .047uf C8 .01uf C13 .1uf C18 .047uf C23 470pf
C4 .047uf C9 69pf C14 .001uf C19 100uf 16V C24 .0033uf
C5 69pf C10 100pf C15 2pf C20 .047uf C25 .001uf
CX to suit antenna used. Start at 150pf. No capacitor may be needed.
C23 Adjust to resonate L6 to IF if necessary.
TC1 TC3 TC4 TC5 3.30pf printed circuit board type trimmer
TC2-750pf compression type trimmer.
VC1A, VC1B, VC1C 3 gang 50/50/35pf or similar
IFT1, 2, 3, 4, 5, 6 Japanese type used in pocket portables (IFT 5 to suit diode detector.)
T1 OC44
T2, T3, T4, T5, OC170
D1 OA89
D2 OAZ207

Interference: The International scene —and applications locally

By the WIA Executive

The following brief resume would interest those who might like to have some knowledge of the immense amount of work being carried out in the International arena under the auspices of the C.I.S.P.R. The data has been culled from a report published in the March 1974 edition of I.T.U.'s Telecommunication Journal and from various Standards Association of Australia publications and other sources.

The International Special Committee on Radio Interference (CISPR) consists of representatives of the National Committees of the International Electrotechnical Commission (IEC) and of other member bodies such as the Int. Union of Producers and Distributors of Electrical Energy (UNIPEDE), Int. Radio and Television organisation (OIRT), etc. The International Radio Consultative Committee (CCIR) of the ITU is represented in the annual Plenary Assemblies of the CISPR by observers.

The work of the CISPR is carried out by 6 main Sub-Committees the chairman of each appointing working Groups to advance the work in his domain. The Sub-Committees cover such fields as "D" Ignition interference and related subjects, "E" radio and television receivers, "F" Domestic appliances, "B" ISM RF apparatus, "C" High-voltage lines and equipment and "A" methods of measurement, etc.

It is interesting to observe the work carried out by the various Sub-Committees during 1973. Space here permits only a few examples to be quoted. Sub-Committee "C" looked at a new report which showed that the measurement of insulators correlates well with the measurement in actual operation in light and dry pollution, but not in areas of heavy pollution. "B" looked at microwave ovens, their spurious radiation and whether stricter limits might be necessary for domestic-use ovens below 5 KW, as well as beginning a study on interference from heavy current or high voltage thyristors.

Sub-Committee "D" dealt with methods of measurement for suppressors in cars, interference to radio reception in a vehicle arising from devices within the vehicle in two specialised fields, interference to mobile reception caused by adjacent roadside electrical installations, and devices and methods of measurement to cover such things as lawn mowers, motorboats, power tools, etc.

Sub-Committee "F" worked on new limits for portable tools, measurements relating to fluorescent tubes and a new recommendation on the measurement of, and limits for, interference caused by switching operations of electrical household and similar appliances.

Other work included a standardised form of listing complaints for analysis, permissible leakage currents and limiting values of radio interference suppression capacitors, detailed methods of evaluating interference to TV pictures and sound and coupling factors between sources of interference and receiver aerials. Some other areas examined included measurements for wideband interference (motors, IC engines, etc.) and narrow-band interference both in relation to conducted interference as well as radiated fields. The distance

My Latest News on YAESU MUSEN Equipment

I have been advised that production of the FT/FP transceivers will soon be phased out, the 200 is to be replaced by the new FT-201 transceiver, with built-in AC/DC supply, actually a cheaper version of the FT 101-B, mostly solid state, somewhat a hybrid of the 200, 501 and 101, estimated landed cost will be around $450.

There is soon expected production of the FL-101, a transmitter companion for the FR-101, with digital read-out possible in the de-luxe version, however, a rather dear set-up for us because of the standard import duties and sales tax on separate receivers & transmitters, in contrast to the duty-free imports of transceivers

There is a new version planned of the FT-620, the 6 Metre transceiver FT-620-B, identical in appearance to the 2 Metre FT-220; the latter will soon be somewhat modified and improved.

The FT-2-FB **has been discontinued,** to be replaced by the FT-224, a 24-channel 2 Metre FM transceiver, landed cost as yet unknown.

YAESU MUSEN

FT-101-B, supplies easing, almost ex-stock	$525
FT-DX-401 with built-in AC supply, 8 weeks	$495
FT/FP-200 discontinued.	
YC 355 D digital frequency counter, still only	$250
Spectronics DD-1 counter for 101/401	$150
FT DX 400/560 noise blankers,	$20
FT 101/101B/560 CW filters	$30

Sorry, no more 101 or 401/560 160 M Conversion Kits.

HY-GAIN ANTENNA

14 AVQ 10-40 M vertical 19 feet tall no guys	$50
18 AVT/WB 10-80 M vertical 23 feet tall no guys	$70
TH3JR 10-15-20 M junior 3 el. Yagi	$110
TH3Mk3 10-15-20 M senior 3 el. Yagi soon	$150
TH6DXX 10-15-20 M senior 6 el. Yagi	$175
204BA 20 M monoband 4 el. full size Yagi	$150
DB 10-15 10-15 M 3 el. Yagi ideal for use over 204 BA	$110
Magnetic base mobile whip 108 MHz up with 18' RG-58U cable and coax plug	$18

CDR ANTENNA ROTATORS

AR-20, smallest model only for 2m beams	$35
AR-22R for stacked 2 & 6m or small HF beams	$45
Ham II with re-designed control box, now with separate brake-control	$135

All for 230 V AC with indicator-control units.

BARLOW-WADLEY RECEIVERS

Model XCR-30 Mk II 500 kHz to 31 MHz continuous coverage, crystal controlled reception of AM/USB/LSB/CW	$225

NOISE BRIDGES

Omega TE 01 up to 100MHz	$25

POWER OUTPUT METERS

Galaxy RF-550A with 6 pos. coax switch	$75

SWR METERS

Midland twin meter type, 52 ohms	$20

BALUNS

New Japanese model, 52 or 75 Ohm 1 KW PEP	$10

MOBILE ANTENNA

Mark helicals 6 feet long	HW 40, 40 M.	$18
	HW 20, 20 M.	$16
	HW 80, 80 M.	$18
	high power KW 40, 40 M.	$25
	tri-band helical HW 3, 10/15/20 M.	$25

CUSH CRAFT ANTENNA PRODUCTS

DGPA 27-50 MHz ground plane	$25
AR-2 144 MHz Ringo	$20
LAC-2 lightning arrestors	$6

ELECTRONIC KEYERS

Katsumi model EK 105A 230V AC with paddle	$35

CRYSTAL FILTERS

9 MHz similar to the FT 200 ones, with carrier xtal	$30

POWER SUPPLIES

240 AC to 12V DC 3 to 3.5 Amps. regulated	$30

LOW PASS TVI FILTERS

Cut-off frequency 35 MHz 6 section filter	$18

MIDLAND

PTT dynamic microphone	$10

27 MHz NOVICE LICENSEE & CITIZEN-BAND EQUIPMENT

MIDLAND 5 W AM 23-channel transceivers complete with PTT mike all channel crystals 12 V DC op. **$95**
PONY 5 W CB-78 identical to Midland 5 W transceivers, **$95;** CB-74 5 W AM with 27.880 xtals, fishermen **$80**
SIDEBAND BRAND NC-310 one Watt hand-held transceivers **$50;** SE-501 SSB/AM 15 W PEP SSB 23-channel transceivers, complete with PTT mike etc. 12V DC **$175**

144 MHz TWO METRE EQUIPMENT

MULTI-7 solid state 24 channel FM 12V DC transceivers, 1 and 10W output, receiver with FET rf stage and mixer, equipped with crystals for TEN Australian channels Nos. 40, 42, 44, 46, 48, 50, 54, 56, 58, 60, to be used either transceive or combinations repeaters and ANTI-repeaters, complete with PTT microphone, mounting bracket **$225**

KEN PRODUCTS KP-202 hand-held 2 W output transceivers, now with 4 Australian channels, 40 & 50 plus a choice of 2 repeaters 42/54, 44/56, 46/58, 48/60 **$150;** KCP-2 battery charger and 10 NICAD batteries **$35** Leather case for KP-202 **$5;** Extra crystals for KP-202, two crystals per channel **$8**

KLM ELECTRONICS solid state 12V DC 2 M. amplifier, 12 Watt output, automatic antenna change-over when driven, ideal for mobile use with the KEN KP-202 **$50.**

BELCOM LINER 2 SSB 20 Watt PEP SSB 12V DC solid state transceivers **$250.**

YAGI ANTENNAS 9 element 10 ft boom with gamma-match coax feed **$30.**

at which a radiation measurement is made depends on the average distance between the source and the receiving antenna. For TV local oscillators that may radiate through the antenna of the set, a distance of 3m was chosen, for measurement of car ignition noise a distance of 10m, and for measurement of ISM apparatus a distance of 30m.

The coupling factor between sources of interference and receiver aerials has been measured for many years and additional investigations are carried out all the time to achieve clear definitions on a standardised basis. The immunity of TV receivers to external (signals entering via the aerial) and internal (e.g. signals entering via the chassis, etc.) forms of interference benefited from work being done over many years in various countries. Much effort is devoted to the definitions of limits for interference of various kinds and as the article stated "a more pragmatic approach was used. One sees the number of complaints and one tries a method of suppression that seems economically justifiable".

The method by which CISPR works is to start by agreeing that suppression of the interference caused by certain sources is desirable. This leads to a study question. Work on this question is taken in hand in several National Committees and by Working Groups consisting of experts in the field. The study should lead to a Recommendation (or sometimes to a Report). The CISPR then asks its member bodies (amongst which are the National Committees of the IEC) to see to it that these Recommendations are used in national legislations and international agreements. The CCIR has recommended all Administrations to follow the methods of measurement and limits of CISPR in their legislation, where possible.

The purpose of CISPR, so states the article, is the abatement of interference and thus better reception possibilities, among others for television, **can only be reached through legislation.** Many countries have already taken steps in this direction and it is hoped that others will folow, for the benefit of all TV viewers and listeners.

So much for a part review of one aspect of international work going on all the time. To return now to Australia we must examine how the various international recommendations are put into operation for local application. It should be noted that the APO is a member of the ITU quite apart from having a voice on various other co-related international organisations. The IARU has observer status at ITU Conferences but otherwise operates mainly through member Societies dealing direct with their local Administrations in a cohesive fashion.

If you read the preface to AS 1044-1973 issued by the Standards Association of Australia (SAA) relating to Limits of Electromagnetic Interference, you would note "the limits and methods of measurement specified are as far as possible, in accordance with the recommendations of the CISPR" — "Account was also taken of BS (British Standard) 800", etc.

SAA Council appoints a number of specialist Committees to examine and report upon the work to be undertaken, be it in the fields of electronics, building materials and so on. The SAA's Telecommunications and Electronics Committee TE/3, dealt with standards such as the one mentioned above which relates to electrical appliances and equipment, AS 1053-1973 relating to Radio Interference Limits and Measurements for Television and Radio Receivers, and AS 1054-73 for semi-conductor control devices, etc.

This particular Committee TE/3 comprised representatives from a wide range of interested parties including the PMG's Dept., IREE, DCA, Dept. of Supply, ABCB, Associated Chambers of Manufacturers, Elec. Supply Assoc., Electronics Assoc., etc. It follows therefore that any special local requirements would receive discussion in the light of a range of international documents including standards adopted in various other overseas countries. Whenever a new standard is recommended or an existing standard is to be revised the SAA publishes it in draft form for public review and comments are sought from the public within a specified period. When a standard is published it is there for adoption by those concerned. Anyone not complying with any particular standard relating, for example, to a product which he manufactures or imports, could find his product unacceptable for a wide range of applications. Few would be willing to take this risk knowingly.

Mr. Myles Wright in his opening address for the 1973 RD Contest (published on p.21 of AR for Oct. '73) drew attention to TVI particularly relating to colour TV and spoke about the development of good housekeeping methods to keep our pollution within our own backyards. The projected and anticipated incorporation of relevant SAA standards into legislation has already received considerable attention by the WIA. Members are quite likely to find themselves placed in awkward situations particularly in metropolitan and marginal reception areas when colour TV comes into general use. A member's TVI problem is most unlikely to be unique, but even if it is, the member concerned should feel that some technical and similar advice ought to be readily and timely available to him.

For this very purpose the Executive, in concurrence by Federal Council, has taken steps to set up an E.M.C. (Electro-magnetic Compatibility) Committee on a Central basis to render expert technical advice to Divisional Interference Committees which it is hoped will be appointed in each Division, to liaise with them and generally to give advice in technical and other areas to the Executive relative to EMC. Mr. Peter Williams VK3IZ, has been asked, in his stand-in role of EMC Co-ordinator, to set up the Central EMC Committee with the concurrence of the WIA Victorian Division where the services of some members of the Committee would derive.

The PMG Handbook Sub-Committee of the Executive has also been looking at the interference problem in relation to the revision of the Handbook and, ipso facto, the possibilities of submissions which might be necessary in relation to any consequential revision of the Wireless Telegraphy Regulations.

Probably the EMC part of interference is likely to respond to intelligent treatment under suitable conditions. Unfortunately the human element could, and does, pose a far more difficult problem to resolve.

In any community there is a percentage of people blessed with a super-abundance of leisure with characters which delight in creating difficulties where none should exist.

If your own transmissions cause no interference with your own TV, radio, etc., this is likely to goad a complainant of the kind described into greater efforts to embarrass you. This is most likely to occur if, unluckily, your initial response to any complaint might not measure up to his expectations. The more you attempt to find a solution the more will your efforts be suspect. And so the thing snowballs into an 'issue' and the big 'squeeze' could begin. Hints of court action maybe. Letters to the Minister or to Parliamentarians. Perhaps other neighbours suddenly 'discover' that your tower and beam are an eyesore and must reduce the values of their properties.

Thoughts crowd in about 'social blackmail' and what does all this do to the public image of amateur radio?

Several local Town Councils in VK-land are notoriously known for the nearly impossible task of getting permission from them to erect a tower or mast for amateur operations. Some even go to the extent of finally approving a tower, but as soon as a beam is mounted on it ordering that the beam shall be removed because the authorisation for the tower did not include details of things to be mounted thereon.

The editorial in Short-Wave Magazine for April '74 illustrates one of these problems:

"It seems that a licensed amateur at Thurnscoe, Yorks was ordered by the local Dearne Valley Council — **ordered by his local Council, mark you** — to 'cease operating on the grounds of amenity and nuisance'. His neighbours had complained of TVI. And who, do you think, clamped down on this Council on his behalf? (None other but) the Post office who said that in the first place, the amateur concerned was **not** causing TVI and that anyway the Dearne Valley Council had no authority whatever to close down, by their diktat, a licensed amateur — who happens, incidentally, to be a 54-year-old confined to a wheel chair with multiple sclerosis". The editorial comment ended, "After all, one of the functions of your local 'Chief executive' (as they like nowadays to be called) is to empty your dustbin".

"Make sure your 'garbage bin' has no pollution in it to offend your neighbours" might be a suitable moral on which to conclude this short article. ●

MODIFICATIONS TO THE VINTEN MTR12 FOR OPERATION ON 52.525 MHz FM NET

R. H. Wales, VK3ACM
Samaria Roadside, Via Benalla, 3672

The Vinten MTR12 is a low band all valve unit, similar to the well known MTR13. It uses valves with greater filament current requirements, and so the overall current drain is slightly higher. However it is similar in design to the MTR13.

BASIC MODIFICATION DATA — RECEIVER
All the front end coils are close wound, enamelled wire, same gauge as original. All coils are 5/16 inch inside diameter.
Aerial coil — 13 turns, tap 2½ turns from cold end.
*RF stage plate coil — 13 turns.
*1st mixer grid coil — 13 turns.
Oscillator plate coil — 14 turns.
Oscillator screen coil — i.e. coil No. 140, add 15 pf to winding.
*Coupling between these coils to be the same as original.

CRYSTAL FREQUENCY —

$$Fx = \frac{Fc-2}{5}$$

Where Fx is crystal freq.
Fc is freq. of operation.

For 52.525 MHz the Rx crystal is 10.105 MHz.

BASIC MODIFICATION DATA — TRANSMITTER
Coil No. 137X — add 47 pf on each winding.
Coil No. 121 — add 15 pf on winding.
3/12 2nd doubler plate coil — add 15 pf.
3/12 final grid coil — add 10 pf.
3/12 plate coil (final) — replace with 10 turns 128 SWG wire, 1 inch inside dia. spaced 2 inches.
Aerial coupling link — should be 2 turns.

CRYSTAL FREQUENCY —

$$Fx = \frac{Fc}{24}$$

Where Fx is crystal freq.
Fc is freq. of operation

For 52.525 MHz the Tx crystal is 2.18854 MHz.

TUNING UP — RECEIVER
Plug in the Rx crystal, connect a high impedance meter (or VTVM) to TP1, set meter to 60 volt DC range. Adjust coil No. 140 for max. reading, making sure that crystal starts reliably, typical reading, 10 volts.

Connect meter to TP2 i.e. 1st Limiter, set meter to 300 uA range. Connect a sig. gen. to antenna socket and adjust C1, C4, C5, C14 and T2 (Coil No. 133) for max. limiter Ig. It may be necessary to use a transmitter on the frequency initially to get enough signal to tune up on.

Peak all cores and trimmers on weak signal. With a known accurate signal, connect a 25-0-25 uA meter to TP4 i.e. Discriminator and adjust crystal frequency with trimmer to give zero meter reading.

The above assumes that the 2nd IF is correctly lined up; this must be done first (refer AR March '74, page 13).

TUNING UP — TRANSMITER
Plug in the Tx crystal, connect a high impedance meter to TP5 — Osc. Ig. set meter 60 volt DC range. If crystal is oscillating reading should be around 14 volts. Connect meter to TP6 — 1st trip Ig. set meter to 300 uA range, a typical reading here is 35 uA.

Note:
There are no adjustments on these two test points. Connect meter to TP7 — 2nd trip Ig. set meter to 1 mA range, peak coil No. 138 for max. typical reading 500 uA. Connect meter to TP8 — 1st doub Ig. set meter to 1 mA range, peak coil No. 137 for max. typical reading 350 uA. Connect meter to TP9 — 2nd doub Ig. set meter to 6mA range, peak coil No. 121 for max. typical reading 1.2 mA. Connect meter to TP10 — final Ig. set meter to 6 mA range peak trimmers for max. typical reading 2.3 mA.

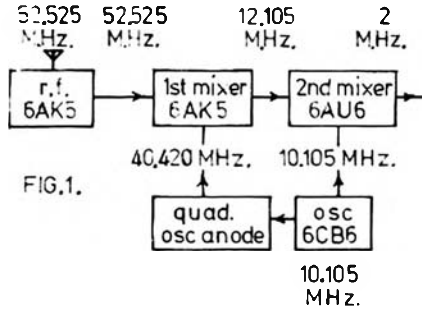


FIG.1.

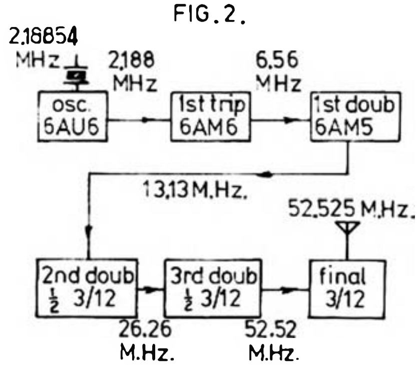


FIG.2.

Adjust final tuning and coupling for **max RF power out.** The deviation can be set either by using a deviation meter or by getting an on-air report. A GDO is a big help in getting the Tx going.

This completes this article, the complete circuit diagram is too large to be reproduced here. The units are capable of good performance and like most Vinten equipment should give years of satisfactory performance, although they are a little "old" by todays "solid state standards". ●

MODIFICATIONS TO THE MTR15 FOR OPERATION ON 53.032 AM

The Vinten MTR15 is a low band AM unit, and as such for those interested it is an ideal unit for the 53.032 AM 6 mx net frequency. The unit normally has a separate power supply (transistor type). It also has a relay mute and noise limiter although in my quiet country location I removed both of these.

BASIC MODIFICATION DATA — RECEIVER
All the front end coils are close wound, enamelled wire, same gauge as original and all coils are 5/16 inch inside diameter.
Aerial coil — 11 turns, tap 2½ turns from cold end.
RF stage plate coil — 11 turns.
1st mixer grid coil — 11 turns, tap 7 turns from cold end.
Oscillator plate coil — 13 turns, add 10 pf across trimmer.
Oscillator screen coil No. 111 — rewind with 45 turns same gauge wire as original, add 25 pF across coil, making a total of 40 pf.
1st IF transformers (coils No. 118) — rewind each winding with 20 turns of approx. 28-30 SWG wire, space coils as original. Remove any external capacitors.

The main IF is 435 kHz, this could be easily returned to 455 kHz if desired, however the crystal frequency would be slightly different.

CRYSTAL FREQUENCY —

$$Fx = \frac{Fc - 435}{5}$$

Where Fx is crystal freq.
Fc is carrier freq.

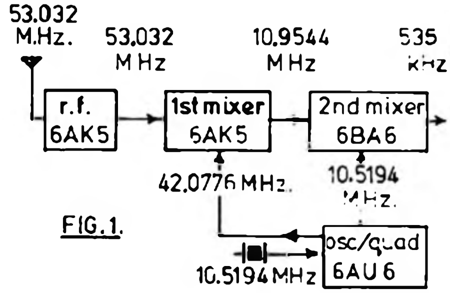


FIG.1.

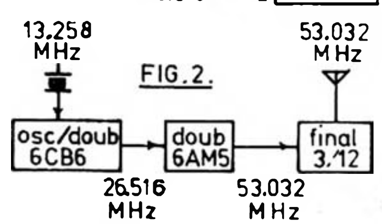


FIG.2.

●

For 53.032 MHz the Rx crystal is 10.5194 MHz.

BASIC MODIFICATION DATA — TRANSMITTER

Oscillator coil No. 122 — remove 5 pf, replace with 25 pf.

Oscillator plate coil No. 121 — rewind with similar gauge wire, 26 turns, remove any tuning capacitance.

6AM5 plate coil — replace with 11 turns of same gauge wire, 5/16 inch inside diameter.

3/12 grid coil — replace with 11 turns of same gauge wire, tap at centre (6th turn) 5/16 inch inside diameter.

3/12 plate coil — replace with 15 turns, ½ inch inside diameter spaced 1-5/8 inch, approx. 14 gauge wire, tap at centre.

Output link — 3 turns of insulated wire.

CRYSTAL FREQUENCY —

$$Fx = \frac{Fc}{4}$$

Where Fx is crystal freq.
Fc is carrier freq.

For 53.032 MHz the Tx crystal is 13.258 MHz.

TUNING UP — RECEIVER

Plug in crystal, connect a **high impedance** meter (or VTVM) in socket opposite 2nd can of 1st IF, set to 60 volt DC range, adjust coil No. 111 for max. reading, making sure that crystal will start reliably. Connect meter to socket opposite last 2nd IF can (No. 124). Connect a sig. gen. to aerial and adjust trimmers for max. reading. It may be necessary to use a Tx on the freq. intially to get the Rx going. It is most important to use a high impedance meter at this point as you are in effect reading AGC voltage. Finally peak all trimmers and cores on weak signal.

Note:
The above assumes the 435 kHz IF is correctly lined up.

TUNING UP — TRANSMITTER

Plug in crystal, connect meter (set to 12 volt DC) to socket opposite 6CB6 oscillator, adjust coil No. 122 for max. making sure that crystal starts reliably. Connect meter to socket opposite coil 121, set to 500 uA range, adjust coil No. 121 for max. Connect meter to socket opposite 3/12, set to 500 uA range adjust the two trimmers — 6AM5 plate. 3/12 grid; for max. drive. Adjust final tuning and coupling for **max. RF power out consistent with good modulation.**

The socket near the mute relay is the 3/12 plate current; do not run in excess of about 90-100 mA. A GDO is very handy in setting unit up initially.

This article may seem a little outdated with the trend towards FM channels and SSB operation on 6 mx, but if you happen to have such a unit and are wondering what to do with it, then this article may be of some help. The unit performs quite well and will put out approx. 10 watts of unmodulated carrier.

There is still some activity on 53.032 at least during the DX season anyway, and a few amateurs in the country have this net frequency — around the North East anyway (where there is no channel 0 or 1 problem).

The complete circuit would take up too much space to be reproduced here. ●

The International Fox Tango Club

The above club was formed in January 1972 by Milton LOWENS, WA2AIQ, 3977-F Sedgwick Ave., Bronx, New York 10363.
Milton is also editor of the "FT Newsletter". The newsletter is published 10 times per year, and also includes information relating to other models as well.

The club consists of owners of Yaesu FT101 transceivers who have banded together to exchange ideas for their mutual benefit.

The club now has a membership of over 1000 amateurs in 33 countries.

In QST of February 1974, an excellent 'critique' of the FT101 B was published. On specific points, the QST story lists seven "Other Observations" or "faults" which can be discussed more objectively. Thereunder is the FT Newsletter's comment on these "observations" and which we consider most appropriate to be reprinted from their July-August 1974 issue.

"1. **RECEIVER CROSS MODULATES AND OVERLOADS** on strong local signals. (Built-in selectable 20-dB receiver pad helps reduce the problem.)

Comment: This is an old story. Many say that the FT-101B performance in this respect is better than the older models, but the fault may still be present to some degree. Judging from the number of letters received on this fault, it seems much diminished. The stories published in the Newsletter over the last three years also reflect diminished complaints.

2. **AGC CHARACTERISTICS** cause popping and clicking unless rf gain is turned back approximately one-third of the full amount.

Comment: This is a new one to me. No one has written about this, to me at least, and I have not noticed it in my own (older) rig. If it is a fault, who can come up with a 'fix'?

3. **LOUD TRANSIENT CLICK OCCURS IN HEADPHONES** when VOX drops out after transmit periods.

Comment: Yes, there has been some comment about this, particularly from South Africa, where Larry Henn, ZE1DP, did a long and fascinating study of the causes of what we call VOX POP. More recently Dave Johnson, W7HV found a cure in audio muting.

4. **WASTED BAND POSITION** results from inclusion of 27 MHz CB range.

Comment: Not everyone agrees that it is wasted; especially Europeans in countries where amateur operations on these frequencies is legal.

5. **MICROPHONE MUST BE DISCONNECTED DURING CW OPERATIONS** to prevent VOX from constantly cycling on and off.

Comment: Touche! This is true, and has been from the very beginning. And more amazing is the fact that it continues to the very latest models, even though the cure is quick and easy, and involves no extra parts or labour in manufacture! I estimate at least a half-dozen "cures" have been suggested in the Newsletter and the factory receives (and apparently reads) the Newsletter. For those who don't like to play with their circuit boards, still another idea using a mercury switch in the mike to 'cool' it when it is undesirably 'hot' appears in this issue.

6. **POWER SUPPLY HAS SUFFICIENT RIPPLE TO CAUSE A T8 CW NOTE.** (Shunting additional 100 mF of capacitance across power-supply filter output solved the problem.)

Comment: This is a rare one too, although one or two members did mention noting it. Its rarity may suggest that the cause may be other than inadequate filtering. Fred Bail, VK3YS, has found instances in which hum was caused by one of the diodes in the HV power supply bridge circuit opening up causing half-wave rectification (rather than full-wave). If you have the problem, better check.

7. **NOISE BLANKER INEFFECTIVE.** Three FT-101's were tested, and the blankers performed poorly even though adjusted in accordance with the instruction manual. Also, the blanker caused cross modulation to worsen when strong signals were present.

Comment: This is another puzzler because some members agree with the above while others say the noise blanker is great. Maybe the trouble is in the instruction manual rather than in the blanker. The manual says nothing about how the blanker circuitry can be aligned; and maybe it was out of alignment . . . even if this seems unlikely in all three sets tested.

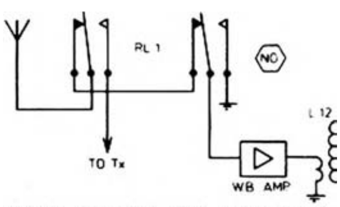
Of course, the purpose of the QST article was to report its findings rather than to seek cures of any faults noted, even though it did suggest one in 6 above. However, since the Newsletter serves mostly those who have already purchased the set, its emphasis has been, is, and will continue to be on means and methods to reduce weaknesses when discovered, and to increase the many strengths of the FT-101."

Any readers of AR requiring information of membership, fees etc., are invited to write to Milton at the address appearing in the first paragraph of this article. ●

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

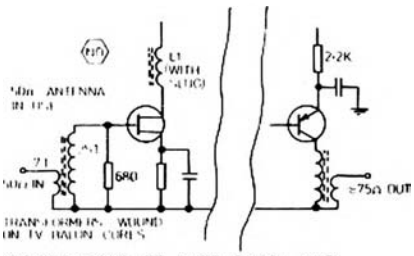
It had to be only a matter of time before we got back to the FT200. The prompt came from Frank Beadle VK6FW. Luckily for us (not for Frank) he found time to play around with his 200 while recovering from an injured back. Readers will no doubt remember the wide band amplifier for the FTDX400 described by Kerrie Adams VK5SU in AR for November 1973. Many were disappointed when they discovered that this unit could not be used with the FT200. With a few simple modifications Frank has overcome this, but I think I will let him tell the story.



WIRING POSITION FOR WIDE-BAND AMP IN THE FT200

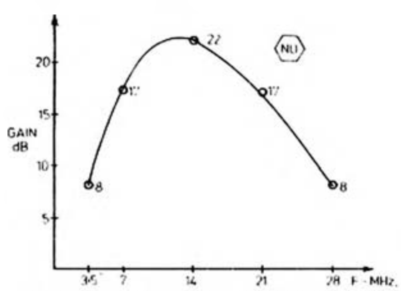
'First, the alignment of the receiver was touched up according to the handbook and the modification to C165 in the detector was incorporated making C165 variable for optimum detector injection. Then the S meter was adjusted for zero and sensitivity (50 uv for S9) using a Marconi Generator type 775.

The interesting result was the confirmation of the previous suspicion that each S point does not give a result for 6dB signal change (far from it). Then another modification was incorporated, the inclusion of the Wide Band Pre-Amp as described in AR for November 1973. This pre-amp was modified in that the input and output were wide band transformer coupled, and it was wired in series with aerial feed from the antenna relay and the input winding of L12. This has two main advantages: (1) You do not need or have to adjust the input capacity as described in the Wide Band Amp article. (2) High level signals (transmit) from the plate of the 12BY7A driver do not get to the input of the amp — so it does not get any high level clouts. It will be noted that my pre-amp has considerably more mid-band (7 to 21 MHz) gain than the one described. This may be due to the fact that I also added a Neosid slug to L1 in the pre-amp or perhaps due to the input output transformers.



MODIFICATIONS TO WIDE-BAND AMP.

The tables give the plotted results but some comment is necessary. First, some slight discrepancies in the tabulated results are apparent. This was obvious during the measurements as the filter in the receiver has a fair amount of ripple and caused some variations. Also it is easy to be 2 dB out reading the S meter. Secondly, it appears that there is some non-linearity in the receiver as the input frequency increases, why I don't know.



APPROX FREQUENCY RESPONSE OF THE MODIFIED WIDE BAND AMP.

However, the results I found interesting, particularly the compression of the S meter scale at the low end. Unfortunately I did not plot the S meter response without the pre-amp before I returned the signal generator to its owner.

PLOT OF "S" METER (Wide Band Amp. in Circuit) f = 3.6 MHz. Constant f (MHz)

Meter Reading	S1	S2	S3	S4	S5	S6	S7	S8	S9	S9 +10	S9 +20	S9 +30	S9 +40	S9 +50	S9 +60
Signal Input	2.5 uV	3.5 uV	4.5 uV	6 uV	8 uV	10 uV	12 uV	16 uV	22 uV	40 uV	80 uV	200 uV	500 uV	1.6 mV	4.0 mV

"S" METER INDICATION (Variation of f MHz and Signal Input)

Note — S meter does not give 6 dB / S paint.

*This would indicate 12 dB gain at 28 MHz, hence remarks re filter ripple and S meter.

Frequency (MHz)	Without Wide-Band Amp Constant 50 uV In	Input for S9	With Wide-Band Amp Constant 50 uV In	Input for S9
3.5	S9	50 uV	S9 + 14 dB	20 uV
7.1	S9 + 2 dB	40 uV	S9 + 30 dB	6.3 uV
14.2	S9	50 uV	S9 + 31 dB	4.0 uV
21.35	S9 + 6 dB	28 uV	S9 + 25 dB	6.3 uV
28.7	S8	80 uV	S9 + 12 dB	20.0 uV*

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

A SHORT CIRCUIT FROM ZERO BEAT

Due to illness and pressure of work I have not had time to do much in the way of preparation for this months issue so have brought to the fore a technical hint from the **Short Circuits** section of the **YRCS** magazine **Zero Beat** for April 69. The headphones mentioned in the article should be high impedance, even some of the small Japanese crystal earpieces could be suitable.

"For our younger members who may have not yet advanced to sophisticated test equipment other than a multi-meter you may like to try this. If you want to check for lost audio in a receiver circuit obtain a pair of headphones, a small value high voltage paper capacitor (or mica), diode and some alligator clips. Connect one lead of phones to the chassis, the other to a pigtail of the capacitor. Using the other pigtail as a probe you can now check for audio in the audio amplifier section. If you suspect the receiver detector or want to check the RF section clip the diode between the chassis and lead and check control grids and at appropriate components. But, don't forget that capacitor to isolate DC."

For further information on a simple RF detector probe I would suggest re-reading June and September 73 **Newcomers Notebook.** Like Eric Jamieson, I have problems doing study and keeping up with other activities, so the size of **Newcomers Notebook** will be restricted probably for many months to come. Next month some more short circuits.

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN June 1974
Ideas for Building Transceivers; Galbraith Counter; Electronic A.R.T.

CQ May 1974
Serrana Bank Snafu; The RME Success Story; Another Approach to Lightweight Yagi Construction; Determining Resonant Lengths of Transmission Lines; Cop's Column, (Now it is ISB SSTV on one and voice on the other).

HAM RADIO May 1974
Log-Periodic for 15 and 20; Parabolic Antenna Design; Antennas and Satellite Communications; Antenna Ground Systems; Antenna Measurements; Three Band DX Vertical; 160 Metre Receiving Antenna; 5/8-Wavelength VHF Antennas; Antenna Tuner; Vertical Radiation Patterns; Pi Network Design.

June 1974
Cosmos Electronic Keyer; Better Receiver Design; Function Generator; Coherent FSK RTTY; 2 m Preamplifier; Optimum Height for Horizontal Antennas; Local Oscillator Waveform Effects; Understanding Spectrum Analysers; Private Line for the Heathkit HW-202; Dipole Beams.

RADIO COMMUNICATION June 1974
Some Interesting Uses for TAA661 Integrated Circuits; The Heathkit HW202 2 m FM Transceiver (Review); Some Thoughts on True Break-in for CW and SSB; Building Blocks for the Novice.

TELECOMMAND AND TELEMETRY OF THE OSCAR 6 AND 7 COMMUNICATIONS SATELLITES PART 1

DAVID HULL, VK3ZDH
Project Australis

The advent of long life amateur communication satellites with the launch of Oscar 6 in October, 1972, brought to the amateur service for the first time the problems of housekeeping on active space satellites. Added to the inherent problems was a technical fault in Oscar 6 which manifested itself soon after launch. This fault tended to reverse the satellite battery charge condition at each terminator, i.e. each day to night transition and vice versa.

INTRODUCTION
Oscar 6 was not designed for continuous operation. The mandatory battery charge periods therefore made it imperative that orbit by orbit observation and command be carried out if the satellite was to achieve its design life for 12 months. That the satellite was still functioning well 18 months after launch is due to the success of the housekeeping efforts of the world wide command stations and to the successful operation of the Australian designed and built command system. This article deals with this system and with the evolution of the two automated command systems in Canada and Australia that now carry the responsibility for the command of Oscar 6 and will continue to do so with Oscar 7. In addition the telemetry system of the two satellites which were partly designed and built in Australia will be discussed.

When Oscar 6 was launched it was intended that a small number of stations in the USA, Australia and Europe would be fitted with command capability to enable the satellite transponder and beacons to be switched off periodically for battery charging, etc. However, the above mentioned fault which showed up on the first few orbits showed a need for either a vastly increased number of command stations with attendant scheduling problems, or for an automatic system whereby preloaded commands could be sent at prescribed times and prescribed antenna settings. The initial chain of manual command stations in Region 3, one in New Zealand, two in Victoria and one in Western Australia, operated satisfactorily for two to three months, but due to pressure of work and inconvenient orbit times (i.e. 0500 in Eastern Australia) a number of orbits were missed entirely.

This showed in erratic voltage changes of the satellite battery, sometimes overcharged, sometimes undercharged. Operation of the intended US command station at the radio club station at Talcott Mountain was unsatisfactory also and this compounded the problem. Automation was the only obvious answer and crash design programmes commenced simultaneously in Canada and Australia in early 1973. These programmes were carried out independently and largely without knowledge of each other. Both systems were tailored to what was locally available, and differ greatly as a result. Both were private individual projects financed and built by one person.

THE SPACECRAFT COMMAND SYSTEM — OSCAR 6
The command system uses audio frequency tones, digitally encoded, transmitted to the satellite over a frequency modulated link. The appropriate command frequency is, after being demodulated, fed to the command decoder. Frequency modulation of sufficient deviation is used to nullify the effects of doppler shift on the received signal and to provide demodulated audio tones of constant frequency. An enable tone sets the decoder and this is followed by a 3 of 7 bit code transmitted serially by two other tones. 21 command functions are available for Oscar 6.

Control can be exercised over the 2-10 m repeater, the 435.1 MHz beacon, the repeater receiver AGC, the selection of morse code telemetry or an internal static shift register memory as readout to the beacons, speed of morse code telemetry, the spacecraft internal clock and the shift register load controls. Several redundant commands are provided and a redundant command encoder selected by one substitution is provided in the event of a command malfunction. This has not been necessary so far. The 896 bit static shift register memory is also loaded by tone selection on the command frequency.

Because of the receiving system used on Oscar 6 considerably greater power is required of the command transmitter than is necessary to operate through the repeater. This, combined with the use of the tone enable system and a special command frequency, has so far ensured security of the command operation.

AUTOCOMMAND — 1. The Canadian System
The Canadian autocommand system built by Larry Kayser VE3QB and subsequently duplicated by Randy Smith VE2BYG was much more a result of evolution than was the Australian system which was designed as a package and built as such. Initially in Canada magnetic tape recorder loops were made of the appropriate OFF and ON commands. A thirty-second timer and a little logic circuitry provided a basic remote control circuit that was connected to the home telephone ringing circuit, so that simply by telephoning home, the transmitter and tape recorder were activated for thirty seconds of ON or OFF commands.

For the next few weeks, it was not uncommon to see Larry dash for a telephone, dial a number, and hang up. This went on several times in a ten-minute period for each pass. Unfortunately, it was still impossible to cover all orbits this way, and occasionally, important orbits were missed when a telephone was not available. Fully unattended automation was certainly more desirable.

Since computer control was anticipated, a time interval of 2½ minutes was selected to be used as an interval between commands, partly based on pointing considerations for the antennas used and also based on the number of characters per printed line of the time-share computer available. A countdown circuit was made up from a 4 MHz clock source whose output was counted down to provide a pulse each 150 seconds which was used to increment an eight-level ASCII paper tape reader that was available. This reader was connected to the original 30-second timer, spare contacts were used to switch the antennas, and thus emerged the so-called Half-SMART concept (System Multiplexing Amateur Radio Telecommands).

The next step was to construct a full Australis digital command encoder unit and tie this into the tape reader to provide full, programmable digital control of the commands to be sent. This was badly needed because of the severe wear-and-tear the tape recorders were experiencing up until this time.

At this point, things were getting better, but a multiple command capability was needed to provide for execution of more than simple ON or OFF commands. In addition, it was desirable to have the capability of selecting between several antennas and to be able to alter the satellite operating schedule to permit special experiments to be conducted on certain orbits. With the assistance of Gregg Hoppenstall, VE3GIH, digital integrated circuits were used to accomplish this.

The basic ASCII code, represents alpha-numeric symbols as combinations of eight binary bits on paper tape. For the auto-command application, three types of control symbols were used:

1. A "wait" pulse given at 2½ minute intervals.
2. A "Command" pulse sent at 2, 4, 8 or 16-second intervals.
3. A "rub-out" or "disregard" pulse.

The "wait" pulse was sent whenever a carriage return, line feed or space was executed. The "command" pulse was sent when a valid command was to be read on the tape. The "rub-out" pulses were used to ignore errors that occur in the preparation of the command paper tape. In the present case, the paper tape contained sporadic errors which were a by-product of the time-share computer used for the tape's preparation.

The various other symbols on the tape were used to programme the command encoder, key the transmitter and select the proper antenna.

Eight of Oscar 6's 21 command functions were selected as having higher priority for automatic generation. Those include:

1 Two-to-ten metre repeater ON
2 Two-to-ten metre repeater OFF
4 435.1 MHz beacon OFF
7 Morse code telemetry at 20 WPM
9 Two-to-ten metre repeater AGC ON
15 Enable spacecraft clock
17 Reset spacecraft clock

On a normal satellite ON day, commands, 1, 4, 7, 9, 15 and 17 would be sent, while on a regular OFF day, commands 2, 4 and 9 were transmitted.

The eight selected commands were represented as binary combinations of bit positions 1, 2 and 3 on the ASCII tape. Bits 4 and 6 were used to select one of four antennas, and bit 5 was used to activate the command transmitter.

(To be continued)

QSP

PROJECT SANGUINE: DX on 45 Hz
Yes, 45 Hz, says Pat Hawker G3VA in TT, Radio Communication July '74. The Massachusetts Inst. of Tech. in their Project Sanguine, he quotes, used two relatively "short" orthogonal crossed dipoles, each a mere 22.5 km long and with the ends grounded and have been putting decodable signals into Norway, Malta, Taipan and Hawaii on 45 Hz and 75 Hz. He goes on to comment that you cannot expect to modulate an elf signal with speech or even normal speed CW — the speed used was about 0.03 bits/s. I do not think anyone, he says, has got round to DC waves or negative "antiwaves" that might give us a whole new spectrum!

RECIPROCAL LICENSING — NEW ZEALAND
The NZART 1974 Call Book in a short "guide for overseas amateurs to obtain a New Zealand licence" advises that holders of **certificates** issued by VK, VE, G, EI, Cook & Niue Islands can be granted a licence by their PMG Dept. on payment of fee. The appropriate licence which would be issued is stated as —

(a) Grade III (i.e. VHF bands AM & FM) for those with less than 12 wpm morse.
(b) Grade II (i.e. 160, 80 and 6 m bands up) for those possessing 12 wpm but no evidence of operator experience.
(c) Grade I (i.e. full privileges all bands) for those with 12 wpm and proven experience.

The NZ exam could be taken in the usual way by those who wish to up-grade their licence. So if you hold a VK 10 wpm morse proficiency certificate beware when contemplating a trip to ZL-land.

ACE Awards

with Alex Slight, VK2ZA

Featured on the cover of AR for February of this year was the CHC Chapter 66 ACE 125 Award, with the caption 'who would be the first to win the same'.

The first ACE 125 Award was presented to Jack Evans VK2CX at the May meeting of the N.S.W. Division by Tony Mulcahy. The gent on the left of Jack is Alex Slight VK2ZA, President CHC Chapter 66.

Up to the present, four ACE 125 Awards have been awarded. They are No. 1 VK2CX, No. 2 VK2ZA, No. 3 VK4LZ, and No. 4 went to a SWL, Charles Thorpe, who also holds the Basic ACE No. 6.

In Charles' case this is no mean feat for a SWL, but it brings to light two very important points. Firstly, as a CHC SWL he apparently does the right thing. That is he includes a SASE with his own QSL card. Secondly, that the VK amateurs have done the right thing under these circumstances and have assisted him by return QSL confirmation.

Twenty-nine basic ACE Awards have been awarded. Ten of the awards have gone to New Zealand where it is tremendously popular. Almost any night you can find a net looking for Australian Electorates around 3.690-3.695 MHz, and generally hosted by George ZL4JP. If you are looking for information or a rare ZL County, this is a good spot to look.

This also brings up another very important point, one which may well be overlooked by the VK boys; under ZL regulations there are many very active amateurs who can at present operate only on the 60 metre band. Many of these fellows are indeed most enthusiastic types but, being restricted to 80 metres, do not have the same opportunity to contact VK5 and particularly VK6 amateurs as do the other ZLs on 40 and 20 metres.

On their behalf we appeal to VK5s and VK6s to come up on 80 metres now and again, and give the ZL chaps at least a chance to try. It is realised that there is a four hour difference between WA and New Zealand but, during the winter time, 7 pm Western Australia is still only 11 pm in New Zealand. If they think there is the slightest chance they will be there trying.

It is suggested that a letter, some two weeks ahead of proposed 80 metre operation, be sent to ZL4JP by Air Mail. You can be sure he will see that it gets plenty of publicity; or you could ask some of the ZL boys on 40 or 20 to QSP to ZL4JP.

It is hoped that many more local and overseas fellows will receive the award, and congratulations go to the others who have already made the grade.

BELOW: Jack Evans VK2CX holds the first ACE 125 Award just presented to him by Tony Mulcahy at the May meeting of the VK2 Division. Looking on at the left is Alex VK2ZA.

REMEMBRANCE DAY CONTEST ADDRESS

By
SENATOR R. BISHOP, Postmaster-General

I am honoured to be invited by the Wireless Institute of Australia to open its 27th Remembrance Day Contest.

This contest is primarily a memorial to the 35 amateur wireless operators who gave their lives in World War II however, it also serves as an advanced training exercise in the important field of radiocommunication.

Amateur Radio, today, is highly skilled activity and provides a reservoir of competent operators, who are internationally recognised, who relieve the stresses from Government services in times of emergency and who do much to promote better understanding between the peoples of Australia and other countries.

Looking beyond the next decade the alliance of computers and communications networks in conjunction with new technologies will provide the capabilities for a wide range of new services. The demand for mobile services of all kinds is likely to increase markedly.

Vast increases can be foreseen in the volume of information conveyed by transmission media, both guided and radiated.

New guided media, for example, optical fibres, could become the main conveyors of point to point transmission; radio being used predominantly for communication with moving objects.

It is likely that there will be great demand in the future for mobile telephone systems. Micro-miniaturisation and digital techniques could make pocket telephones a reality if a suitable and adequate spectrum can be found.

New techniques will be developed to exploit the upper reaches of the spectrum — perhaps higher capacity satellites.

Domestic satellite systems may eventually be expected to provide services for entertainment, education and welfare, and to give outback centres full access to National Telecommunications facilities.

Notwithstanding the rapid progress and specialisation of the electronic art, the amateur is keeping his equipment up-to-date, operating to international standards and himself ready and able to meet any emergency.

This contest, which I now declare open, is an exercise in skill, speed, efficiency and improvisation in simulating for 24 hours, an emergency communication network. It will demonstrate the valuable and specialised service that radio operators give unstintingly without expecting tangible reward.

I wish it every success. ●

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VK0	VK0RSA, Macquarie Island x	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.002
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville x	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.301
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
JA	JA1IGY, Tokyo, Japan	52.500
3D	3D3AA, Suva, Fiji x	52.500
ZL1	ZL1VHF, Auckland	145.100
ZL1	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

x denotes change or addition.

On the subject of beacons I was rather perturbed to note the current listings for the Region 3 (including VK) beacons in the 1974 copy of the New Zealand Call Book which has just come to hand. The list is quite out of date, being taken from the January 1972 issue of "Amateur Radio", and DX-ers in both VK and ZL are warned to observe the above listing which is as correct as I can make it at the time of going to press. An airmail letter has been forwarded to the NZART giving a list of current beacons and frequencies in the hope a correction can be printed in "Break-in" in time for the coming summer DX season.

Further on the matter of beacons, your attention is drawn to the revised call sign of the Macquarie Island beacon. Talking to Keith, VK0MX at Casey on 20 metres recently, I was informed that VK0GR, the Casey 6 metre beacon on 53.200 MHz, is currently running 24 hours a day, using MCW to a 3 element yagi beamed on Australia, and 100 watts output. A recent tune-up of the beacon indicates it is still running well. Keith mentioned that probably the beacon on Mawson, VK0MA was also running well, also with 100 watts of MCW.

The Townsville beacon has changed call sign to VK4RTL; no news of any other current changes.

A contact with Eugene 3D2AZ of Suva, Fiji, on 20 metres recently also revealed the presence of an active beacon there, using the call sign 3D3AA on 52.500 MHz, running 24 hours a day with 50 watts from a 6146. At present the beacon is beamed to Honolulu for TEP checks, but it is hoped soon to increase the power to 250 watts and to employ a switchable antenna, possibly of the omni-directional type. Originally this beacon was used for TEP schedules between Fiji and Guam, but now the interest is centred on Hawaii. 3D2CM is custodian of the project beacon.

Eugene mentioned he was rather a lonely operator, despite being only 1½ miles from the beacon. He operates an FTV650 transverter to an FT101, using a 5 element yagi up 60 feet. He is able to operate 50 to 54 MHz, and keen to operate into VK, and will be watching 52.050 now that he has been informed of our listening frequency. He has had one 6 metre contact, that with ZL1IQ in March 1974 when his antenna was only two feet off the roof!! Heard the VK2WI beacon on one occasion, signals rising to S7, despite many calls on both 6 and 20 metres could not raise an interested soul — took quite a long time for his fingernails to grow to full length again! So there you eastern staters — look what you missed simply because you don't keep your ears on the band. Once again the words of Rod VK2ZQJ "Six metres never really closes, only the operators go to sleep". Incidentally, where were you, Rod?

THE COMING DX

Yes, its coming all right, and before long too. Both 6 and 2 metres will be really worth watching this year, and judging by reports received in various contacts of late, plenty of people are getting geared up for the DX. Ross VK4RO in Ayr, North Queensland, mentions quite a bit of interest in 2 metres in the north; amateurs in Mackay are getting geared up with 2 metres SSB or high power AM, Ron VK4EN using 4 x 10 el. yagis. Ross 4RO has an FT220 on order.

Over in Ceduna on the west coast of SA, Kerry VK5SU advises he is as keen as ever on 6 and 2 metres, also in the same camp is Noel VK5EI who is getting ready for 6m DX and building a 4 el beam. He also has a FTDX560 and FTV650, a 4 el 2m beam etc. etc. Also, Noel is very interested in 432 MHz ATV. He has a 432 Tx under construction, and hopes it will be ready by the end of the year, and will hopefully be looking for some ATV contacts with Adelaide then. He is keen to try FM on 2 metres to Adelaide as well, so remember the West you Adelaide boys. Kerry also mentions some linears for 2m being built in VK6, so looks like some good signals will be around this year. Bob VK5MM has started the ball rolling by working into VK2 and VK7 on meteor scatter during the Remembrance Day Contest; that's scoring the hard way!

SPECIAL

144 MHz opened up in Adelaide on 30th August. After many months of calling I worked three stations in Adelaide on 2 metres, VK5ZK, VK5ZPS and VK5QR, distance 25 miles!! Boy. Was I pleased to know my gear was still working!

REMEMBRANCE DAY CONTEST

Certainly a wonderfully satisfying contest to join in. I never heard one cross word on any bands HF and VHF during the contest, even several strong and broad HF Interstaters were tolerated — surely these chaps with the audio gain they were using, would have been running close to 1 kW PEP input! Seemed like it anyway. VHF participation was again excellent, and the bedlam on the FM nets had to be heard to be believed, and full credit to those operators who amassed good scores from amongst the mess. Providing everyone co-operates and sends in their log there should be some very interesting results.

PORTABLE OPERATION

No information this month from anyone contemplating some portable operation over the Christmas/New Year break. Possibly my words last month might get a few stirring soon, but don't leave it too late to start getting the gear in order. I have selected two likely sites for my proposed portable operation, both of which have probably not been used before. Have yet to decide which one I will use. Several factors have to be taken into account, and it is hoped that by next issue the selected site will be known and passed on to readers and likely operators.

There seems little else to report for now, so will close with the thought for the month: "Marriage is an institution that turns a night owl into a homing pigeon".

The Voice in the Hills.

Intruder Watch
with Alf Chandler VK3LC

15... ... Street, Glen Iris, 3146

Further to my previous report regarding the identification of Red China stations intruding in our bands, the following signs used by them may be useful to Observers. The procedures used are slightly different in some ways to our own and can be identified by characteristic two and three letter signs analogous to our Q signals.

V — used to precede a call up and before the next call, e.g. — V ABC de XYZ V ABC de XYZ HJ K.
R — groups of these are used to "break in".
S — or a slow E E E indicates QRM.
W — used after a number, like 24W used to request repeat of numbered group.
CF and DB (not known to me as yet).
DE — This is used to request to identify.
HJ — commonly used, particularly in morse for "How do you hear me?". Also used in RTTY.
GP, QC, QK, TH (not known by me as yet).
TY — possibly like QRV, QRX or QSL. Also found in RTTY.
XH — followed by a number indicates QTC and number of messages on hand.
YH, YN, YR (not known as yet).
ZL — seen in RTTY.
ZBT — may be common operator's signal.
TBO — CQ for weather broadcast.
TBD, HGR, SQV (not known as yet).
PJS — Time zone.
KC is used instead of kHz.

Note the frequent use of 4 digit groups, also 4 letter groups. I guess that these are simple look-up numbers for the 10,000 Chinese characters and the letters are an encryption of them. The following extract from a letter received from Fred Laun may be also of interest to Observers —

"I happened to catch two tactical stations working each other and broke into their net in order to see what would happen. This was done by carefully zero beating one of the stations and sending groups identical to theirs. The sequence of their operations leads me to the following tentative description of their communication procedure and is quite uniform for all stations that have distinctive "two-tone" chirp as well as a great many others who exhibit varying degrees of signal quality. The one common feature of the signals is the hand-keyed sending. First the call-up procedure — "V WTL9 de Y85D HJ".

Second, after the stations have established contact, the term "XH" plus a number seems to indicate "QTC". Sometimes "TY" is used, and seems to be used when a station appears to have received a part of a message ok.

The manner of operation is full break-in, and should a station miss a group, he will send a series of rapid "R R R R" until he breaks the transmitting station. When the receiving station succeeds in breaking the transmitting station he asks for fills as follows — "24W" etc. The transmitter then repeats the group and makes a short pause, then continues. Should persistent interference be encountered the station encountering the QRM signals the other one by a slow "S" or "E E E". Should the interfering station sound like one of theirs they will then send "DE" which is a request for the station to identify itself.

A response using a home made tactical call such as theirs was made. This was answered by a request for me to wait ("AS" sent just as we would) and when the calling was persisted in, breaking their communication, they lapsed back into the "E E E" business and began to take evasive action, moving up and down the band without any apparent co-ordination, as though such evasive action is prescribed automatically as part of their procedure. When I persisted in following them they went QRX, returning in three to five minutes".

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.

P.O. Box 87,
Bundoora, Vic. 3083

The Editor,
Dear Sir,

I refer to QSP on page 3 of August AR regarding intruders in the amateur bands.

With respect to VK3ZA it appears that he has hit the panic button over the recent distribution of pamphlets which urge the Australian Government to create a Citizens Band.

It is perfectly obvious that the Postmaster-General's Department is not going to be caught up with the 11 metre caper; however, if VK3ZA would care to look up the first article in a series on radio piracy by Roger Harrison (VK2ZTB) in the January, 1974 edition of Electronics International Today, he may possible take heart from one of the suggestions submitted to Roger Harrison — a proposal to establish a sophisticated type of Citizens Band in the UHF spectrum.

I disagree with VK3ZA where he insists that any person capable of sending CW at 20-25 w.p.m.

should be able to qualify for an amateur licence — without the 70 per cent theory pass, how is this possible?

Is it not then probable that many of those unanswered QSLs from CW contacts are directly attributable to our licensing conditions. Conversely, we have something like half of our Australian amateurs with limited tickets where in many cases the code is a stumbling block to DX operation.

A little more calm and a genuine attempt to understand the other guy's situation would pave the way to most — not all — of the answers.

M. R. Morris, L30134

The Editor,
Dear Sir,

Further to the excellent editorial in AR, August 1974, in particular the reference to the many commercial intruders who are using the amateur frequencies for their communications, I would like to suggest that the WIA "start the ball rolling" on a somewhat different approach than has been used in the past.

The Intruder Watch is very necessary and does an excellent job of logging many of these intruders, but in the main it is a long and sometimes hopeless process in getting rid of them!

Is it too much of a goal or challenge to suggest that we should be negotiating with the necessary Australian Government Departments to set up and operate a WIA controlled "jammer"! Sure, it has its difficulties and problems, but in co-operation with the Intruder Watch it could be very effective. There will be those who will say "it can't be done", but with co-operation of the ARRL, RSGB, JARL (right on the doorstep!) and amateur determination I feel that it can be done!

It may take some time, years in fact, but nothing ventured is nothing gained.

Personally I am prepared to back such a scheme financially and materially.

What do other members think?

Yours faithfully,

John E. Dunkley, VK5JE

The Editor,
Dear Sir,

In QSP of the August AR, John Bennett mentioned amongst other things the problem of piracy. I am fully aware that piracy exists, but I also feel that many acts of "piracy" are in fact accidents.

Whilst in Nigeria I operated a station for many years. One day I heard a European station talking to 5N2AAU — my station callsign. After the first shock I found that the station was in Lagos, the name was Joe — and in fact it was 5N2AAJ. Joe used the phonetic J — Juliet, but his accent made it sound like Yuliet, hence the mistake. I was able to work the European station and rectify the mistake.

Such mistakes on phone are well known to us. Whilst in U.K. I have the call G3YSO. I have had frequent cards which were found to be for G3YFO. Similar mistakes are easily possible on CW especially when an operator uses a bug key on VOX. I would suggest that John checks callsigns which are similar to his in Morse. I am sure he will find the "pirate" is properly licenced but improperly heard. 3ZA could easily be 2DA or even 4OV with the occasional bit of static.

I once had a QSL card sent to me made out to 5N2ALT. The bureau manager had correctly interpreted the SWL's mistake, but then — he only had one Bill on his books.

Yours faithfully,

Bill Senior, VK2BZA

The Editor,
Dear Sir,

Further to the recent letter in this column (1) there is a lot of truth that the amateur is or should be an experimenter. This brings us to the point, why is the authentic experimenter denied the use of all amateur frequencies allocated to the amateur service to conduct his experiments because he has not studied the morse code (another language), and is therefore classed as a second-class or a limited amateur. In reality, he may be a first-class experimenter assisting in science technology or the advancement of electronics of our country, or even world wide.

On the other hand, the communicator either with his "black box" or well-designed home brew "rig" mainly interested in making contacts (QSOs) either in morse or voice, is just as important, being a very valuable ambassador for Australia; representing Australia to the rest of the world, by this side of his hobby called DX-ing, or he may be a contest king gathering rare cards, or "wallpaper" (2), thus narrowing international barriers and relations.

To obtain rare countries, naturally CW is one of the best means. It overcomes any language problem with the foreign amateur operator, therefore, with this high speed communication expertise, this type of operator is also a first-class amateur. This type of amateur who reads morse like another language you will find is possibly a postal or commercial telegraphist or an ex-military operator, therefore an o'd hand with a good fist. He being an old hand with a good fist. He being an expert in this (his) field, in the same way the technician-engineering type who carries out constructive and practical experiments. He is often involved in, or had engineering practice, and therefore equally an expert in this (his) field. Top amateurs in both fields are top or first-class men, ranging from top to bottom, with the average morse DX operator or experimenter, down to the newcomer in either field. In other words, there is a fairly defined line dividing the two fields, recognised professionally as signallers or technician/engineers. So far, so good, but where it comes to the existing amateur service regulations in this country and world-wide, the two classes are intermixed as it should be for the hobby to cover all tastes and shades of interest. Why should one expert be called second-class (LAOCP) when in his own right he is also a first-class amateur.

The writer, who formed a committee in Victoria (3), and Rex Black (4) who promoted the introduction of the novice licensing scheme here in this country, backing the Youth Radio Club Scheme, the new Novice (or third class) licence will provide the stepping-stone both for the technical and communicator type of new amateur. Our Novice licence provides the incentive to study further his theory, and increase his code speed, thus starting the newcomer on both or either path of expertise, which will become often the youngster's career, as well as his hobby.

Therefore, some thought should be given to perhaps a new arrangement of class of licences, to provide and overcome the shortcomings of the existing licence structure. I put forward such a workable plan that should give more freedom, and stimulate the pleasure and growth of healthy amateur radio in this country of ours.

What do you think? As a responsible reader, please forget, because you had to do it, so should all idea or thought.

Incidentally, the FCC (5) has proposed such a twin-tier plan or system of amateur radio licensing to provide for the extra class CW expert and the technical expert, in their incentive structure. This plan would provide to the signaller-communicator and the technician-engineer type, giving both the same status and privileges. Why should the competent experimenter be suppressed or rated second-class, in actual fact it is he who broke the UHF and microwave records, designed and pioneered our repeaters, built up parts for our Oscar Satellites, studied Transequatorial Scatter and Sporadic-E propagation, etc.

Instead of waiting for the FCC to lead the world in such a plan, why can't we Australian Amateurs provide a lead in the line of thought. We often quote that in Australia we have the highest standards, and qualifications to the rest of the world. The level of our present amateur examinations are of very high standard.

Finally, it must be realised, we also have some amateurs who are experts in both fields, not necessarily at the same time, but over their amateur life. Being excellent CW and SSB operators, and true experimenters and constructors providing amateur radio a valuable service, which licence would they take?

This letter to the Editor is to provide food for thought — do we need a dual system of licensing to cover both fields of amateur radio?

George Francis, VK3ASV/T

References:

(1) Letter by Cyril Maude, VK3ZCK, AR, June 1974.
(2) Certificates and Awards.
(3) Eastern Zone (VK3) Basic Licencing Committee for Victorian Division.
(4) Founder of the WIA YRCS, and chairman of the Federal Novice Investigating Committee.
(5) See QST March 1974 League Lines "dual-latter" proposal and no-code licence. (Page 15).

SUGGESTED PLAN No. 1

FIRST GRADE (FULL)	**COMMUNICATOR** **AOCP, 10 WPM,** (could be increased to 14 wpm, but not recommended) **PRESENT THEORY, ALL BANDS.**	**TECHNICAL** **NEW AOCP.** (to start 1975/6) Such as additional knowledge in RTTY, Repeater cons ruction and operation, SSTV, FSTV, etc. (by permit perhaps). **NOVICE + LAOCP = NEW AOCP**
SECOND GRADE (LIMITED)	**NOVICE** plus 5 WPM. Segments of 3.6, 21, 27 MHz plus Dual Licencing	**LAOCP** Codeless, present theory, (Started 1952). Above 52MHz.
BASIC GRADE (NOVICE)	3.6, 21, 27, 52, 144 MHz and above. 5 WPM **NOVICE** (started 1974/5) Segments in 3.6, 21, 27 MHz bands. Tenature only.	

SUGGESTED PLAN No. 2

COMMUNICATOR **AOCP 10 WPM.** Full Call, all bands, all modes.	**EXPERIMENTER/CONSTRUCTOR.** LAOCP plus 5 WPM. (Actually the dual Licence). All bands, AM except CW on HF.
LOCP **NO CW.** **VHF ONLY.**	
NOVICE, Limit 5 WPM.	

TECHNICAL CORRESPONDENCE

SOME DEEP THOUGHTS ON A REGULATED POWER SUPPLY

In the July 1974 issue of "Amateur Radio", the design details of a regulated power supply were discussed and a circuit diagram with component values produced. However, some very important points require careful consideration if people are to build similar units and have consistent reliable operation.

(1) The Author neglected the forward voltage drop across the diode in the bridge rectifier. Practice shows that a one volt drop occurs across each conducting diode and since two diodes conduct on any half cycle, then the maximum voltage from the rectifier using a 19Vrms transformer secondary will be:—

$V_{max} = V_{rms} \times 1.4 - 1 \times 2$
$= 27 - 2$
$= 25$ Volts.

(2) As stated, the input to the uA 723 C regulator must be +4.4V higher than the required output voltage to maintain regulation. If the required output voltage is 15 volts, then the minimum capacitor voltage is:—

$V_{min} = 15 + 4.4$
$= 19.4$ Volts.

(3) The discharge time will now be:—

$T = 5 + 1/18 \sin^{-1} V_{min}/V_{max}$
$= 5 + 1/18 \text{ arsin } 19.4/25$
$= 5 + 2.85$
$= 8$ milliseconds (approx.)

(4) Substituting these new values:—

$$C = \frac{IT}{V_{max}-V_{min}} \times 100 \text{ uF}$$

(Where I is load current and in this case 15 Amps)

$$= \frac{15 \times 8}{25-19.4} \times 1000 \text{ uF}$$

$= 21{,}500$ uF

(an increase of 7,500 uF comparing this figure with that shown in the article)

(5) The worst case of series pass element dissipation occurs when maximum load current is being drawn from the supply at minimum output voltage. The power dissipation across the series pass elements is load current times the collector to emitter voltage.

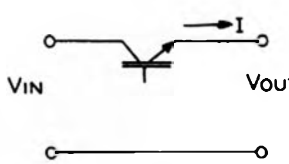


FIG 1

From Fig. 1 the power dissipation is:—

$P = (V_{in}-V_{out})\ I$

Where $V_{in} = \frac{V_{max} + V_{min}}{2}$ (approx. average DC voltage)

i.e. $V_{in} = \frac{25 + 19.4}{2}$

$= 22.2$

$\therefore P = (22.2 - 10)\ 15$
$= 180$ watts (approx)

Hence as stated in the article, if 3 elements are used, each element must dissipate 60 watts.

(6) Now we come to the heatsink design. The collector junctions of the series pass elements will run at high temperatures due to power dissipation. Fig. 2 shows that this heat energy must travel through three thermal resistances before it reaches the ambient air. The three thermal resistances are:—

Any thermal resistance is equal to the temperature drop across it divided by the power dissipation:—

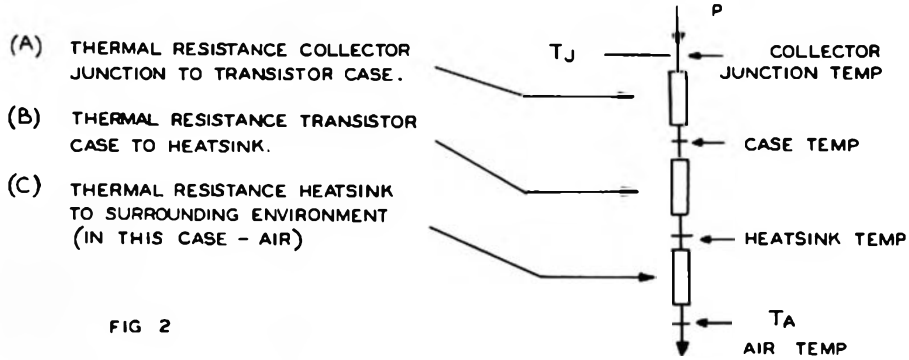


FIG 2

i.e. $R_{th} = T/P$

and we can write a "Thermal" Ohm's Law —

$T = P.R_{th}$ where T is expressed in °C, P in watts and Rth in °C/W.

compare this with Ohm's Law. $V = IR$

Also from Fig. 2 we see that the junction temperature (Tj) is the sum of the ambient temperature (Ta) plus the temperature differentials heatsink to ambient (Ths-a), transistor case to heatsink (Tc-hs) and collector junction to case (Tj-c).

i.e. $T_j = T_a + T_{hs\text{-}a} + T_{c\text{-}hs} + T_{j\text{-}c}$

The thermal resistance transistor case to heatsink can be minimised by the addition of a thin smear of silicon compound between the case and the heatsink. However mica washers are used for insulation purposes and this thermal resistance must still be considered. It is generally taken as 0.5 °C/W.

From the 2N3055 data sheet we find that the maximum allowed junction temperature (Tjmax) is 200°C and thermal resistance collector junction to case is 1.5°C/W, and as stated in the article a 6" piece of 'Miniwatt 35D' heatsink will rise 80° above ambient whilst dissipating 60 watts.

Now, if the ambient temperature is not expected to exceed 50°C (120°F) then:—

$T_j = 50 + 80 + 60\ (0.5) + 60\ (1.5)$
$= 50 + 80 + 30 + 90$
$= 250$°C
= destruction! (contrary to the article)

See Fig. 3.

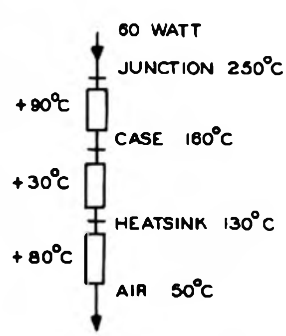


FIG 3

In fact if five transistors are used, each dissipating 36 watts, working back we find:—

$T_{hs\text{-}a} = T_{jmax} - T_{j\text{-}c} - T_{c\text{-}hs} - T_a$
$= 200 - 36\ (1.5) - 36\ (0.5) - 50$
$= 78$°C

and the 'Miniwatt 35D' data sheet shows a 3" piece of heatsink could be used.

If you are keen on using only 4 series pass elements then a much more elaborate heatsink is required. Calculations show we need to dissipate 45 watts with a 60°C heatsink temperature rise. A 2" piece of 'Miniwatt 55D' heatsink will suffice. For those keen on using 3 series pass elements, each will need to be mounted on a 12" piece of 55D heatsink. This is cost prohibitive and physically ridiculous. The best compromise is probably 4 transistors each on a 2" piece of 'Miniwatt 55D' heatsink.

(7) Now a word of warning about dissipation of the power driver. Once again its worst dissipation case is at maximum load current together with minimum output voltage. From the 2N3055 data sheet the minimum current gain is 20 and therefore the driver emitter current could be as high as 15/20 amps. Its collector dissipation will be approx:—

$P = 12 \times 15/20$
$= 9$ watts

Quick calculations show we require a heatsink with a thermal resistance of 15°C/W. We can obtain this by bolting the driver to the power supply case.

(8) Worst case dissipation of the uA 723 C also occurs at maximum load current with minimum output voltage. Calculation shows this to be approx. 360 milliwatts. The uA 723 C data sheet shows this figure to be well within the dissipation figures at 25°C. These are:—

dual in line package (DIP) 900 mW.
metal can 800 mW.

However we must apply a derating factor of 6.8mW/°C for the metal can and 9mW/°C for the DIP for operation at ambient temperatures above 25°C (from uA 723 C data sheet) i.e. at 50°C internal dissipation cannot exceed:—

DIP 675 mW.
Metal can 630 mW.

Hence there is no problem until we come to the possible situation of point (9).

(9) Finally, a word of warning when this type of supply is operated at maximum load current. If for any reason the load is increased (possible load short circuit) the current limiting action will still hold the output current at 15 amps but the output voltage will fall away toward zero. In this case the excess voltage (approx. 22 V) will appear across the series pass elements and the power dissipation will be 330 watts (far in excess of the normal 180 watt figure used in heatsink design calculations). The dissipation ratings of the uA 723 C will also be exceeded under these conditions! So watch your output voltage! A 15 amp fuse before the filter capacitors would protect the rectifiers and a 2 amp slow blow fuse in the transformer primary circuit would afford the overall unit better protection.

I suppose some people will still be non-believers in fact as the author said, "The prototype has now been in operation over 12 months", and he also goes on to say that about half a dozen other units are in operation around the town.

The unaccounted diode volt drop and the understated value of filter capacitance could in some cases be overcome by the fact that an average commercial grade electrolytic capacitor has a tolerance range of —50% to +100%. The negative tolerance would make matters worse but since the total capacitance value of 14,000 uF was probably made up of several 2,000 uF capacitors in parallel and as the majority tend to exhibit a large positive tolerance, then more than likely the Author ended up with much more than his 14,000 uF.

As for the heatsink problem, it is highly unlikely that the supply has ever run supplying 15 amps at 10 to 12 volts for prolonged periods, otherwise destruction would have been inevitable. It should be noted that for any reduction in ambient temperature, then all temperature levels reduce by the same amount, i.e. if the collector junctions were running at 170°C under load, then a 20°C reduction in ambient temperature (colder day or operation in a cooler room) would reduce the junction temperatures to 150°C. Under medium load this would help save the power transistors from thermal destruction.

Indeed as the Author said, the article was not intended to describe a unit to be copied exactly, but more as a source of ideas. I will release through the Moorabbin and District Radio Club details of a regulated supply continuously variable from 0-15 volts with load regulation of 0.03%, ripple rejection better than 76 db and with two ranges of current limit, each continuously variable from 0-1 amp and 0-10 amps. The supply can either operate in constant voltage or constant current mode and will incorporate remote sensing. Details will be offered for publication in "AR" at a later date.

Adrian E. Mensforth, VK3ZCM,
5 Newbury Court, Ashwood, Vic. 3147

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

ANTENNAS CAN CAUSE INTERFERENCE

Some texts on radio interference state that antennas cannot cause interference, but only radiate what is fed to them.

This may be true in theory but if you are causing interference it is a good idea to check your antenna. I have twice discovered the same cause of interference, once in VK4 and once in VK3. The antennas in question were both ZL specials made with 300 ohm TV ribbon. In each case a few strands of wire had broken at the feeder connection. Antenna performance was quite normal but once the broken strands became oxidized they acted as rectifiers and generated interference.

No doubt this can happen with any other metal connections, not necessarily part of the radio installation. Still it is well worthwhile checking your antenna and perhaps save a lot of effort looking elsewhere.

M. N. O'Burtill, VK3WW

PROJECT AUSTRALIS

ARRL AND AMSAT V FCC

Readers of QST and other American magazines will have noticed the steadily increasing regulation of amateur activities in the US by the FCC. Repeater regulation in particular has felt the "heavy hand" in recent times. Now the FCC has turned its attention to the satellite service and has announced its intention to conduct an inquiry into this facet of amateur activity to see if further specific rules and regulations are required.

From an international point of view this is of a more serious nature than the majority of the FCC's actions. As the launching authority for all Oscars in the foreseeable future any undue restriction on future satellite operation by the FCC will have a drastic effect on the rest of the world, if only in the choice of sub-systems to be flown. With this in mind the ARRL sought the views of other interested national bodies before determining its own attitude to the inquiry.

Those countries that had replied before the deadline of the June issue of QST were unanimous in their opposition to further specific satellite operation regulation. The WIA position, as formulated by FE earlier in the year, was quoted at length in QST and attention was drawn to the consistency of the international replies along the lines stated. The ARRL in its efforts to keep the FCC on the rails is heavily stressing the international nature of the Oscar projects, not only in hardware development but also in operation. To quote from the editorial of June QST: "In fact 90 per cent of Oscar 6 control has been by VE, D, VK and ZL stations. So established co-operation, not more rules, is the necessary ingredient here . . . Yes indeed, this matter is substantially one of international effect".

FCC1, AMSAT 0 . . . the OSCAR 7 2304 MHz BEACON

The FCC has refused AMSAT permission to operate the 2304 MHz beacon on Oscar 7 whilst over the US because of "international implications". Whilst this decision need not affect 2304 MHz operation over Oceania (the internal spacecraft clock will automatically turn off the beacon after one half hour of operation) the writing appears to be on the wall for future operation of any beacons not within the present amateur satellite allocations. Whilst Australis is not giving up hope of flying a future VK 1296 MHz beacon the prospects of this project are bleak at this stage.

VE-VK CO-OPERATION

Australis was kindly sent a copy of the VE Oscar newsletter recently. This worthy publication highlighted the extensive technical co-operation that has existed between the VK and VE amateur satellite groups in the joint development of a computer controlled command system for future Oscars. In fact, whilst most of the design and development work for this project has been done in this country, it has been funded almost exclusively by donation of components by VE amateurs. Some of these items — such as microprocessors — are almost unobtainable in VK, certainly on a sample basis. Co-operation of this order between two groups on opposite sides of the world can only generate goodwill not only for the Oscar projects but for all of Amateur Radio.

Contests

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

CONTEST CALENDAR

Oct	5/6	VK/ZL Oceania Phone
Oct	12/13	VK/ZL Oceania CW
Oct	12/13	RSGB 21/28 MHz Phone
Oct	19/20	RSGB 7 MHz CW
Oct	19/20	Scout Jamboree
Oct	26/27	CQ WW DX Phone
Nov	2/3	RSGB 7 MHz Phone
Nov	10	Czechoslovakian CW & Phone
Nov	23/24	CQ WW CW

WHEN IS YOUR CLUB OR DIVISION HOLDING A CONTEST?

RD CONTEST

Firstly, the comment made in the Contest Notes for August that "one contact per band for HF means just that etc." was an error. It contravened Rule 5 and the resulting consternation and inconvenience is sincerely regretted.

One of the first logs received came from Harold VK3CM who commented, "Many thanks for a very enjoyable contest. It certainly brings back memories of the war years. Most stations were very strong indicating good adjustment of their transmitters. It was quite a surprise to contact so many CW stations".

VK6J has claimed 616 points for 132 CW contacts and commented, "Thank you for a very enjoyable first contest, I look forward to the next". Peter VK4PJ, our former contest manager, wrote shortly before departing for a short holiday in USA, "The RD went off pretty well by all accounts. The VK5s were going very strongly . . . onto the VK4s like hawks . . . on to me anyhow. All reports indicate that the contest was friendly . . . 80 metres a bit disappointing . . . but 40 pretty good from here to make up. 20 was good to me and some good contacts to VK6 who seemed to be working all over the place and should do well. Spent some time calling on 10 metres as did a VK6 without any success. I am sure the CW double points was received".

ROSS HULL CONTEST

As mentioned last month Bob, VK3AOT's suggestions about scoring were circulated to a number of contestants and this has generated a great deal of correspondence. Distributing this to all interested amateurs is not practicable but some copies will be prepared and circulated when time permits so that differences of opinion may be discussed and the rules and/or scoring table for 1975/76 amended to the extent of any agreements reached.

The distance table which was published in AR, Nov. 1971, has been converted to kilometres and it will be printed and distributed as soon as practicable.

1973 CQ WW CONTEST

Results by airmail from Frank, W1WY.

		PHONE			
		Australia			
VK3ARY	A	44,352	192	26	51
AX3SM	21	24,150	193	13	29
AX3XB	3.8	392	22	3	4
VK4VU	A	780,340	1226	77	143
AXFH	..	168,074	572	37	64
VK4UA	..	49,176	249	33	39
VK4DO	14	42,280	197	30	59
VK4AK	..	26,363	103	30	67
VK4PJ	..	176	6	5	6
AX5MF	A	46,475	246	44	83
VK6NE	A	8,262	54	25	29
VK6TU	..	3,063	33	15	19
VK6CT	7	135,810	521	29	61
		CW			
		Australia			
VK2GW	A	302,874	729	61	82
AX2BQQ	..	19,136	103	23	41
VK2BKM	14	247,244	755	30	83
VK3BRC	A	1,924	21	14	18
AX3KX	21	84,168	456	22	41
VK3APN	7	62,814	360	23	[illegible]
AX3XB	3.5	5,080	88	11	[illegible]
VK4ZV	A	284,765	779	53	76
VK4XW	..	1,920	26	16	16
VK6RU	A	26,082	144	28	35

ZIP CODE CONTEST

This is a new contest organised by the S.E. Virginian Wireless Association. The scoring system is based on the total sum of the last two digits of the Zip Code worked i.e. 23518 is worth 18 points. This unique system, which could be adapted to our postcode system, should make some stations very popular.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA 5152

WORKED ASIAN CAPITAL CITIES, (AHC AWARD)

The V.C.R.C. in Vasteras, Sweden, issues the WASCC Award to any amateur and SWL in four classes:

AA for 40 capital cities
A for 30 capital cities
B for 20 capital cities
C for 15 capital cities

Endorsements will be made for any single band or mode. Fee: 10 IRCs or equivalent. QSL cards need not be sent. However, a certified list of claimed contacts, signed by two amateurs or an official club is required.

Address:

Urban Eugenius, SM5BTX,
Patrull-gatan 6, S-72347 VASTERAS, Sweden.

Asian Capital Cities: Afghanistan/Kabul, Bahrein/Mamana, Bhutan/Thimba, Burma/Rangoon, Cambodia/Phnom Penh, Ceylon/Colombo, China/Peking, Cyprus/Nicosia, Formosa/Taipeh, Hong Kong/Hong Kong, India/New Delhi, Indonesia/Djakarta, Iran/Teheran, Iraq/Baghdad, Israel/Jerusalem, Japan/Tokyo, Jordan/Amman, South Korea/Seoul, North Korea/Pyongyang, Kuwait/Kuwait, Laos/Vientiane, Lebanon/Beirut, Macao/Macao, Malaysia/Kuala Lumpur, Maldive Is/Mahe, Mongolia/Ulan Bator, Muscat & Oman/Muscat, Nepal/Katmandu, Trucial Oman/Dubai, Pakistan/Islamabad, Philippines/Quezon City, Qatar/Doka, Saudi Arabia/Riyadh, Singapore/Singapore, South Yemen/Hadinat ash Sheb, Syria/Damascus, Thailand/Bangkok, Turkey/Ankara, South Vietnam/Saigon, North Vietnam/Hanoi, Yemen/Saana.

THE SEVENTY-THREE AWARD (AHC AWARD)

The North Japan DX Club (NJDXC) will award an attractive certificate attesting honorary membership to any licensed amateur having made two-way communication with the prefix "7" in three countries in each continent (i.e. 3 x 6 = 18 QSOs), plus three members of NJDXC.

Any band may be used, CW or phone or mixed.

All contacts must have been made since 1st January 1953.

The application must be accompanied by the 21 QSL cards, a list of claimed contacts, and 10 IRCs, and it should be sent to:

NJDXC Awards Manager
G.P.O. Box 70
Sendai, Miyagi, Japan.

The award is available also to SWLs.

NJDXC members: JA7 AD FC JH JI KW MJ MN OD.

D.X.C.C.

Announcement is made of the deletion of Tibet (AC4) and Zanzibar (5H1) from the ARRL Countries List. Any contacts made June 1st 1974 and after with stations located in Tibet will be creditable toward the China (BY) listing, while contacts with stations located in Zanzibar will be creditable toward the Tanzania (5H3) listing. (QST June 1974)

The following stations have qualified for Awards since the last list was printed:

W.A.V.K.C.A.

Cert. No.		Cert. No.	
583	ZL4JP	597	JA1AJA
584	YJ8DE	598	JA7TI
585	UK2FAD	599	DJ0YD
586	JA7JW	600	ZL3UF
587	JA7CYC	601	JA1JKG
588	JA1RRU	602	JA2KLT
589	ZL1ACL	603	JA6TTO
590	JA3MXR	604	GM3HGA
591	WA6SOV	605	OK1TA
592	JA1WVK	606	ZL1IO
593	JA1BNW	607	UA1CS
594	G3TJW	608	JA2RGH
595	JA0GRF	609	JA2HGA
596	F6ACV		

W.A.V.K.C.A. (V.H.F.)

Cert. No.	
7	VK3BFG/T
8	VK3ZAZ

V.H.F.C.C.

Cert. No.	
90	VK3BFG/T
91	VK4ZMI
92	VK3ZAZ

W.A.S. (V.H.F.)

Cert. No.	
110	VK4ZMI
111	VK3ZAZ

THE "SURPRISE" STORY

12NSF/MM Ambrogio Fogar, in his yacht SURPRISE, left Italy November 5th, 1973. His aim was to sail around the world from East-West solo. He is probably the first Italian to attempt this voyage.

December 26th:
Arrived in Rio de Janeiro after an uneventful journey across the Atlantic Ocean.

January 2nd, 1974:
Left Rio for Cape Horn.

January 27th:
Rounded Cape Horn.

February 3rd:
Caught in a 90 mph storm 900 miles west of Chile, "Surprise" flipped upside down. All equipment ruined, daily contact with all amateurs ceased. ZL1BAK requested to give radio watch assistance and search and rescue alerted.

March 1st:
"Surprise" holed by playful whale. Emergency repairs to keep afloat.

April 9th:
Arrived in Auckland.

May 11th:
Left Auckland to travel south of Australia. New Swan SS200 transceiver and hustler antenna installed by ZL1AQE Des, and ZL1BAK. Ship repaired and restocked.

May 25th:
"Surprise" hit by worst storm around Australia, Ambrogio swept overboard on lifeline, "Surprise" capsized and Ambrogio able to re-board the "Surprise". All the equipment ruined again.

May 26th:
Ambrogio failed to keep daily schedule. ZL1BAK, VK4LZ, VK3OL, VK3UX, YJ8EE, VK3BH/aero mobile, maintained continuous watch, marine operations centre, Canberra, notified.

May 27th:
"Surprise" sighted heading for Sydney in good order.

June 5th:
Left Sydney heading south. Radio and antenna repaired by courtesy of Sydney VK's and A.W.A. Caught in storm, decided to sail north.

From then on, reasonable sailing conditions until the hazards of the Great Barrier Reef were encountered. From Torres Strait across the north of Australia, good weather gave the "Surprise" a good speed. July 21st, 2100 miles west of Australia. Assistance given by amateurs in New Zealand and Australia has been invaluable and contributed to the success of the voyage around Australasia.

On behalf of Ambrogio and myself I wish to thank all those ZLs and VKs who have assisted in this operation. Special mention must be made of the following:

ZL1RO (Gus) for daily watch and sailing information. ZL1AQE (Des) for radio repair and installation. ZL1BR, ZL1BHK, ZL1NX, ZL1BBH, ZL2BAD, ZL4BC for standby and relay. VK4LZ (Les) for VK co-ordination, daily watch, sailing information and relay. VK3OL and VK3UE for daily watch. VK2ALK for watch and assistance with radio in Sydney. YJ8EE/VK7 and VK3BH for search assistance. VK3UX, VK3ABY, VK3MH, VK3AXQ, VK3AIH, VK2ATC, VK2XD, VK2BZV, VK2ALH, VK2AJL, VK2BIG, VK2BGK, VK5AH, VK5QX for standby.

Mention must be made of the many radio amateurs who have given a clear frequency and stood by patiently ready to assist.

Relay assistance from the "Galileo Galilei" Italian Passenger Liner with the aid of Francesco and his radio officers, gave Ambrogio great pleasure.

I believe that publication of this information and the letter enclosed would in some way be a token of appreciation of the service of all radio amateurs.

Den Burrage, ZL1BAK
NZ Co-ordinator for 12NSF/MM

LEGA NAVALE ITALIANA
Sezione di Milano, Corso di Porta Romana, 17
Tel. 879762, C.ce Postale 20122
Milano, 12 luglio 1974

Den Burrage, ZL1BAK,
New Zealand Co-Ordinator,
12NSF/MM.

Dear Mr. Burrage,

I have just received your letter, and I must say that I read it not only with great pleasure, but with a certain amount of emotion too.

Since I have been responsible for radio-aid and public relations for many Italian sailors who, in the last few years have had the spirit to undertake oceanic trips, it is not the first time, and I do not imagine it will be the last, that I have observed the unselfish devotion to the task which radio amateurs throughout the world feel called to. When somebody needs a helping hand, or a friendly word, or is in danger of losing their own life, in times of danger, it is always to the radio-amateurs that they feel they can turn to.

Ambrogio, not only in this part of his important trip around the world, has drawn courage and received useful information from the short-wave radio transmitters manned by radio-amateurs, and through them he has always been able to keep in touch with his home, with those close to his heart, with his land, and with the many people throughout the world who have been following his progress. When he left Italy in November 1973, Brazilian and Angolan stations operated together with Italian radio-amateurs; after Rio de Janeiro, the Uruguaians, Argentinians and an important station in Santiago Chile took over, and they followed Ambrogio's progress during the most dramatic phase of his trip around Cape Horn. At Auckland, I know how closely the New Zealand and Australian radio-amateurs kept contact with him and how much brotherly affection he found in your far-away country, that so few of us have had the good fortune to visit.

I would like, in the name of all Italian sportsmen, and of all people who are following this lonely and courageous navigator's voyage, to thank individually all radio-amateur stations of New Zealand and Australia. In your wonderful letter you have given me the names of various stations which I am keeping for Ambrogio's dairy: please send to each and every one of them a copy of these QSL of Ambrogio's trip around Cape Horn.

I imagine they would want to have a souvenir of a man, who in these troubled times, has tried in his adventure with the sea, the most powerful and difficult of all elements, to test his personal courage and to rediscover the essence of living.

With my kindest regards,

E. A. PRATELLA

To:
The Wireless Institute of Australia, P.O. Box 2611W, Melbourne, Victoria, 3001 — Australia.
VK4LZ / VK3OL / VK2ALK / YJ8EE/VK7 / VK3ABY / VK2BZV / VK2ALH / VK3BH / VK2BIG / VK3MH / VK5QX / VK5AH / VK2AJL / VK3AXQ / VK2BGK / VK3AIH / VK2ATC / VK2XD.
NZART, Box 1733, Christchurch — New Zealand.
ZL1RO / ZL2BAO / ZL1NX / ZL1BHK / ZL1BR / ZL4BC / ZL1BBH.

TOWNSVILLE PACIFIC FESTIVAL CONTEST 1974 — RESULTS

PHONE SECTION

VK2BYC	390	VK5HN	79
VK4MM	281	VK2BIP	66
VK4QO	250	VK2BHV	65
VK4DT	234	VK4QW	65
VK4LT	222	VK5LM	59
VK3ANM	180	VK4ZDB	56
VK3ARY	155	VK4PJ	50
VK4RR	135	VK4GI	49
VK3AYL	132	VK3BK	46
VK3TK	124	VK3BER	45
VK4CR	123	VK4GS	45
VK4KW	101	VK2BCG	31
VK4NU	99	VK4NB	28
VK4XZ	92	VK2BMX	27
VK2OW	90	VK1QJ	24
VK5RK	90	VK5ZX	24
VK6KB	82	VK5KL	14
VK2LS	80	VK6DG	12
VK4BG	79		

OPEN SECTION

VK4LZ	696	VK6WT	280
Trophy winner		VK4LT	243
VK4TL	419	VK4PV	162
VK4HE	351	VK4RF	157
VK4FH	347	VK5LI	120
VK3WW	327	VK4VA	103
VK3XB	321	VK4QD	102
VK3VF	292	VK4PS	91

CW SECTION

VK3CM	184	VK4VO	38
VK4KX	162	VK1DC	122
VK5DL	88	VK1DA	52
VK7RY	52	VK8HA	118

RECEIVING SECTION

L-4018	542	L-40498	10
L-30042	190	L-50087	79
L-40506	79	P. J. Elliott (VK2)	34
Ross Inglis (VK4)	29		

QSP

AWARDS DIRECTORY

The Publications Committee believe it would be useful to publish a complete list of the various Awards (other than those which already appear in the Call Book) issued by various clubs and bodies in Australia. Could the readers of this please ask the issuers of any such Awards to send details (and specimens) to the Executive Office as early as possible for inclusion in the Awards Directory. This includes all those which had previously been publicised in AR because there may have been subsequent amendments or deletions.

TALK THROUGH THE TOP OF YOUR HEAD

Not quite, says Pat Hawker in Radio Communication July '74 in TT, but he describes an ingenious technique developed as "Earcom" devices by a company in California. The "Earcom" combined headphone and microphone was a single small transducer in the outer ear both as ear-piece to bring the signals in and a microphone to pick up voice energy at the ear from the total otolaryngeal system providing clear individually recognisable speech. Of course, he says, whether you speak more sense out of the top or side of your head than off the front or back depends on you.

I.A.R.U. REGION 1

Advice has been received that the next IARU Region 1 Conference will be held in Warsaw during May 1975.

Ross Hull VHF-UHF Memorial Contest 1974-75 rules

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: 6th December, 1974, 1401 GMT, to 19th Jan. 1975, 1400 GMT. (0001 Hours E.A.S.T. 7th December 1974 to 2400 Hours E.A.S.T. 19th Jan. 1975.

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 1401 hrs GMT to 1400 hrs GMT.

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.

In the 48 hours 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 cross band 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 division winner is not eligible for the 48 hour division award.

5. Two contacts per band per day, irrespective of mode, are permitted provided that 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 licence.

8. The exchange of RS or RST reports with serial numbers beginning with 001 shall 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 Wireless Institute of Australia, Federal Contest Manager, Box 67, East Melbourne, 3002, in time for the last opening of logs on Friday 21st February 1975. Envelopes should be clearly marked "Ross Hull Contest". Early logs are appreciated.

10. Scoring will be based on the attached table and the table of distances published in the Contest column of this issue of AR. Approximate distances are to be shown in the log. Operation via repeaters or translators is not permitted.

11. Logs should be set out as in the example and must carry a front sheet with the following information:

Name ....
Address ....
....
Section ....
Callsign ....
Claimed 7 day score ....
Operating dates ....
Highest 48 hour score ....
Operating period ....
I hereby certify that I have operated in accordance with the rules and spirit of the contest ....
Comments ....

12. All times are to be logged in GMT only.

13. Certificates will be awarded to the winners of each section of each call area. Certificates will be awarded to contestants who break any Australian VHF-UHF distance records.

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.

2. Contest times and logging of stations will be the same as for the transmitting section except that there will not be a 48 hour Division.

3. Logs must show the callsign of the calling station, the serial number given, and only the callsign of the other station. Scoring will be as for transmitting stations.

4. Any scoring contacts may be logged. There no limit to the number of times that a station may be logged provided serial numbers are given.

5. The logs for any 7 days (calendar) 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. Try and exchange names with each contact.

DISTANCE TABLE FOR ROSS HULL MEMORIAL VHF CONTEST

The mileages shown in the table published on P.18 of Amateur Radio, Oct. 1973 have been multiplied by 1.609319 to produce the following metric table. Accuracy: Plus or minus 3 km.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	0	1886	1333	3249	1610	959	3066	2633	2940	634	1162	1036	657	380	1236	2137	1730	1159	1928	3223	1123
2	1886	0	1988	5055	3433	2832	4730	2826	4533	2391	2680	2643	2438	2070	3122	385	3405	3043	3338	4942	3005
3	1333	1988	0	4162	1962	1959	4166	1302	4103	1897	2469	2325	1891	1707	2028	1997	1701	2031	1429	4260	2034
4	3249	5055	4162	0	2308	2308	760	5161	1059	2670	2427	2428	2630	2993	2142	5356	2766	2163	3360	486	2176
5	1610	3433	1962	2308	0	964	2528	2853	2848	1450	1812	1661	1390	1638	636	3618	504	758	1101	2525	818
6	959	2832	1959	2308	964	0	2213	3153	2145	526	861	703	467	798	359	3096	1336	241	1806	2329	[illegible]
7	3066	4730	4166	760	2528	2213	0	5298	309	2438	2050	2103	2414	2747	2168	5065	3026	2144	3627	306	2134
8	2633	2826	1302	5161	2853	3153	5298	0	5279	3175	3753	3603	3162	3006	3132	2662	2424	3167	1880	5345	3188
9	2940	4533	4103	1059	2848	2145	309	5279	0	2308	1868	1939	2288	2602	2152	4878	3083	2111	3677	616	2092
10	634	2391	1897	2670	1450	526	2438	3175	2308	0	579	428	63	322	884	2686	1746	769	2123	2609	713
11	1162	2680	2469	2427	1812	861	2050	3753	1868	579	0	166	602	788	1178	3014	2195	1056	2638	2268	993
12	1036	2643	2325	2428	1661	703	2103	3603	1939	428	166	0	443	673	1032	2966	2034	908	2472	2303	846
13	657	2438	1891	2630	1390	467	2414	3162	2288	63	602	443	0	369	824	2728	1691	708	2071	2578	652
14	380	2070	1707	2993	1638	798	2747	3006	2602	322	788	673	369	0	1138	2364	1860	1033	2155	2924	983
15	1236	3122	2028	2142	636	359	2168	3132	2152	884	1178	1032	824	1138	0	3363	1070	124	1603	2424	186
16	2137	385	1997	5356	3618	3096	5065	2662	4878	2686	3014	2966	2728	2364	3363	0	3537	3294	3402	5267	3260
17	1730	3405	1701	2766	504	1336	3026	2424	3083	1746	2195	2034	1691	1860	1070	3537	0	1176	603	3011	1231
18	1159	3043	2031	2163	758	241	2144	3167	2111	769	1056	908	708	1033	124	3294	1176	0	1693	2229	63
19	1928	3338	1429	3360	1101	1806	3627	1880	3677	2123	2638	2472	2071	2155	1603	3402	603	1693	0	3613	1740
20	3223	4942	4260	486	2525	2329	306	5345	616	2609	2268	2303	2578	2924	2424	5267	3011	2229	3613	0	2229
21	1123	3005	2034	2176	818	186	2134	3188	2092	713	993	846	652	983	186	3260	1231	63	1740	2229	0

1—Adelaide
2—Albany
3—Alice Springs
4—Auckland
5—Brisbane
6—Canberra
7—Christchurch
8—Darwin
9—Dunedin
10—Geelong
11—Hobart
12—Launceston
13—Melbourne
14—Mt. Gambier
15—Newcastle
16—Perth
17—Rockhampton
18—Sydney
19—Townsville
20—Wellington
21—Woollongong

SCORING TABLE

Distance (km)	52 MHz	144 MHz	420 MHz	576 MHz	Higher
50	1	1	2	5	10
50-100	2	2	5	10	25
100-150	5	5	15	30	50
150-300	10	10	25	50	100
300-500	25	15	50	150	250
500-800	20	25	100	250	300
800-1200	15	35	200	300	350
1200-2000	10	75	250	350	400
2000-4000	25	125	300	450	500
4000-6000	35	200	400	500	600
6000-9000	50	300	450	550	650
9000	100	400	500	600	700

EXAMPLE OF VK4 TRANSMITTING LOG

Date/ Time GMT	Band MHz	Emission	Call Sign	RST Sent	RST Recd.	Dist. km	Pts.
Dec. 24							
1402	52	A3(a)	VK7ZAB	56001	57022	1234	10
1424	52	A3(a)	VK4OP	57002	54004	330	25
1534	144	A3	VK5ZDL	58003	56043	980	35
1655	144	A3	VK3ZHD	45004	57089	175	10

EXAMPLE OF VK6 S.W.L. RECEIVING LOG

Date/ Time GMT	Band MHz	Call Heard	RST Sent	Station Called	Dist. km	Pts.
Jan.2						
1207	52	VK5ZXG	56087	VK8OK	1330	10
1400	52	VK2ZDD	56244	VK6DB	2450	25
1815	432	VK6JX	57061	VK6TG	60	5
2[illegible]	144	VK5RF	47004	VK6ZDQ	1330	75

Hamads

FOR SALE

Spectrum Analyzer, Radio Corporation T.V. Type. Xtal locked front end. Ideal to use for 6 x 2 mx, $30. **Plessey 847** 36-54 MHz FM transceiver, going, in good cond., $45. **GEC High Band** repeater Tx and Rx units, 3/20 final, $60. **Cossor 1039** Dual Trace CRO, $80. John Day VK3ZJF, 12 Boston Ave., Carnegie, 3163.

Command Tx BC-458-A, in original state, 5.3 to 7.0 MHz, convertable to amateur band, $10. VK3BDN QTHR. Ph.: (03) 848 3959.

Teleprinter on matching metal table, V.G.C., $85. **Teletype** character and distortion test generator, $35. **S.T.C. High Band** transceiver, $20. VK3ZAO, QTHR. Ph.: (03) 96 4292.

2-FM MR-6 3/12 Final. Complete and in excellent condition. Comes with Xtals for Ch 1, 2, 4, B, and 50. $100.00 ONO. Ring Rod (03) 630 7947, AH: 232 9237.

3 only **Filter Condensers 2 MFD,** 3000 VW, $4 each. VK3ML, GPO Box 4533, Melb. Ph.: (03) 329 9633.

TCA Type 1674 6m FM, $20. **EAs 1966** —73, $5 posted per year, 40 yds **UR67 Coax,** 40c yd posted, E[illegible]10 **Metalwork,** Dial Drive, RF meter, $12. "S[illegible]" **Constant Volt Trans** 350 VA, $75. **Zephyr** 300 Watt AM Tx (ex Royal Flying Doctor), offers. G. Algie, Box 1101, Mt. Isa 4825 Q. Ph.: (077) 43 4917.

Katsumi Electronic Keyer, brand new, $25. Eric Bierre VK2BEK. Ph.: (02) 358 3491 evenings.

Antenna Mast, Oregon 2" x 2", 50 ft. in two telescopic sections. Suitable VHF beams including guys, $20. **Pye 6m AM carphone,** tunable Rx 12V, $15. Self-contained **Geloso** 5 band VFO regulated PS, $20. **4 el 6 metre beam** coax feed, $10. VK4CCD (072) 38 2757 (Brisbane).

Trio TR2E 144-148 MHz transceiver with FET pre-amp. Internal speaker, good performer. 240 V AC and 12 V DC operation, $230. Also **Lafayette HA230** General Coverage Rx, 550 kHz to 30 MHz, $130. VK3ATR, 29 Flinders St., Keilor Park, 3303. Ph.: (03) 336 1054.

Tape Punch. 3 small desk top units, each incorporating an 8 level (ASCII) paper tape punch. A 24 level card reader. Power supply and control logic for above. Info to convert punch to reader if required. $35 each. VK5ZCP, QTHR. Ph.: (082) 223 2296.

Carphone AWA MR3 12V, Ch. 37, 42(R1), $40. **PS Unit,** complete with speaker in case, suits HF SSB transceivers, $40. VK3BR, QTHR. Ph.: (03) 878 4939.

Yaesu FTV-650 6m transverter, complete with connecting cables and manual. Good condition. What offers? Bob Martindale VK3BMA. Ph.: (03) 62 9465 (business hours only).

Rx Kingsley KCR/II (post war version of AR7), complete with all coil boxes and IF crystal, in carrying case, with power supply, $70. VK3ZJM, QTHR. Ph.: (059) 75 3139.

Collins S-Line 75S3 Rx, $485. **32S3 Tx and 516 F2** PS, $525. Perfect order and cond., just overhauled by Collins. **75A4 Rx,** 160 mx-10 mx, four Collins filters, 500 Hz, 2.1 kHz, 3.1 kHz, 6 kHz, passband tuning, rejector tuning, noise limiter, professionally fitted with the recognised up-dating mods. (7360 mixers, 6GM6 RF, etc.) $485. VK3BM, QTHR. Box. No. Ph.: (050) 32 4102.

Ex Army Transceiver C45, includes all cables, plugs, acc., 24 V power supply, aerial tuner and 100 ft. coax. Perfect cond., 23-38 MHz, $70. VK3ZJP, Flat 5/34 Gardenia St., Gardenvale.

High Band mobile, 25 W Courier FM 400/30, solid state transmitter, hybrid receiver, circuit, $60. VK3AOT, QTHR. Ph.: (03) 949 6612 (bus. hours).

FT101-B, still in original carton, new, never used. Ph.: (02) 525 6005 after 6 p.m.

Communications Rx, type R5223, 29 bands in 1 m Hz sweeps, covers. 55 MHz to 30 MHz, BFO, noise limiter, inbuilt PSU and speaker, similar in operation to the 51J series of Receivers, as new cond., complete with operators' manual, $260. **Creed Model** 7B Teleprinter in V.G., $60. W. Babb, VK3AQB. Ph.: (03) 337 4902.

Vintage Communications Receiver. Classic RME 69 in original order, working well. Suit amateur radio museum or historic collection. $100 ONO. VK3OM. Ph.: (03) 560 9215.

WANTED

BC 348, not working or partly wrecked, chassis for restoration purposes, or buy **BC348 Tuning** gang, xtal filter, tuning knob and dial escutcheon, controller for aircraft Rx type AD704. W. Babb VK3AQB. Ph.: (03) 337 4902.

Receiver Type 78 Schematic and conversion info. Pay postage and copying costs. Also wanted: **General Coverage Receiver** (550 kHz to 30 MHz minimum) in good condition. VK2ATJ/T. P.O. Box 45, Kensington, 2033.

DC200, 12 V PS for FT200 and cable harness plugs etc. VK8KG, QTHR. Ph.: Nhulunbuy 87 1427 A.H. or 87 1177, ext. 318.

Morse Keys, 20 plus years old, any condition wanted. Write details and price C. P. J. Crothers, 90 Kitchener Rd., Ascot, Brisbane, 4007.

Eddystone 940 EA1Z 770R. Price and details Ph.: (08) 382 5610 after 6 p.m. or 20 College Road, Kent Town, S.A., 5162.

20 Years Ago

with Ron Fisher VK3OM

OCTOBER 1954

"The oft repeated statement that the costly instruments demanded by the advances made in the electronic art in recent years have sounded the death knell of the Amateur Experimenter is based on a false concept". The Editorial Page of October 1954 Amateur Radio made the comment and continued:

"However the Amateur with his great enthusiasm and pioneering spirit can and will still be out in front searching for new worlds to conquer".

Some interesting statistics on the QSL habits of the Australian amateur are included in the annual report of the Federal QSL Manager. From a high of 73,000 cards in 1947, QSLing had declined each year to only 21,000 in 1953. Total cost of running the Bureau amounted to only $12.13.

The New Look in Frequency Modulation. John Miller VK2ANF described an exciter with switching for either phase or frequency modulation. The real start of amateur FM was still a few years off. The release of surplus commercial units around 1957 saw FM as we know it today come into being. In the series 'Complete Amateur', Tom Athey described the construction of a heterodyne frequency meter.

Silent Keys

Mr. J. C. A. YOUNG VK4OY
Mr. VINCENT HILL VK2SWL

Ionospheric Predictions

with Howard Rider, VK3ZJY October, 1974

This month's predictions from information supplied by the Ionospheric Prediction Service Division indicate point to point band openings for at least 50 per cent of the month.
Times quoted are GMT.

28 MHz				
VK2	to	JA		2300 - 0600
VK4	to	W6		2100 - 0100
		KH6		2100 - 0700
VK5	to	JA		2400 - 0600
VK6	to	JA		0100 - 0700
VK7	to	VK9		0200
21 MHz				
VK2	to	G(SP)		0900
		SU		0400 - 0900
		ZS		0500
		UA		0400 - 0900
		VK9		2100 - 0800
VK3	to	KH6		2000 - 0700
		G(SP)		0700 - 1000
		VE3(SP)		2100 - 2300
		VK9		2100 - 0900
		ZL		0200 - 0400
VK4	to	SU		0400 - 0900
		KH6		1900 - 0900
		VK0		0100 - 0800
		W1		2000 - 2400
VK5	to	JA		2200 - 1000
		UA		0400 - 1000
		W6		2100 - 0300
		ZS		0500 - 0600
VK6	to	G(SP)		0700 - 1200
		W6		2300 - 0300
		ZL		0400
VK7	to	JA		2200 - 0900
		9G1(LP)	2100 - 0200	0700 - 0800
		W1		2200 - 2400
14 MHz				
VK2	to	G(SP)		0800 - 1600
		KH6		0500 - 1300
		SU	1200 - 1600	2100 - 2300
		VK0		2000 - 1000
		W1		1300 - 1500
		ZL		2000 - 1000
VK3	to	JA	0600 - 1600	2100 - 2300
		VE3(SP)		1300 - 1500
		9G1(SP)		2300 - 0100
		VK9		2000 - 1600
		UA		0800 - 1600
		ZS		1200
VK4	to	W6	1600 1900	0400
		VK0	0300 - 1300	2000 - 2400
		ZS		1200 - 1300
		JA	0600 - 1800	2100 - 2200
VK5	to	KH6	0500 - 1300	2000
		PY	0700 - 1200	2100 - 0100
		9G1(SP)		2200 - 0100
		9G1(LP)		0700 - 1000
VK6	to	PY	0700 - 1100	2100 - 0300
		UA		1000 - 1700
		W1	1300 - 1700	2100 - 2300
		ZL		2200 - 1200
VK7	to	G(SP)		0900 - 1500
		SU	2100 - 2400	1200
		VK0		2000 - 1700
		W6	0400	1900
7 MHz				
VK2	to	G(SP)		1500 - 2000
		W6		0700 - 1500
VK3	to	JA		0900 - 2000
		9G1(SP)		1800 - 2100
VK4	to	VK0		0700 - 2100
		PY		0800 - 0900
VK5	to	KH6		1600 - 2100
		VE3(SP)		0800 - 1300
VK6	to	ZL		0900 - 1900
		SU		1500 - 2100
VK7	to	VK9		0800 - 2100
		UA		1300 - 2100

QSP

SUNSPOT CYCLE

"If our predictions are correct, high frequency propagation during the next six to eight years will be marginal. While weeks of solar quiesance will be punctuated by bursts of activity, only those lucky enough to be on the bands at the right time may reap the rewards. There is a way, however, to remove some of the chance in knowing when conditions are favourable for long-distance communications. By establishing immediately a network of world-wide beacon stations in the 10, 15 and 20 metre bands, operators can have continuous indications of propagation conditions over various paths. (The beacons could also be used to conduct comprehensive studies on ionospheric propagation — as a result of such studies we will perhaps learn how to use the HF bands more effectively during periods of sunspot minima)". So writes W4UMF and co-author Paul Liniz concluding an article entiled 'The Sunspot Cycle' in CQ for Mar. '74.

It's on again . . .

Sat. 2nd Nov. — Sun. 3rd Nov.

ANNUAL CONVENTION

of the

WESTERN ZONE

at Hamilton, Victoria

Channel 1, Mt. William, operating.
For an enjoyable weekend.
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Robert Wilkins, VK3AUR
Byaduk, 3285, via Hamilton
Victoria

ICOM

IC 22 FM 10W 144 MHz

Features

- ☐ Switchable Power 1 or 10 Watts
- ☐ 22 Channel Capability
- ☐ Adjustable Deviation
- ☐ Solid State T/R Relay
- ☐ Built-in Protection for P.A.
- ☐ DC Voltages Filtered and Regulated
- ☐ Complete with Mounting Bracket
- ☐ Microphone, Cables etc.
- ☐ Size 58 x 156 x 205 mm

PRICE: $198 INC. TAX
AND 3 CHANNELS
EXTRA CHANNELS $7.80/PR

ALL AVAILABLE EX STOCK with all accessories

IC 21A FM 144 MHz Mobile Base

Features

- ☐ Basic Features of IC 22 with addition of Built-in AC Power Unit
- ☐ DC Operation 13.5 V DC
- ☐ Disc. Meter + SWR Meter
- ☐ Switchable Deviation — Wide/Narrow
- ☐ VFO Operation Possible
- ☐ Continuously Variable Power Output
- ☐ Built-in Calibration
- ☐ Size 111 x 230 x 260 mm

PRICE: $285 INC. TAX
AND 3 CHANNELS
EXTRA CHANNELS $7.80/PR

AVAILABLE EX STOCK

IC 501 CW SSB AM 50 MHz Transceiver

Features

- ☐ Phase Lock Loop VFO
- ☐ Covers 50 - 54 MHz
- ☐ 10 Watts PEP SSB
- ☐ Xtal Filters for AM/CW
- ☐ Xtal Channel Operation
- ☐ AC or DC Operation
- ☐ Size 260 x 230 x 111 mm

PRICE: $428 INC. TAX

ALSO AVAILABLE

IC 60	6 METER MOBILE	$220
IC 31	420 - 450 MHz	$378
IC 30	420 - 450 MHz	$328

OFFICIAL SINGLE BRAND REPS.
Write for details of confidential Credit Terms.

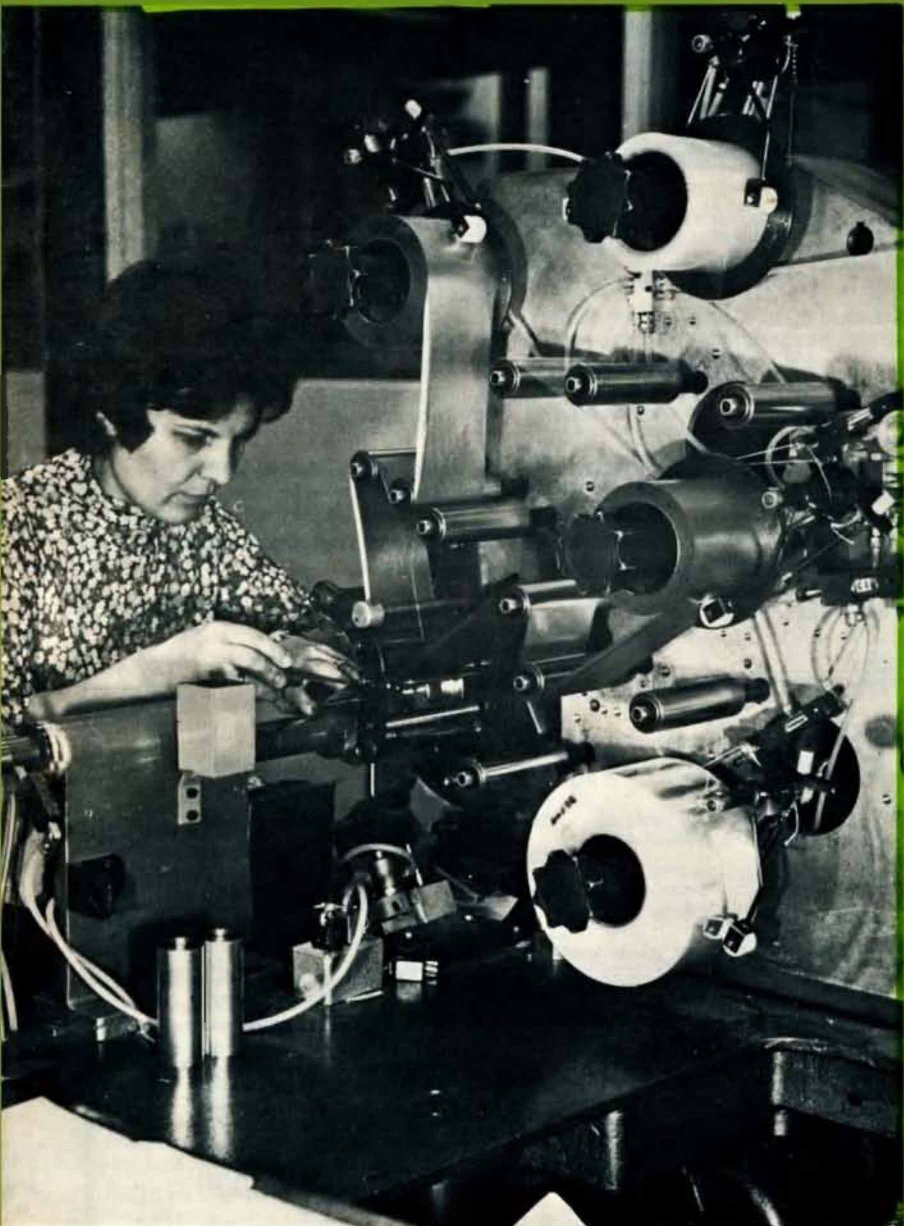
Since devaluation no immediate change of PRICES.

Maico Electronics

MOUNT STREET, HEIDELBERG, VICTORIA 3084 AUSTRALIA. TEL. 45 2615

amateur radio

NOVEMBER, 1974



Despite a lot of talk recently that the component industry in Australia is finished, at least one factory in Melbourne is in full production of capacitors. This particular machine is winding metalised paper capacitors for the telephone industry. Photo: VK3ACA

CONTENTS

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER **Model TE-15**
SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE **Model HE-22D**
AUDIO GENERATOR **Model TE-22D**
SPECIFICATION

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt.
Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8
12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K

Compact-Space Saving
Printed Circuit for uniform Characteristics
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

Disposal Specials — Richmond only

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1 MHz D style ea.	$8.00
100 kHz 7 pin glass enclosed	$10.00
Most popular D style for 2 m FM channels 1, 4, B, 50 etc.	$6.50
58 ohm new ⅛" diameter coax cable 12c/yd or 100 yd	$10.00
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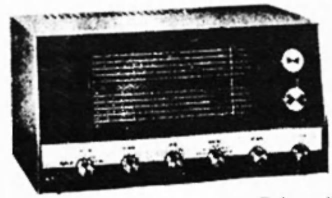
Selsyn motors, 50 volt, new	$5.00
PMG phone plug and socket, Ericcson type, per pair	95c
Phone curly cords, cream	30c
Rocking armature mic. insert	30c
Key switches, various types, 50c &	75c
4/125a Ceramic valve socket	$2.00
7 pin PTFE valve socket with screw-on shield	98c
9 pin as above	98c
Polypak 100 mixed resistors ⅛W-2W all new	$1.90
Polypak 30 assorted capacitors, ceramic, electrolytic polyester, all new	$1.50
Switches, 11 position, 2 pole, 2 bank ceramic	$1.50
Switches, 4 position, 2 pole	$1.00
8 transistor radio cricuit board with all components and battery holder ready to go straight from production line	$3.00
6 transistor, as above	$2.00

LAFAYETTE HA-600A SOLID STATE
GENERAL COVERAGE

5 BANDS 150-400 kHz, 550-1600 kHz (Broadcast band), 1.6-4.8 MHz, 4.8-14.6 MHz, 10.5-30 MHz.
Operates from 12 Volts DC (negative ground) or 220-240 Volts 50 Hz.

- Field Effect Transistors in RF Mixer and Oscillator Stages.
- Two Mechanical Filters for exceptional selectivity.
- Voltage Regulated with Zener Diodes.
- Product Detector for SSB/CW.
- Edge illuminated Slide Rule Dial with "S" Meter.
- Continuous Electricai Bandspread Calibrated 80-100M Amateur Bands.
- Variable BFO, Automatic Noise Limiter.
- Speaker Impedance: 4 to 16 ohms.



Price $215.00
P & P $2.00

Also available — HA800B Amateur Band. 6 Bands 3.5MHz to 29.7MHz and 50-54MHz as above features with 100kHz calibration facility: $210.00. 100kHz Xtal Extra $10.75. P & P $2.00

SOLID STATE WIDEBAND RF SIGNAL GENERATOR
MODEL SG-402

This is an all solid state, wideband RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES

1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

Disposal Specials — Richmond only

5BPI CRO tubes, new	$3.00
Headphones, low impedance, ex-Army in sealed box, pair	$2.00
Tag strips, 7 lug plus 2 mounting lugs 10 for	50c
Egg insulators, porcelain, new, ea.	12c
20 amp DC meter in wooden carrying case	$10.00
Telephone hand set with PTT switch, ex-Army	$1.50
Coil formers, 1¼" with octal plug, 40 cents each or 3 for	$1.00

No. 19 and 62 transceivers, partly wrecked, any reasonable offer accepted.
Personal shoppers only.

TRIO 3" OSCILLISCOPE DC — 1.5 MHz
MODEL CO-1303A
SPECIAL FEATURES

1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
3. All solid state construction for compact, lightweight portability.
4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
5. Direct input to 150MHz for SSB and AM transmission monitoring.

Price $150. p & p $2.00

DISPOSAL SPECIALS

Coax. Cable, 58 ohm Ascand 15 P1/24. Brand new ⅛ outside diameter. 12c per yard. $10 per 100 yard reel.

AWA BEAT FREQUENCY OSCILLATOR from Zero Cycles to 13 kHz, 240 Volt AC $35.

PLESSEY TRANSCEIVERS in stock at present include B47, B48, C42, C45 with power supplies and accessories also available.

Brand new valves and semiconductors

2N3055	$1.00
OA91	15c
807	$2.00
IT4, 6C8, IR5	75c
6BA6-6AK5-6V6G-6J6	$1.00
2E26-QQEO4/7-QQEO4/10	
6SK7-ECH35-6K8G-5763	$3.00
6SJ7GT-12AT7	$1.50

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Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 10.30 a.m. to 5.0 p.m., and on Saturdays to midday.

amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910

NOVEMBER, 1974
VOL. 42, No. 11
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Registered at the G.P.O. Melbourne for transmission by Post as a Periodical— Category "B"

QSP

LICENCE FEES

Since the Government doubled licence fees for the Amateur Service in the recent Budget, strong representations have been made by the Executive through both Governmental and Opposition channels.
Letters were immediately written to the Treasurer, Post-Master General, Minister for Defence and Deputy Leader of the Opposition spelling out our objections to the licence fee increase and the hardships and unwarranted imposition which this placed upon all amateurs in Australia.
Replies, as at time of writing, have been received from the Post-Master General, Minister for Defence and the Deputy Leader of the Opposition.

On the Governmental side, the replies have indicated the matter has now been referred to the appropriate authorities for examination. The Deputy Leader of the Opposition, Mr. Phillip Lynch, replied that he had made urgent representations on behalf of the Institute to the appropriate Ministers and had also referred the matter to Senators Guilfoyle and Durack, both of whom have Opposition responsibility in the areas to which we referred.

It is to be hoped that these representations, together with those made by individual amateurs through their local Members will result, at the very least, in restoration of the old $6 licence fee.
The importance of individual amateurs raising this subject with their own Member cannot be stressed too strongly.
Only by each and every amateur raising his or her voice in protest can we hope to impress upon the Government the full significance of this increased cost.

It would be a great shame if even one amateur were forced, through these economic considerations, to abandon a hobby which provides, on the one hand, great enjoyment and a contribution to international understanding and, on the other hand, the potential for providing valuable emergency communications, the need for which can never be forecast.

JOHN McL. BENNETT, VK3ZA
WIA Executive, Public Relations Officer

DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI
Sundays 10.00 Z —
3595 kHz
27125 kHz AM
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI
11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.868 MHz AM
145.13 MHz AM
Hunter Branch Mondays 19.00h 80m.

VK3WI
10.30 local time Sundays:
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
144.5 MHz AM
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI
09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch 8 FM. BC officer VK4HB.

VK5WI
23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambier on 2m

VK6WI
09.30 local time on Sundays
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM

VK7
09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

THERE MUST BE SOMETHING HERE THAT YOU WANT FOR CHRISTMAS

Books — Here's your chance to become a real expert or take up something new as the Christmas season approaches. We have the best selection anywhere because we actively study what's available all over the world. We can therefore confidently recommend the following:

Radio Amateur Callbook (USA) gives an alphabetical directory listing of names and addresses for every radio amateur in the States, Possessions and personnel overseas. Over 283,000 K and W calls are listed. New edition just published has over 600 pages. (P&P $1.00) $9.95

Foreign Radio Amateur Callbook (DX Listings) covers over 211,000 radio amateurs outside the USA. Companion volume to above. Latest edition runs to over 400 pages. (P&P $1.00) $9.95

Get the two volumes for just $16.00 (P&P $1.00), saving you over $4 on combined purchase.

Radio Amateurs Prefix Map of the World. Specially designed for the shack and must be the centrepiece. Printed in 4 colours. Shows 40 DX zones, plus continental boundaries, time zones, alphabetical listing of prefixes and countries, continents and DX zones. (P&P 50 cents) **Only $1.50**

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Radio Amateurs DX Guide. A wealth of information — International DX log, World Map with prefixes. Time tables, etc. 64 pages. (P&P 50 cents) $3.00

A Course in Radio Fundamentals — ARRL — 26 chapters for home study. Starts from basic theory, goes right through to feedback, etc. $3.75

The ARRL Antenna Book — An accumulation of years of amateur experience. 5 Chapters of theory plus chapters on various designs $4.25

Hints and Kinks — ARRL — If you've got a small amount of money and a good junk box, then away you go! Hundreds of clever ideas $2.00

The Radio Amateur's Operating Manual — ARRL — Written for those who must have the finest technique. 9 chapters cover all aspects. $3.00

FM and Repeaters for the Radio Amateur — ARRL — A good guide written by amateur experts. Wealth of information plus special jargon section. $4.75

SSB for the Radio Amateur — ARRL — A digest of articles from QST tells all about Theory and Practice. $4.75

The Radio Amateur's VHF Manual — A thorough treatment including history. Principles, circuits, test gear, etc., with a practical emphasis. $4.25

Learning the Radiotelegraph Code — ARRL — Uses the 'Sound' conception method which greatly simplifies code learning. $1.00

NEW! The Radio Amateur's Handbook — Latest edition of this widely used book, 25 chapters. Textbook, Data book, Construction Manual. THE reference book. $6.50

The World Radio and TV Handbook — The complete directory. 400 pages giving complete and exact info. on every, yes EVERY, transmitting station in the world. SWL's were queuing up for this one when they first arrived. Useful DXers reference book and many sold to professional radio people. (P&P 75 cents) $5.75

XYLs/Girlfriends/Wives/Lovers — We know how difficult it is to compete with his hobby, but we haven't neglected you. If the following few books don't appeal to you, they will to him!

US Radio Amateur Callbook and Foreign Radio Callbook are listed elsewhere. You can use them to do his QSLs and you'll have something like half a million names and addresses. Failing that you could correspond with their XYLs?

Radio Amateur's Prefix Map, also listed earlier, makes a good excuse to venture into the shack or even get him to tidy up. It's colourful, 28 in. by 40 in. and only **$1.50**. At least you'll be able to know where the callsigns come from.

Ham Notebook has rapidly established itself as essential because it is full of handy tips. Learn a few off by heart or read them to him, you'll be amazed at the effect. This book has been compiled from the top US magazine, 10 chapters, 176 pages. When he congratulates you, tell him Dick let you have the book for only $3.50 instead of the usual $4.50 as a Christmas gift!

One final word, don't tell the OM you read this column, it may upset him.

POWER SUPPLY
suitable for use with 27 MHz transceivers and IC22. Fully regulated 12V @ 3A from 240V main $32.00

Kenwood TS-520 — 160W, SSB transceiver covers 80 to 10 metres. Features noise blanker, VOX, DX switch, 8 pole crystal filter etc. etc. Has fully transistorised receiver with 0.5uV sensitivity on 80 to 15M. Stability is 100Hz per 30 minutes after warm up. Has one IC, 18FETs, 44 transistors, 84 diodes and a 3 tube line up. Heavy duty die cast construction protects components and ensures lasting stability. Operates on 13.8V dc or 240V ac for mobile and field operation. Too many features to list. Call in to Gore Hill and see one. You'll want one at **$543.00** (Road Freight extra).

VHF EQUIPMENT

Icom IC22 144-148 MHz, FM transceiver has power outputs of 1W and 10W. The 22 channels all have separate trimmers. Deviation 5-15 kHz. Features solid state Tx/Rx relay, large built-in speaker, MOSFET front end with 5 helical filters, noise cancelling mic., quick disconnect mobile mount. And if the spec doesn't grab you, the looks will. Soft green back lighting, special transmit light and and even a light to tell you of incoming signals if the volume is turned down. Supplied complete with workshop manual and accessories right down to a silicone cloth to keep the set like new.

Fitted with one set of crystals for 146.00 or 146.5 MHz (please specify). Normal price is $245 but we are introducing them at only **$189.00**, freight anywhere for only $3.50 including insurance).

Kits — Knock one of these popular kits up over your holidays. 30 Watt VHF Amplifier intended for 2 Metres but easily adapted to 6M. Only 300mW in gives a full 30W out from a 12.6V supply. Ideal for mobiles. Uses the ultra-robust 2n5589/90/91 (2N5590 stage not needed for 6M)

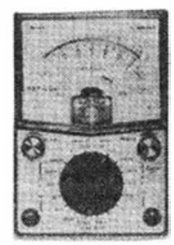
7 Watt stage	2N5589	**$12.50** complete
15 Watt stage	2N5590	**$14.50** complete
30 Watt stage	2N5591	**$18.50** complete

All three stages together for only **$39.50**. If building 6M version please request instructions.

200MHz Counter Kit (E.A. Dec. 73) fully solid state with 4½ decade readout via 7 segment LED displays. Leading zero suppression. Internal crystal timebase or external calibration as required. Inputs from 50mV to 10V rms into 10M across 50pF. Definitely the best value possible. Basic 20MHz counter **$116.00** or with prescaler for full 200MHz use **$136.00** (P&P $2.00).

Digital voltmeter (E.A. Oct. 73) uses the Analog Devices 3½ digit panelmeter with an accuracy of 0.05% plus or minus 1 digit. Covers 200mV to 2kV and 20 ohm to 200k. Complete kit **$145.00** (P&P $2.00).

Note: Both the instruments are supplied with posh cases and front panels so that their appearance lives up to their performance.



FET Multitester Special — Constant 10Meg input impedance, 27 ranges, battery operated, complete in vinyl case. The famous Jayem L55 in our catalogue last year at **$43.50 slashed by $10** just for the first 100 readers buying before Christmas. Check catalogue for impressive spec, then hurry and save $10. Price is now a low **$33.50**. Special probes to suit but only limited quantities at these prices — RF Probe **$9.50**, Temperature Probe, was $11.00, now **$6.50**, 30kV probe, was $11.00, now **$5.00**. HURRY, HURRY!

Catalogue — Dick's new catalogue was published in October's Electronics Today. If you haven't got a copy send 30 cents towards P&P. Catalogue is the usual small print 64 pages. To print it like the other would require around 4 times as many pages which we couldn't afford, so get a magnifying glass. Three pages for Amateurs alone plus all the useful bumph you need but can never find. 50 cent vouchers, Mail Order form etc., etc. Send now

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160-162 Pacific Highway
Gore Hill, 2065 439 5311

Also at 361 Hume Highway, Bankstown (100yds from Chapel Road)
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Dick please send me a copy of your new 64-page catalogue. I enclose 30c towards post and packing.

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QSP
WARNING! RAPID PRINTED CIRCUIT BOARD ETCHING

In recent weeks items have appeared in electronics magazines suggesting the use of a mixture of Hydrogen Peroxide and Hydrochloric acid as a rapid etchant for printed circuit boards. Both chemicals are dangerous in themselves but when mixed and a copper board added an exothermic (heat generating) reaction is started which can go into thermal runaway — with explosive results. The results of flying glass and boiling acid on the surroundings (i.e. you) are too horrifying to contemplate.

Even given that the mixture might not explode, chlorine gas may be given off and the results of inhalation of even a small amount are nasty and lasting. (Chlorine was used during W.W.1 as a poison gas).

The amateur would be well advised to stick with Ferric Chloride solution as it is safe (provided you don't splash it in your eyes or try to drink it) and stable. At room temperature with fresh solution a board should etch in about half an hour and if the solution is warmed etch times as short as 5-10 minutes can be achieved. Do not boil though, as nothing is gained and it tends to spit.

R. Roper

ALLOCATION OF FREQUENCIES

One of the potentially controversial claims made by the 'Third World' (less developed) countries, supported by China, at the WARC (Maritime) in Geneva a few months ago relates to the joint ownership of the radio frequency spectrum by all countries. It appears that these countries actively dispute the historical development of the international allocation system which gives first users the right of protection against newcomers. How far this philosophy will spill-over into allocations not directly relating to the maritime service cannot of course be predicted with any great precision but if it does the amateur bands might present a tempting target. Certainly the 7 MHz amateur band might well be claimed to belong to those broadcasting stations which have populated it for so long by the time WARC 1979 approaches.

UHF TV

The ABCB has announced channelling arrangements for UHF television as a first step towards the future introduction of some TV services on UHF. The UHF channels extend from Channel 28 (526-543 MHz) to Channel 34 (574-582 MHz) in Band IV and from Channel 39 (614-622 MHz) to Channel 63 (806-814 MHz) in Band V and are stated to supplement the existing 13 VHF channels. The non-continuous numbering system arises from the desirability of arranging for uniformity between Australian channels/frequency allocation and the present overseas practice, it is stated. No UHF transmitting has so far been authorised but the need to do so for new types of TV services might arise in possibly 5 years time. In the shorter term, however, the Board would be authorising UHF transmissions to supplement VHF transmissions for "fill-in" type services. No new services, it is said, will use Channel 5 in the future in accordance with the FM Inquiry recommendations and many existing services on this channel will have to change to an alternative channel to make way for the introduction of FM broadcasting.

CALL-SIGN PREFIXES

The following callsign blocks have been allocated: A9A-A9Z Bahrain; C4A-C4Z Republic of Cyprus; H3A-H3Z Republic of Panama. The Republic of Gambia has become the 147th member country of the ITU. XV5AA, XV5AB and XB5AC have been authorised to exchange radiocommunications with other amateur radio stations outside the Republic of Viet-Nam. Radio Comms. Aug. '74.

RECEIVERS

Pat Hawker G3VA in TT (Rad. Comms. Aug. '74) discusses some of the valid reasons in favour of home-brew HF communications receivers quite apart from any natural sense of achievement that comes from such a project. "Just as teenagers can build a performance car that will outperform Detroits' creations on the drag strip, many an amateur can build a better receiver than he can afford to buy. Yet too many of the designs in amateur journals are imitations of commercial designs and although giving their builders valuable experience too often may result in an inferior receiver at a higher cost".

A Sheet Metal Bender

Reprinted from Zero Beat, December 1969

Simple construction and usefulness are combined in this easy to make machine which will bend the softer metals up to 18 gauge and the harder metals up to 24 gauge.

The length of the machine must be determined by the constructor having in mind the largest chassis likely to be required, so plan the size accordingly. The nominal measurements are for 24 inches long overall, giving a bending length of approximately 20 inches.

THE FOUNDATION

The wooden foundation pieces are 1½ inch thick and should be of well seasoned hardwood; the base is 5 inches wide, the hold down 3 inches and the bender 2½ inches wide. Note that the inside edge of the hold down is bevelled to a slope of approximately 80 degrees (the metal edge too) to allow for the natural spring back exerted by metal when bent in length. If the bender is brought tight against the bevel, the metal when relieved of pressure, will spring back to a right angle. The wooden surfaces that come into contact with the metal to be bent are covered with iron, or mild steel, either fully or by 2 inches x ⅛ inch flat, fixed with counter sunk screws set slightly below the surface. If the strip is used rather than the full plate, then build up the surface flush with the metal by using ⅛ inch masonite fixed with glue, nails or counter sunk screws.

The hinges must be robust and free from wobble, so obtain a good pair. A slight clearance must be made in the wood to accommodate the knuckle of the hinge. The hinges may well be fitted before the wooden surfaces are covered, as the two edges must bind as closely as possible to ensure a clean bend. This part is probably the most important so exercise care and accuracy in fitting.

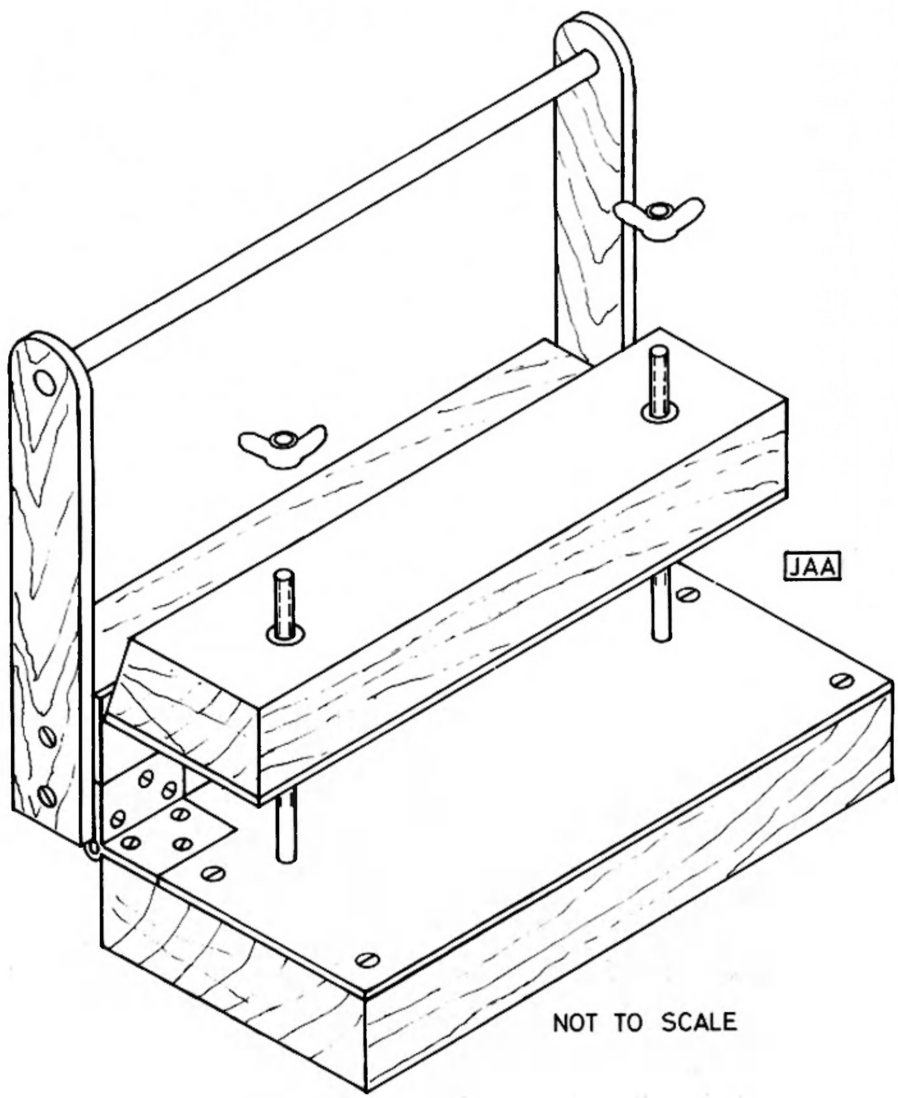
THE HOLD DOWN

This rides freely on two ¼ inch bolts which are a fixture in the base. Hexagon heads, let in, are ideal. The centres are set about 2 inches in from the front edge and from the side. A steel washer under each wing nut will make tightening easier. Slots are required in the hold down for box forming and should be approximately 1½ inch deep. The distances apart are determined by chassis size required and can be put in as required.

Two blades in a hacksaw frame (teeth of each blade opposite to each other) will give sufficient width. The slots are cut into the bevelled edge.

Alternative to cutting slots, a narrow piece of ⅛ inch mild steel could be used, the slots being cut into the wood with a wood saw then the metal cut to length, ends squared and fastened, with a gap, to correspond with the slots in the wood. (Or a number of different length hold downs could be constructed.)

The bender is lowered to a horizontal position and the work allowed to project over the edge of the base as is desired. The material is then clamped with the hold down and the bender pulled up to a vertical position. ●



SSTV Scene — 1974

Doug McArthur VK8KK
9 Bulbul Street, Ludmilla, Darwin

Since earlier articles in AR were published, the popularity of SSTV in Australia has been little short of fantastic. The amount of video coming from Australian shacks is on the increase daily. There are, at this time, more than sixty stations with monitors.

To help those interested in venturing into this field, it was thought wise to let all know of the present state of the art in Australia and overseas.

Import duties make the procurement of commercial equipment quite out of the question for most amateurs. Hence most SSTV equipment used in Australia is of the "home brew" variety.

The need to provide help to would-be Slow Scanners was realised by the Eastern and Mountain District Radio Club (EMDRC) SSTV group, and thus the ground was prepared to provide "State of the Art" printed circuit boards and designs around available commonly procurable local components. To date, the group can supply at cost, printed circuit boards for X51 monitor, X52 camera, SSTV master sync pulse generator, Fast Scan to Slow Scan Sampler, and Video Keyboard.

All of these boards will be supplied with circuits and component details. It is emphazised that these boards are the result of a tremendous amount of research culminating in a finished product which, with little effort, is right up to the state of the Art.

MONITORS

The earlier monitors derived their sync and raster from the distant station and thus when sync was not forthcoming the screen remained blank. It was not long before monitors began to appear whose locally generated ramp generators were synchronized to the incoming video.

This gave the added benefit of a continuously painted raster and even when a slight loss of sync did occur, video information would still be presented in a very recognisable form, and in some cases one would not realise that any disturbance had occurred. Sync derivation techniques improved to allow for better signal to interference ratio. The earlier development of toroidal tuned circuits to extract the 1200 Hz sync pulse has given way to the physically compact use of active filters using operational amplifiers. Some circuits go even further and use phased locked loops. However, this idea has not received as much attention as it deserves.

The X51 monitor board will provide the constructor with the major back-bone for a monitor. It is fully solid state using Operational Amplifiers extensively and commonly available components. The only additional components required to complete the monitor are a CRO tube, EHT supply and basic power supply (+ and — 15 volt regulators are already on the board).

The original use of P7 phosphor tubes (5BP7, 5FP7, 7BP7 etc.) was alright, however, the availability of these tubes now is a problem. Also, deflection and focussing coils were an additional problem as these are likewise very hard to obtain.

Doug VK8KK with home-built slow scan monitor at lower left, fast scan monitor above, Akai tape recorder, and FTDX490 transceiver.

The SSTV group realising this problem, approached a TV tube re-gun manufacturer for an alternative. The outcome was a major breakthrough for the Australian SSTV exponent. After much testing, an E26 phosphor was developed which could be inserted in any TV glass ware. The finished product is a brand new guaranteed tube with a phosphor which could be viewed in relatively bright lighting (Twin 40W fluorescents) something which was only a dream with the P7 phosphor.

At present we are awaiting further tests on several new phosphors imported from the UK. These have very interesting possibilities and hopefully we may be able to further improve the E26 phosphor, which has a very slight tendency to smear and cause slight loss in picture definition compared with the P7 style of phosphor.

Additionally the bright trace was eliminated from the picture during scan. The picture colour is a reddish orange, but after viewing for a short time one quickly adapts to this colour against the green nature of the P7 phosphor. An 11 inch tube can be supplied "off the shelf" for approximately $26.50 plus packing. Eight inch tubes are now a little hard to come by, due to glassware problems. This is most likely caused by TV stations standardising on larger video monitors. However, if you can obtain a tube of smaller dimensions with an intact envelope, EMDRC will rephosphor and re-gun this for you. The most common size of picture raster depends upon the viewing distance, but normally a 6 inch square picture is satisfactory, and going above this size will tend to cause degradation in the picture due to the line spacing.

By using the TV picture tubes, standard focusing, deflection and EHT component parts are used. The normal EHT requirement for this phosphor is about 13.5 kV. This is a compromise between brightness and persistance. **A word of warning:** the screen will burn instantly if a spot or a high intensity picture is left on the screen for any length of time. However, the X51 monitor has "spot kill" and line deflection failure circuits inbuilt for tube protection.

After one has completed his monitor and has overcome his excitement of receiving high quality pictures from all over the world, he quickly wants to get amongst it and send his own video. Probably he has approached one of the SSTV operators and has his CQ call, name and QTH on tape to attract attention, but it's not the same as sending what he wishes when he wishes. Now he faces the decision of how to tackle the problem. He has the basic choice of three directions:

1. Flying Spot Scanner.
2. X52 type of Camera.
3. Fast to Slow Scan conversion technique.

Taking them one by one.

The Flying Spot Scanner can be broken down into two types. "See through" and "Reflective". The "See through" type places the scanned subject between the raster tube and the photo multiplier and is naturally a transparency. The reflective version places the image to be scanned in front of the raster which is focused upon the image. The reflected light intensity is picked up by two photo multipliers placed in front of the lens.

Out of the two, the reflective system is by far the most flexible, enabling the average amateur to find transmission data from books, etc. or his own pen drawings of the appropriate size.

The other method requires the amateur to dabble in photography and thus limits his capabilities. Both systems give the same picture quality. The electronics behind a Flying Spot Scanner are very simple and basic. They would also be by far the most inexpensive. The metal work, etc. in the construction requires a bit of a workshop and poses the biggest headache.

When building a Flying Spot Scanner, several operators have run into smearing definition problems. This has been due to the phosphor of the raster tube. 3BP7, 3FP7 and the like as generally used for this purpose rely on the fast phosphor (the bright blue trace—not the green afterglow) which allows for a fast rise and fall time used in scanning. However, during their time of manufacture (WW2) the prime objective was to produce the "P7" phosphor i.e. the long persistance, and the "excitation phosphor" was not always of a fast writing type. The author has had experience of having three 3BP7s by the same manufacturer produced within a four month period giving completely different results. Only one tube was satisfactory. If you have a smearing or similar problem, this could be your trouble.

Incidentally, while talking CRO tubes, we in VK are trying to convince overseas manufacturers to change the 1 : 1 picture format, for the standard 4 : 3. Even the foremost manufacturer of SSTV equipment uses a 4 : 3 tube but masks out the remainder of the unused tube. Of course, as previously mentioned, the large majority of VK monitors use TV tubes, and technically there are only advantages to be gained. The only draw-back being those using old CRO tubes which give a smaller overall picture. It will not be long before these surplus P7 tubes will become extinct.

Some amateurs would be quite happy to stop at a Fast Scan Sampler and put up with its draw-back of having to prepare all material which is to be sent beforehand. However, the bug normally bites to own a camera and shoot scenes at random.

Improvement always means added expenditure and increased technical finesse!

Example of digital video — produced from home-built keyboard of VK8KK.

Thus we move onto cameras.

X52. This is similar to the commercial SSTV cameras and it derives all its voltage requirements from its matching monitor. It is technically a "fast scan" camera with inbuilt sampling. One should not confuse the term fast scan as related to normal TV transmissions, as the term indicates. However, it runs at a 4 kHz rate, which is then sampled. It can be seen from this that a "fast scan" output is not compatible with normal TV monitors, and thus cannot be displayed on same. Most commercial SSTV systems employ this technique though lately a new brand has come out with the true fast scan sampled camera. The only draw-back with the former system (4 kHz sampled) is that all set up focusing, lighting etc. must be carried out observing your slow scan monitor. This can be frustrating and time consuming, waiting for adjustments to be seen on each subsequent 8 second frame.

However, all is not as dark as might appear. With additional circultry your CRO (if you own one — almost essential for SSTV) can be used to display the 5 kHz picture. It is quite acceptable and allows for instant focusing and set up.

Most SSTV manufacturers advertise a "fast scan" adaptor and in nearly all this is what they refer to.

THE TRUE FAST SCAN SAMPLED TECHNIQUE

Here again the amateur is faced with the most important immediate criterion — cost. What is required is a normal fast scan camera as used in a store security set up. It is possible to obtain one of these if one keeps his ear to the ground and is in the right place at the right time. You could be lucky to obtain one with its own monitor or else an old standard TV receiver will suffice. It is not necessary to have an RF output but one has to bring out the video. Incidentally, having procured a fast scan camera, it opens up the possibility of using this for fast scan transmissions on UHF.

The techniques here have been made very simple, and a fast scan to slow scan converter PC board of latest design is available, with a master sync pulse generator board, from the SSTV group.

By using this technique you can instantly switch from FS to SS without defacing your FS camera (you may wish to sell it later) and at all times watch your picture for alignment. In the slow scan mode your fast scan display will tend to flicker slightly (due to the 16 2/3rd Hz frame rate) but is perfectly readable with very little degradation.

Before leaving video generation techniques, a word about SSTV FM modulators. Some of the older circuits use discreet component multivibrators. These are extremely hard to set up and to hold their settings. The latest thing is the NE566 which is a voltage controlled oscillator and the implementation of one of these plus an Operational Amplifier low pass filter will provide a very stable modulator.

OVERSEAS TRENDS

Most stations you exchange video with outside Australia will be using commercial equipment; however there still remains a hard core body who "roll their own" and exercise new techniques. You will quickly recognise these operators because in general, their video will stand out over the normal run-of-the-mill video.

The latest to come from the USA, namely from W0LMD, is direct conversion from fast scan to slow scan without any modification whatsoever to the camera. This complicated process will digitally convert any fast scan video to slow scan which opens up great possibilities.

Further to this, a slow scan to fast scan system is now working as designed by this same person. This is undoubtedly the slow scanner's dream. To do away with all long persistence phosphor tubes. You would then be able to view all received video on your common fast scan receiver. This process is not easy and requires a very large capacity memory which is loaded at slow scan rate and continuously read at fast scan rate. A project of this nature is almost impracticable for the Australian amateur due to the cost of the IC's needed. However, as the IC continues to fall in price, the practical feasibility draws nearer. Maybe by that time some enterprising person will have designed the complex PC boards.

Obviously the next possibility as a flow on is instant colour slow scan pictures. Technically, with what is available at this very time, it is quite feasible but the catch is how to do it without spending a million dollars.

Another interesting adjunct to the SSTV field is the SSTV video keyboard. As any slow scanner soon finds when trying to have a QSO, or especially in a contest, he ends up with large amounts of paper with call signs, reports, and the like he has been flashing before his camera.

This little magic box eliminates all this. It consists of a keyboard (like a typewriter) in which ASC II characters are generated and eventually converted to SSTV. Hence, you sit back and type away your QSO and video mix with your camera. No fuss, no bother, the hardest thing is the typing. This magic box with its 60 odd ICs will be available from the SSTV group as a PC board by the time you read this.

There is already a great queue of overseas amateurs awaiting its release.

COSTS

The first thing most amateurs ask is "how much will it cost me to get into SSTV?" The second statement is "Oh, it's too difficult for me".

Well, the difficulty angle as previously explained has been overcome by the production of first-class fibre glass solder dipped and gold flashed edge connector PC boards and it is simplicity plus to insert the components.

It is always difficult to put a price tag on a home-built piece of equipment for each amateur has his own degree of junk box. The basic components are hereby listed as a guide, but it must be remembered that nowadays prices change by the hour.

PC board for monitor (X51)	$11.00
PC board for camera (X52)	$11.00
11 inch E26 tube	$26.50 + $1.00 P & P
SSTV sampler	$6.50
SSTV sync pulse generator	$6.50
K7OLO fast to slow scan boards (2 in set)	$20.00 pair
Resistors capacitors IC for monitor —	supplied on request
Resistors capacitors IC for camera —	supplied on request

Monitor and camera kits etc. available on request.

Finally, to answer some of the more general questions that are asked besides availability of circuits and costs which have been covered earlier.

Q. *Where can I obtain information on SSTV?*

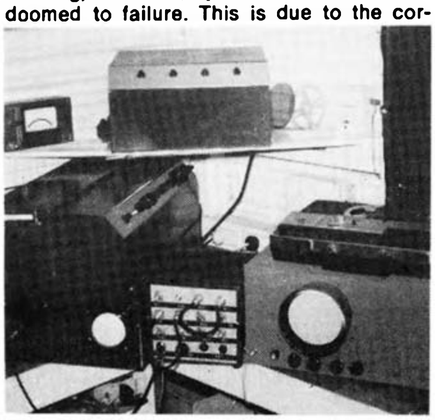
A. SSTV handbook published by 73 available from advertisers in AR or SSTV Group.

Q. *Where do you find SSTV operators?*

A. Mostly on 14 MHz (14230 kHz) which is the most active frequency for all slow scan, but there is activity also on 3565, 7125, 21340 and 28650 kHz when conditions permit.

Q. *How can I record SSTV pictures?*

A. As SSTV signals are FM audio tones anging from 1200 Hz (Sync) to 2300 Hz (white) they can be recorded on a good quality tape recorder. In attempting to record signals blind, (without a monitor working) off air, your results will be doomed to failure. This is due to the correct tuning necessary (In true fact it is not that critical) and without a working monitor is difficult to achieve. SSTV dubbings of tapes for alignment purposes are available to you by sending your tape to the SSTV group. Remember direct electrical patching between recorder and receiver audio is a must, otherwise severe sync pulse distortion will result.



Rig of Barry VK5BS showing home-built flying spot scanner and monitor.

Finally, on tape recorders. Wow and Flutter are the major problems and even with the more expensive cassette types this proves objectionable. Straight lines etc. tend to jitter. Reel to reel recorders to 3¾" or preferably 7½" per second are most satisfactory. However, if you will accept the jitter, use cassettes. Watch out for RFI into your recorder. A lot of cassette recorders with ICs suffer badly in this regard.

Q. *How do I receive information on SSTV?*

A. Join in with the SSTV gang on 14230 kHz and someone will always be willing to slide off the frequency and give you the latest "drum". Everybody is most welcome, but rag-chewing without video on the International SSTV net frequencies should be avoided. SSTV operators in general are poor letter writers and it is quicker to get you acquainted with what concerns you over the air.

Q. *I cannot handle anything with these IC things in them.*

A. A complete untruth! They are simple to fault find and anyway, if you get into trouble, there are plenty of people to help you on 14230. Besides, if you follow the drawings and put the right things in the right place, you should have immediate success. The next SSTV operator has built the same monitor as yours.

Q. *What test equipment is necessary?*

A. (a) Ideally most SSTV stations should be equipped with a DC CRO that will reach to 5 MHz.

(b) Alignment of modulators require precise frequency adjustments which indicates a digital frequency meter; however, tone tapes are available for this purpose.

(c) Normal multimeter etc.

Q. *What modifications to my transmitter are necessary to transmit SSTV?*

A. *Nil* — by using, if you have it, the "phone patch" facilities (e.g. FTDX 400 etc.) the 600 ohms input/output can be fed to and from your SSTV monitor or modulator. Remember SSTV is FM audio and the ratings for PA are continuous duty cycle. Reduce your input accordingly or a PA tube "wipe out" will occur within no time at all. Watch for colour in PA tubes and reduce input below this point when transmitter is correctly tuned.

Typical Symptoms of picture degradation:

Multipath distortion. Picture displaced due to loss of sync or multiple sync. At times picture unreadable even though signals are very strong. Fault is due to propagation causing sync to arrive at different time intervals. Nothing can be done to overcome this trouble. The higher the frequency the less the multi-path effect. Long path signals are less affected than short path of similar or even weaker signal strengths.

Picture too dark — receiver tuned too low in frequency. Often loss of sync will occur at the same time.

Picture too light, lacking in contrast — Receiver tuned too high in frequency. Loss of sync not always noticable and in general vertical sync disappears before horizontal sync.

Snow on picture when signals are strong and sync is good — Too high a level feeding monitor.

One of the most common complaints confronting the SSTV scene revolves around received pictures having too much contrast or too little. In 90 per cent of these cases, the fault lies at the transmission end. It is an easy trap to set up the camera and monitor to give the indications of a perfectly balanced contrast range, however, this need not be so. Thus a "shack standard" must be maintained to overcome this problem. Commercial monitors normally supply a test tape for adjustment purposes. On this tape a grey scale is presented and the monitor should be set up to this standard, controls marked for reference and settings used as such to set up your camera. For those who roll their own, one can procure a test tape as mentioned earlier, or have someone send you grey scale over the air for calibration purposes. Ideally, one should construct a grey scale generator for this purpose. The X51 and E26 monitor combination can easily display six distinct levels of grey scale.

Hopefully, now your interest has been aroused in SSTV, for you can see the way has been paved in VK to help you join in this rewarding aspect of our hobby by allowing you to follow in the footsteps of others who have learned the hard way.

Join in the fun, we hope to *see you* on the nets.

ACTIVE SSTV OPERATORS IN VK, ZL AREAS

VK1AU	Col	VK4NP	Norm
VK2KK	Ted	VK4NO	Tom
VK2KI	Gil	VK5BS	Barry
VK2AGO	George	VK5PV	Peter
VK2BMO	Mike	VK5AV	John
VK3CR	Rod	VK5CY	
VK3TE	Stan	VK5MF	Al
VK3LM	John	VK5WC	Chris
VK3KK	Reg	VK5ZPG	Peter
VK3WX	Bill	VK6CS	Col
VK3PB	Jack	VK7JV	John
VK3EG	Ted	VK7TB	Trevor
VK3MN	Milton	VK7FB	Mike
VK3AQM	Phil	VK7TM	Tom
VK3ABM	Walley	VK8KK	Doug
VK3AQL	Geoff	VK9XX	Tony
VK3AMC	John	P29MC	Mac
VK3BOB	Bob	P29DJ	Graham
VK3BFM	John	ZL1ADW	Malcolm
VK3BAX	Max	ZL1ADY	Ian
VK3YEO	Mac	ZL2AAV	Ralph
VK4TM	Trevor	ZL4PJ	Bronk

SLOW SCAN NET FREQUENCIES

80	3670 kHz	15	21340 kHz
40	7135 kHz	10	28650 kHz
20	14230 kHz		

For information on SSTV, Kits, PC Boards, alignment tapes, picture tubes etc., contact John Wilson, VK3LM, c/- Eastern & Mountain District Radio Club, PO Box 87, Mitcham, Victoria. ●

Telecommand and Telemetry of the OSCAR 6 and 7 Communications Satellites - Part 2

David Hull, VK3ZDH
Project Australis

As had been stated the Australian system of Autocommand was designed and built as a package. Non-availability of computer time on a day to day basis and the possession of certain items of hardware fixed the initial design more on economic grounds than anything else.

AUTOCOMMAND — 2. The Australian System

It was decided from the start to eliminate as much as possible the use of electro-mechanical devices such as tape readers and magnetic tape recorders to ensure as much reliability and freedom from maintenance as possible. Previous experience had proved the practicability of static shift registers and character recognition as a cheap sequential memory source. Baudot code was chosen instead of the more usual ASCII simply because the author owned a Creed Model 78 teleprinter. The initial character recognition of the 31 characters (ignoring upper and lower case) of Baudot has proved more than sufficient for Oscar 6. However, Oscar 7 will require the use of 35 command words alone so upper and lower case memory circuits will be added to allow expansion.

The choice of memory length in terms of bits was taken as a result of the unique window of the Itos satellites (and hence Oscars 6 and 7 which were flown as secondary payloads with these satellites) over Australia. The Itos orbit pattern results in 2 groups of visible orbits over Eastern Australia in a 24 hour period, 3 to 4 orbits centred on 0800 hours east and a second group centred on 2200 hours east. A period of some 8 hours exists in the middle of the day when no orbits are visible. This pattern of command requirements led to the choice of 2 independently loaded shift register memories for a 24 hour period.

MINIMUM LOAD 3 ORBITS 512 BITS

```
TR % % C C V V
  WTR % % % B B V V V C C
  WTR % 7 B C V %
NNNN
```

Words are 2 letters (16 bits) long.

MNEMONIC LIST. Australian Auto Command

Load stop functions only	1st let	2nd let	
Memory Select	Ø	7	
(Ø Deselects Previous Mem)	Ø	8	
	Ø	9	
LOAD	L	D	
READ	R	D	
LOAD or READ FUNCTIONS			
WAIT		W	To be followed by wait period (Hexadecimal x 10)
Transmitter ON	T	R	
Antenna Move (NOT USED) (16 bit word)	M		This is 1st letter of 3 letter group.
COMMAND 1		Z	(TRANSPONDER ON)
2		X	(TRANSPONDER OFF) THESE ARE THE
4		C	(435.1 mhz Beacon off) MAIN COMMANDS
8		V	(Telemetry to 10 WPM) USED.
9		B	(AGC ENABLE)
17		A	(Clock Reset)
TRANSMITTER OFF	CR	LF	
Print (Teleprinter)	P	R	
Stop Printing	P	S	
Stop (Reverts to load stop)	N	N	N N

Figure 6 Sample Frame of Teletype Telemetry Data

```
11001-10111-00000-00101-11101-01010-11111-10101-00111-11011
11001-10111-00000-00101-11101-01010-11111-10101-00111-11011
00977-01558-02873-03730-04157-05534-06368-07198-08614-09734
10854-11220-12348-13149-14000-15674-16075-17598-18664-19025
20238-21363-22532-23123-24672-25389-26131-27506-28907-29211
30871-31089-32140-33585-34613-35831-36722-37255-38234-39189
40645-41452-42950-43001-44335-45786-46479-47362-48919-49604
50057-51482-52942-53717-54451-55184-56999-57500-58236-59968
```

It was decided early to only pre-programme 24 hours in advance to allow maximum flexibility for last minute changes and as a safety measure in case of power failure, etc. It has been found in the many months of operation of this system that the author is in attendance to check approximately 80 per cent of the orbits commanded. A further benefit of the choice of 2 memories to cover 24 hours has been the ability to use a simple elapsed time clock between orbits. The "wait" period has been fixed at 100 min. and this is derived by counting 50 Hz mains cycles.

With Oscar 6's orbit period of 114.994 minutes the 100 minute wait period allows commands to be sent over at least the initial 50 per cent of the orbit pass. Letters (or symbols) from the shift registers are read in groups of 2 or 3, depending on whether antenna positioning is required, at intervals of 1 minute during the orbit. A "minute" word therefore is of 16 or 24 bit length (2 bits are used as the letter stop function instead of the usual one, to allow even subdivision of the 512 and 1024 bit shift registers used). A two letter "word" is used for the more critical control functions such as "transmitter on" or "off" as a safety measure. Single letters within the 16 or 24 bit minute word are used for command selection and antenna positioning and for time wait periods.

It is intended to allow a more versatile wait period by using a programmable divider as part of the wait clock with its programming code selected as the 2nd letter of the wait command. This will be added when time allows. As the attached mnemonic list shows certain control functions such as memory load, memory read and memory selection (4 separate shift registers of varying multiples of 512 bits are available) can only be selected when the shift register clock source is disabled (stop mode). All control functions are sent from the teletype keyboard in the stop mode. This allows positive checking of S.R. load as a teletype print out. Correct timing is assured by parity check circuits, also the S.R. are always filled to capacity. The recognition of 4 successive 'N' will disable the S.R. clock and place the system back in the load stop mode, i.e. under the command of the keyboard. Figure 1 is an example of a "minimum" load of 512 bits covering 3 orbits and the intervening wait periods.

Antenna positioning is not used in this example, i.e. an omni directional antenna is used. This is adequate for orbits 15° max. elevation or more. Directional antennas on azimuth-elevation mounts must be used on lower elevation orbits or where weather conditions (hot days) may cause bending of the command signal. When antenna positioning is not required a 16 bit (2 letter) word is selected and the appropriate antenna controls switched off. When antenna positioning is required a 24 bit word is used and the first and second letters within the 24 bit minute word frame are used to stop the azimuth and elevation units (in 10° increments) when required. Autohoming circuits are used on these control units after each orbit. The azimuth unit used is a modified commercial Stolle rotator and the elevation unit was made for the author from a DC motor with worm gear drive and remote lead sensing by a friend. The last letter of the 16 or 24 bit word is used to select the command to be sent and through a latch and matrix selects the 3 bit of 7 code to be sent on the command encoder board. This command is sent in brackets of 5 at 1 second intervals at each minute period. The drive to the transmitter is removed between these bursts of commands so that a minimum of radiated signal is used.

As the block diagram shows, the transmitter final power amplifier, a 4C x 250R vacuum tube, which is in a class C protective bias situation, has plate and screen, heater, and bias voltage applied for the whole of the pass. 1 minute before the satellite is due, recognition of the word TR applies power to the heater and bias circuits of the tube and to its blower; 40 seconds after this a time delay relay applies plate and screen power. 20 seconds after this, at the next 1 minute word, the first command is sent when the RF exciter and driver, which are all solid state, are energised. Sufficient drive is used to overcome the bias. Recognition of the characters CrIf turns off power to all stages and the next word sets the wait period until the next orbit.

Positive check is maintained on the system by a series of LED indicators including a 7 segment

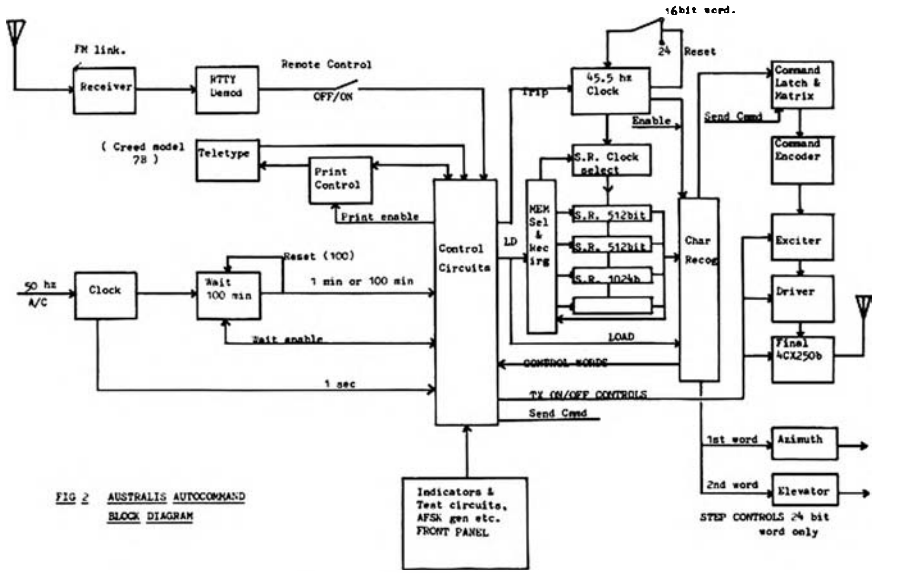


FIG 2 AUSTRALIS AUTOCOMMAND BLOCK DIAGRAM

numeric led indicator which indicates the SR in use and a 3 figure (7 segment leds again) bit counter on the system clock. A further 3 figure counter on the wait clock is being installed.

Several peripheral circuits have been added to allow control of the teleprinter to save paper when printout is not required. Because the system uses the Amateur standard 45.5 Hz Baudot code speed provision has been made to allow remote control of the system and memory loading through an RTTY link on command frequency via an AFSK demodulator built into the unit. This allows precise starting of the clock and hence the whole memory system from a remote source if need be. Other subsystems allow continuous clock operation to check memory loads and provision for dumping the loads into a cassette recorder via a phase coherent AFSK generator also built into the hardware.

The hardware involved is mounted on a total of 15 small plug-in boards to allow easy modificating and servicing. TTL small and medium scale integration is used wherever economically feasible. The SR and some other minor items are National Semiconductor Mos. The matrix at present in use to select the 3 or 7 code is to be replaced by a PROM to eliminate the Huge matrix required for 35 separate commands. The total number of IC involved is approximately 120 and all the NON RF hardware and power supplies are contained within a 7" depth sliding 19" rack tray.

A system of standard orbits in 5° increments of equator crossings is used to predict AZ and EL settings for each orbit. These are generated by a small Fortran programme which allows prediction for any part of the world by specifying the latitude and longitude co-ordinates. A further programme is supplied to each command station that predicts orbits in terms of minute by minute corrections to AZ and EL. As will be seen by the above description the autocommand is just a controller and nothing else. It depends entirely on the correct programme being fed in as 'software' and also on the programme being started at the correct point in time. A more long term and sophisticated alternative is at present under development around one of the new single IC 8 bit parallel processors now available. It is planned with this unit to build virtually a dedicated minicomputer so that the standard orbit programme can be stored and a long term operational programme can be implemented by automatic reference to them and a suitable time reference. It is also hoped to supply these units to the other command stations, nominated by AMSAT world wide, as a 'standard' package.

(To be concluded)

The "Pasatest" Communicating Calculator

Roy Hartkopf, VK3AOH
34 Toolangi Road, Alphington, 3078

There are so many calculators and minicomputers on the market nowadays that to merit the claim that it is the ultimate in its field, the Pasatest Communicating Calculator must be — as indeed it is — a fantastic piece of electronics.

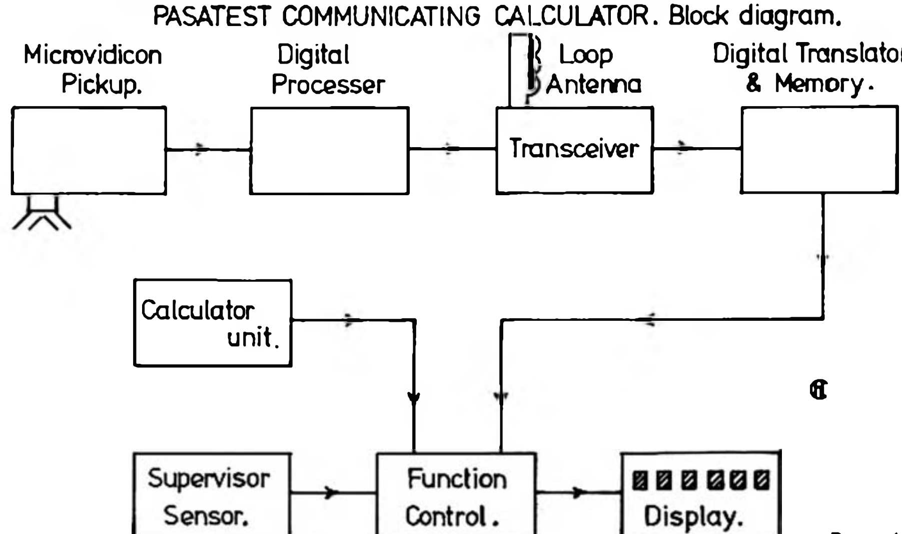
In appearance it is exactly like the average medium priced pocket calculator, but internally the Pasatest is completely different. It is, if one can coin a phrase, actually a digtal handie talkie designed to enable its fortunate owner to pass any examination for which he wishes to sit.

The heart of the unit as can be seen from the block diagram, is a micro teletype transceiver with the difference that instead of a spacer printout the characters appear on the twenty digit alphanumerical display. When he receives the examination paper the owner places the calculator on it, presses a key marked FIX, and casually moves the instrument over the paper. A microvidicon scans the writing and feeds the information into the digital processor and it is then transmitted to a friend with a similar instrument in a parked car near the building. The friend writes out the answer and transmits it to the examinee who copies it down as it appears on the alphanumeric display. So that he can copy at his own pace, each group of words is displayed until the PRO. (proceed) button is pressed, when the next group appears.

A further refinement is the built-in SUPERVISOR DETECTOR which, if a supervisor comes within three metres of the examinee, automatically converts the instrument into an ordinary calculator. When the danger has passed the examinee presses the PRO. (proceed) button and carries on copying down the answer. It will now be clear why the manufacturers, A. S. Windell Ltd., of Trilton on the south coast of Tasmania, do not put their own name on the calculator but market a variety of models exactly resembling various internationally known makes of pocket calculator. All models are at present in extremely short supply but if anyone wishes to send cash or postal notes to the value of $73,000.00 (seventy three thousand dollars) to the writer as a **deposit** he will endeavour to procure a pair as soon as possible.

NOTE 1.—If desired the PASATEST COMMUNICATING CALCULATOR can be directly interfaced to a computer, eliminating any human error. An alternative readout in the form of an automated biro is also under development.

PASATEST COMMUNICATING CALCULATOR. Block diagram.



The Wagga Floods — and the Amateur Radio Communications Network September 1974

Harry Hendriks, VK2ZHX
Wagga District Radio Club,
P.O. Box 25, Wagga Wagga, 2650

Members of the Wagga District Radio Club recently proved that once again Amateur radio communication capability is an essential part of this country's Civil Defence, and emergency scheme.

The Murrumbidgee River proved how vicious it could be during late August and early September. Twice it rose to serious flood levels. On Thursday 29th August the mammoth task of evacuating almost the entire population of North Wagga was commenced, for it was envisaged that a severe flood would hit the city within 24 hours. The calculated height was to be in the 31 to 32 feet range. At this height North Wagga would certainly be covered with at least 3 to 4 feet of water. However, due to continued heavy discharge from Burrinjuck Dam plus continued increases in local rainfall, it was realised by the authorities early on Friday the 30th that the river would reach an all-time high of over 35 feet. (The highest reading for over 100 years). The peak was reached late Friday night at 35 feet 3 inches.

In so far as the Wagga District Radio Club was concerned, they were initially requested by Civil Defence to be on standby as a back-up for the existing SSB and 27 MHz equipment. As early as Thursday night it was obvious that the Civil Defence Systems would not be satisfactory for the "short haul" work that was to be done. Long skip on 3730 kHz, many on-frequency heterodynes, plenty of ZLs, plus great quantities of general transient noise interference, was making the passing of even simple routine messages a very time-consuming affair. Coupled to this was the continuously increasing need for fast "evacuation-type" messages from North Wagga back to Civil Defence Headquarters on the city side of the river.

At approximately 10 p.m. on Thursday, the Wagga and District Radio Club VHF Net was officially called in to replace Civil Defence SSB on the major traffic handling nets. Continuous traffic was then passed (via WDRC VHF) between the Wardens Post evacuation centre and Headquarters. Whilst our Amateur message handling was far removed from the official Civil Defence procedure, we would mention that at the peak of traffic important messages were being handled, without any known errors, at a rate of at least two a minute. The noise-free signals that were being exchanged between our operators via VHF over such a relatively short distance when compared with the noises and problems present with the HF SSB did impress many influential people on the scene. When it was realised that the river was to reach in excess of 35 feet, Civil Defence ordered all personnel out of North Wagga (including our team, minus their vehicle which was abandoned).

The major scene of activity then switched to the main city side of the river. For those readers who have never visited Wagga we would mention that many miles of major levee banks surround the entire northern side of our city, with minor banks protecting the eastern and western sectors. With the prospects of at least a 35 foot river, and with the major levee bank designed many years ago to stand against a 36 foot river, a very serious situation had developed. A concentrated effort was made by every available service facility in Wagga to generally reinforce and increase in height all levee banks. As the river rose, the main duty of WDRC VHF operators was to now work with Civil Defence levee patrols and to report problems and requirements as they appeared. At one time during the Friday night there were five VHF mobiles on patrols with reports going directly to Local Headquarters of Civil Defence.

To go into details of the various situations and experiences encountered during the operation would take pages to relate. Suffice to say that the WDRC supplied continuous communication between base and out-stations from around 10 p.m. on Thursday till around 11 a.m. on the Saturday. By this time the Murrumbidgee was past its peak at Wagga and was very slowly falling. An electricity authority team took over from the WDRC on routine levee patrols and our members took a well earned rest on stand-by.

Because of the high average rainfall in our area this year, it was found that the surrounding flooded country-side was very slow in "running off", and as late as Wednesday many adjacent areas to the river were still covered by feet of still water.

On Thursday 5th September, with the river still in this swollen state, word was received that a second flood could be expected by the weekend. Expected height would be in the region of 31 feet.

Once again the WDRC was called in to provide all local Civil Defence communications. Two VHF bases were set up (Local Headquarters and North Wagga School), plus two river reading posts approximately 6 and 12 miles up stream. In addition to these "fixed" stations, levee bank patrols in North Wagga were to be covered by VHF. The whole relief operation this time was centred on the saving of North Wagga homes from being inundated with water for the second time in just over one week. The operation was successful due to the efforts of many volunteers from all sections of the community. This second flood resulted in our operators being again on duty continuously from 9 a.m. on Friday 4th till 9 a.m. on Sunday 6th September, when the river had peaked and was slowly falling.

At the time of writing, the areas surrounding the Murrumbidgee from Gundagai to Narrandera are mostly covered with various depths of still, muddy water. We all hope that we have seen the last of floods for many years, but with an unusually high snow build-up in the catchment area waiting to thaw, plus the rather ominous looking weather maps, we are feeling a little uneasy at the moment. ●

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GENERAL

Frequency Range: 3.5–4.0 MHz, 7.0–7.5 MHz, 14.0–14.5 MHz, 21.0–21.5 MHz, 28.0–30.0 MHz, WWV 15 MHz (receive only).

Mode: Selectable USB, LSB, CW or AM.
Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100Hz 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: 32 Transistors, 9 FET, 6 Integrated Circuits, 52 Diodes and 3 Tubes.
Power Requirement: 100/110/117/200/220/234 V AC, 50/60 Hz, 380 Watts maximum, or 13.5V DC nominal, 6.7 A for standby, 0.7 A for receive (Heater OFF) and 24 A for transmit.
Size: 340(W) x 153(H) x 285(D) m/m.
Weight: 15 Kg.

RECEIVER

Sensitivity: 0.3 μV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz.
Selectivity: 2.4 KHz nominal bandwidth at 6 dB down, 3.8 KHz at 60 dB down on SSB, CW and AM. 600 Hz nominal bandwidth at 6 dB down, 1.2 KHz at 60 dB down with optional CW filter. 600 Hz nominal bandwidth at 6 dB down, 12 KHz at 60 dB down with optional AM filter.
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 6 μV. Selectable AGC time constant, fast or slow. Fast attack time 3 milli-second and slow attack time 5 milli-second. Fast release time 0.35 second and slow release time 2 seconds.
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. (Slightly lower on 10 meter.)
Microphone: 50 K Ohm dynamic type.
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WIRELESS INSTITUTE OF AUSTRALIA

PROJECT AUSTRALIS

STANDARD ORBITS — OSCAR 6

This set of Standard Orbits and the Ascending Nodes (the longitude in degrees West and the time in hours, minutes and seconds, G.M.T., of the satellite's path over the Earth, when it crosses the Equator, travelling into the Northern Hemisphere) is the only information needed to track OSCAR 6. It also allows calculation of when the satellite will be in range of the areas around other State capitals.

The morning (Southbound, at around 0900, local time) orbits over Australia have Ascending Nodes between 80 and 290 degrees West, while the evening (Northbound, at 2100 local time) orbits have Ascending Nodes between 150 and 275 degrees West. As a guide, the morning orbits will have smaller numbers at the start of the "ASCN NODE ADD MINS" column (between 56 and 82 minutes), than the evening orbits (between 86 and 104 minutes).

Ascending Nodes will be transmitted in Morse Code by the Codestore system on OSCAR 6 (29.45 and 435.1 MHz), and will also be announced on the weekly Divisional broadcasts.

If you are in or near Sydney, and want to track a (morning) orbit which has an ascendin node of 359 degrees West at 2157 G.M.T., select the closest Standard Orbit from the Sydney set — 360 degrees West. Add 58 minutes to 2157 G.M.T., and you will hear the satellite at 2255 G.M.T. Time, azimuth and elevation points are given every two minutes on the Standard Orbits.

Because the satellite is in an almost circular (1460Km), near-polar orbit, with each orbit being completed in 115 minutes, given one Acending Node (say, 330 degrees West at 1905 G.M.T.), later Ascending Nodes can be determined by simply adding the distance in degrees which separates the orbits at the Equator (the Nodal Increment, 28.8 degrees), to 330, and adding 115 minutes to 1095 G.M.T. The result is, in round figures, 359 degrees West at 2157 G.M.T., for the next orbit.

To see whether the orbit which you are tracking in Sydney will be in range of Perth, look at the Perth Standard Orbit which corresponds with the orbit that you are following. If you are tracking an orbit with an Ascending Node of 359 degrees West and are using the 360 degrees West Standard Orbit for Sydney, OSCAR 6 will be in range of Sydney from 58 to 78 minutes after the Ascending Node (2255 to 2315 G.M.T., on the example above), a total of 20 minutes. The same orbit will be in range of Perth from 68 to 78 minutes after the Ascending Node (2305 to 2315 G.M.T.). Therefore, that orbit will be in range of both Sydney and Perth from 2305 to 2315 G.M.T., so that 10 minutes of contact through the satellite will be possible. By slecting an orbit that passes midway between Sydney and Perth (e.g., an Ascending Node of 25 degrees West), contacts of up to 18 minutes are possible. For contact with New Zealand, orbits to the East of Australia should be used, while for contacts into Asia, orbits in the North and West should be used.

Users of Standard Orbits should note that the sets of Southbound Orbits start towards the end of the set (315 degrees West for Sydney) and resume at the beginning of each set (0 degrees West for Sydney), ending near the middle of the set (45 degrees West for Sydney). They are then immediately followed by the first of the Northbound orbits (150 degrees West for Sydney). It was not possible in the short time available after the OSCAR 6 launch rocket was changed to put the Southbound orbits in continuous order).

Assuming a launch at 1715 G.M.T., on 9th, October, the first Ascending Nodes bringing orbits in range of Australia will be: —

Orbit 1 324 W at 1842 GMT 9/10/72 Southbound
Orbit 2 353 W at 2037 GMT 9/10/72 Southbound
Orbit 3 22 W at 2232 GMT 9/10/72 Southbound
Orbit 4 50 W at 0028 GMT 10/10/72 Southbound
Orbit 8 166 W at 0809 GMT 10/10/72 Northbound
Orbit 9 194 W at 1004 GMT 1/10/72 Northbound
Orbit 223 W at 1159 GMT 10/10/72 Northbound
Orbit 252 W at 1354 GMT 10/10/72 Northbound

Any change in the OSCAR 6 launch date will alter the times, but not the longitudes of the Ascending Nodes. Any alterations will be notified on Divisional broadcasts.

INSERT WITH AMATEUR RADIO OCTOBER 1972

ADELAIDE

ASCN NODE 0. W.

ADD MINS	AZ	EL
60.0	46	0
62.0	51	7
64.0	58	14
66.0	68	23
68.0	85	32
70.0	112	38
72.0	141	35
74.0	162	26
76.0	174	17
78.0	181	9
80.0	186	2

ASCN NODE 5. W.

ADD MINS	AZ	EL
60.0	37	3
62.0	43	11
64.0	49	20
66.0	59	31
68.0	80	44
70.0	119	50
72.0	154	41
74.0	172	28
76.0	181	15
78.0	186	9
80.0	190	2

ASCN NODE 10. W.

ADD MINS	AZ	EL
60.0	31	6
62.0	33	16
64.0	37	25
66.0	46	40
68.0	78	59
70.0	138	64
72.0	173	45
74.0	184	29
76.0	189	17
78.0	191	8
80.0	193	1

ASCN NODE 15. W.

ADD MINS	AZ	EL
58.0	21	1
60.0	21	8
62.0	21	17
64.0	22	29
66.0	24	48
68.0	35	75
70.0	187	78
72.0	194	44
74.0	195	27
76.0	196	16
78.0	196	7
80.0	196	0

ASCN NODE 20. W.

ADD MINS	AZ	EL
58.0	12	2
60.0	11	10
62.0	8	19
64.0	4	32
66.0	355	50
68.0	311	72
70.0	221	61
72.0	211	39
74.0	207	24
76.0	202	14
78.0	20[illegible]	5

ASCN NODE 25. W.

ADD MINS	AZ	EL
58.0	3	3
60.0	360	10
62.0	355	19
64.0	346	31
66.0	327	45
68.0	287	55
70.0	243	47
72.0	223	33
74.0	213	20
76.0	207	11
78.0	203	4

ASCN NODE 30. W.

ADD MINS	AZ	EL
58.0	354	3
60.0	349	10
62.0	341	19
64.0	329	27
66.0	310	37
68.0	278	41
70.0	249	35
72.0	230	26
74.0	219	16
76.0	211	9
78.0	206	2

ASCN NODE 35. W.

ADD MINS	AZ	EL
58.0	345	2
60.0	339	8
62.0	337	15
64.0	316	22
66.0	297	23
68.0	274	33
70.0	261	26
72.0	234	20
74.0	223	12
76.0	215	6
78.0	209	0

ASCN NODE 40. W.

ADD MINS	AZ	EL
58.0	337	0
60.0	329	6
62.0	319	11
64.0	306	17
66.0	289	21
68.0	270	21
70.0	252	19
72.0	237	14
74.0	226	9
76.0	217	3

ASCN NODE 45. W.

ADD MINS	AZ	EL
60.0	321	3
62.0	311	8
64.0	298	12
66.0	284	14
68.0	268	15
70.0	252	13
72.0	239	9
74.0	228	5
76.0	219	0

ASCN NODE 50. W.

ADD MINS	AZ	EL
60.0	313	4
62.0	304	6
64.0	292	7
66.0	279	9
68.0	261	9
70.0	252	7
72.0	240	5
74.0	231	2

ASCN NODE 55. W.

ADD MINS	AZ	EL
62.0	298	0
64.0	287	2
66.0	275	4
68.0	263	4
70.0	251	3
72.0	240	1

ASCN NODE 65. W.

ADD MINS	AZ	EL
66.0	272	0
68.0	261	0

ASCN NODE 160. W.

ADD MINS	AZ	EL
104.0	101	0
106.0	91	0

ASCN NODE 165. W.

ADD MINS	AZ	EL
100.0	122	1
102.0	111	3
104.0	99	4
106.0	87	4
108.0	75	3
110.0	64	1

ASCN NODE 170. W.

ADD MINS	AZ	EL
98.0	132	1
100.0	122	4
102.0	110	7
104.0	97	9
106.0	83	9
108.0	70	7
110.0	58	4
112.0	48	1

ASCN NODE 175. W.

ADD MINS	AZ	EL
96.0	142	0
98.0	134	4
100.0	123	8
102.0	110	12
104.0	95	14
106.0	79	14
108.0	64	12
110.0	51	8
112.0	41	4

ASCN NODE 180. W.

ADD MINS	AZ	EL
96.0	144	2
98.0	136	8
100.0	125	13
102.0	111	18
104.0	93	21
106.0	74	21
108.0	57	17
110.0	43	12
112.0	33	7
114.0	25	1

ASCN NODE 185. W.

ADD MINS	AZ	EL
96.0	146	5
98.0	139	11
100.0	128	18
102.0	112	25
104.0	91	29
106.0	67	29
108.0	47	23
110.0	33	16
112.0	23	9
114.0	16	1

ASCN NODE 190. W.

ADD MINS	AZ	EL
94.0	154	1
96.0	150	7
98.0	143	15
100.0	132	24
102.0	115	34
104.0	88	40
106.0	56	39
108.0	34	29
110.0	20	19
112.0	12	11
114.0	7	4

ASCN NODE 195. W.

ADD MINS	AZ	EL
94.0	157	3
96.0	154	10
98.0	148	19
100.0	144	30
102.0	122	44
104.0	82	55
106.0	38	46
108.0	17	33
110.0	7	21
112.0	1	11
114.0	357	4

ASCN NODE 200. W.

ADD MINS	AZ	EL
94.0	160	4
96.0	158	12
98.0	155	22
100.0	150	36
102.0	135	56
104.0	68	73
106.0	9	54
108.0	357	34
110.0	352	21
112.0	351	11
114.0	347	3

ASCN NODE 205. W.

ADD MINS	AZ	EL
94.0	164	4
96.0	164	14
98.0	164	25
100.0	165	41
102.0	171	65
104.0	317	81
106.0	331	52
108.0	338	32
110.0	331	19
112.0	331	10
114.0	339	2

ASCN NODE 210. W.

ADD MINS	AZ	EL
92.0	167	0
94.0	168	7
96.0	171	15
98.0	175	26
100.0	184	42
102.0	212	61
104.0	281	62
106.0	312	43
108.0	322	27
110.0	327	16
112.0	329	7
114.0	331	0

ASCN NODE 215. W.

ADD MINS	AZ	EL
92.0	170	1
94.0	173	8
96.0	177	16
98.0	185	26
100.0	211	39
102.0	253	50
104.0	274	46
106.0	298	33
108.0	310	22
110.0	317	12
112.0	321	5

ASCN NODE 220. W.

ADD MINS	AZ	EL
92.0	173	1
94.0	178	8
96.0	184	16
98.0	196	25
100.0	214	34
102.0	243	38
104.0	271	34
106.0	290	25
108.0	301	16
110.0	308	8
112.0	313	1

ASCN NODE 225. W.

ADD MINS	AZ	EL
92.0	176	2
94.0	182	8
96.0	191	15
98.0	205	22
100.0	224	28
102.0	247	29
104.0	268	24
106.0	283	18
108.0	294	11
110.0	301	4

ASCN NODE 230. W.

ADD MINS	AZ	EL
92.0	179	2
94.0	187	8
96.0	197	13
98.0	211	19
100.0	231	22
102.0	249	21
104.0	266	17
106.0	279	12
108.0	288	6
110.0	294	0

ASCN NODE 235. W.

ADD MINS	AZ	EL
92.0	183	2
94.0	192	7
96.0	203	11
98.0	217	15
100.0	233	16
102.0	250	15
104.0	264	11
106.0	275	6
108.0	284	2

ASCN NODE 240. W.

ADD MINS	AZ	EL
92.0	186	1
94.0	196	6
96.0	208	9
98.0	221	11
100.0	236	11
102.0	250	9
104.0	262	6
106.0	272	2

ASCN NODE 245. W.

ADD MINS	AZ	EL
92.0	189	1
94.0	199	4
96.0	211	7
98.0	224	8
100.0	237	7
102.0	250	5
104.0	260	1

ASCN NODE 250. W.

ADD MINS	AZ	EL
92.0	192	0
94.0	203	3
96.0	214	4
98.0	226	4
100.0	238	3
102.0	249	1

ASCN NODE 255. W.

ADD MINS	AZ	EL
94.0	205	1
96.0	217	1
98.0	228	1

ASCN NODE 320. W.

ADD MINS	AZ	EL
74.0	130	1
76.0	141	1
78.0	151	1
80.0	161	0

ASCN NODE 330. W.

ADD MINS	AZ	EL
70.0	109	0
72.0	120	2
74.0	131	4
76.0	144	4
78.0	155	3
80.0	166	1

ASCN NODE 335. W.

ADD MINS	AZ	EL
68.0	98	1
70.0	108	4
72.0	120	6
74.0	133	7
76.0	146	7
78.0	159	5
80.0	169	2

ASCN NODE 340. W.

ADD MINS	AZ	EL
66.0	87	1
68.0	96	5
70.0	108	9
72.0	121	11
74.0	136	11
76.0	150	10
78.0	162	6
80.0	172	2

ASCN NODE 345. W.

ADD MINS	AZ	EL
64.0	75	1
66.0	83	5
68.0	94	10
70.0	109	14
72.0	124	16
74.0	140	15
76.0	155	12
78.0	167	8
80.0	176	3

ASCN NODE 350. W.

ADD MINS	AZ	EL
64.0	70	5
66.0	79	11
68.0	92	16
70.0	108	20
72.0	127	22
74.0	145	19
76.0	160	14
78.0	171	9
80.0	179	3

ASCN NODE 355. W.

ADD MINS	AZ	EL
62.0	58	3
64.0	65	9
66.0	75	16
68.0	89	23
70.0	109	28
72.0	132	28
74.0	152	23
76.0	167	16
78.0	176	9
80.0	183	3

ASCN NODE 360. W.

ADD MINS	AZ	EL
60.0	46	0
62.0	51	7
64.0	58	14
66.0	68	23
68.0	85	32
70.0	112	38
72.0	141	35
74.0	162	26
76.0	174	17
78.0	181	9
80.0	186	2

ASCN NODE 0. W.

ADD MINS	AZ	EL

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ASCN NODE 0. W.

ADD MINS	AZ	EL
62.0	28	5
64.0	29	13
66.0	31	23
68.0	35	38
70.0	47	60
72.0	132	76
74.0	182	53
76.0	191	33
78.0	194	20
80.0	195	10
82.0	196	3

ASCN NODE 5. W.

ADD MINS	AZ	EL
60.0	19	0
62.0	18	6
64.0	18	15
66.0	17	26
68.0	14	43
70.0	7	68
72.0	221	77
74.0	20[illegible]	49
76.0	201	31
78.0	20[illegible]	18
80.0	191	9
82.0	190	2

ASCN NODE 10. W.

ADD MINS	AZ	EL
60.0	11	0
62.0	9	7
64.0	6	16
66.0	1	27
68.0	351	43
70.0	321	63
72.0	249	62
74.0	213	43
76.0	211	27
78.0	20[illegible]	16
80.0	20[illegible]	7
82.0	201	0

ASCN NODE 15. W.

ADD MINS	AZ	EL
60.0	2	1
62.0	359	8
64.0	35[illegible]	16
66.0	34[illegible]	26
68.0	333	39
70.0	298	51
72.0	25[illegible]	48
74.0	229	35
76.0	21[illegible]	23
78.0	209	13
80.0	20[illegible]	6

ASCN NODE 20. W.

ADD MINS	AZ	EL
60.0	351	1
62.0	349	7
64.0	342	15
66.0	331	24
68.0	31[illegible]	33
70.0	28[illegible]	39
72.0	25[illegible]	37
74.0	234	28
76.0	221	19
78.0	212	11
80.0	20[illegible]	4

ASCN NODE 25. W.

ADD MINS	AZ	EL
60.0	345	0
62.0	33[illegible]	6
64.0	33[illegible]	13
66.0	31[illegible]	20
68.0	302	26
70.0	280	30
72.0	25[illegible]	28
74.0	23[illegible]	22
76.0	22[illegible]	15
78.0	215	8
80.0	20[illegible]	2

ASCN NODE 30. W.

ADD MINS	AZ	EL
62.0	330	4
64.0	321	10
66.0	309	15
68.0	294	20
70.0	275	22
72.0	255	21
74.0	239	17
76.0	226	11
78.0	217	5
80.0	209	0

ASCN NODE 35. W.

ADD MINS	AZ	EL
62.0	327	2
64.0	315	7
66.0	301	11
68.0	287	14
70.0	271	16
72.0	251	15
74.0	241	12
76.0	221	8
78.0	218	1

ASCN NODE 40. W.

ADD MINS	AZ	EL
64.0	301	3
66.0	291	7
68.0	281	10
70.0	261	11
72.0	251	10
74.0	241	8
76.0	221	4
78.0	21[illegible]	1

ASCN NODE 45. W.

ADD MINS	AZ	EL
64.0	299	0
66.0	289	3
68.0	277	5
70.0	265	6
72.0	252	6
74.0	240	4
76.0	229	1

ASCN NODE 50. W.

ADD MINS	AZ	EL
68.0	273	1
70.0	262	2
72.0	250	2
74.0	231	1

ASCN NODE 150. W.

ADD MINS	AZ	EL
100.0	112	0
102.0	101	0

ASCN NODE 155. W.

ADD MINS	AZ	EL
96.0	133	0
98.0	122	2
100.0	111	3
102.0	99	4
104.0	87	3
106.0	76	2

ASCN NODE 160. W.

ADD MINS	AZ	EL
96.0	133	2
98.0	122	5
100.0	111	7
102.0	9[illegible]	8
104.0	83	6
106.0	70	5
108.0	60	2

ASCN NODE 165. W.

ADD MINS	AZ	EL
94.0	143	1
96.0	134	5
98.0	127	9
100.0	109	12
102.0	94	13
104.0	78	12
106.0	65	10
108.0	53	6
110.0	43	1

ASCN NODE 170. W.

ADD MINS	AZ	EL
94.0	144	3
96.0	135	6
98.0	123	13
100.0	108	17
102.0	90	19
104.0	73	18
106.0	57	14
108.0	45	9
110.0	36	4

ASCN NODE 175. W.

ADD MINS	AZ	EL
92.0	152	0
94.0	145	6
96.0	137	12
98.0	124	18
100.0	108	23
102.0	87	26
104.0	66	24
106.0	49	19
108.0	36	12
110.0	27	6
112.0	20	0

ASCN NODE 180. W.

ADD MINS	AZ	EL
92.0	154	2
94.0	148	8
96.0	139	15
98.0	127	23
100.0	108	31
102.0	82	34
104.0	56	31
106.0	38	23
108.0	26	15
110.0	18	8
112.0	12	1

ASCN NODE 185. W.

ADD MINS	AZ	EL
92.0	155	3
94.0	150	11
96.0	143	19
98.0	131	30
100.0	110	40
102.0	75	45
104.0	43	38
106.0	24	27
108.0	14	17
110.0	7	8
112.0	3	2

ASCN NODE 190. W.

ADD MINS	AZ	EL
92.0	157	5
94.0	154	13
96.0	149	23
98.0	138	36
100.0	115	52
102.0	61	58
104.0	24	45
106.0	9	29
108.0	1	16
110.0	357	9
112.0	354	2

ASCN NODE 195. W.

ADD MINS	AZ	EL
90.0	161	0
92.0	166	7
94.0	158	15
96.0	155	26
98.0	149	43
100.0	129	66
102.0	30	71
104.0	359	47
106.0	352	30
108.0	349	17
110.0	347	8
112.0	345	1

ASCN NODE 200. W.

ADD MINS	AZ	EL
90.0	161	1
92.0	161	8
94.0	161	17
96.0	16[illegible]	29
98.0	16[illegible]	48
100.0	17[illegible]	75
102.0	327	70
104.0	33[illegible]	44
106.0	33[illegible]	27
108.0	337	16
110.0	337	7
112.0	337	0

ASCN NODE 205. W.

ADD MINS	AZ	EL
90.0	165	2
92.0	166	9
94.0	169	19
96.0	174	31
98.0	185	49
100.0	229	67
102.0	296	57
104.0	316	38
106.0	323	23
108.0	326	13
110.0	328	5

ASCN NODE 210. W.

ADD MINS	AZ	EL
90.0	167	3
92.0	170	10
94.0	175	19
96.0	184	31
98.0	204	45
100.0	245	53
102.0	284	44
104.0	303	30
106.0	312	19
108.0	317	10
110.0	320	3

ASCN NODE 215. W.

ADD MINS	AZ	EL
90.0	169	4
92.0	174	11
94.0	182	20
96.0	194	30
98.0	217	39
100.0	250	41
102.0	277	34
104.0	294	23
106.0	303	14
108.0	309	6
110.0	312	0

ASCN NODE 220. W.

ADD MINS	AZ	EL
90.0	172	4
92.0	178	11
94.0	188	19
96.0	203	27
98.0	226	33
100.0	252	32
102.0	273	25
104.0	287	17
106.0	296	10
108.0	302	3

ASCN NODE 225. W.

ADD MINS	AZ	EL
90.0	175	5
92.0	183	11
94.0	194	18
96.0	210	24
98.0	231	26
100.0	252	24
102.0	269	18
104.0	281	12
106.0	290	6
108.0	296	0

ASCN NODE 230. W.

ADD MINS	AZ	EL
88.0	170	0
90.0	177	5
92.0	187	11
94.0	191	16
96.0	21[illegible]	20
98.0	235	21
100.0	257	18
102.0	266	13
104.0	277	7
106.0	285	2

ASCN NODE 235. W.

ADD MINS	AZ	EL
88.0	172	0
90.0	180	5
92.0	191	10
94.0	204	14
96.0	220	16
98.0	237	15
100.0	251	12
102.0	264	8
104.0	273	3

ASCN NODE 240. W.

ADD MINS	AZ	EL
88.0	174	1
90.0	183	5
92.0	194	9
94.0	208	12
96.0	223	13
98.0	238	11
100.0	250	8
102.0	261	4

ASCN NODE 245. W.

ADD MINS	AZ	EL
88.0	176	1
90.0	186	5
92.0	198	8
94.0	211	9
96.0	225	9
98.0	238	7
100.0	249	4
102.0	259	0

ASCN NODE 250. W.

ADD MINS	AZ	EL
88.0	178	1
90.0	189	4
92.0	201	6
94.0	213	7
96.0	226	6
98.0	238	3
100.0	248	0

ASCN NODE 255. W.

ADD MINS	AZ	EL
88.0	180	1
90.0	191	4
92.0	203	5
94.0	215	5
96.0	227	3
98.0	237	0

ASCN NODE 260. W.

ADD MINS	AZ	EL
88.0	182	1
90.0	193	3
92.0	205	3
94.0	217	2
96.0	227	0

ASCN NODE 265. W.

ADD MINS	AZ	EL
88.0	184	1
90.0	195	2
92.0	207	1
94.0	218	0

ASCN NODE 270. W.

ADD MINS	AZ	EL
86.0	175	0
88.0	186	1
90.0	197	1
92.0	208	0

ASCN NODE 275. W.

ADD MINS	AZ	EL
86.0	177	0
88.0	188	0
90.0	199	0

ASCN NODE 280. W.

ADD MINS	AZ	EL
86.0	179	0
88.0	190	0

ASCN NODE 285. W.

ADD MINS	AZ	EL
84.0	169	0
86.0	180	0

ASCN NODE 290. W.

ADD MINS	AZ	EL
82.0	160	0
84.0	171	1
86.0	182	0

ASCN NODE 295. W.

ADD MINS	AZ	EL
80.0	151	0
82.0	162	1
84.0	173	1
86.0	184	0

ASCN NODE 300. W.

ADD MINS	AZ	EL
78.0	141	1
80.0	152	2
82.0	164	2
84.0	175	2
86.0	186	0

ASCN NODE 305. W.

ADD MINS	AZ	EL
76.0	131	1
78.0	142	3
80.0	154	4
82.0	166	4
84.0	177	2

ASCN NODE 310. W.

ADD MINS	AZ	EL
74.0	121	1
76.0	131	4
78.0	143	6
80.0	156	6
82.0	168	4
84.0	179	2

ASCN NODE 315. W.

ADD MINS	AZ	EL
72.0	110	1
74.0	120	5
76.0	132	7
78.0	145	8
80.0	159	7
82.0	171	5
84.0	181	2

ASCN NODE 320. W.

ADD MINS	AZ	EL
70.0	99	1
72.0	108	5
74.0	120	9
76.0	133	11
78.0	148	11
80.0	162	9
82.0	174	6
84.0	184	2

ASCN NODE 325. W.

ADD MINS	AZ	EL
68.0	88	0
70.0	96	5
72.0	107	9
74.0	120	13
76.0	136	14
78.0	151	13
80.0	165	10
82.0	177	6
84.0	186	1

ASCN NODE 330. W.

ADD MINS	AZ	EL
68.0	84	4
70.0	93	9
72.0	106	14
74.0	121	18
76.0	139	18
78.0	155	16
80.0	169	11
82.0	180	6
84.0	188	1

ASCN NODE 335. W.

ADD MINS	AZ	EL
66.0	72	3
68.0	79	8
70.0	90	14
72.0	105	20
74.0	123	23
76.0	143	22
78.0	161	18
80.0	174	12
82.0	183	6
84.0	189	0

ASCN NODE 340. W.

ADD MINS	AZ	EL
64.0	61	0
66.0	65	6
68.0	74	13
70.0	86	20
72.0	104	27
74.0	127	29
76.0	149	26
78.0	167	20
80.0	178	13
82.0	186	6
84.0	19[illegible]	[illegible]

ASCN NODE 345. W.

ADD MINS	AZ	EL
64.0	54	4
66.0	60	11
68.0	68	19
70.0	82	28
72.0	104	35
74.0	133	37
76.0	158	30
78.0	173	21
80.0	183	13
82.0	189	5

ASCN NODE 350. W.

ADD MINS	AZ	EL
62.0	44	0
64.0	47	7
66.0	52	15
68.0	60	25
70.0	76	37
72.0	165	46
74.0	143	44
76.0	168	33
78.0	180	21
80.0	187	12
82.0	191	5

ASCN NODE 355. W.

ADD MINS	AZ	EL
62.0	36	3
64.0	38	10
66.0	42	19
68.0	50	31
70.0	66	48
72.0	118	60
74.0	160	51
76.0	179	34
78.0	187	21
80.0	191	11
82.0	194	4

ASCN NODE 360. W.

ADD MINS	AZ	EL
62.0	28	5
64.0	29	13
66.0	31	23
68.0	35	38
70.0	47	60
72.0	132	76
74.0	182	53
76.0	191	33
78.0	194	20
80.0	195	10
82.0	196	3

KW E-ZEE MATCH, an efficient coupling unit of the Z match type for use from 80 to 10 metres over a wide impedance range. For use with balanced or coaxial feed lines at up to IKW PEP.

KW-107 SUPERMATCH, an all in one unit, combines an E-ZEE match, Antenna switch, Dummy Load and SWR/PWR meter for balanced or coaxial feeds. Wide impedance matching range at up to IKW PEP.

ALSO AVAILABLE:

KW-160, an "L" network coupler especially for 160M, can also be used right through 80 & 40 for single wire or co-ax feed. Similar size and appearance to the E-ZEE.

KW-109. Higher power version of the KW-107, same size but employing higher voltage condensers and heavier coils.

KW MULTIBAND antenna traps. Comprises two special trap coils, ceramic centre "T" insulator and instructions for a 108 ft. 80-10M dipole, using co-ax or twin 70 ohm feeder.

KW BALUN, ferrite 1 : 1 suitable for 50 or 70 ohms, lightweight and waterproof, has screw terminal connection.

KW-103 SWR/power meter, toroidal pick-up type for accuracy and reliability, 0-30 MHz. A quality unit.

KW DUMMY Load, air cooled, up to 1 KW, 0-70 MHz, 52 and 75 ohm.

KW ANTENNA Switch, 3 position co-ax switch with UHF type teflon connectors, usable up to 500 MHz, 1 KW PEP, cross-talk better than —80db.

KW-108 MONITORSCOPE, connects in antenna line for visually monitoring your transmission. Includes built-in two tone oscillator.

KW-2000E 160-10 M SSB transceiver, pair 6146 B P.A., superb construction, with matching A.C. P.S. and speaker unit.

KW-1000 80-10 M linear amplifier, uses pair of 572/T160L triodes in grounded grid circuit. Fan cooled, double screened P.A. Panel meter reads current, voltage and S.W.R.

Also available: Barlow-Wadley XCR-30 receiver, AM/FM digital clock radios; A comprehensive range of Hy-Gain, Newtronics, Cushcraft and Asahi antennas; SWR meters; Rotators; Morse Keys; Digital clocks, etc.; Plus, of course, the full range of Yaesu Musen transceivers, transmitters and receivers.

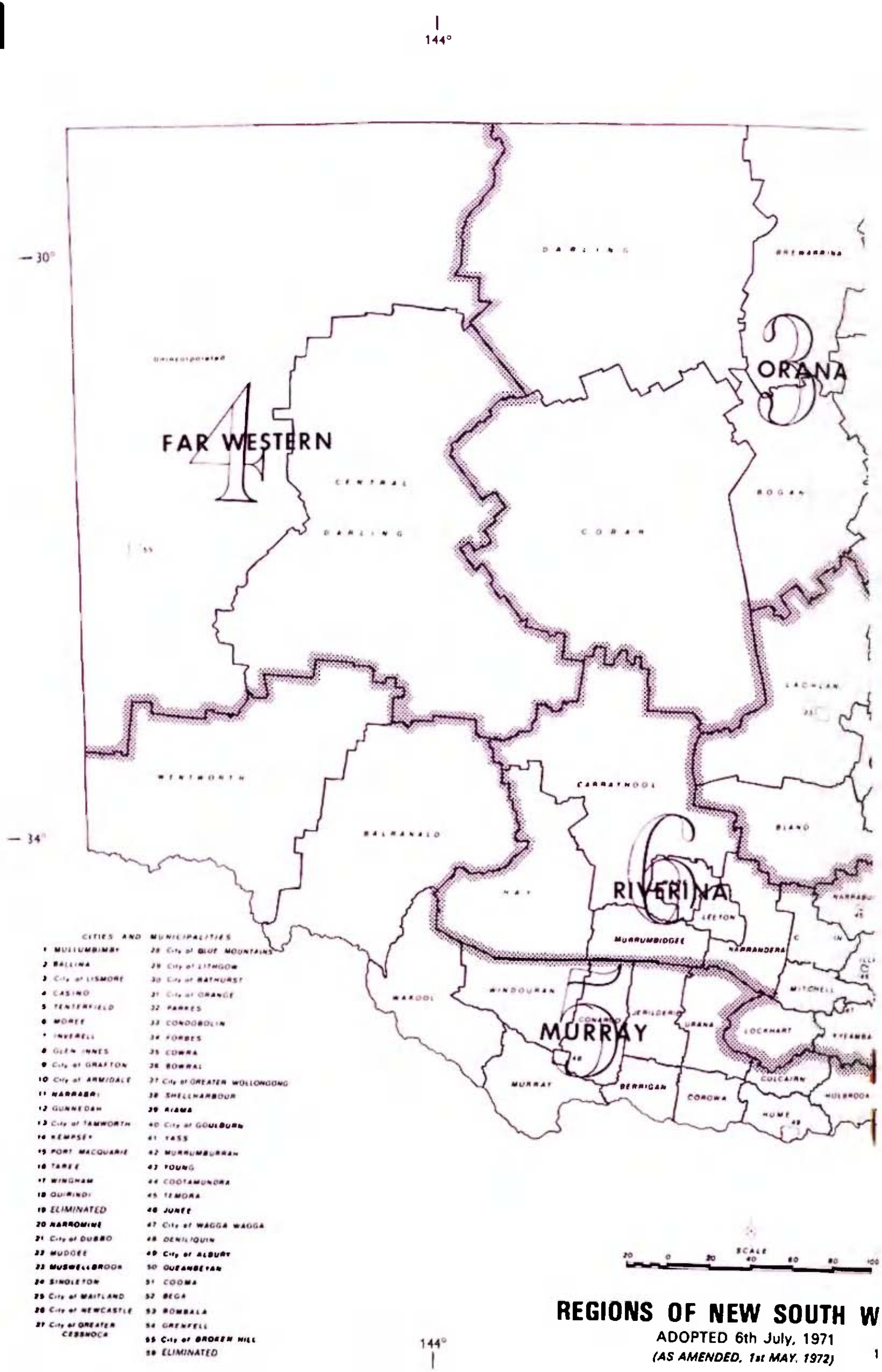
The items on this page are but a few from our large and still growing range of accessories. If the accessory you require is not shown on this page then call us or our agents, we're sure to have it.

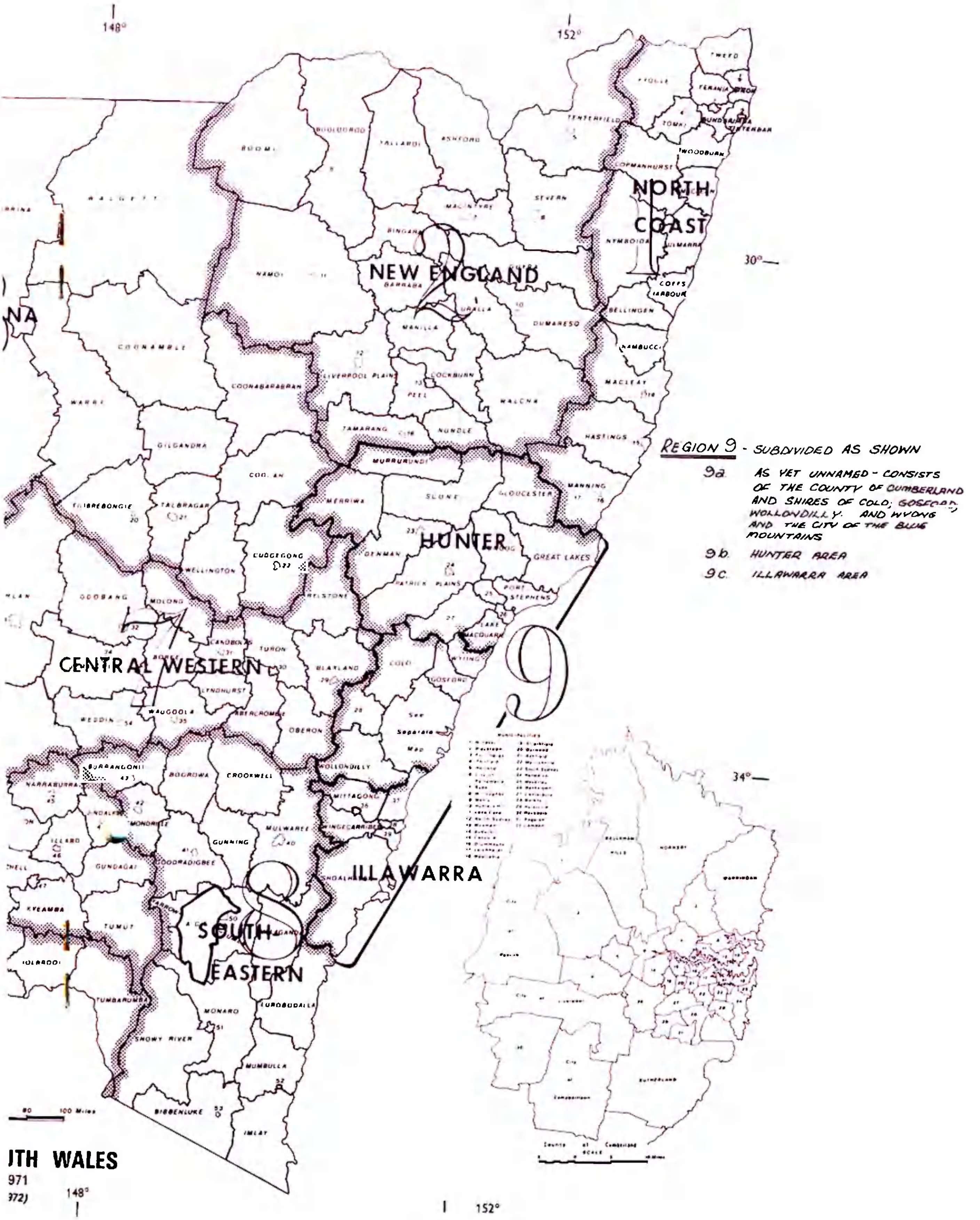
bail ELECTRONIC SERVICES

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 56, Mascot, 2020	Ph.	Day 667 1650 A.H. 371 5445
S.A.	FARMERS RADIO PTY. LTD. 257 Angas Street, Adelaide, 5000.		Ph. 23 1268
W.A.	H. R. PRIDE, 26 Lockhart Street, Como, 6152.		Ph. 60 4379

VK2 WICEN and Broadcast zones




148°
152°
30°
34°
NORTH COAST
1
NEW ENGLAND
2
CENTRAL WESTERN
HUNTER
9
ILLAWARRA
SOUTH EASTERN
8
NA
REGION 9 - SUBDIVIDED AS SHOWN
9a. AS YET UNNAMED - CONSISTS OF THE COUNTY OF CUMBERLAND AND SHIRES OF COLO, GOSFORD, WOLLONDILLY AND WYONG AND THE CITY OF THE BLUE MOUNTAINS
9b. HUNTER AREA
9c. ILLAWARRA AREA
TWEED
KYOGLE
TERANIA
TOMKI
TENTERFIELD
WOODBURN
COPMANHURST
BOOMI
BOOLOOROO
YALLAROI
ASHFORD
WALGETT
SEVERN
MACINTYRE
BINGARA
NYMBOIDA
ULMARRA
NAMOI
BARRABA
URALLA
DUMARESQ
COFFS HARBOUR
BELLINGEN
NAMBUCCA
COONAMBLE
MANILLA
LIVERPOOL PLAINS
COCKBURN
PEEL
MACLEAY
COONABARABRAN
WARREN
WALCHA
TAMARANG
NUNDLE
HASTINGS
GILGANDRA
MURRURUNDI
COOLAH
MANNING
TALBRAGAR
MERRIWA
SCONE
GLOUCESTER
GREAT LAKES
CUDGEGONG
DENMAN
WELLINGTON
PATRICK PLAINS
PORT STEPHENS
GOOBANG
MOLONG
RYLSTONE
LAKE MACQUARIE
CANOBOLAS
TURON
WYONG
BLAXLAND
COLO
GOSFORD
LYNDHURST
WAUGOOLA
ABERCROMBIE
WEDDIN
OBERON
See Separate Map
BURRANGONG
BOGROWA
CROOKWELL
NARRABURRA
WOLLONDILLY
MITTAGONG
MONDRIE
GUNNING
MULWAREE
WINGECARRIBEE
GOORADIGBEE
GUNDAGAI
SHOALHAVEN
KYEAMBA
TUMUT
TUMBARUMBA
EUROBODALLA
MONARO
SNOWY RIVER
MUMBULLA
BIBBENLUKE
IMLAY
100 Miles
JTH WALES
971
972)
HORNSBY
WARRINGAH
SUTHERLAND
County of Cumberland
SCALE

(Continued from April, 1974)

SOUTH AUSTRALIA

VK5SD—R. S. Amos, 13 Kenwyn Drive, Campbelltown, 5074
5SF—M. H. Wood, 3 Wilson Street, Elizabeth Downs, 5113
5ZLO—L. F. Powning, 6 Oxford Street, Somerton Park, 5044
5ZMC—L. N. Coventry, 33 Creighton Avenue, Morphettvale, 5162

WESTERN AUSTRALIA

VK6ZCE—T. C. Bazen, 89 Thornlie Avenue, Thornlie, 6108

TASMANIA

VK7AF—J. E. Nicholson, Postal: Private Bag 200, Launceston, 7250; Station: "Marylands", East Tamar Highway, Launceston, 7250
7LW—L. W. W. Tacey, 39 Kaoota Road, Rose Bay, 7015
7OB—J. R. O'Brien, 37 New Town Road, New Town, 7008
7RW—R. M. McLennan, 14 Derwent Avenue, Lindisfarne, 7015
7ZAX—Dr. D. L. Mitchell, 8 Woolton Place, Sandy Bay, 7005
7ZMP—J. M. Powell-Davies, 30 Lanoma Street, Launceston, 7250

NORTHERN TERRITORY

VK8RR—R. R. Hooper, Postal: PO Box 288, Darwin, 5794; Station: 3 Lambell Terrace, Darwin, 5794

CHANGE OF ADDRESS

VICTORIA

VK3BA—A. E. Bromeley, 54 Normanby Street, Cranbourne, 3917
3HS—G. Strachan, 409 Mt. Dandenong Road, Croydon, 3136
3NW—F. K. McTaggart, Change of Postal Address: 21 Ellsmore Avenue, Killara, N.S.W., 2071
3TG—E. L. Blackmore, 2 Willow Court, Kyabram, 3620
3AIQ—J. Glenn, "Surrey" Old Main Road, Ferny Creek, 3786
3AKT—M. K. Tulloch, Cnr. Dow and Bellar Aves., Irymple, 3498
3BCT—R. D. Trickett, 22 Waratah Street, Ascot Vale, 3032
3BGN—R. W. Rogers, 16 Merritt Ave., Werribee, 3030
3ZFK—F. Swainston, 11 Brownlow Court, Epping, 3076
3ZEH—A. C. Carreck, 20 Albert Road, Hallam, 3803
3ZIN—A. S. Wedgwood, Lot 5, Anzac Road, Warrandyte South, 3134
3ZOD—Schmidt, Callsign VK3ZOD Not VK3ZOO

QUEENSLAND

VK4EM—R. L. Reseck, 119 Kate Street, Indooroopilly, 4068
4WX—W. Wishart, Unit 10, Malla Court, 43 MacDonald Road, Margate, 4019
4ZDL/T—Rev. De Laver, 10 Church St., Boonah, 4310
4ZRJ—R. Harris, 82A Jubilee Terrace, Bardon, 4065
4ZSR—R. W. Rigg, 61 Surf Street, Mermaid Beach, 4218

SOUTH AUSTRALIA

VK5ZEW—P. J. Wilsen, 23 Marlborough Road, Westbourne Park, 5041
5QZ—J. A. Hackworth, 6 Tamar Crescent, Banksia Park, 5091
5ZTS—T. Scholten, F12/15 Wakefield Street, Kent Town, 5062
5WI—Wireless Institute of Australia, S.A. Division, VHF Group—6 Tamar Cres., Banksia Park, 5091

WESTERN AUSTRALIA

VK6EJ—E. J. R. Cowles, 11 Centaur Road, Bluff Point, 6530

TASMANIA

VK7SS—P. R. Tompson, 48 Cross Street, New Town, 7008

NORTHERN TERRITORY

VK8DA—Darwin Amateur Radio Club Inc., Postal: PO Box 1418, Darwin, 5794; Station: East Point Reserve, Darwin, 5794

CANCELLED STATIONS

VICTORIA

VK3DI—A. F. Meynderts. Not renewed
3JI—P. R. Gilbert. Not renewed.
3RT—R. A. Tozer. Not renewed.
3AFN—J. R. Nugent. Transferred to A.C.T.
3AHI—J. C. Eagon. Not renewed.
3AXB—J. Linden. Not renewed.
3RZZ—Wireless Institute of Australia, Vic. Division. Not renewed
3YEX—A. E. Fisher. Not renewed.
3YFG—D. W. Edwards. Not renewed
3ZEG—T. S. Gray. Not renewed
3ZET—R. J. Abell. Not renewed
3ZKR—J. M. Carter. Not renewed
3ZGZ—M. J. Howden. Not renewed
3ZNG—A. Boyle. Not renewed
3ZXA—D. L. Mitchell. Transferred to Tasmania
3ZXZ—M. Adlamd. Not renewed

QUEENSLAND

VK4EM—R. L. Reseck, 119 Kate Street, Indooroopilly, 4068 (shown November as VK4EN, incorrect)
4KH/T—K. F. Hoffman, 10 Duce Street, Toowoomba, 4350 (shown as VK4HK/T, incorrect)
4SH—S. T. Henkel, 32 Randall Road, Wynnum West, 4178 (deceased)
4ZHM—H. T. Moores, 6 Thomas Street, Wilston, 4051 (Now VK4IJ)
4ZIT—I. L. Tinney, 19 Fifth Avenue,, St. Lucia, 4067

WESTERN AUSTRALIA

VK6SO—J. Sollis. Non-payment renewal fee
6ZHI—P. A. Bradshaw. Non-payment renewal fee
6AF—RAAF Pearce-Amateur Radio Club. Ceased operations

MAY, 1974

NEW STATIONS

AUSTRALIAN CAPITAL TERRITORY

VK1YS—P. W. Bowers, 4 McCay Place, Pearce, 2607
1ZBE—N. C. Welstead, 21 Vogelsang Place, Flynn, 2615

NEW SOUTH WALES

VK2FI—B. L. Maguire, 5 Kimberley Road, Carlingford, 2118
2FQ—F. H. Hailstone, 18 Alan St., Seaforth, 2092
2NY—D. G. Hallam, 2 St. Johns Rd., Blaxland, 2774
2AJX—J. W. Wilmott, 6 Winchester Ave., Lindfield, 2070
2AKP—L. I. Howell, 17 Sherwin Avenue, Castle Hill, 2154
2ATJ/T—T. E. King, 5/59A Boronia St., Kensington, 2033
2BFF—D. C. Foster, 223 Clovelly Rd., Clovelly, 2031
2BFO—B. F. Orr, 8 Glenside St., Balgowlah, 2093
2BFP—B. E. Cloudesley, 7 Point St., Bateau Bay, 2262
2BZB—S. J. Blair, 17 Deborah Place, Eastwood, 2122
2BZC/T—P. B. Webster, 25 Bayview Avenue, Earlwood, 2206
2BZD/T—J. B. Webster, 25 Bayview Avenue, Earlwood, 2206
2BZE—M. S. Hort, 44 Strata Avenue, Barrack Heights, 2528
2YCC—K. A. Blow, "The Nook", Jacques Ave., Peakhurst, 2210
2YCE/T—C. J. Erwin, 5 Allawah Road, Pymble, 2073
2YCG—G. Archibald, 26 Benghazi Rd., Carlingford, 2118
2YCH—J. K. Gilin, 50 Barton St., Oak Flats, 2527
2YCI—B. Robertson Dunn, 182 Warringah Road, Beacon Hill, 2100
2YCL—C. G. Levitt, 18 Mooramba Ave., Lane Cove, 2066
2ZJP/T—J. H. The 2nd Powell, Flat 2/55A Carter Street, Cammeray, 2062
2ZNR, N. R. Tiefer, 191 Vimiera Rd., Eastwood, 2122
2ZPB—P. F. Bell, 2 Numantia Rd., Engadine, 2233
2ZVU/T—J. R. Trenning, 48 Chisholm Avenue, Avalon, 2107

VICTORIA

VK3IL—D. N. Baker, 30 Madden St., North Balwyn, 3104
3APA—F. R. Kent, Flat 17, 10/18 Minnie Street, Brunswick, 3056
3AWD—W. D. Melrose, 23 The Righi, East Ivanhoe, 3079
3YGE—R. A. Morrison, 7 North Gate, Werribee, 3030
3YJD—J. D. Smyth, 28 Clydesdale Street, Box Hill, 3128
3YKH—H. W. Kennedy, 787 Bell St., West Preston, 3072
3ZKQ—K. C. James, 27 Gordon Grove, East Preston, 3072
3ZLB—Ludewing, 4/3 Coleridge St., Elwood, 3184
3ZTC—H. E. K. Eames, 160 Wood St., Preston, 3072
3ZWJ—W. J. Mathews, Lot, 13, Browns Road, Devon Meadows, 3977

QUEENSLAND

VK4DK/T—C. W. Welsh, 21 Hart St., Mackay, 4740
4DT—D. T. Laurie, 5 Wanawong Court, Ferny Hills, 4055
4YU—K. Dillon, 6 Ceriman St., MacGregor, 4109
4ZE—M. J. Joyce, 35 Prout St., Camp Hill, 4152
4WIT—Townsville Amateur Radio Club, P.O. Box 964, Townsville, 4810 (See VK4TC below)

SOUTH AUSTRALIA

VK5EC—R. E. Taylor, 19 Easton Rd., Pt. Lincoln, 5606
5LI "Moonta May"—I. D. Campbell, Rossiter's Road, Moonta Bay, 5558
5PO—J. C. Crawford-Lindsay, 3 Rutherglen Ave., Valley View, 5093
5ZJM—J. F. Mott—Lot 31, Emmett Rd., Craters, 5152
5ZIS—G. W. Schultz, 74 Shannon Ave., Glenelg North, 5045

WESTERN AUSTRALIA

VK6AQ—A. K. Maynard, Station: Lot 19 Oxford St., Albany, 6330; Postal: P.O. Box 153, Albany, 6330
6OC—O. C. Winterton, 42 Shakespeare Avenue, Yokine, 6060
6ZJA—C. W. James, 10 Traverse St., Wagin, 6315
6ZFM—T. J. Macha, 57 Bagot, Subiaco, 6008
6ZDT—S. W. Lawrence, Lot 24, Strettle Road, Mahogany Creek, 6072

TASMANIA

VK7KZ—R. J. Geeves, 33 Main Road, Moonah, 7009

NORTHERN TERRITORY

Nil

CHANGE OF ADDRESS

AUSTRALIAN CAPITAL TERRITORY

VK1AC—A. A. G. Parker, 10 Islander Cres., Flynn, 2615
1DB—D. A. R. Brown, 17 Grace St., Weetanger, 2614
1LF—L. B. Fisher, Flat 80, Burnie Court, 3 Burnie Street, Lyons, 2606
1ZMB—B. J. Mayfield, 32 Urlarra Forest, Uriarra, 2611
1ZPC—P. M. Cohn, 2/2 Burkett Street, Page, 2614
1ZQR—R. C. Qlocl, 8 Cooney Crt., Charnwood, 2615
1ZWG—W. R. Godley, 1 Gore St., Higgins; Postal, P.C. Box 31, Higgins, 2615

NEW SOUTH WALES

VK2BT—W. H. Kennedy, 818 Myamba Pde., Surfside North, Batemans Bay, 2363
2BX—B. G. Warren, 3 Glaisher Parade, Cronulla South, 2230
2FU—G. Pollock, 12 Edward Pde., Wentworth Falls, 2782
2GU—P. G. Arthurs, 52 Bungalow Rd., Peakhurst, 2210
2GP—G. T. Pile, 38 Mt. Ettalong Rd., Umina, 2257
2HU—N. H. T. Yuile, 42 Bighview Road, Pretty Beach, 2256
2IY—T. H. Cahill, 21 Georgina St., Bass Hill, 2197
2JP—S. B. Mason, 54 Vaux St., Cowra, 2794
2LD—R. L. Dickinsons, 36 Romford Rd., Frenchs Forest, 2086
2LX—H. C. Crisp, 18 Lett Street, Gorokan, 2263
2LZK—W. E. C. Bischoff, 37 Merrenburn Avenue, Naremburn, 2865
2MN—C. M. Croke, Back Creek Rd., Young, 2594
2OZ—J. R. Moyle, 572/50 Pennant Hills Road, Normanhurst, 2076

variations of plate voltage. (More so than in a tetrode.)

Screen grid current supply from power supply insufficient, i.e. the power supply voltage may be reasonably stable even if the power supply cannot provide sufficient current.

Control grid bias not sufficiently stable.

Use of cathode bias. (Cathode drive systems can introduce unsuspected cathode bias because of the ohmic nature of the drive circuits.)

Control grid resistance is excessive. If used, suggest a change to RF choke.

Use of paralleled valves. It may happen that unity power factor does not occur at resonance. Quite common with paralleled triodes.

Output loading not tight enough.

Trust that these notes may help in solving the problem.

Chris Cullinan, VK3AXU

The Editor,
Dear Sir,

I noted with interest the listing of top scores for the 1973 CQ WW WPX Contest (P.20 AR, August 1974).

It may be of some interest to you that I was successful in obtaining "second world high" in that contest as single operator on 21 MHz with a score of 343, 826 points, operating as VK9RY (P29RJ since self government).

Perhaps of equal interest (and I trust encouragement) to would-be contest participants is the fact t throughout the contest my final PEP to the antenna never exceeded 200 watts. The antenna is a "home brew" 6 element monoband Yagi with a 34 ft. boom and (believe it or not) for the past five years has been rotated unerringly by a Stolle Rotator!

The same combination was used on 21 MHz for the 1973 VK-ZL Contest.

Ron Johns
P29RJ/ex VK9RY/ex VK1RJ
MWIA and foundation member of Radio Society of Papua

The Editor,
Dear Sir,

I would like to say that I am in agreement with Brian J. Hannan's letter which was published in AR for September 1974.

I cannot see why Associate members should pay $17.50 a year to join the WIA which, as Mr. Hannan stated, is only 50c less than a full member. The associate member (as far as I can see) does not have a say as to how the money the WIA gets is spent, and is unable to vote on any matters that will affect him when he obtains his Amatuer licence. Neither can he get a concession on a ham band or general coverage receiver as do full members if they import a transceiver into the country.

There must be several associate members that are more interested in the listening side of amateur radio. That is, sending reports to amateurs and receiving QSL cards, and through no fault of their own, are not able to study to become an Amateur.

There must be also a number of associate members apart from those sending QSL cards to amateurs, who enjoy reading AR, and have to join the WIA to obtain it, as it is not available through book shops or newsagents.

The only advantage I can see that associate members get from the WIA is the non-postage on QSL cards. I am not running the WIA down, as they do a good job for the fully licensed Amateur.

The same thing happens in NZ where the associate member pays 50c less than the "transmitting" member. Although both have to pay 1c per card to be sent through the NZART Bureau, they also have no voting rights similar to the associate member in Australia.

73 Barrie Boyce L3-425

(Licensed Amateurs in Australia are also unable to obtain concessions on receiver imports. The matter is still being pressed. — Ed.)

The Editor,
Dear Sir,
Rising Prices.

I have for some time tried to wage a private war against rising prices of items offered for sale to Amateurs. This was made possible by a number of devices and the fact that I considered this matter a leisure activity to make available certain products to Amateurs whose workshops lacked metalworking facilities.

It is now necessary to report that this policy cannot be continued indefinitely and new prices, about 1/3rd higher will have to be charged as soon as presently available stocks (four only) of Quad kits and other items are sold.

The need for this action is regretted but, with rapidly rising prices for raw materials of all types, it is impossible for me to maintain prices at present levels.

Syd Clark, VK3ASC

Magazine Index

With Syd Clark, VK3ASC

BREAK-IN June 1974
Ideas for Building Transceivers; Galbraith Counter; Electronic A.R.T.

CQ May 1974
Serrana Bank Snafu; The RME Success Story; Another Approach to Lightweight Yagi Construction; Determining Resonant Lengths of Transmission Lines; Cop's Column (Now it is ISB SSTV on one and voice on the other).

HAM RADIO May 1974
Log-Periodic for 15 and 20; Parabolic Antenna Design; Antennas and Satellite Communications; Antenna Ground Systems; Antenna Measurements; Three Band DX Vertical; 160 Metre Receiving Antenna; 5/8-Wavelength VHF Antennas; Antenna Tuner; Vertical Radiation Patterns; Pi Network Design.

HAM RADIO June 1974
Cosmos Electronic Keyer; Better Receiver Design; Function Generator; Coherent FSK RTTY; Two-Metre Pre-amplifier; Optimum Height for Horizontal Antennas; Local Oscillator Waveform Effects; Understanding Spectrum Analysers; Private Line for the Heathkit HW-202; Dipole Beams.

RADIO COMMUNICATION June 1974
Some interesting Uses for TAA661 Integrated Circuits; The Heathkit HW202 2M FM Transceiver (Review); Some Thoughts on True Break-in for CW and SSB; Building Blocks for the Novice.

BREAK-IN July 1974
Ideas for Building Transceivers; NZART Conference Report.

RADIO COMMUNICATION July 1974
The "Normal-Mode" Helical Aerial; A Digital Frequency Display Unit; Building Blocks for the Novice.

SHORT-WAVE MAGAZINE June 1974
Modifying the FR-50; Microphone Pre-Amplifier; Third Method SSB Exciter; Paraboloid for Twenty-Three.

QST July 1974
A Character Generator for ATV; Learning to Work with Semiconductors; EME Scheduling, When and Where; A Fence Mount for Vertical Antennas; The Elco 753 Rides Again; More Receiver Design Notes, Part 2; A Poor Man's Electronic Tower Hoist; Heathkit HW-202, Spectronics DD-1 Digital Display, Inoue IC-230; Wind Force on a Yagi Antenna.

73 MAGAZINE June 1973
Poor Man's Quad; Reconditioning the Long Squared Quad; Antenna Wind Indicator; Matching; Remotely Tuned Antenna Coupler; A Practical Ground System for 160; Wide Range Antenna Tuner; Old Antennas and New Baluns; A multiband Ground Plane; Mod Quad for Frustrated Cliff Dwellers.

New Products

Information is to hand on a new range of five multi-voltage, general purpose, power transformers from Ferguson.

Two of the transformers have two independent 0-12-15 Volt windings while the other three have either two 0-26-32.5 or two 0-28-35 volt windings.

Outputs from 3 to 70 volts and to 10 amps are available using different arrangements. The 15 volt units are available in 75 VA (2.5 A max per winding) and 120 VA (4 A) while the 35 volt units come in 105 VA (1.5 A), 210 VA (3 A) and 350 VA (5 A).

All except the 120 VA unit are fitted with electrostatic screens and all comply with A.S. C 126.

The sample provided was up to spec, well constructed and quiet.

This range should prove most versatile and useful for the amateur.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

This month I have a grouch. I am getting far too few reports of intruders.

This is not because intruders are not in our bands, but because most Members are apathetic towards reporting them.

That is a very bad show!!

One ray of sunshine has emerged though. On 14150 kHz daily, except Sundays, from about 9 a.m. until 10 a.m. Melbourne time, VK3UE controls a net in which many stations participate, either momentarily or prolonged, and he has agreed that any Member who has heard an Intruder and wishes to pass on the news can call in on the net and, either he or myself can take the particulars. This is a great step forward, and I have already had several interesting reports.

Also, another method which I am pursuing, and one that takes the onus off Members writing out reports on the forms supplied, is for Members to telephone me. My number is 50 2556 in Melbourne, but please do not ring after 9 p.m. in the evening. When you hear an Intruder just take a note of the following: Date and time GMT; Frequency; Mode; Signal strength; Call Sign (if identified); any traffic heard, and if possible the bearing ex your QTH. Also, on first reporting, I shall require your type of receiver and its IF frequency, and an indication whether you mind me mentioning your Call sign, because I shall wish to sign the form as for yourself per mell

In Brisbane Murray VK4KX phone No. 36 5385; in Perth Ross VK6DA No. 24 2909; in Adelaide Leith VK5LG No. 276 4724; will take any calls that you wish to make.

Some members seem to think it futile to report Intruders. This is far from the truth, and it is to the credit of the WIA Intruder Watch that some stations have been removed from our bands. A notable example is KJG who, by the RTTY read-out submitted by a Member Observer, was reported to RSGB who in turn prevailed upon the Yugo-Slav Government through the British Administration and had that station removed.

I may be a little premature, but it is some time since the Indonesian stations 7BD2 etc. on 14060 kHz have been heard. Don't for a moment think that Amateur frequencies are the only ones occupied by Intruders. I have been supplied with a page from the document RR692 — "The Board (IFRB) shall prepare periodically, for publication by the Secretary General, summaries of the useful monitoring data received by it including a list of the stations contributing the data". This double sided page which is pages 297 and 298 covers from 13902 to 14385 kHz, and is full of intruding stations mostly only identified by country.

An interesting feature is that those identified have similar Call signs to those heard in our bands by Amateur Observers. So you see the necessity and the advantage of reporting those insidious intruders.

Stations reported August through September are as follows —

kHz		
21313	A1	FUJ — calling FAAG with weather report in French.
14040	A1	— calling JPB — stopped when QRMed.
14046	A1	IIAV — Vs. High speed CW.
14076	A1	— 5 figure code.
14111	F1	— RTTY.
14128	A1	— Letter and figure code.
14131	A1	VLKH — calling 3NIH.
14133	A1	VLIU — Vs and QRO, QRZ.
14150	A1	DNOQ — calling OUNC. 4 letter groups.
14152	F1	— RTTY, 100 baud, 500 shift.
14182	A1	— Letter and figure code.
14184	F1	— RTTY, 500 shift.
14240	A1	OGZB
14253	A3	— Foreign broadcast.
14326	F1	— RTTY, 500 shift.
14334	A1	MNYK — calling 53NI.
3615	A3	— Foreign broadcast.
3843	A1	AAQJ — calling OD9X.
3845	A1	— 4 figure code.

PERTH

ASCN NODE 0. M.

ADD MINS	AZ	EL
68.0	102	2
70.0	113	4
72.0	125	6
74.0	138	6
76.0	150	5
78.0	161	2

ASCN NODE 5. M.

ADD MINS	AZ	EL
66.0	90	3
68.0	101	6
70.0	113	9
72.0	127	10
74.0	141	10
76.0	154	7
78.0	165	4

ASCN NODE 10. M.

ADD MINS	AZ	EL
64.0	73	3
66.0	87	8
68.0	100	12
70.0	114	15
72.0	131	15
74.0	146	13
76.0	159	9
78.0	169	5
80.0	177	0

ASCN NODE 15. M.

ADD MINS	AZ	EL
62.0	66	2
64.0	73	8
66.0	84	13
68.0	99	18
70.0	116	21
72.0	135	20
74.0	152	16
76.0	164	11
78.0	174	5
80.0	181	0

ASCN NODE 20. M.

ADD MINS	AZ	EL
61.0	54	0
62.0	60	6
64.0	68	13
66.0	80	20
68.0	98	26
70.0	120	28
72.0	142	26
74.0	159	19
76.0	170	12
78.0	178	6
80.0	184	0

ASCN NODE 25. M.

ADD MINS	AZ	EL
61.0	47	4
62.0	53	11
64.0	61	19
66.0	75	28
68.0	97	36
70.0	127	37
72.0	152	31
74.0	167	21
76.0	177	13
78.0	183	6

ASCN NODE 30. M.

ADD MINS	AZ	EL
58.0	36	0
60.0	39	7
62.0	44	15
64.0	52	26
66.0	66	38
68.0	97	50
70.0	139	47
72.0	165	35
74.0	177	23
76.0	184	13
78.0	188	5

ASCN NODE 35. M.

ADD MINS	AZ	EL
58.0	28	3
60.0	30	10
62.0	33	20
64.0	38	32
66.0	52	50
68.0	104	68
70.0	163	55
72.0	181	36
74.0	187	22
76.0	193	12
78.0	192	4

ASCN NODE 40. M.

ADD MINS	AZ	EL
58.0	19	5
60.0	19	13
62.0	19	23
64.0	20	38
66.0	21	61
68.0	175	86
70.0	196	56
72.0	196	35
74.0	196	21
76.0	195	11
78.0	195	3

ASCN NODE 45. M.

ADD MINS	AZ	EL
58.0	10	6
60.0	8	14
62.0	4	25
64.0	357	40
66.0	336	60
68.0	259	68
70.0	220	48
72.0	209	30
74.0	204	18
76.0	202	9
78.0	199	2

ASCN NODE 50. M.

ADD MINS	AZ	EL
56.0	3	0
58.0	360	6
60.0	355	14
62.0	348	24
64.0	335	37
66.0	307	49
68.0	261	50
70.0	233	38
72.0	219	25
74.0	211	15
76.0	206	7
78.0	203	0

ASCN NODE 55. M.

ADD MINS	AZ	EL
58.0	351	6
60.0	343	13
62.0	334	21
64.0	318	31
66.0	291	37
68.0	263	36
70.0	243	29
72.0	225	20
74.0	216	12
76.0	210	5

ASCN NODE 60. M.

ADD MINS	AZ	EL
58.0	340	4
60.0	332	11
62.0	321	17
64.0	306	24
66.0	285	27
68.0	262	26
70.0	244	21
72.0	230	15
74.0	220	8
76.0	213	2

ASCN NODE 65. M.

ADD MINS	AZ	EL
58.0	332	3
60.0	323	8
62.0	311	13
64.0	297	17
66.0	279	19
68.0	262	18
70.0	245	15
72.0	233	10
74.0	223	5
76.0	216	0

ASCN NODE 70. M.

ADD MINS	AZ	EL
58.0	324	0
60.0	315	5
62.0	304	8
64.0	290	11
66.0	276	13
68.0	260	12
70.0	247	9
72.0	235	6
74.0	225	2

ASCN NODE 75. M.

ADD MINS	AZ	EL
60.0	308	1
62.0	297	4
64.0	285	6
66.0	272	7
68.0	259	7
70.0	247	5
72.0	236	2

ASCN NODE 80. M.

ADD MINS	AZ	EL
62.0	292	0
64.0	281	2
66.0	270	2
68.0	258	2
70.0	247	0

ASCN NODE 185. M.

ADD MINS	AZ	EL
104.0	104	1
106.0	93	1
108.0	82	1

ASCN NODE 190. M.

ADD MINS	AZ	EL
100.0	125	0
102.0	115	3
104.0	103	5
106.0	91	6
108.0	78	5
110.0	66	3
112.0	56	1

ASCN NODE 195. M.

ADD MINS	AZ	EL
98.0	136	0
100.0	126	4
102.0	115	7
104.0	102	10
106.0	88	11
108.0	74	10
110.0	60	8
112.0	49	4
114.0	40	0

ASCN NODE 200. M.

ADD MINS	AZ	EL
98.0	138	3
100.0	128	8
102.0	116	12
104.0	102	16
106.0	85	17
108.0	68	16
110.0	53	12
112.0	41	8
114.0	32	3

ASCN NODE 205. M.

ADD MINS	AZ	EL
96.0	147	0
98.0	140	6
100.0	131	12
102.0	118	18
104.0	101	23
106.0	81	25
108.0	60	23
110.0	44	17
112.0	32	11
114.0	24	5

ASCN NODE 210. M.

ADD MINS	AZ	EL
96.0	150	3
98.0	144	9
100.0	135	17
102.0	122	25
104.0	102	32
106.0	75	35
108.0	50	30
110.0	33	22
112.0	21	14
114.0	14	7
116.0	9	0

ASCN NODE 215. M.

ADD MINS	AZ	EL
96.0	153	4
98.0	148	13
100.0	141	22
102.0	128	33
104.0	103	44
106.0	65	47
108.0	34	37
110.0	18	25
112.0	9	15
114.0	4	7
116.0	0	1

ASCN NODE 220. M.

ADD MINS	AZ	EL
94.0	160	0
96.0	158	7
98.0	154	16
100.0	149	27
102.0	138	42
104.0	109	60
106.0	43	61
108.0	12	42
110.0	2	27
112.0	357	16
114.0	353	7
116.0	351	0

ASCN NODE 225. M.

ADD MINS	AZ	EL
94.0	163	2
96.0	162	9
98.0	161	18
100.0	160	31
102.0	157	50
104.0	140	78
106.0	354	68
108.0	347	42
110.0	345	26
112.0	344	15
114.0	343	6

ASCN NODE 230. M.

ADD MINS	AZ	EL
94.0	167	3
96.0	168	10
98.0	170	20
100.0	174	33
102.0	184	53
104.0	236	73
106.0	311	58
108.0	325	37
110.0	330	23
112.0	333	12
114.0	334	4

ASCN NODE 235. M.

ADD MINS	AZ	EL
94.0	171	4
96.0	174	11
98.0	179	21
100.0	188	33
102.0	209	48
104.0	254	55
106.0	293	44
108.0	310	30
110.0	318	18
112.0	323	9
114.0	326	2

ASCN NODE 240. M.

ADD MINS	AZ	EL
94.0	175	4
96.0	180	12
98.0	188	20
100.0	202	30
102.0	225	39
104.0	258	41
106.0	284	33
108.0	299	22
110.0	308	13
112.0	314	6

ASCN NODE 245. M.

ADD MINS	AZ	EL
94.0	179	5
96.0	186	11
98.0	197	19
100.0	212	26
102.0	234	31
104.0	259	29
106.0	278	23
108.0	292	16
110.0	301	9
112.0	307	2

ASCN NODE 250. M.

ADD MINS	AZ	EL
94.0	184	4
96.0	192	10
98.0	204	16
100.0	220	21
102.0	239	23
104.0	259	21
106.0	275	16
108.0	286	10
110.0	295	4

ASCN NODE 255. M.

ADD MINS	AZ	EL
94.0	188	4
96.0	198	9
98.0	210	13
100.0	226	16
102.0	242	17
104.0	258	14
106.0	271	10
108.0	282	5
110.0	290	0

ASCN NODE 260. M.

ADD MINS	AZ	EL
94.0	192	3
96.0	202	7
98.0	215	10
100.0	229	12
102.0	244	11
104.0	257	8
106.0	269	5
108.0	278	1

ASCN NODE 265. M.

ADD MINS	AZ	EL
94.0	196	2
96.0	207	5
98.0	219	7
100.0	232	7
102.0	245	6
104.0	256	4
106.0	266	0

ASCN NODE 270. M.

ADD MINS	AZ	EL
94.0	199	1
96.0	210	3
98.0	222	4
100.0	234	3
102.0	245	2

ASCN NODE 275. M.

ADD MINS	AZ	EL
96.0	213	0
98.0	224	1
100.0	235	0

ASCN NODE 350. M.

ADD MINS	AZ	EL
74.0	134	0
76.0	145	0

ASCN NODE 355. M.

ADD MINS	AZ	EL
70.0	113	0
72.0	124	2
74.0	135	1
76.0	147	2
78.0	158	1

ASCN NODE 360. M.

ADD MINS	AZ	EL
68.0	102	2
70.0	113	4
72.0	125	6
74.0	138	6
76.0	150	5
78.0	161	2

ASCN NODE 0. M.

ADD MINS	AZ	EL

ASCN NODE 0. M.

ADD MINS	AZ	EL

ASCN NODE 0. M.

ADD MINS	AZ	EL

BRISBANE

ASCN NODE 0. M.

ADD MINS	AZ	EL
56.0	25	1
58.0	26	8
60.0	28	17
62.0	32	29
64.0	41	47
66.0	75	69
68.0	160	63
70.0	181	41
72.0	187	26
74.0	190	15
76.0	192	6

ASCN NODE 5. M.

ADD MINS	AZ	EL
56.0	16	3
58.0	16	10
60.0	15	20
62.0	14	34
64.0	11	54
66.0	334	83
68.0	205	62
70.0	201	39
72.0	193	24
74.0	198	13
76.0	197	5

ASCN NODE 10. M.

ADD MINS	AZ	EL
56.0	7	4
58.0	5	12
60.0	1	21
62.0	353	35
64.0	335	52
66.0	281	64
68.0	231	50
70.0	215	33
72.0	208	20
74.0	204	11
76.0	201	3

ASCN NODE 15. M.

ADD MINS	AZ	EL
56.0	351	4
58.0	353	11
60.0	346	20
62.0	334	31
64.0	311	43
66.0	274	46
68.0	243	38
70.0	225	26
72.0	216	16
74.0	210	8
76.0	205	1

ASCN NODE 20. M.

ADD MINS	AZ	EL
56.0	348	3
58.0	342	10
60.0	333	18
62.0	319	26
64.0	297	32
66.0	271	33
68.0	248	28
70.0	232	20
72.0	221	12
74.0	214	5

ASCN NODE 25. M.

ADD MINS	AZ	EL
56.0	340	2
58.0	332	8
60.0	322	14
62.0	307	20
64.0	289	23
66.0	269	23
68.0	250	20
70.0	236	14
72.0	225	8
74.0	218	2

ASCN NODE 30. M.

ADD MINS	AZ	EL
56.0	331	0
58.0	323	5
60.0	312	10
62.0	299	14
64.0	283	16
66.0	267	16
68.0	252	13
70.0	239	9
72.0	228	4
74.0	220	0

ASCN NODE 35. M.

ADD MINS	AZ	EL
58.0	315	2
60.0	305	5
62.0	293	8
64.0	279	10
66.0	265	9
68.0	252	7
70.0	240	4
72.0	231	1

ASCN NODE 40. M.

ADD MINS	AZ	EL
60.0	299	1
62.0	288	3
64.0	276	4
66.0	264	4
68.0	252	3
70.0	241	0

ASCN NODE 45. M.

ADD MINS	AZ	EL
64.0	273	0

ASCN NODE 150. M.

ADD MINS	AZ	EL
104.0	110	2
106.0	99	3
108.0	87	4
110.0	75	3
112.0	64	1

ASCN NODE 155. M.

ADD MINS	AZ	EL
100.0	131	0
102.0	121	3
104.0	110	6
106.0	97	8
108.0	84	9
110.0	70	8
112.0	58	5
114.0	47	2

ASCN NODE 160. M.

ADD MINS	AZ	EL
100.0	133	3
102.0	123	8
104.0	111	12
106.0	96	14
108.0	80	15
110.0	64	13
112.0	51	10
114.0	40	5
116.0	31	1

ASCN NODE 165. M.

ADD MINS	AZ	EL
98.0	143	1
100.0	136	7
102.0	126	12
104.0	112	15
106.0	95	22
108.0	75	22
110.0	57	19
112.0	42	14
114.0	31	9
116.0	23	3

ASCN NODE 170. M.

ADD MINS	AZ	EL
98.0	147	4
100.0	140	10
102.0	130	18
104.0	115	25
106.0	94	31
108.0	68	31
110.0	46	26
112.0	31	19
114.0	21	11
116.0	14	4

ASCN NODE 175. M.

ADD MINS	AZ	EL
96.0	155	0
98.0	151	7
100.0	145	14
102.0	136	24
104.0	120	34
106.0	92	43
108.0	57	42
110.0	32	33
112.0	18	22
114.0	9	13
116.0	4	5

ASCN NODE 180. M.

ADD MINS	AZ	EL
96.0	158	2
98.0	156	9
100.0	152	18
102.0	145	30
104.0	130	45
106.0	91	60
108.0	35	54
110.0	12	37
112.0	2	23
114.0	357	13
116.0	354	5

ASCN NODE 185. M.

ADD MINS	AZ	EL
96.0	163	3
98.0	162	11
100.0	160	21
102.0	158	35
104.0	152	56
106.0	69	82
108.0	355	59
110.0	349	37
112.0	347	22
114.0	346	12
116.0	345	4

ASCN NODE 190. M

ADD MINS	AZ	EL
96.0	167	5
98.0	168	13
100.0	170	23
102.0	175	38
104.0	169	59
106.0	270	74
108.0	320	52
110.0	329	33
112.0	333	20
114.0	335	10
116.0	336	3

ASCN NODE 195. M.

ADD MINS	AZ	EL
96.0	172	5
98.0	176	14
100.0	182	24
102.0	193	37
104.0	220	52
106.0	268	54
108.0	301	40
110.0	314	26
112.0	321	16
114.0	325	7
116.0	328	0

ASCN NODE 200. M.

ADD MINS	AZ	EL
94.0	174	0
96.0	178	6
98.0	183	14
100.0	193	23
102.0	208	33
104.0	235	40
106.0	267	39
108.0	290	30
110.0	304	20
112.0	312	11
114.0	317	4

ASCN NODE 205. M.

ADD MINS	AZ	EL
94.0	178	0
96.0	183	6
98.0	191	13
100.0	202	20
102.0	220	27
104.0	243	30
106.0	266	28
108.0	284	21
110.0	295	14
112.0	304	7
114.0	310	1

ASCN NODE 210. M.

ADD MINS	AZ	EL
94.0	182	0
96.0	188	6
98.0	198	11
100.0	210	17
102.0	227	21
104.0	246	22
106.0	265	19
108.0	279	14
110.0	290	8
112.0	298	3

ASCN NODE 215. M.

ADD MINS	AZ	EL
94.0	186	0
96.0	193	5
98.0	204	9
100.0	217	13
102.0	232	15
104.0	249	15
106.0	263	12
108.0	276	8
110.0	286	3

ASCN NODE 220. M.

ADD MINS	AZ	EL
96.0	198	3
98.0	209	7
100.0	222	9
102.0	236	10
104.0	250	9
106.0	262	7
108.0	273	3

ASCN NODE 225. M.

ADD MINS	AZ	EL
96.0	202	2
98.0	213	4
100.0	225	6
102.0	238	6
104.0	250	4
106.0	261	2

ASCN NODE 230. M.

ADD MINS	AZ	EL
96.0	206	0
98.0	216	1
100.0	228	2
102.0	239	1
104.0	250	0

ASCN NODE 320. M.

ADD MINS	AZ	EL
70.0	119	1
72.0	130	2
74.0	141	1
76.0	152	0

ASCN NODE 325. M.

ADD MINS	AZ	EL
66.0	97	1
68.0	108	3
70.0	120	5
72.0	132	5
74.0	144	4
76.0	156	2

ASCN NODE 330. M.

ADD MINS	AZ	EL
64.0	86	2
66.0	96	5
68.0	108	8
70.0	122	9
72.0	135	9
74.0	148	7
76.0	160	4
78.0	169	0

ASCN NODE 335. M.

ADD MINS	AZ	EL
62.0	74	2
64.0	83	6
66.0	94	11
68.0	109	14
70.0	124	15
72.0	140	13
74.0	153	10
76.0	164	5
78.0	173	0

ASCN NODE 340. M.

ADD MINS	AZ	EL
60.0	61	1
62.0	69	6
64.0	71	12
66.0	91	17
68.0	111	21
70.0	129	21
72.0	145	17
74.0	153	12
76.0	163	6
78.0	177	1

ASCN NODE 345. M.

ADD MINS	AZ	EL
60.0	56	5
62.0	63	12
64.0	74	19
66.0	91	25
68.0	113	29
70.0	136	27
72.0	154	21
74.0	166	14
76.0	175	7
78.0	181	1

ASCN NODE 350. M.

ADD MINS	AZ	EL
58.0	43	2
60.0	48	9
62.0	56	17
64.0	68	27
66.0	88	36
68.0	118	39
70.0	146	34
72.0	164	24
74.0	174	15
76.0	181	7
78.0	185	1

ASCN NODE 355. M.

ADD MINS	AZ	EL
58.0	35	6
60.0	39	14
62.0	46	24
64.0	58	36
66.0	85	50
68.0	130	52
70.0	161	39
72.0	175	26
74.0	182	15
76.0	186	7
78.0	189	0

ASCN NODE 360. M.

ADD MINS	AZ	EL
[illegible]	25	1
58.0	26	8
60.0	28	17
62.0	32	29
64.0	41	47
66.0	75	69
68.0	160	63
70.0	181	41
72.0	187	26
74.0	190	15
76.0	192	6

SYDNEY

ASCN NODE 0. W.

ADD MINS	AZ	EL
58.0	26	1
60.0	26	8
62.0	28	17
64.0	31	33
66.0	38	47
68.0	71	71
70.0	165	65
72.0	186	42
74.0	190	26
76.0	192	15
78.0	193	5

ASCN NODE 5. W.

ADD MINS	AZ	EL
58.0	17	3
60.0	16	10
62.0	15	20
64.0	13	33
66.0	9	54
68.0	330	82
70.0	209	62
72.0	202	39
74.0	200	24
76.0	198	13
78.0	198	5

ASCN NODE 10. W.

ADD MINS	AZ	EL
58.0	7	4
60.0	5	11
62.0	1	21
64.0	353	36
66.0	338	52
68.0	284	64
70.0	232	51
72.0	215	33
74.0	208	21
76.0	204	11
78.0	201	3

ASCN NODE 15. W.

ADD MINS	AZ	EL
58.0	358	4
60.0	354	11
62.0	347	20
64.0	335	31
66.0	312	43
68.0	275	47
70.0	242	39
72.0	224	27
74.0	215	17
76.0	209	8
78.0	204	2

ASCN NODE 20. W.

ADD MINS	AZ	EL
58.0	349	3
60.0	342	10
62.0	333	18
64.0	320	26
66.0	298	33
68.0	271	35
70.0	247	29
72.0	230	21
74.0	220	13
76.0	212	6
78.0	207	1

ASCN NODE 25. W.

ADD MINS	AZ	EL
58.0	340	2
60.0	332	8
62.0	322	14
64.0	308	20
66.0	290	25
68.0	268	25
70.0	249	21
72.0	234	15
74.0	222	9
76.0	215	3

ASCN NODE 30. W.

ADD MINS	AZ	EL
58.0	331	0
60.0	322	5
62.0	313	10
64.0	300	15
66.0	283	17
68.0	266	17
70.0	250	15
72.0	237	11
74.0	226	6
76.0	218	1

ASCN NODE 35. W.

ADD MINS	AZ	EL
60.0	315	2
62.0	305	6
64.0	293	9
66.0	279	11
68.0	264	11
70.0	250	9
72.0	238	6
74.0	228	2

ASCN NODE 40. W.

ADD MINS	AZ	EL
62.0	299	2
64.0	288	5
66.0	275	6
68.0	262	6
70.0	250	5
72.0	239	2

ASCN NODE 45. W.

ADD MINS	AZ	EL
64.0	284	0
66.0	272	1
68.0	261	1
70.0	249	0

ASCN NODE 151. W.

ADD MINS	AZ	EL
102.0	112	1
104.0	101	2
106.0	90	2
108.0	78	1

ASCN NODE 155. W.

ADD MINS	AZ	EL
100.0	123	2
102.0	112	5
104.0	100	6
106.0	87	7
108.0	74	6
110.0	63	3
112.0	52	0

ASCN NODE 160. W.

ADD MINS	AZ	EL
98.0	136	2
100.0	124	6
102.0	112	9
104.0	98	12
106.0	83	12
108.0	69	10
110.0	56	7
112.0	44	3

ASCN NODE 165. W.

ADD MINS	AZ	EL
96.0	144	0
98.0	136	5
100.0	126	10
102.0	113	15
104.0	97	19
106.0	79	18
108.0	67	16
110.0	48	12
112.0	38	7
114.0	29	1

ASCN NODE 170. W.

ADD MINS	AZ	EL
96.0	146	3
98.0	139	9
100.0	128	15
102.0	114	21
104.0	95	25
106.0	73	26
108.0	54	22
110.0	39	16
112.0	28	9
114.0	21	3

ASCN NODE 175. W.

ADD MINS	AZ	EL
96.0	149	5
98.0	142	12
100.0	132	20
102.0	117	29
104.0	93	35
106.0	65	35
108.0	47	28
110.0	27	20
112.0	19	12
114.0	11	5

ASCN NODE 180. W.

ADD MINS	AZ	EL
94.0	157	1
96.0	153	8
98.0	147	16
100.0	136	26
102.0	122	38
104.0	92	46
106.0	52	46
108.0	27	34
110.0	14	22
112.0	6	13
114.0	2	5

ASCN NODE 185. W.

ADD MINS	AZ	EL
94.0	160	2
96.0	157	10
98.0	153	19
100.0	147	31
102.0	133	49
104.0	89	65
106.0	27	56
108.0	7	37
110.0	359	23
112.0	355	13
114.0	352	5

ASCN NODE 190. W.

ADD MINS	AZ	EL
94.0	167	4
96.0	162	12
98.0	161	22
100.0	160	36
102.0	156	58
104.0	73	86
106.0	349	58
108.0	345	36
110.0	344	22
112.0	343	12
114.0	343	4

ASCN NODE 195. W.

ADD MINS	AZ	EL
94.0	167	5
96.0	168	13
98.0	171	24
100.0	176	39
102.0	192	60
104.0	272	72
106.0	317	50
108.0	327	32
110.0	330	19
112.0	332	10
114.0	334	2

ASCN NODE 200. W.

ADD MINS	AZ	EL
94.0	171	0
96.0	175	14
98.0	181	26
100.0	193	38
102.0	221	52
104.0	259	53
106.0	306	39
108.0	313	26
110.0	319	15
112.0	322	7
114.0	326	0

ASCN NODE 205. W.

ADD MINS	AZ	EL
92.0	172	0
94.0	176	7
96.0	181	16
98.0	191	24
100.0	207	34
102.0	235	41
104.0	267	39
106.0	290	29
108.0	302	19
110.0	311	11
112.0	315	4

ASCN NODE 210. W.

ADD MINS	AZ	EL
92.0	175	1
94.0	180	7
96.0	188	16
98.0	200	27
100.0	218	29
102.0	242	32
104.0	265	28
106.0	283	21
108.0	295	14
110.0	301	7
112.0	308	0

ASCN NODE 215. W.

ADD MINS	AZ	EL
92.0	178	1
94.0	185	7
96.0	194	13
98.0	207	19
100.0	225	23
102.0	245	23
104.0	264	20
106.0	278	14
108.0	289	8
110.0	297	3

ASCN NODE 220. W.

ADD MINS	AZ	EL
92.0	181	1
94.0	189	6
96.0	200	11
98.0	214	15
100.0	230	17
102.0	247	17
104.0	262	13
106.0	275	9
108.0	284	4

ASCN NODE 225. W.

ADD MINS	AZ	EL
92.0	184	1
94.0	193	5
96.0	205	9
98.0	218	12
100.0	233	12
102.0	248	11
104.0	261	8
106.0	271	4

ASCN NODE 230. W.

ADD MINS	AZ	EL
92.0	188	0
94.0	197	4
96.0	209	7
98.0	222	8
100.0	235	8
102.0	248	6
104.0	259	3
106.0	269	0

ASCN NODE 235. W.

ADD MINS	AZ	EL
92.0	191	0
94.0	201	2
96.0	212	4
98.0	224	5
100.0	237	4
102.0	249	2

ASCN NODE 240. W.

ADD MINS	AZ	EL
94.0	204	1
96.0	214	2
98.0	226	2
100.0	237	0

ASCN NODE 315. W.

ADD MINS	AZ	EL
72.0	121	0
74.0	132	2
76.0	141	2
78.0	149	1

ASCN NODE 320. W.

ADD MINS	AZ	EL
70.0	110	2
72.0	121	4
74.0	134	5
76.0	146	5
78.0	158	3
80.0	168	0

ASCN NODE 325. W.

ADD MINS	AZ	EL
68.0	99	3
70.0	112	6
72.0	123	8
74.0	136	9
76.0	149	7
78.0	161	4
80.0	171	1

ASCN NODE 330. W.

ADD MINS	AZ	EL
66.0	87	4
68.0	97	8
70.0	110	11
72.0	124	13
74.0	140	12
76.0	153	10
78.0	165	6
80.0	174	1

ASCN NODE 335. W.

ADD MINS	AZ	EL
64.0	74	3
66.0	83	8
68.0	97	13
70.0	110	17
72.0	127	18
74.0	144	16
76.0	158	12
78.0	170	7
80.0	178	2

ASCN NODE 340. W.

ADD MINS	AZ	EL
62.0	62	2
64.0	69	8
66.0	79	14
68.0	93	20
70.0	111	24
72.0	132	24
74.0	150	20
76.0	164	14
78.0	174	8
80.0	181	2

ASCN NODE 345. W.

ADD MINS	AZ	EL
60.0	54	0
62.0	56	6
64.0	63	13
66.0	74	21
68.0	91	28
70.0	114	32
72.0	139	30
74.0	158	23
76.0	171	15
78.0	179	8
80.0	185	2

ASCN NODE 350. W.

ADD MINS	AZ	EL
60.0	44	3
62.0	46	10
64.0	55	18
66.0	67	28
68.0	88	39
70.0	120	43
72.0	150	36
74.0	168	26
76.0	178	16
78.0	184	9
80.0	188	1

ASCN NODE 355. W.

ADD MINS	AZ	EL
60.0	36	4
62.0	39	14
64.0	45	24
66.0	56	35
68.0	83	53
70.0	133	55
72.0	166	41
74.0	179	27
76.0	185	16
78.0	189	7
80.0	191	[illegible]

ASCN NODE 360. W.

ADD MINS	AZ	EL
58.0	25	1
60.0	26	8
62.0	28	17
64.0	31	30
66.0	38	47
68.0	71	71
70.0	165	65
72.0	186	42
74.0	190	26
76.0	192	15
78.0	194	6

ASCN NODE 0. W.

ADD MINS	AZ	EL

ASCN NODE 0. W.

ADD MINS	AZ	EL

ASCN NODE 0. W.

ADD MINS	AZ	EL

MELBOURNE

ASCN NODE 0. W.

ADD MINS	AZ	EL
60.0	35	1
62.0	37	9
64.0	41	17
66.0	48	29
68.0	62	43
70.0	97	57
72.0	148	53
74.0	173	37
76.0	184	23
78.0	188	13
80.0	191	5

ASCN NODE 5. W.

ADD MINS	AZ	EL
60.0	27	3
62.0	28	11
64.0	30	20
66.0	33	34
68.0	43	54
70.0	101	75
72.0	175	58
74.0	188	37
76.0	192	22
78.0	194	12
80.0	196	4

ASCN NODE 10. W.

ADD MINS	AZ	EL
60.0	18	5
62.0	17	13
64.0	16	23
66.0	14	38
68.0	9	62
70.0	247	83
72.0	205	55
74.0	201	36
76.0	199	20
78.0	198	11
80.0	197	3

ASCN NODE 15. W.

ADD MINS	AZ	EL
60.0	8	6
62.0	5	14
64.0	1	24
66.0	352	39
68.0	329	58
70.0	263	64
72.0	224	46
74.0	212	30
76.0	206	18
78.0	203	9
80.0	200	2

ASCN NODE 20. W.

ADD MINS	AZ	EL
60.0	350	6
62.0	351	14
64.0	346	24
66.0	332	36
68.0	305	47
70.0	263	48
72.0	234	37
74.0	221	25
76.0	211	15
78.0	206	7
80.0	202	0

ASCN NODE 25. W.

ADD MINS	AZ	EL
60.0	348	5
62.0	342	13
64.0	332	21
66.0	316	30
68.0	292	36
70.0	263	36
72.0	240	29
74.0	225	20
76.0	216	12
78.0	209	5

ASCN NODE 30. W.

ADD MINS	AZ	EL
60.0	339	4
62.0	331	10
64.0	320	17
66.0	305	23
68.0	284	27
70.0	262	26
72.0	243	22
74.0	229	15
76.0	219	9
78.0	211	3

ASCN NODE 35. W.

ADD MINS	AZ	EL
60.0	330	2
62.0	322	8
64.0	311	13
66.0	296	17
68.0	279	20
70.0	260	19
72.0	244	16
74.0	231	11
76.0	221	5
78.0	213	0

ASCN NODE 40. W.

ADD MINS	AZ	EL
60.0	322	0
62.0	314	5
64.0	303	9
66.0	290	12
68.0	275	13
70.0	259	13
72.0	245	10
74.0	233	7
76.0	223	3

ASCN NODE 45. W.

ADD MINS	AZ	EL
62.0	307	1
64.0	296	5
66.0	284	7
68.0	271	8
70.0	258	8
72.0	245	6
74.0	234	3
76.0	224	0

ASCN NODE 50. W.

ADD MINS	AZ	EL
64.0	291	1
66.0	280	3
68.0	268	4
70.0	256	3
72.0	245	2
74.0	234	0

ASCN NODE 155. W.

ADD MINS	AZ	EL
102.0	107	1
104.0	96	1
106.0	85	0

ASCN NODE 160. W.

ADD MINS	AZ	EL
98.0	128	0
100.0	117	3
102.0	105	5
104.0	93	5
106.0	81	4
108.0	69	2
110.0	59	0

ASCN NODE 165. W.

ADD MINS	AZ	EL
96.0	138	0
98.0	128	4
100.0	117	7
102.0	104	9
104.0	90	10
106.0	76	9
108.0	64	6
110.0	53	1

ASCN NODE 170. W.

ADD MINS	AZ	EL
96.0	139	3
98.0	130	7
100.0	118	11
102.0	103	14
104.0	87	15
106.0	71	14
108.0	57	11
110.0	46	6
112.0	36	2

ASCN NODE 175. W.

ADD MINS	AZ	EL
94.0	148	0
96.0	141	5
98.0	132	11
100.0	119	17
102.0	102	21
104.0	83	22
106.0	64	20
108.0	49	15
110.0	37	10
112.0	28	4

ASCN NODE 180. W.

ADD MINS	AZ	EL
94.0	150	2
96.0	144	8
98.0	134	15
100.0	121	22
102.0	102	29
104.0	78	33
106.0	55	27
108.0	39	20
110.0	27	12
112.0	19	6
114.0	13	0

ASCN NODE 185. W.

ADD MINS	AZ	EL
94.0	153	4
96.0	147	11
98.0	139	20
100.0	125	29
102.0	102	38
104.0	70	41
106.0	43	34
108.0	26	24
110.0	16	15
112.0	9	7
114.0	5	0

ASCN NODE 190. W.

ADD MINS	AZ	EL
92.0	159	0
94.0	156	6
96.0	151	14
98.0	144	24
100.0	132	37
102.0	104	51
104.0	57	53
106.0	25	40
108.0	11	26
110.0	4	16
112.0	359	7
114.0	356	0

ASCN NODE 195. W.

ADD MINS	AZ	EL
92.0	161	1
94.0	159	8
96.0	157	17
98.0	152	29
100.0	144	46
102.0	112	67
104.0	27	64
106.0	2	41
108.0	355	27
110.0	351	15
112.0	349	7
114.0	348	0

ASCN NODE 200. W.

ADD MINS	AZ	EL
92.0	164	2
94.0	163	10
96.0	163	19
98.0	163	32
100.0	166	52
102.0	173	82
104.0	337	65
106.0	339	41
108.0	339	25
110.0	339	14
112.0	339	6

ASCN NODE 205. W.

ADD MINS	AZ	EL
92.0	166	3
94.0	168	11
96.0	170	21
98.0	176	34
100.0	190	[illegible]
102.0	246	[illegible]
104.0	305	[illegible]
106.0	320	[illegible]
108.0	326	[illegible]
110.0	329	[illegible]
112.0	336	4

ASCN NODE 210. W.

ADD MINS	AZ	EL
92.0	169	4
94.0	173	12
96.0	178	21
98.0	189	34
100.0	212	48
102.0	256	53
104.0	291	42
106.0	307	28
108.0	315	17
110.0	319	8
112.0	322	1

ASCN NODE 215. W.

ADD MINS	AZ	EL
92.0	173	5
94.0	178	12
96.0	187	21
98.0	201	31
100.0	226	40
102.0	258	40
104.0	283	31
106.0	297	21
108.0	306	12
110.0	311	5

ASCN NODE 220. W.

ADD MINS	AZ	EL
92.0	176	5
94.0	184	12
96.0	194	20
98.0	211	27
100.0	234	31
102.0	258	29
104.0	277	23
106.0	290	15
108.0	299	8
110.0	304	2

ASCN NODE 225. W.

ADD MINS	AZ	EL
90.0	174	0
92.0	180	6
94.0	189	12
96.0	201	18
98.0	218	21
100.0	238	24
102.0	257	21
104.0	273	16
106.0	284	10
108.0	293	4

ASCN NODE 230. W.

ADD MINS	AZ	EL
90.0	176	0
92.0	184	5
94.0	194	11
96.0	207	15
98.0	223	18
100.0	241	18
102.0	257	15
104.0	270	10
106.0	280	5
108.0	287	0

ASCN NODE 235. W.

ADD MINS	AZ	EL
90.0	179	0
92.0	187	5
94.0	198	9
96.0	212	12
98.0	227	14
100.0	242	13
102.0	256	10
104.0	267	6
106.0	276	1

ASCN NODE 240. W.

ADD MINS	AZ	EL
90.0	181	0
92.0	191	4
94.0	202	8
96.0	215	9
98.0	229	10
100.0	243	8
102.0	255	5
104.0	266	1

ASCN NODE 245. W.

ADD MINS	AZ	EL
90.0	184	0
92.0	194	3
94.0	205	6
96.0	218	7
98.0	231	6
100.0	243	4
102.0	253	1

ASCN NODE 250. W.

ADD MINS	AZ	EL
90.0	186	0
92.0	197	2
94.0	208	4
96.0	220	4
98.0	232	[illegible]
100.0	242	0

ASCN NODE 255. W.

ADD MINS	AZ	EL
92.0	199	1
94.0	210	2
96.0	222	1

ASCN NODE 260. W.

ADD MINS	AZ	EL
92.0	201	0

ASCN NODE 310. W.

ADD MINS	AZ	EL
78.0	147	0
80.0	156	0

ASCN NODE 315. W.

ADD MINS	AZ	EL
74.0	126	0
76.0	137	2
78.0	148	2
80.0	160	2
82.0	171	0

ASCN NODE 320. W.

ADD MINS	AZ	EL
72.0	116	1
74.0	126	3
76.0	138	5
78.0	151	4
80.0	162	3
82.0	173	0

ASCN NODE 325. W.

ADD MINS	AZ	EL
70.0	105	2
72.0	115	5
74.0	127	7
76.0	141	9
78.0	154	7
80.0	165	4
82.0	176	1

ASCN NODE 330. W.

ADD MINS	AZ	EL
68.0	93	2
70.0	103	6
72.0	115	9
74.0	129	11
76.0	143	11
78.0	157	9
80.0	169	5
82.0	179	1

ASCN NODE 335. W.

ADD MINS	AZ	EL
66.0	81	1
68.0	90	6
70.0	102	11
72.0	116	14
74.0	131	15
76.0	147	14
78.0	161	10
80.0	172	6
82.0	181	1

ASCN NODE 340. W.

ADD MINS	AZ	EL
64.0	70	0
66.0	77	6
68.0	87	11
70.0	100	16
72.0	117	20
74.0	135	20
76.0	152	17
78.0	166	12
80.0	176	6
82.0	184	1

ASCN NODE 345. W.

ADD MINS	AZ	EL
64.0	64	4
66.0	72	10
68.0	83	17
70.0	99	23
72.0	119	26
74.0	141	25
76.0	158	20
78.0	171	13
80.0	180	7
82.0	186	1

ASCN NODE 350. W.

ADD MINS	AZ	EL
62.0	53	2
64.0	56	8
66.0	66	16
68.0	78	24
70.0	98	31
72.0	124	34
74.0	149	30
76.0	166	22
78.0	177	14
80.0	184	6
82.0	189	0

ASCN NODE 355. W.

ADD MINS	AZ	EL
62.0	45	5
64.0	50	12
66.0	58	22
68.0	72	32
70.0	97	42
72.0	132	43
74.0	159	34
76.0	174	23
78.0	183	14
80.0	188	6

ASCN NODE 360. W.

ADD MINS	AZ	EL
60.0	35	1
62.0	37	8
64.0	41	17
66.0	48	28
68.0	62	43
70.0	97	57
72.0	148	53
74.0	173	37
76.0	183	23
78.0	188	13
80.0	191	5

ASCN NODE 0. W.

ADD MINS	AZ	EL

ASCN NODE 0. W.

ADD MINS	AZ	EL

ASCN NODE 0. W.

ADD MINS	AZ	EL

ASCN NODE 0. W.

ADD MINS	AZ	EL

What are we doing to ourselves

Peter B. Dodd, VK3CIF
1306 Glenhuntly Road, Glenhuntly, 3163

In between the sweeping generalities in this article, there is a great amount of truth viewed against our 'popular' identity, the performance at ITU conferences of many delegates from African and other countries and the dark clouds of a world frequency conference hanging over us for 1979. Perhaps the Eastern bloc countries are quite right in classifying amateur radio as a sporting activity. (Ed.)

Quite frankly, I am heartily sick and tired of all the preaching going on within the amateur service to justify to ourselves that amateur radio is a good thing. But more, later.

Do you hear footy requiring justification for its existence? Or table tennis? Or chess? Or stamp collecting? Or flying model aircraft? There is public acceptance of these activities as essential parts of everyday existence.

"And what are your interests, Joe?" "Reading, football and going to the beach in summer". "Very good Joe — what else occupies your time apart from work and sleep, don't you bet for instance?" "Oh, yes, I have a dollar a week on Tatts and follow the dogs a bit whilst having a drink with my mates down at the pub".

You see my point? First rate things like reading, watching footy and such like. Then down to the fringe-area things like betting and a drink or two.

Listening to the radio or watching the monster are other socially acceptable activities.

But mention amateur radio and what is the response?

Either it is an unknown activity or you are asked in a derogatory way about being 'one of those hams'. Kindly folk ask what is a ham and what does he do? Perhaps the word 'ham' did us more harm in the public relations field than everything else put together including interference to favourite programmes.

Have you never faced a supercilious enquiry about being 'one of those hams'.

"Oh yes", you say, "and I gave him a really expert run down on amateur radio which he won't forget in a hurry". "Did you — good on yer mate". Like to take a bet on his reaction to your good intentioned preaching? Did you hear him later in the week talking to his friends about meeting some ham bloke — "must have been a real nut-case the way he shoved the stuff down my throat".

In the public's mind is amateur radio an activity rated below the fringe area even?

If it is — why?

I'll tell you.

We have fallen down badly with our public relations work. Not merely lately but most of the time. Are we so wrapped in our hobby, so self-centred or so introverted that we have not time to publicise ourselves. What are we? A mob of rabbits for ever burrowing underground instead of shouting our excellence from the roof tops? We claim to talk to the world but where do we hide publicity to the ordinary man in the street?

What does the public know — or care — about the OSCAR programme? Did officialdom see to it that amateurs received no mention for their part in the recent Queensland floods? What could a good journalist have done with amateur communications for Las Balsas and countless other out of the ordinary occurrences?

Things that are happening now! Not the stale old stuff about pioneering 200 metres and below. Or the vital part played long ago by amateurs in communications by wireless. All this is good stuff but forget it once it is in written history.

OSCAR satellites, moonbounce and other scientific experiments, day to day communications going on with an interesting background. These and numerous variations on such themes should regularly appear in the press, be heard on radio and be seen on television. But for sure, ban that word 'ham'. It has lost any value it once had. It is no longer funny — just as Tony Hancock's "It's raining in Tokyo" is dated. Incidentally, the use of 'that word' is to be discouraged on no less an authority than through a policy of the WIA Federal Council.

What are we doing for the young? What are we doing for beginners? What will we be doing for Novices? Are we so smug and so elite, so privileged, so know-it-all that we have no patience with anyone aspiring to climb the ladder below us?

What are we missing in the schools? It might be too much to expect amateur radio to be an examination subject but apart from a few dedicated individuals manning the occasional YRCS activity or a 'big deal' once a year appearance by a few people on JOTA what are we doing for the young?

Hit and miss methods hopefully believing that an occasional teacher in equally few schools will fire up enough enthusiasm even to inform students about amateur radio are no longer good enough. Every school ought to know something about Oscar satellites and how easy it is to climb on this bandwagon of exciting experimentation to broaden the pupils' knowledge of the world around him (and her, too).

No, we go around hiding our talents. Because we are 'amateurs'? Is the word 'amateur' as great a millstone round our necks as the word 'ham'? Everyone must have heard the expression 'he came up from the world of amateurs'.

I submit we must do a big job on our public relations, our beneficial effects and our potential value to the community. And this applies to you, and you and you over there as well as to WIA activated publicity constantly flooding the media until they sit up and take notice of us.

All this is very different from sitting supine in your operating chair hoping the other bloke will do something; reading in our amateur magazines about the benefits of amateur radio and how can we stave off disaster by convincing ourselves we are, after all, splendid blokes full of knowledge and world-wide bonhomie; what the great 'we' have done and hope to do.

Amateur radio is not a secret society. The activity is not allied to black magic, witchcraft or any other little known fad or occult art. Sure, we have some mystic language but this is necessary fun, part of the game. We talk openly, even with Russians, but we are not communist spies as an article in the "Sun" of 18th March seemed to imply from a British Defence Council Report.

This article is intended to stir every right-thinking amateur into doing something about our public image. Not only now, not only next week, not only next year BUT ALL THE TIME, mate. Despite our increasing numbers we do not get more frequencies. Without frequencies on which to operate where would we be? Back to growing roses perhaps! ●

QSP

EMERGENCY COMMUNICATIONS

"It is expected that AMSAT-OSCAR 7 will be used in support of such (emergencies) communications during any such emergencies, as a back-up for HF radio, which is highly dependent upon favourable ionospheric conditions". Amsat Newsletter, Sept. '74.

●

What to do with that old receiver

By Harry Roach
Reprint from Zero Beat, April 1970

That old radio that Uncle Bob gave you, what can you do with it? Ever thought of making a Signal Tracer out of it? This is how you do it. If it is a superhet type, you can make it do at least 5 things.

1. **A signal generator.**
2. **An RF probe tracer.**
3. **Detector output of set is used to apply to any amplifier.**
4. **Use the set's audio output for testing other gear or as a PU amp or can be used with hi-level output microphone.**
5. **Lo-level output.**

You will need a switch with 5 positions. 2 x 100pf mica condensers. 3 x .05 condensers (Philips polyester) value not critical. Use at least 400v working type. Quantity of coax. (75 ohm or microphone cable) PMG jack and plug and a home made probe (out of a ball point pen shaft).

By connecting a 100pf condenser to the oscillator section of the tuning gang, you pick up the RF generated by the local oscillator of the set. This should be good until at least the third harmonic (see table) and if you use a list of broadcast stations you can work out what generated frequency you are on or what harmonic. This is very handy as a rough check on your short wave receiver, or for lining up.

Make a probe out of a ball point shaft. Plug one end with some insulating material and insert a knitting needle or a bodkin. Solder your coax. to this and the other end of the coax. goes to a PMG jack plug.

Don't forget to earth the shielding. When the S/W is in the No. 2 position you can use this probe to pick up RF signals on another receiver. If you have trouble in the RF section of a set, use the probe by tracing a signal until you get nothing and then you start looking at that particular section for trouble.

The aerial is disconnected from the tracer whilst tests are being made with the exception of the No. 3 position.

Dial Tuning	**Osc. Tuning**	**2nd H'monic**	**3rd H'monic**
550 KC	1005 KC	2010 KC	3015 KC
3AR (620)	1075 „	2150 „	3225 „
3LO (770)	1225 „	2450 „	3675 „
3AW (1280)	1735 „	3470 „	5205 „
3AK (1500)	1955 „	3910 „	5865 „

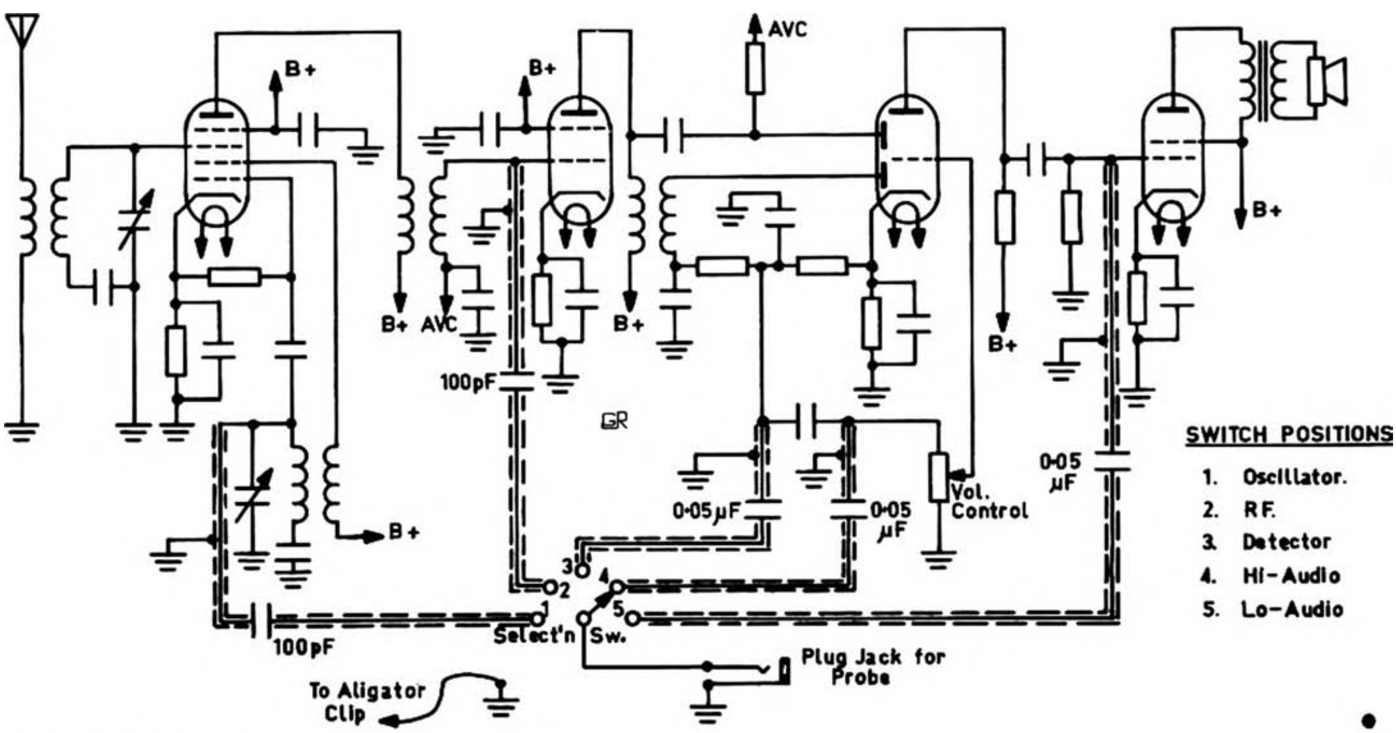
(with set using 455 KC I/Fs)

I realise that there will be many types of superhet about and the types of valves will vary enormously, but the principal is the same throughout. In this diagram the first valve is the Mixer, the second is the IF amp, the third is AVC DET. and 1st Audio, and the last valve is the Output amplifier. The rectifier is not shown.

When making connections to the switch place the condenser as near as you can to the component or element and the length of shielded cable is then earthed near that point and the rest of the cable run to and joined at the switch. A length of about two feet joined to a crocodile clip makes up the earth lead and this can be soldered or just plugged into the chassis.

If you like this idea and give it a go and find it successful you can later on make a more sophisticated tracer by using most of the equipment again but altering some of the coils and switches. Try this first. The main thing in getting this going, is to get a copy of the circuit of the receiver (if you can) or get some friend to help out with where to put the connections on. It looks a bit hard, but it really isn't. ●

BELOW: A standard circuit for pre-solid state broadcast receivers.



Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley. 3150

FT101 VOX OPERATION

It's now quite a while since we discussed the FT101. Perhaps it is indicative of the reliability of these rigs that very little is ever heard of serious problems or the need for odd modifications. To start with, in this present discussion we will look at the adjustment of the VOX circuits. Earl Lagergren K70EP, DL4LE and VK2EP devised the following and Les VK4LZ forwarded it on to me.

"Recently I had the pleasure of visiting with Les VK4LZ, and came across the following problem with his **FT101**. Since this appears to be a common problem and prevents many fellows from using the VOX, I thought I would pass along my experiences with it. Les's VOX would operate satisfactorily for a few minutes and then slowly hang-up.

Looking at the VOX schematic on page 17 of the instruction manual, you will see that the VOX relay is controlled by a bipolar transistor (Q6) which will operate the relay as soon as the base voltage increases above about 0.7 volt. The base voltage is controlled by the action of a junction FET (Q5) in the following manner: with no inputs from either the VOX or anti-trip circuitry, the voltage on the gate of Q5 will be zero. With zero gate voltage the drain voltage of Q5 and therefore the base voltage of Q6 will be a factor of the drain load resistance R25, the particular FET characteristics and the source bias determined by the value of VR3.

Let us assume the source bias pot VR3 RELAY is adjusted so that the quiescent drain voltage is 0.4 volt. Any speech from the mike will be amplified by the VOX amplifier and rectified by D1 and D2. The gate voltage will no longer be zero, and as it goes in the negative direction the drain voltage will become more positive. As soon as the drain voltage increases from 0.4 to 0.7 the VOX relay will be activated. With no further speech input this voltage will fall back to 0.4 volt and somewhere along the way the rig will switch back to receive.

This is the problem; if the base voltage as adjusted by VR3 RELAY is too close to the turn-on voltage of Q6, then any slight drift may cause the transceiver to hang-up in transmit. However, if the RELAY pot is adjusted too far in the other extreme, too much VOX gain will be required and the VOX may not operate on the first syllable.

The best method of adjustment is as follows: with the receiver audio gain turned down speak into the mike and turn the VR3 RELAY pot fully counter-clockwise. This should cause the rig to hang-up in transmit. Now slowly turn the pot clockwise until the relay drops out and then turn it a fraction more to take any drift into account. Now advance the VOX gain pot VR1 until the VOX actuates on the first syllable. Turn up the receiver audio gain, tune in a strong signal, and advance the anti-trip pot VR5 until the relay stops chattering. It might be necessary to play with these two pots a bit. However, it is much better to keep the mike and speaker separated and use only a little anti-VOX than to put the mike right in front of the speaker and need too much anti-VOX."

IMPROVED CW OPERATION FOR THE FT101B

Tom House VK2BTH makes a simple suggestion for CW operators lucky enough to own an **FT101B.**

"Owners of the popular Yaesu **FT101B** transceiver who like both CW and SSB will probably have noticed that unless the microphone is unplugged when operating in the CW mode, the VOX tends to cycle on and off. A simple remedy is, on switching to CW, to turn the mic gain fully clockwise (maximum). A perusal of the circuit diagram shows that this effectively shorts to earth the output of the mic stage to the VOX amplifier when the unit is receiving. It allows the microphone to be left permanently in place, thus avoiding much tiresome and time-consuming pulling and tugging."

Remember, when reverting to SSB, to return the mic gain to its normal position.

Try This

with Ron Cook VK3AFW and Bill Rice VK3ABP

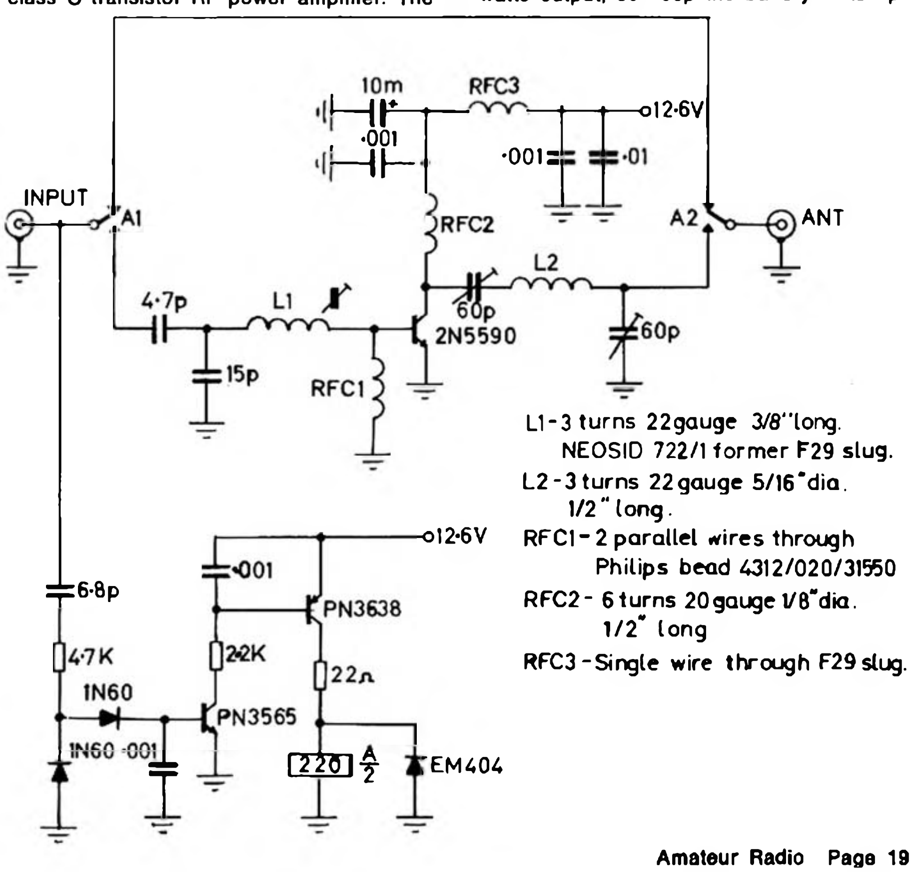
KP202 RF POWER AMPLIFIER

A power amplifier is useful when using the KEN KP202 as a mobile or base. This is best done by using an RF switched power amplifier between the KEN KP202 and the antenna.

The amplifier unit consists of a relay driven by an RF Sensor and uses a 10 W class C transistor RF power amplifier. The RF power amplifier is a 10 watt RF Power Kit (Dick Smith Electronics) which uses a 2N5590 transistor. If higher output is desired a 25 W board could be added on also.

The changeover relay is actuated by detecting the RF from the KEN, and using this to drive the relay via a DC amplifier. The relay used was a small cradle relay with low capacitance and high current contacts. Suitable relays may be obtained from Siemens and other sources.

The amplifier was simply peaked up for output and produced 9 watts output for 12 volt supply and 1.5 watts drive. But 14 volts supply and 1.5 watts drive produced 12 watts output, so keep the battery volts up.



Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

This month I have a few more short circuits from Zero Beat.

JUNE 1969 HARRY SMITH VK3ZXS. An ordinary, cheap, glass cutter (disc roller type) makes an excellent tool for cutting aluminium sheet. Some care must be taken to score both sides opposite each other then flex until it breaks at the score. In most cases, and especially if the sheet is large, it pays to clamp the aluminium between two pieces of timber of appropriate size. Try putting one end in the vice and fix the other with a G clamp, or use two clamps.

JUNE 1969. Correcting fluid designed to cover mistakes in typed mimeographed stencils can also be used for repair of small tears and holes in speaker cones. The solution is inexpensive and can be purchased in small bottles from any of the office supply stores.

AUGUST 1969. Winding coils with enamelled wire and having trouble cleaning the ends for soldering? Then try this. Heat the area you want to strip in a methylated spirit flame. A small jar with screw lid with a wick through a tight hole in the top will do as a burner. When it is red hot dip it into some cold methylated spirit and you have a perfectly cleaned wire.

AUGUST 1969. After applying decals (transfers) to a panel, cabinet, etc., fix them to ensure their permanency. Use a small camel hair brush to apply a small amount of acetone fingernail polish remover, or lacquer thinner to the decal. Use just enough solvent to dissolve the clear decal backing.

APRIL 1970. Where there is not much room to work, replacement transistors will be easier to insert if the leads are staggered, that is cut each lead a little shorter than the other. This allows you to insert only one lead at a time instead of trying to manoeuvre three leads through three holes all at once. The excess length can be cut off after the leads have been soldered.

APRIL 1970. One neat and simple method of providing taps on hand wound coils is to make a loop in the wire and twist it two or three times. Continue on with the coil to the end and cut the loop on one side near the twist, clean the twist and solder. The piece of wire in the loop gives you your tapped lead. ●

QSP

HF MARKER STATIONS

Radio telephony weather broadcasts radiate from the Sydney area on 3432, 6680 and 10017 kHz at each hour and 30 minutes past each hour. The broadcasts on 3432 and 6680 are good markers to determine whether 80 m and 40 m bands are open from your QTH to VK2, especially the Sydney area.

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,

Brian Hannan's letter in September issue has spurred me to write about the problems of the associate member in the WIA. I cannot but agree that associate members do receive a raw deal — at least in Victoria. Some three to four years ago a delegation from the Eastern Zone at a special Divisional Council meeting brought up this very point, and the additional point that associates have no voting rights even in matters which affect them only.

The membership fee which now stands at 97 per cent of full membership fee is unjust considering the reduced privileges the associate receives. They have no voting rights on any subjects, their WIA listeners numbers are not published, there are few articles in AR which are of value to them, I'm not sure but I think they pay to the IARU, they pay for part of the Federal conventions at which their affairs are not discussed, and they have no need of the help of the TVI committee or to receive assistance in dealing with "problem" neighbours. It was with these things in mind that the Eastern Zone broached this subject. The Eastern Zone was told that it cost just as much to administer an associate as a full member and that there could be no consideration of associates having any voting rights even on subjects that only concerned them. The inference was more fool the associates for belonging to the WIA. Regretably, I have no reason to believe that the Victorian Divisional Council have changed their minds on the importance of the associate in the whole scheme of amateur radio.

I believe that a membership fee of 70 per cent or thereabouts would be reasonable for an associate to pay, for what they should get out of the WIA and for what they should put into the WIA. It cannot be just a one way affair. For example, on investigation it appears that the listeners numbers were dropped from the callbook because they were inaccurate either through the WIA records of this nature assuming a low priority, or the associates did not advise the WIA of changes of address and such like. Why don't the people who are interested in this listing get together and make sure that the listings are accurate and up to date. Perhaps an approach could be made to the Editor of AR to determine whether each Division could submit an insert for each State of the listener numbers, names and addresses in much the same way as the callsign amendments are done. The system I envisage would be that VK5 would only receive the VK5 list of listeners, likewise VK3 only the VK3 listeners and so on.

I coudn't agree more that the content of AR directed towards associate members is relatively small. However, Newcomers Notebook is aimed at the associate and the newly licensed amateur. Regretably very little feedback is received to determine whether or not this column is filling this need. I have appealed from time to time for help with the column and have been deafened by the silence of people speaking up and offering. I have very little time to prepare articles — a co-author for this segment of the magazine would be most desirable. I cannot recall when I last saw an article written by an associate. It is difficult for a licensed amateur to write for people with significantly different interests to his. The associate member must contribute more to the magazine, not just bemoan the fact that there is very little to interest him in AR. The SWL notes died a natural death through lack of contributions by the associate members.

Perhaps the whole outlook of the WIA executive, divisional councils, rank and file amateurs and the associate members should change concerning what role the associate plays in the WIA. The associate grading should be the way in which a radio enthusiast is introduced to amateur radio. I believe that the person we are aiming to attract to the broad spectrum of amateur radio knows nothing of it — because of lack of publicity on our part. These people of whom we know nothing would join as associates and a large proportion would likely become amateurs. We need good publicity followed up by good educational courses in amateur radio. These two aspects will be most important when and if the Novice certificate comes in. Quite a proportion of the 27 MHz pirates might not have been pirates if we had had some publicity in the World at large, and courses of instruction to help them on the way to amateur radio. I estimate that there are more pirates than licensed amateurs. Wouldn't it be good if most had become amateurs instead of pirates? Have we lost these people because of our "closed house" attitudes. I say in many cases we have.

To recapitulate (1) The associate member has my support for a lowering of fees in his case, and I am sure other full members would too. In each case contact sympathetic amateurs in your own states so that this point can be put forward. If you don't contact full members you cannot expect their help.

(2) I believe that associates should have voting rights but only on those things which directly concern them.

(3) Associates themselves need to push for the re-insertion of the listener numbers.

(4) Associates need to contribute more to AR if they want a fair coverage of items of interest to them.

(5) The WIA in total needs to look carefully into the role of the associate as it is and what it should be.

(6) The WIA needs to publicize amateur radio much more widely than it does currently, and perhaps steer young people who might go pirating on the road to amateur radio.

(7) The WIA needs more and better instructional courses for radio/electronics enthusiasts. Perhaps the Government could be persuaded that these types of courses should be subsidised under the free tertiary education scheme.

(8) These particular points become increasingly important with the possibility of Novice licensing.

Think these points over whether you be a full or associate member. The time for change is perhaps already upon us. Rodney Champness, VK3UG

The Editor,
Dear Sir,

I was intrigued with the problem raised in the letter to the Editor of AR, July 1974, by VK6TU, and have given a few thoughts to it.

I have not seen the reference quoted from the "Radio Communication Handbook", hence I do not know as to what type of valve or circuit conditions to which it applies.

The statement is correct in relation to a type 813 beam power valve used under class C conditions with a very stable independent screen grid power supply. This was verified in a practical test with an 813. When tuning the plate circuit through resonance, the plate current dip and the screen grid current peak occurred together.

The reference that in the amplifier no grid current was flowing, indicates that the 6146s were being used in either class A or class AB1, and probably they are parallel connected. No reference to the type of drive being used was made, i.e. grid or cathode drive.

The 6146 is a little different in one respect from other beam power valves, it has a rather low screen grid impedance and it is this which makes screen grid modulation slightly more difficult than with, say, an 807, for AM.

I have extracted the following data for a pair of 6146s from a valve manufacturer's data sheet for class AB1 operation under ICAS conditions.

Plate Voltage: 750 V.

Screen Voltage: 200 V. Preferably obtained from a very stable power supply, either independent or extra well regulated.

Control grid Voltage: 50 V. Again preferably from a well regulated supply. Cathode bias is not recommended.

Plate current: Zero signal input. 57 mA, maximum signal input 227 mA.

Screen grid current: Zero signal input. 7 mA, maximum signal input 27.5 mA.

Power Output: 120 watts.

Assuming that the 6146 behaves as stated in the handbook, the problem may be due to any of the following:

Screen grid voltage not sufficiently stable. This is vitally important as variations in screen grid voltage have more effect on plate current than

Contests

with Jim Payne, VK3AZT

Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

1974 REMEMBRANCE DAY CONTEST RESULTS

	a	b	c	d	e	f
VK5 & 8	289	837	34.5	1485	71944	26325
VK4/P29	132	775	17	1945	49049	10299
VK6	77	525	14.6	1444	29152	5719
VK1	35	130	26.9	1056	11203	4072
VK2	109	2151	5.1	1522	34524	3271
VK7 & 0	42	231	18.1	706	12003	2888
VK3	89	2054	4.3	1046	30555	2370

a—Logs received d—Average top 6 logs
b—Licences e—Total score
c—Logs/Licences % f—Trophy score

CONGRATULATIONS TO THE VK5 & 8 participants.

Their joint effort was well organised and the roneoed cover sheets received with most of their logs made my job much easier. Column "c" of the results shows the call areas where prior organisation might wrest the trophy from VK5. But pity the contest manager, for this time there were 809 logs received and over 200 of them arrived during the two days before entries closed.

Unfortunately a few logs contained less than the minimum 5 contacts and consequently could not be recorded. Several misread the scoring table and claimed highly inflated scores; quite a number failed to double scores for CW contacts, and a surprisingly large number either did not total their score or make any effort to score. Several operators forwarded check logs and some of the top scorers prepared their logs with meticulous care. Generally, the numerous comments referred to a most enjoyable contest but quite a few criticised various aspects which cumulatively ask the question, is it a contest or a QSO party? This column is not the place to record those constructive criticisms and they will be referred to the Executive. The VK7 people were very disappointed because repeater contacts were not allowed this time and copies of their comments will be forwarded to their Councillor.

Many operators recorded the name of the distant op and one entry, written with pride in the log received from VK4AL/8 shows VK3OW as "Dad".

It had to happen! Operators are allowed logkeepers. As an SWL submitted in the receiving section, a replica of a log entered in the transmitting, phone section, is there any good reason why an SWL should not have an operator?

DIVISIONAL SECTIONAL LEADERS' LOGS ARE SUBJECT TO FURTHER CHECKS

In the following detailed scores the first figures are the points scores and the second contacts made.

RECEIVING (OPEN)

VK2	J. Hilliard	449	141
VK3	E. Treblicock	628	164
VK4	J. O'Sullivan	442	172
VK5	R. Wilford	1564	597
	L. Collins	1137	312
	M. Spooner	1131	408
	M. Wall	922	425
	J. Macdonald	621	228
	M. Warrington	504	204
	R. Chester	361	129
	G. Edmeades	286	121
	D. Minchin	234	95
	R. Taylor	40	14
	I. Vickers Green	26	11
VK6	T. McGrath	1268	509
	G. Down	614	240
	R. McIntyre	461	168
	M. Clarke	459	187
VK7	P. Hall	913	387
	R. Everett	638	291

STATE SCORES

VK1

Phone

GB	1164	438	JG	129	40	TH	41	30
RA	553	229	ZAR	99	99	KW	30	30
ZT	467	227	RY	98	56	RH	13	8
TR	436	201	TJ	82	19	ML	11	11
LF	424	139	MF	76	57	JF	8	8
QJ	239	98	CR	61	57	PM	8	8
DV	213	90	AN	58	40	RD/4	758	260
BA	181	102	DS	53	53			
WI	138	112	ZMV	43	43			

Open

DA	1304	517	DC	722	318	ACA	94	19
AOP	1193	487	EP	635	278	YR	45	43
BC	1026	405	VP	436	175			
MS	929	376	AU	194	55			

VK2

Phone

ASD	1615	586	AWN	254	90	BXG	52	10
DO	1545	511	OW	249	62	AKV	47	9
XT	1530	519	BSC	242	97	AWX	42	42
BNS	1111	387	NV	227	76	AHH	41	21
AJY	949	317	BKE	191	69	BGG	40	12
BDT	889	307	BMX	190	83	AIM	39	8
ADA	782	306	AZY	173	69	ALV	38	15
AGF	754	235	BRU	159	56	ANL	36	12
ZA	731	238	AXJ	151	58	AGS	35	10
OH	706	231	BGA	150	53	JF	31	22
VU	611	185	AQ	127	51	YAO	29	29
BIP	575	210	ZCT	125	125	KQ	27	12
BDN	536	211	BSG	122	30	YCC	26	26
AJH	431	126	ASJ	117	40	QC	26	11
BML	344	118	ADL	114	34	ADR	26	5
ASH	343	120	SW	110	48	AXS	25	14
AGM	339	126	LW	103	21	BJK	23	14
AXL	336	100	YCK	99	99	HZ	21	10
LS	332	109	ZSG	84	84	ZZX	19	19
SB	307	100	ZVN	82	82	AEB	19	6
ABC	301	98	AFA	79	20	ZVJ	16	8
BPS	292	106	FJ	78	34	AGZ	13	5
CS	280	90	AAI	71	32	YBW	11	11
GV	277	83	CI	66	66	ZVY	10	10
AJL	275	97	AAC	63	12	YCA	8	8
RX	260	188	BHS	54	21			

Open

BO	1703	504	PN	619	144	BET	72	20
CAX	1333	401	AWQ	444	120	AXU	60	7
ATT	792	286	BCC	254	50	AHM	36	11
BLK	764	186	AJQ	232	55			

CW

CX	1408	248	GR	270	52	AXK	128	20
QL	1034	159	ANY	212	40	JY	118	26
HW	786	125	HQ	204	50	TR	90	25
BHO	710	145	BNL	200	43	IV	90	16
BQQ	652	120	KA	176	41	AMB	82	19
VN	608	112	SI	144	31	ZC	36	10
YB	458	79	VM	144	25	RJ	34	8

VK3

Phone

AFW	1127	500	BFN	313	154	WM	153	47
BDL	1119	553	KK	290	114	AJR	129	51
AYF	1066	525	ZD	287	123	ZBM	128	128
HT	1009	487	DC	280	121	BKW	122	121
AUQ	848	461	ASN	280	101	AJP	122	52
ADW	792	308	VQ	250	100	BJM	112	55
AXV	780	355	BMA	244	153	YHS	103	103
ARY	744	336	JK	244	117	BJB	95	42
SM	722	301	QG	235	93	ZBB	51	51
ANM	659	341	ZY	233	100	NV	51	25
GI	583	244	AGJ	227	104	ZRG	44	44
EF	556	250	PY	220	88	AXU	31	17
YQ	548	206	AKG	218	214	BAX	27	16
RV	517	217	HZ	214	110	ZZU	22	22
AGM	487	252	AVJ	207	122	ZSC	18	18
WP	469	220	IC	190	112	ARA	15	7
AFJ	397	176	ZLM	189	189	YFL	9	9
ABP	376	144	XF	188	80	AKT	3	8
SR	372	194	LV	183	63	BRB	7	7
QZ	353	154	UV	176	87	YDA	6	6
AAO	320	155	BAZ	173	67	ZPN	5	5

Open

AYL	985	481	QP	635	225	EZ	148	71
AQO	973	422	VF	266	160			
WW	947	443	PR	242	107			

CW

OP	714	180	JI	442	112	GK	100	24
CM	672	165	YK	320	70	TJ	92	24
FC	638	161	NK	266	68	ABR	82	22
ZO	584	142	RJ	284	74	AJB	74	24
ANU	582	160	ARK	242	73	BDH	18	7
MJ	506	116	AZT	222	55			
MR	446	118	ABS	152	50			

VK4

Phone

ZQ	2113	785	GI	217	65	ZDB	60	60
VU	1365	476	CY	216	93	ZUA	58	58
YS	1187	439	RO	200	66	ZGR	57	57
MM	871	349	LN	198	81	ZNH	57	57
OW	870	380	NO	186	45	FE	55	36
DO	870	310	CW	184	60	XN	50	12
FD	741	265	ZBV	181	181	KZ	49	18
CP	721	255	PU	178	50	NG	42	12
ZB	702	218	ZRF	173	173	ZTK	36	36
VV	688	243	ZLC	168	168	ZA	35	35
EZ	671	207	NB	162	32	UB	34	14
FU	663	256	YG	158	53	HW	33	10
KS	635	208	ZW	153	67	ZAF	29	29
LE	633	208	NY	138	52	ZRQ	28	28
OO	614	220	WIG	137	46	ZNI	26	26
PX	589	200	XZ	134	71	ZLD	25	25
MW	562	178	LR	134	40	TL	22	10
HB	434	149	BG	123	50	OW	19	10
IE	414	124	HZ	114	30	VS	22	6
PJ	400	117	ZML	113	112	ZFA	18	18
FX	377	119	AM	98	52	MU	18	10
GS	371	125	VL	96	36	SR	17	17
EM	349	122	ZZ	92	32	ZRI	17	17
FN	342	110	AQ	89	35	ZJM	15	15
WIM	309	108	NV	89	33	GT	14	8
IC	299	147	CR	82	34	UI	12	12
UC	289	121	ZDC	81	81	ZRG	11	11
GM	278	157	DV	75	31	ZDG	11	11
AJB	267	150	ZEZ	71	71	ZMD	9	9
DJ	250	93	ZJO	67	67	ZEA	8	8
CZ	247	73	LA	66	30	AL/8	292	100
NQ	237	84	EH	64	43			
UJ	217	101	AZ	61	22			

Open

II	2386	665	WL	676	122	PV	333	109
RH	1996	618	PS	655	217	XJ	266	91
UX	1909	603	LZ	643	236	IJ	209	92
HE	1787	504	NP	631	173	QH	61	29
LT	1291	363	VB	610	144	UG	60	23
UA	1005	287	UU	588	148	OS	48	15
DT	927	341	RF	518	173			
KI	765	167	AK	380	114			

CW

KX	962	159	HH	252	50	OK	104	20
UR	642	110	MY	220	38	CN	52	15
KU	492	87	CU	218	52			
FB	416	78	VA	138	30			

VK5

Phone

QX	1557	618	MF	555	184	WB	307	140
BW	1446	563	DI	542	167	SS	307	100
BI	1397	467	US	532	192	ZU	305	93
NC	1318	447	VX	511	149	IZ	304	119
FT	1233	442	LL	507	202	NY	301	137
NT	1226	513	KR	488	222	FR	294	102
EN	1186	438	VT	486	131	XI	278	123
PH	1041	394	TY	485	225	SU	269	100
CU	901	409	WR	483	181	CH	262	100
HI	896	360	NJ	477	174	AWI	259	122
GM	859	353	ZGZ	453	453	XU	246	78
WI	844	332	BQ	453	190	KX	239	173
LM	783	288	DV	445	273	AW	239	146
OV	767	279	DK	442	158	HN	235	120
LI	749	258	CY	433	150	NX	211	92
ZT	747	330	GL	427	304	ZQ	200	104
ZK	741	320	QY	422	138	PX	194	103
FD	735	259	QH	419	170	DF	184	58
LP	709	252	LX	406	150	BH	181	60
ST	700	268	UJ	388	140	ZCP	172	172
NN	692	236	AX	372	144	ZMF	172	172
ZZ	678	233	LN	357	119	TB	164	50
VB	634	227	ZDD	353	353	ZAC	161	161
NB	629	274	GV	347	115	FL	158	45
EF	629	243	LQ	342	104	PF	155	54
EX	611	231	UC	342	100	JD	153	69
MG	589	216	KG	317	129	AF	153	55
MM	561	229	GN	312	104	ZCR	150	150

BD	150	46	AS	68	42	PS	24	24
ZJV	148	148	ZNJ	67	67	WW	24	14
ZE	148	62	FA	63	41	CS	23	6
WN	141	79	JQ	63	30	ZBE	22	22
AH	140	41	EQ	63	21	ZKP	22	22
OZ	139	50	ZKS	60	60	ZMR	22	22
KH	138	65	QE	60	30	ZTK	20	20
TW	136	60	ZCV	56	56	VH	20	7
MT	131	92	GZ	56	21	ZTT	19	19
PO	131	38	ZDL	53	53	UL	19	12
JU	129	51	GX	52	52	WA	19	8
SD	128	37	TU	51	31	ZOO	18	18
CL	123	74	ME	51	30	ZL	17	10
HW	123	40	OO	50	25	WD	17	5
ZKJ	121	121	ON	50	18	ZAH	16	16
ZN	118	118	ZIB	49	49	RS	16	10
AL	116	30	GO	49	49	BA	16	9
BS	113	33	ZAR	48	48	ZY	16	8
ZAJ	110	110	ZBC	47	47	ES	16	5
KF	108	49	LW	47	24	UA	16	5
OC	108	38	IR	46	46	TX	15	15
ID	107	32	ZHF	45	45	ZSJ	15	15
SR	104	38	WK	45	22	ZZX	15	15
DE	104	30	QP	44	22	CX	14	14
ZS	102	63	LG	41	41	JN	14	14
GF	102	39	ZDT	41	41	ZFX	14	14
AC	102	30	PB	40	20	ZMC	14	14
JR	101	64	WM	39	12	ZHS	13	13
XV	99	46	ZJF	38	38	ZLH	13	13
PL	99	39	EB	37	31	ZLA	12	12
DP	97	32	IB	36	11	ZAQ	12	12
[illegible]W	96	29	OT	36	11	ZTX	12	12
[illegible]	96	29	ZKT	34	34	ZDI	10	10
KT	95	95	ZK	34	34	ZLO	10	10
LZ	95	22	JX	34	10	ZLT	10	10
PI	94	30	ZIM	32	32	LK	9	6
HH	91	33	KW	32	10	ZNN	9	9
TO	88	37	ZJM	31	31	AN	8	8
GW	88	30	UN	31	9	ZFM	8	8
RI	88	29	ZEF	30	30	ZIS	8	8
ZR	88	27	ZJA	30	30	BT	8	6
PV	83	36	ZLK	30	30	PG	7	7
LC	83	25	ZPP	30	30	CJ	6	6
IM	82	31	ZAW	29	29	MK	6	6
HD	80	20	ZAT	28	28	ML	6	6
YS	79	30	RW	28	13	OP	6	6
ZNJ	76	76	MB	27	9	ZMK	6	6
RY	76	21	ZHR	26	26	JF	5	5
OG	75	38	DQ	26	9	RL	5	5
ZDG	74	74	ZBM	25	25	CV/4	91	31
PQ	74	32	ZPS	25	25			
JE	69	30	RP	25	14			

Open

NO	1875	555	QI	570	135	RK	178	63
RG	1337	383	RC	485	145	MA	15	8
BO	878	252	RR	270	105			
XX	656	266	HM	267	76			

CW

OR	850	170	KU	400	62	DS	58	10
[illegible]	900	175	ZX	312	60	KY	56	12
[illegible]	898	172	AU	296	48	GK	44	8
QR	758	143	LD	190	40	LB	30	10
MD	676	127	RX	172	25	JG	26	8
FM	598	117	DW	160	41	RH	26	8
IF	488	100	KQ	156	30	PE	26	7
QB	454	98	XD	156	28	VC	20	6
KJ	450	95	DL	110	27	UE	18	5
NM	438	97	TL	104	20			
FY	424	85	HO	84	25			

VK6
Phone

KG	1763	700	EB	276	111	WI	121	106
ID	1235	500	GR	259	95	SH	112	112
AO	1076	412	DT	255	105	ZGZ	108	108
KY	1048	494	AN	234	152	KC	106	34
WC	980	405	GL	226	90	CO	103	45
DA	952	452	DZ	220	86	TU	98	37
KW	932	364	ZIW	208	208	CW	87	49
VP	778	284	VK	180	82	TZ	75	72
KS	739	287	ZHJ	176	176	KJ	72	35
JK	668	253	FW	172	62	MM	68	68
PH	666	256	FH	164	67	PD	68	68
NM	588	213	DY	161	84	LT	66	21
BD	550	203	HE	161	52	CN	59	37
VW	495	202	WL	154	59	ML	51	15
LG	466	100	HU	142	141	HT	45	19
KB	465	254	BY	138	120	ZCN	40	40
JY	342	152	MF	125	53	XX	38	10

ZKY	34	34	CD	22	9	JO	8	8
LE	29	11	AWI	19	19	RC/8	27	9
OR	25	12	NE	19	19			
NA	25	6	ZDF	10	10			

Open

CT	2073	722	NK	587	167	RL	230	75
RU	1294	455	ZZ	537	191	HX	212	61
MA	1196	426	EJ	401	153	CR	106	32
ZE	928	215	QJ	289	127			
FI	713	249	EG	282	110			

CW

WT	1106	218	GA	88	20
JF	616	132	HD	24	8

VK7
Phone

BR	876	442	BJ	251	75	SF	68	20
KJ	650	256	EB	236	117	FB	58	27
NR	570	203	ZIF	194	194	ZJG	51	51
MX	567	248	OA	149	70	ZDA	36	36
LH	547	243	BM	127	50	ZIE	29	29
KH	544	200	CF	112	57	ZAD	26	26
MZ	505	138	BE	91	54	ZWX	24	24
AX	483	248	ZBY	84	84	ZLD	23	23
GW	451	110	ZGG	76	76	TT	9	9
OH	387	164	LY	74	29	ZMF	6	6
JU	286	144	DW	73	32			

Open

ZZ	368	133	AL	245	58
HE	340	91	PF	133	59

CW

CH	872	171	RY	300	84	RL	12	6
RO	712	169	RK	62	21			

VK8
Phone

FB	1065	363	CEB	248	91	BB	33	13
AX	428	171	CEG	179	58			
AZ	291	93	RZ	144	71			

Open

KK	1298	526	JS	346	153	AJ	168	71

CW

HA	366	66

VK0
Phone

MX	1038	178	DM	273	48

P29
Phone

DJ	1479	440	DM	577	207	CA	316	102

ZL
Phone

1BKL	946	475	2AUS	726	341	3SZ	1119	326
AGO	179	75	GJ	644	320			

Open

1ACL	798	390	3ABC	812	214
2KX	450	194	4CP	1920	422

CW

4BE	944	103	1BJH	242	67

ROSS HULL MEMORIAL VHF-UHF CONTEST 1974/75

The rules were set out in last months issue of AR. It is in the best interests of Amateur Radio to be as active as possible in these parts of the spectrum so join in if you can, please.

JOHN MOYLE NATIONAL FIELD DAY

It is only 3 months off so how about trying out your car's alternator on the lawn mower motor. Incidentally, David VK3AKG made 214 contacts during the RD contest using 2 watts F3 on 52 and 146 MHz.

CONTEST CALENDAR

Nov 10	Czechoslovakian
Nov 16/17	ARRL Phone Sweepstakes
Nov 23/24	CQ WW DX CW
Nov 30	10 metre ground wave test
Dec 7/8	Tops CW
Dec 7	Ross Hull Memorial
Dec 14/15	ARRL 10 metre

Czechoslovakian Contest

MN GMT Sun Nov 10 to 2400 GMT
Phone and CW all bands

Categories: Single op, both single and all band. Multi op all band only.

Scoring: One point per qso, 3 points if with Czech stn. Multiply total by sum of ITU zones worked on each band. Certs to top scorers in each category in each country. Logs to Central Radio Club, Box 69, Praha 1, Czechoslovakia by Dec 31st.

PROJECT AUSTRALIS

The following equator crossings are for Oscar 6 "on" orbits over Australia for November 1974. The satellite is "on" Monday night, Thursday night, Saturday night and Sunday morning local time.

Times given are U.C.T. (Z) but days are local. Figures have been corrected to latest NASA predictions.

Orbit No.	Time (Z)	Equator Cross (°W)
Sat. 2nd		
9362	0728.71	160.6
9363	0923.71	189.3
9364	1118.7	218.1
9365	1313.69	246.8
Sun. 3rd		
9368	1858.68	333.1
9369	2053.67	1.8
9370	2248.67	30.6
Mon. 4th		
9387	0723.57	159.3
9388	0918.56	188
9389	1113.56	216.8
9390	1308.55	245.5
Thurs. 7th		
9425	0813.36	171.7
9426	1008.35	200.5
9427	1203.35	229.2
9428	1358.34	258
Sat. 9th		
9450	0808.22	170.4
9451	1003.21	199.2
9452	1158.21	227.9
9453	1353.2	256.7
Sun. 10th		
9455	1743.19	314.2
9456	1938.18	342.9
9457	2133.18	11.7
9458	2328.17	40.4
Mon. 11th		
9475	0803.08	169.1
9476	0958.07	197.9
9477	1153.07	226.6
9478	1348.06	255.4
Thurs. 14th		
9513	0852.86	181.6
9514	1047.86	210.3
9515	1242.85	239.1

Orbit No.	Time (Z)	Equator Cross (°W)
Sat. 16th		
9538	0847.72	180.3
9539	1042.72	209.1
9540	1237.71	237.8
Sun. 17th		
9543	1822.7	324
9544	2017.69	352.8
9545	2212.68	21.5
9546	0007.68	50.3
Mon. 18th		
9563	0842.58	179
9564	1037.58	207.8
9565	1282.57	236.5
Thurs. 21st		
9600	0737.38	162.7
9601	0932.37	191.5
9602	1127.36	220.2
9603	1322.36	249
Sat. 23rd		
9625	0732.24	161.4
9626	0927.23	190.2
9627	1122.22	218.9
9628	1317.22	247.7
Sun. 24th		
9631	1902.2	333.9
9632	2057.2	2.7
9633	2252.19	31.4
Mon. 25th		
9650	0727.1	160.1
9651	0922.09	188.8
9652	1117.08	217.6
9653	1312.08	246.4
Thurs. 28th		
9688	0816.88	172.6
9689	1011.88	201.3
9690	1206.87	230.1
Sat. 30th		
9713	0811.74	171.3
9714	1006.74	200
9715	1201.73	228.8

NOTES—These orbits are those that can be seen by the Australian East Coast Command Station (VK3ZDH, Melbourne) and can therefore be commanded 'on'. Additional Western orbits can be seen by VK5 & 6 readers. You are welcome to use these orbits if they are "on" on the correct nights and Sunday morning. To obtain azimuth, elevation and time settings for any QTH in Australia, use the standard orbit predictions for the nearest capital city as printed in AR. It is hoped to provide these predictions and similar ones for Oscar 7 on a monthly basis in AR.

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

NOVEMBER 1974
AMATEUR BAND BEACONS

VK0	VK0RSA, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney x	144.101
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6VF, Perth	52.301
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
JA	JA1IGY, Tokyo, Japan	52.500
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

x denotes change of frequency.

Reading the "Victorian VHFer" I note John VK2BHO reports VK2WI in Sydney now being on 144.101 MHz. This frequency has been noted in the listing and I hope it will prove correct. It would certainly be appreciated if changes to frequencies, call signs or locations could be advised to me by those responsible for the beacons as it would help to keep lists accurate. The fact that I do care about accuracy of listings should be evident from the fact that I followed up a set of very incorrect listings in the 1974 NZART Call Book, mention of which was made last month. So, beacon officers, please keep me informed.

Band operational news being rather scarce this month, I feel it is just as or more important to give you a couple of reprints this month to help you with your digestion. They are very relevant, and very important, I think you should read on. The first comes from the QRT edition of "The Victorian VHFer" being the editorial by Mike Goode, VK3BDL . . .

"THE GOLDEN AGE OF THE BUTTON PUSHER". "Button pushing" idealises in many respects the current "state of the art". With large numbers of commercial carphones about, the ready availability of specifically designed amateur equipment, and the use of well designed and well located repeaters, the amateur's life has become a very easy one. One wonders if the modern ham can possibly become as enthused as the older members of the fraternity who originally produced their own equipment.

"Admittedly, in some respects, todays carphones are similar to the 522 sets of yesteryear, however, one fears many amateurs may never wish to operate anything more than what is really a glorified telephone (a function which it satisfies well), as contacts are so easy to obtain. Additionally, the repeater systems are often abused by people pushing sub-standard signals through the device, despite the consequent poor reports from other operators.

"Amateurs were originally those who developed and experimented with new radio communication techniques. In today's society, such is nigh impossible because of the commercial exploitation of wireless that followed the initial development. However, amateurs are still the exponents of propagation effects and there are many keen experimentalists in this field, e.g. moonbounce, and meteor scatter. Amateurs are also providing mobile emergency communications through bodies such as WICEN. In this sense, we are a unique group in the community as we understand how communication "works" and thus we can exploit our system far more fully than other groups of communicators.

"We can only hope in the current shortage of radio spectrum that we can continue to justify our existence and preserve our frequencies for the amateurs of the future.

"Have you considered trying a little harder and producing a signal which will allow some degree of experimentation and not just sufficient to key the local repeater?"

A few comments from me. Everything Mike has said is only too true. The amount of VHF activity at present on both 6 and 2 metres, other than FM, is appalling. One needs only to look at the VHF notes in the quite large number of publications currently being produced in Australia to realise there is just about nothing to pass on for about 9 months of the year. VK5 must surely take the lemon for the lowest degree of activity of anywhere in Australia, particularly on 2 metres, and I would be fairly safe in betting that it is not because of equipment building! One needs only to look at the small display of equipment brought to our WIA members equipment night each year in August to realise practically nothing VHF-wise is being constructed on a worthwhile scale. And what about such gatherings as the VHF Convention on the June holiday weekend in Mt. Gambier, which was held for the 10th time this year. Despite scores of VHF amateurs attending, only a very very small display of home constructed equipment is tabled. Yet, if one looks outside on such occasions, dozens of cars have transmitting antennas mounted thereon, and connected to commercial gear.

So I think Mike is right on the ball when he pleads for some signals in areas of the bands which allow for some experimentation. And lest anybody, in VK5 particularly, likes to start pointing any fingers in my direction let the facts be put right. I have struggled to keep this column going for quite a few years now with not much help from the amateur fraternity as a whole, with a few exceptions. Particularly has it been difficult during the past two years due to homework and exams for the colour TV course I have been doing, and will be doing until the end of this year. Three times in succession I have won one of the section prizes for home constructed gear (all VHF orientated) at successive WIA Annual members equipment nights, for equipment constructed between school lessons, a little bit of band listening, and still keeping the home fires burning. At present I am constructing a 432 MHz transverter, and a transmitter for 576 MHz. So lay that pen down!

The other editorial is contained in the September 1974 issue of the Geelong Amateur Radio Club Newsletter, headed "TV or NOT TV" above the name of Daryl R. St. John, VK3AQR.

"The Australian TV system is possibly the most unorthodox in the world. In 1956 when TV was first started, we had a selection of 10 TV channels (1 to 10). A few years later, as the channel situation was generally found to create problems and proved unsatisfactory, a 13 channel system was substituted. Besides adding three new channels, 0, 5A and 11, we had to alter Ch. 1, 4, 5 and a slight shift to Ch. 10. Now with FM broadcasting around the corner it appears that within the next year or two we will have to vacate Ch. 3, 4 and 5 if we are to use the international FM band (88-108 MHz).

"This would mean another shift in TV frequencies, also that Ch. 5A which is adjacent to our very popular 2 metre band, may be used more commonly for TV. As most, or I should say all amateurs know, the six metre band creates all sorts of problems to channel 0 and vice-versa. Recently, over the VK3WI broadcast, the facts regarding Ch. 5A have been released. To the amateur, it appears that we may be 'pushed' out of our popular 2 metre band, similarly to the 6 metre situation.

"It is time for us to lobby together, and discuss the 2 metre band problem at clubs, over the air, and to our local member of Parliament. It is ridiculous for a "young country" like ours to have two changes, from the original TV system in 18 years . . . and what is next? UHF? All local TV manufacturers have been advised to provide switching for UHF converters for future installation . . . A further TV frequency change?

"The best TV system proposed to date, appears to be a VHF Channel 6 upwards, for country areas because of the range and propagation conditions and UHF for capital and main cities, because of lack of interference from power lines, vehicles, co-channels etc. Aerials should be cheaper too with UHF, due to smaller size etc.

"It is up to us now, to look into the problem. Look at the troubles associated with the shift in FM channels on 2 metres. What happens if we have to possibly vacate the entire band? Many 2 metre FM repeaters are located on the site of TV transmitters. Receiver problems, and additional expense to repeater groups will undoubtedly occur if 5A was introduced. So far here in Victoria, we have not been allocated a Ch. 5A, but in other states, especially Queensland and NSW, Channel 5A licences are pending.

"I believe that in Townsville, the channel 3 ABC station will be changed to 5A (2 metres), and a local repeater to serve a suburb on Ch. 1 (6 metres). In other words, possibly spelling no 6 or 2 metre activity from the Townsville area!

"Look out; keep up the SSB on 52, and 144 MHz. Use FM and repeaters correctly, and give some thought".

If that doesn't prick the consciences of many amateurs I don't know what will. It was a great tragedy when we lost the lower two MHz of 6 metres, placing us 2 MHz further apart from the majority of the rest of the world, in particular, with our neighbours most likely to come within range at certain times. Many worthwhile contacts over the years have no doubt been lost because of the 2 MHz difference. Similarly, if we get pushed up to the last 2 MHz of 146 to 148, we will be isolated with a vengeance. A 2 metre yagi cut for 144 operation is an almost worthless device 2 MHz away, particularly higher, so the chap on the other end on 144 in New Zealand, as an example, is never likely to hear you, nor you him. And has it ever occurred to those who have never operated on the lower end of 2 metres that if we lost all the 2 metre band, you would really have to start doing some construction work and produce 432 MHz gear (if we still had that band!) because not much commercial equipment is around suitable for conversion to 432 or 440 MHz.

Finally, before the subject is changed, it surprises me to note the number of amateurs originally considered dyed-in-the-wool VHF types who, when the full licence is obtained, simply take up appliance operation on the HF bands. There is room on our bands for all kinds of operators, but don't let any of us become too narrow in our operating circle.

PORTABLE OPERATION

Despite my requests for information of proposed portable operation during the Christmas-New Year break, nothing has reached my desk, so presumably no one is going out except me. Ah! Well. I guess I can take up kite flying around 0700 instead of working other portable stations during those periods of coastal ducting and inversions. However, not quite all is lost, as Kerry VK5SU did write to me with some information on proposed operation from Ceduna this coming DX season. Kerry advises the VHF beams are being rebuilt or overhauled. On 6 metres he will run CW/SSB 40 watts PEP output, AM/FM 20 watts output. All modes to a 4 el. yagi at 54 feet. 2 metres: CW/SSB 20 watts PEP output, AM also available, all to 11 el. yagi at 60 feet. He mentions that even with this low power he was successful in working to Sydney and Canberra last year. FM: 10 watts output to a 10 element vertically polarized yagi at 57 feet, and will have available: Repeaters: New 1, 2, 3, 4. Old Ch. B. New Channel 50. He will be looking for contacts through the Adelaide and Albany repeaters, and further afield if possible. FM will also be monitoring either Ch. 50 of Ch. B when home, and amateurs passing through Ceduna would be welcome. Thanks Kerry, for going to the trouble of writing. Would be pleased to hear from you again soon.

THE TOWNSVILLE SCENE

A letter from Ron VK4ZLC, Publicity Officer of the Townsville Amateur Radio Club, indicates the repeater is progressing slowly. They are hoping to be allocated Ch. 1. The Club has been busy holding raffles, dinner dances etc. to raise funds for the repeater. It is hoped to site the repeater on Mt. Stuart, alongside the TV stations. Mt. Stuart is situated about 5 miles west of the town with a good lookout both north and south and only slight reduction in coverage to the west. Present proposals are for a 25 watts solid state repeater, possibly more power later.

About 35 amateurs are now capable of radiating on Ch. 50 in the Townsville area, and the majority also capable of Ch. 40. On 6 metres local nets are on 53.032 Sunday mornings, while Ross VK4RO at Ayr (50 miles south) and Mario VK4ZMS (70 miles north) have regular skeds on 52.010 SSB.

It is hoped there will be some signals available on 144 MHz for the coming DX season, as this may be the last opportunity for a while (due to propagation) or forever (if we lose 144-148) of working the northern VK4 boys from the southern areas.

THE VICTORIAN VHFer

The "QRT" edition of the above reached my desk recently. Very sorry indeed to see it go, it has contained a wealth of information within its pages in its rather short life. Reasons given are lack of suitable articles, rising printing and paper costs, and postal charges. All valid points. Originally the brainchild of Bob VK3AOT, that great exponent of the art of VHF, and later carried on by Ian VK3YAY, and supported by all too few at the working end, I am sure all will regret the demise of such a worthwhile contribution to the VHF scene. May I voice my lone thanks to those associated with its production, and mention I still have on file every copy of the "VHFer". And they will be kept for the future. A job well done, boys.

Similarly, looks like some production difficulties for the Sydney based publication "6UP". Issues have been few and far between of late, again I expect for the same reasons in Victoria. All too few willing to help with production, costs high etc., changing home demands of already overworked personnel and so on. However, hope you can keep going for the time being Roger, VK2ZTB, your style is different, and you don't mind being controversial, certainly no yes-man!

While on the subject of publications, once again I thank all those clubs and publicity officers who continue to send me copies of their newsletter with such regularity. Although I don't write back personally, there just isn't time at present, believe me, their receipt is appreciated, and I feel it would be a sorry day when they ceased to arrive.

That's probably enough for this month, looks like a few grouches aired etc. but all in a good cause. I could add more, but won't. Closing with the thought for the month: "We have too many people who live without working, and we have altogether too many who work without living". And did you hear about the transistor-radio manufacturer — he's so outstandingly successful he's looking for smaller premises!

The Voice in the Hills.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA 5152

ITU "DIPLOME DES 100" AWARD

Secretary General M. Mill of the International Telecommunication Union has announced the establishment of an award for radio amateurs and shortwave listeners in recognition of their efforts to promote international goodwill through amateur radio. Known as the "Diplome des 100", the award will be given to any amateur who submits proof of contact with stations in 100 different member-countries of the ITU, or to any SWL who proves reception of amateur stations in same. Only contacts made on or after January 1, 1967, or after a country's ratification or accession to the Montreux convention, whichever is later, may be counted.

Only stations using frequencies, emission modes, and call signs which are in accordance with the ITU Radio Regulations may be logged or contacted for purposes of this award. There will be no endorsements for special conditions, but stickers will be given for each ten additional Administrations contacted or logged.

Administration of this award has been delegated to the International Amateur Radio Club (4U1ITU), Geneva. Requests for further details should not be sent to Geneva but should be mailed, with a self-addressed stamped envelope, to the IARC Award Manager, L. M. Rundlett, K4ZA, 206 East Amhurst St., Sterling Park, VA 22170. The application fee is 10 IRCs or $2.

DIPLOME 35 (AHC)

The Section 35 (Ille et Vilaine) of REF, France, issues this certificate to licensed amateurs and SWLs all over the world.

1. Licensed amateurs need contact with five different stations located in the department 35, Ille et Vilaine, France.
2. SWLs need send reports to 5 stations as above.

The Award is issued separately for (a) HF bands and (b) VHF bands. Contacts may be made using any mode of transmission.

An exchange of RS(T) and QTH is obligatory.

Contacts with mobile-portable stations located in department 35 are valid provided their exact location is indicated on the QSL cards.

QSL cards are not required to be sumitted.

Licensed amateurs apply with a copy of the station log, signed by the applicant. SWLs apply by enclosing a copy of their SWL licence and the QSL cards to the 5 stations of department 35.

Costs 8 IRCs.

These rules are valid as from January 1969.

Address for the application:

Jean-Yves Rioult, F5JU
11 Square de Provence
35 - Rennes, France.

DLYL CERTIFICATE

A certificate is now available for those persons showing proof of contact with YLs in the GERMAN FEDERAL REPUBLIC. The requirements are: DX stations outside EUROPE work 10 women amateur radio operators with a licence of the German Federal Republic. A QSL of a YL working at a club station (DK0 or DL0) counts extra if this QSL and the personal QSL of the YL show different dates. All bands, and all modes of emission are acceptable. This award is available to SWLs as well as amateur radio operators. Stickers are awarded for each additional 10 contacts.

Send GCR-list together with 10 IRCs, or equivalent stamps of your own country, to the custodian: Ursula Burger, 12 Furberger Str., 563 Remscheid, Germany/Europe.

This award will be sent by airmail.

Hamads

FOR SALE

AWA MR10C, complete with Ch. B, $55 O.N.O. **Hebross HF AM Transceiver**, xtal locked, suitable for 160 metres, $10. Complete **Microwave** duplex system, comprising of two units, fully tunable and plenty of spare parts, $110. VK3ZQP, 94 Dendy St., Middle Brighton, Vic. 3186. Ph. (03) 92 5667 A.H.

Geloso G222TR AM-CW 80-10 metre Tx with handbook, $75. 20 foot dural self supporting portable **Mast** in canvas bag, $8. Power and audio transformers, tuning dials, power supplies, valves, HT chokes, blowers, amplifiers, tuning capacitors, and other oddment parts for best reasonable offer. VK3UG, QTHR. Ph. (03) 231 2028 after 7 p.m.

HAM-M Rotator, as new, $120. **Mast** 60 ft. — 5 section, butt on type by Hills, $50. **Teleprinter** Creed 7C, good working order, $30. **Power Supply** — 500V/500mA, stabilized. Dural **Tubing**, various diameters and lengths. **Pye Mark 3**, converted to 6 m. **3API** C.R.O. tube. VK6NE, QTHR.

Yaesu Station, consisting of FTDX-400 with 45 C.F.M. fan attached, and spare 6KD6s, FTDX 400 VFO, FTV 650 and SP20, matching speaker, $550, but open to any reasonable offer or will separate units to sell. VK6NE, QTHR. Ph. (092) 46 3232.

Hallicrafters SX 117 Rx — HT 44 Tx — P.S. and speaker, 80-10, SSB-CW-AM, VOX-PTT, 120 PEP. Good condition. All new valves and new spare 6DQ5 Finals, $320 or offer. L. A. Lawson, 77 Hill Ave., Burleigh Heads, 4220. Ph. (075) 35 2639 day, 35 2640 night.

Trio TR2E 144-148 MHz AM Transceiver, 240V/12V P.S. inbuilt, separate VFOs for Tx/Rx, also xtal locked, 1 xtal for Tx 144.25 MHz, Mic, handbook, good condition, $150 ONO. VK7ZDA, 65 Brougham St., West Launceston, Tas. 7250. Ph. (003) 31 6643.

Drake TR4 Transceiver with AC P.S. Excellent condition with mike, speaker. Spare set Final Tubes. VK2AGO, QTHR. Ph. (02) 43 2427.

Galaxy 5 Transceiver SSB 80, 40, 20, 15 28-30, complete with P.S. spkr., mike, manual and full circuit, very good condition, $350 ONO. VK3FO, QTHR. Ph. (054) 75 2245, AH (054) 2378.

Pye 9 MHz xtal filter with carrier xtal, $25. **Collins** PTO VFO, 75A series, $20. **Pye** Reporter 53.032 MHz AM Tx CR, $15. **Contact** 53032 MHz TXCR, $10. **TCA** FM 100 W base, $40. 100W Zero Bias 807s **Modulator**, $40. **PSU** 866s, 800V @ 800 mA, $40. Several **Command Receivers**, $15 each. 3.5-4 MHz **Receiver**, $10. **Tx**, 3.5-30 MHz CW, AM, 150W, built-in PSU (still used on CW) "mini mitter" VFO H/bands, $65. **WIA** 6 & 2 metre converters with xtal for H/band, $30. 2 as new **4C x 250B Valves** and 1 only secondhand one, $30 the lot. 1 **pair** 27.125 hand-held **Sharp Transceivers**, 1 watt, 2 channel, $60. **RCA** 14 in. portable TV, $70. A. Greening, VK3WU, 57 Glen St., Glenroy. Ph. AH (03) 306 2039.

Pye Ranger FM Transceiver, converted to 2m with channel B xtals, FET preamp. Ex VK3TR, in working condition, $50. H. Trotter, 133 Dalton Rd., Thomastown, Vic. 3074.

Transmitters: 2 of AT14 100W AM, 2 x 813 PA, 2 x 809 mods, 2-20 MHz; 2 of AMT300 300W AM, 1.6-10 MHz, 2 x QY3/125 PA, 2 x QY3/125 mods, all recently operating RFDS, suitable lineara or bits; also transformer 240-7 KVCT 0.9A, and HV chokes 0.6A. Offers to VK4OH, 20 Alfred St., Charleville, Q. 4470.

Auction Sale Night. Moorabbin & District Radio Club. To be held on Friday 1st November 1974, at the Moorabbin baseball clubrooms, Summit Ave., Moorabbin, at 8 p.m. Quantity, new and slightly used VHF and UHF FM solid state mobiles and portables. Enquiries to Treasurer: John Emery, VK3YCD. Ph. (03) 783 6003 AH.

AWA MRT25A with xtals for 52.525 MHz, $100. **AWA MRT25A** with xtals for Ch. A, B + & 4, $120. **Pye MkIIIA** with xtal for 53.866 MHz, $12. Complete set of RF & IF coils for AR88D, what offers? VK2AXJ, QTHR. Ph. (02) 798 9021.

FT200/FP100 combination with xtals for 28.0 and 27.0 installed. Smart black facia, 12 months old and as new, $270. VK2BBD. Ph. (02) 939 7215.

ESTATE LATE VK2ASU. 40 ft. 3 leg gal. steel tower complete with prop, pitch motor, motor mounting plate with Selsyn motor attached, 20 ft. 2" drive shaft gal. pipe, top bearing, side ladder, platform mounts, 8 ft. x 2" heavy aluminium twin boom, duralumin tubing. This tower will support any beam. $165 ONO, VK2AFN, QTHR. Ph. (02) 76 9525.

SWAN 350 SSB Transceiver with DC and AC PS in excellent condition with manual VOX xtal calibrator, $320. VK2ABU, QTHR. Ph. (02) 212 1623, A.H.; or 32 5916, Bus.

FT101B, new in carton, used 3 times only, $470. P. Gibson (P29LL), Flat 104, 150 Mill Point, South Perth.

Pye 2Mx Carphone, conv. to SS chs A, B, C 1 and 4 (old). Boards to 25W. Plus untried 50W board. Needs attention, $120. **AWA MR10C** SS PSU, all cables etc. ch 4 (old) and B, $45. **Kingsley AR-7** HF Rx, all coil boxes with PSU, $65. **No. 10 Calibrator**, $10. VK3YGY, Box 41, P.O. Castlemaine, 3450.

KEN KP202 2 metre transceiver, $120. Ch. B, 1, 4, 144.48, 144.6. **10 watt** amp to suit above, $20. VK2ZSC, QTHR. Ph. (02) 85-5324.

Channel 1 xtals for MR3 etc., $10.00. Wanted xtals for Channel 2. VK3TG, 2 Willow Crt., Kyabram, 3620. Ph. (058) 52 1636.

Collins 75S3 Rx mint condition, unmodified, little used, $550 ONO, also antennas TH3 and 18AVQ. VK3ARD, QTHR. Ph. (03) 277 3954 A.H.

WANTED

14 AVQ in good condition. Part exchange 4 band, 3 element "mini beam" in good condition. VK2BBD. Ph. (02) 939 7215.

Amateur band or General coverage Rx, write R. Jacob, 429 Kothoff St., Lavington, N.S.W.

FT200/FP200 combination. Price and particulars to R. Norman, VK5SW, QTHR. All replies answered.

GDO with coverage up to 2 metres. VK3ZTA, QTHR.

Bandspanner, Webster, mobile all band HF antenna. VK6QR, 16 Narrung Way, Nollamara, 6061. Ph. (092) 49 3492 AH.

18 AVT vertical or similar. Price etc. to: VK3YGY, Box 41, P.O. Castlemaine, 3450.

20 Years Ago

with Ron Fisher VK3OM

NOVEMBER 1954

"Should We Hold a Region III Congress". The Institute was fast becoming aware of the need for an international approach to the problems facing the Amateur Service. Even in 1954 intruders in the exclusive amateur bands were common. The battle continues today. The question of reporting modulation quality was one that came up from time to time. With the RST system firmly established by this time, an RSM system was proposed by the RSGB. The 'M' was to donate modulation quality on a 1 to 5 basis with 'unintelligible modulation' at the lower end and 'good modulation, not exceeding 100 per cent' at the other.

Ray Jones VK3RJ in his Federal QSL Bureau Notes reports on one of the most interesting cards he had ever handled. The card from KF3AB located on Fletcher Ice Island in the Arctic, confirmed a QSO with Chas VK1AC on Macquarie Island. In a letter accompanying the QSL, the writer Lloyd Hull claims that the QSO is a record as no other pole to pole contacts had previously been made.

Technical articles in November 1954 Amateur Radio included: The New Look in Frequency Modulation, part two — the receiver, by John Miller VK2ANF; Part two of the Complete Amateur by Tom Affley VK4UT described a small audio oscillator plus a newcomers introduction to aerials; and Jack Duncan VK3VZ described the 'New Overtone Oscillator Circuit'. This was later known as the Robert Dollar circuit.

A 'stop press' item announces that South Australia has won the 1954 RD contest with Western Australia a close second.

Silent Keys

ERN HODGKINS — VK2EH
FRED ORVAD — VK2AHX

The month of July 1974 brought sorrow to the Central Coast Radio Club.

First, the passing of Ern VK2EH and in the same week, Fred VK2AHX.

Ern was one of the old-timers and was licensed in 1934 but held one of the early Experimenters Licences prior to that. He spent the greater part of his life in the Technical Education Department and resided on the Central Coast for many years.

Wherever Ern went he was active in the Amateur Radio Field and for a number of years operated the morse Tape Service and regularly took his place on the nightly morse practice session on 80 metres.

In this capacity he assisted many present Hams to obtain their licences and gained great pleasure from doing so.

He was a past president of the Central Coast Club and held office of some kind the whole time he was a member. Ern became ill a couple of years ago and had to relinquish a lot of Ham activities. He passed away after an operation in Gosford Hospital early in July.

Fred Orvad VK2AHX was another of the old brigade, first being licensed in 1937. He was a PMG telegraphist in the early days and later was attached to the electrical branch of the department.

Since moving to the Central Coast, Fred was a stalwart member of the Radio Club and always a willing worker.

Although mainly a DX man, Fred was well known on the local scene on VHF since retiring. He was a friend to everyone and his shack door was always open to visitors in true Ham style.

The Central Coast Radio Club will be much the worse for both these members' passing and extend sincere sympathy to their loved ones.

Their calls will no longer be heard — but, they will be remembered.

Dick Maitland, VK2BBK

LEW MACDONALD, VK2WU, late of 29 Milson Street, Charlestown, passed away on 31st August 1974 aged 65 years.

Up to the time of his death, he was an active member of the Hunter Branch of the NSW Division.

Lew obtained his Amateur Licence on 13th May 1930 and a Broadcast ticket in October 1936. He also obtained a 1st Class Commercial operator's certificate in March 1937.

Lew will be remembered by many amateurs for his assistance and instruction in helping others to obtain their amateur licence.

To his family and friends, we extend our deepest sympathy.

Ray Leben, Hon. Secretary,
Hunter Branch

ALEX STEWART VK2AXF

The many friends of Alex Stewart were sad to hear of his passing away in hospital on 2nd September. Alex first entered Ham radio in the late 1920s in Temora, and later Tumut, as VK2XF. He later spent many years in the radio section of Qantas but relinquished his call sign when on a long tour of duty overseas. Ill health caused his retirement and he came back on the air as VK2AXF. Alex always kept two receivers and two transceivers tuned to parts of the 7 mc band, and a short call generally "raised" him if not already in a net. Many Hams attended his funeral and he will be sadly missed by many who, like myself, have known him many years.

VK2BC

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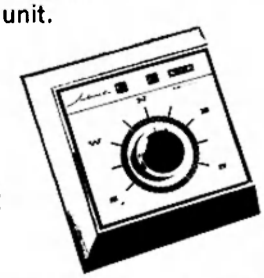
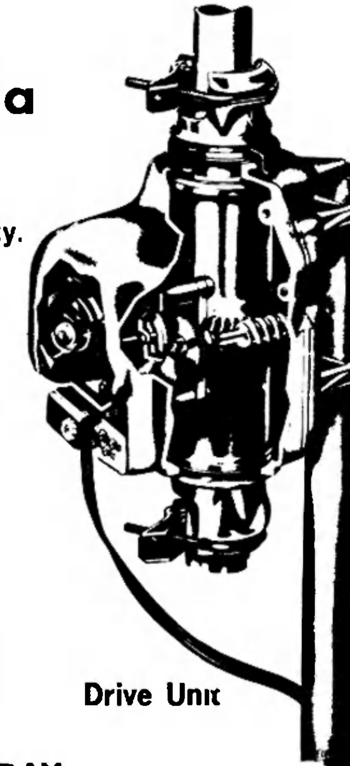
An unrivalled aerial rotating system for TV or Amateur Radio antennas. With a **STOLLE Automatic Aerial Rotator,** accurate and positive antenna positioning in any direction, is right at your fingertips. This allows you to beam your antenna (for transmission or reception) by simply turning the control knob to the desired position, with a full 360° coverage. A STOLLE rotator is rugged enough to handle the weight and wind load requirements of ham antennas up to the size of a normal 3-element 20-metre beam. It can operate for sustained periods of time without thermal overload . . . and with absolute synchronization. Positive disc brake on motor prevents "overshoot".
A five-core cable is available to connect rotor to control unit.



Control Unit



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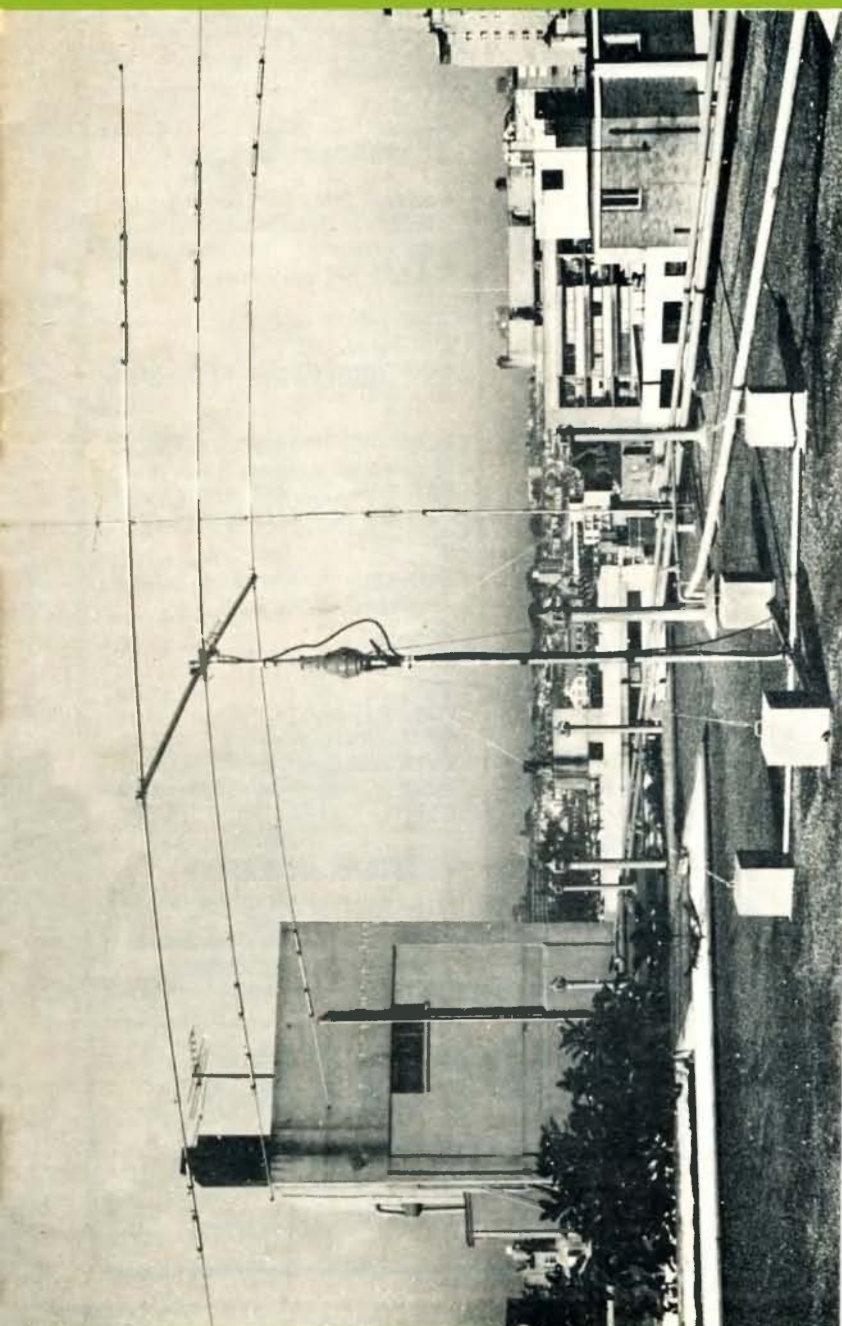
DECEMBER, 1974
VOL. 42, No. 12



The high rise antenna farm of Eric VK2BEK. See article on page 9.

CONTENTS

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER **Model TE-15**
SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
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C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
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amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA, FOUNDED 1910

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DIVISIONAL BROADCASTS

Do you have the time and want to keep in touch with events? If so here are the latest details available of Divisional broadcasts.

VK1WI

Sundays 10.00 Z —
3595 kHz
27125 kHz AM
146.5 MHz FM
BC Committee VK1VP, IMP, 2YS/1.

VK2AWI

11.00 local time Sundays:
3595 kHz AM
7146 kHz SSB
52.525 MHz FM
53.866 MHz AM
145.13 MHz AM
Hunter Branch Mondays 19.00h 80m

VK3WI

10.30 local time Sundays:
1825 kHz AM
3600 kHz SSB
7146 kHz SSB
144.5 MHz AM
Ch1 FM
(subject to availability at present of relay stations whilst under re-location).

VK4WI

09.00 local time Sundays:
3580 kHz AM
7146 kHz SSB
14342 kHz SSB
re-broadcast on Ch 8 FM. BC officer VK4HB

VK5WI

23.30Z Sunday mornings originating on 1.8 MHz band and relays as follows—
3.615 MHz by VK5ZQ
7.125 MHz by VK5NB
14.170 MHz by VK5TY
52.2 MHz by VK5ZEG
Ch 48 by VK5WB
VK8CM in Darwin on 2m
VK5DK in Mt. Gambier on 2m

VK6WI

09.30 local time on Sundays:
3600 kHz SSB
7080 kHz SSB
14100 kHz SSB
52.656 MHz FM

VK7

09.30 local time on Sundays originated on Mt. Barrow 2m repeater VK7RAA and re-broadcast in Launceston area 3672 kHz SSB, 7130 kHz AM and in Hobart area on 53.032 AM, 144.1 MHz AM, 146 MHz FM and 432.1 MHz AM.

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QSP

★ W.I.A. Members are reminded that notices for their 1975 subscriptions will soon be on the way to them, but read on.

★ As in previous years, the annual subscription rates are composed of several elements.

★ In simplest terms, each subscription comprises a Federal part and a Divisional part. The Federal part is determined each year in advance by the Federal Council and for 1975 is $9.80.

★ The Divisional part is the difference between the Federal Part and the total subscription rate which is determined separately for each grade by each Divisional Council.

★ Because of centralised processing of subscriptions done on a strictly commercial and audited basis subscriptions are payable direct to the W.I.A. Executive office, P.O. Box 150, Toorak, Vic. 3142.

★ The office retains the Federal part of the subscriptions and remits to each Division from time to time the Divisional portions of all the subscriptions received.

★ The processing of subscriptions forms part of the EDP system from which address labels for AR are produced.

★ AR address labels are automatically suppressed for those members who remain unfinancial after a short period of grace covering the first issues of the year; missing issues are not sent.

★ If AR is undelivered and is returned to sender the address label is forthwith suppressed until a fresh address is received from that member.

★ Missing issues of AR are despatched with the next bulk postings where it was no fault of the member that he did not receive them.

★ AR costs a lot of money to produce and distribute and absorbs the leisure time of a great many volunteers.

★ The 1975 noticnal element for AR in each member's subscription is $5.04 for the whole year — this is only 42c per issue and is the main portion of the Federal part of subscriptions.

★ The Federal part also includes 30c IARU levy and not less than 50c towards the costs of the annual Federal Convention previously funded out of Divisional monies. The $3.96 balance making up the total Federal dues of $9.80 goes towards the expenses of the Executive and the Executive office.

★ The full metropolitan member rates for 1975 have been set out by each Division as follows—

	Div. portion	Grand Total
VK1	$5.20	$15.00
VK2		
VK3	$7.70	$17.50
VK4	$5.20	$15.00
VK5	$5.70	$15.50
VK6	$5.20	$15.00
VK7	$2.20	$12.00

★ The metropolitan associate member rates for 1975 are —

	Div. portion	Grand Total
VK1	$5.20	$15.00
VK2		
VK3	$7.20	$17.00
VK4	$5.20	$15.00
VK5	$4.20	$14.00
VK6	$3.70	$13.50
VK7	$0.20	$10.00

★ Lower subscription rates apply for pensioners, students, families and juniors in the the EDP grades S, G and X. The Federal element for those who receive AR (S and G grades) is $5.04 AR plus 30c IARU making a total of $5.34 for the full year 1975. This is a flow-on from a Federal Council decision.

★ The Divisional portion of subscriptions is applied by the Division towards the costs of providing or maintaining the Headquarters facility including, in the case of NSW and Victoria, a paid Administrative Secretary and office functions. The Division also provides liaison with the local Radio Branch and other organisations, broadcasts, beacons, repeater facilities and bulletins, classes and YRCS, WICEN and VHF activities, equipment, components and publications sales and numerous other functions including QSL Bureaux, perhaps a library, technical advice and general assistance to individuals or groups.

★ The Federal part of subscriptions goes towards the costs of AR and providing for the Executive office and staff to process subscriptions and membership records. The Executive co-ordinates and carries out WIA policies as determined by Federal Council, negotiations with Federal bodies such as the Central Office of the Radio Branch, organisation of all-Australia awards, contests and the like, liaison with overseas sister Societies and support for the IARU and IARU Region 3 organisation. The Executive Office also handles "Magpubs" activities, printing the Call Book and other items such as certificates, awards and leaflets, advertising in AR and the Call Book and many other central functions.

★ Unfortunately virtually nothing can escape the effects of inflation. The Institute needs your continuing support.

EXECUTIVE

CW NETWORK

From Sunday 20th October, the CW net will run on 7025 kHz from 10.00 a.m. E.A.S.T. to 12 noon. The SSB commentary will be held only after the CW net on the last Sunday of each month. The frequency will be from 7045-7050 kHz to avoid QRM with RTTY operation.

VK2AV for CW net

NZART 1975 CONFERENCE

"The conference committee would like to extend to our fellow amateurs from across the sea an invitation to attend our annual conference of NZART" writes ZL1AYQ, Publicity Officer for the conference to be held from 31st May to 3rd June 1975, in Rotorua of geyser fame. He suggests that any VK intending to tour New Zealand should do so about that time so as to include the conference in their itinerary, at which they will be made most welcome. Write for further details to the Conference Secretary, P.O. Box 1984, Rotorua.

There is a conference net on the 4th Thursday of each month at 08.00 Z on the 80 m band outside our allowable frequency range (on 3.725 MHz).

IARU REGION 3 ASSOCIATION

The Singapore Amateur Radio Transmitting Society (SARTS) has been admitted to membership of the IARU Region 3 Association thus bringing the total membership of the Association up to nine.

LOGGING REQUIREMENTS IN THE U.S.A.

"Now that FCC, in all its magnanimity, has come forward with reduced logging requirements for amateur stations, the amount of paper work in connection with operating an amateur station figures to decrease drastically" writes W1NJM in the Operating News column QST Sept. '74. "In fact", he says, "all your log will really tell you is when (i.e. what date) you started operating from your present location, and the dates between which you operated from any previous locations". He goes on to say though that all amateurs are urged to continue to keep an accurate and detailed log of their station operation, just as they have always done — whether required by FCC rules or not.

SCL LOGIC

"This new logic", writes Jim Fisk in Aug. '74 Ham Radio Editorial, "which is called SCL (for space-charge-limited) outperforms all other logic, power-wise, at switching rates over 1 MHz. Cmos circuits, while low-power kings at the lower frequencies, require more power than SCL devices at frequencies above 1 MHz. Furthermore, SCL devices theoretically should have all the low-noise performance of vacuum tubes because they have the same built-in noise cancellation that comes with space-charge-limited current flow".

WARC 1979 PREPARATIONS

They (A Spectrum Planning Sub-Committee Working Group on the Amateur Services meeting in Washington since early 1974) have also proposed new amateur bands at 10.1-10.6 MHz, 18.1-18.6 MHz and 24.0-24.5 MHz. With communications satellites assuming more and more of the burden of long-distance commercial and government traffic, these enlarged HF amateur allocations are a distinct possibility. Editorial in July '74 Ham Radio. ●

A Digital Readout for Transceivers

ROY HARTKOPF, VK3AOH
34 Toolangi Road, Alphington, 3078

There are many advantages in using a digital readout, not least being the fact that it saves a lot of space around the critical front panel area and in addition it can be more accurate than the most expensive, elaborate and cumbersome dial mechanism. This article describes a 3 decade readout with 1 kHz resolution.

About a year ago Ron, VK3BDM and I started working on the design of a SSB transceiver. While looking for ideas, we came across the series of articles by Harold Hepburn and Ken Nisbet published in AR during 1968 and 1969. We decided to use the same type of VFO generator, namely a 10 to 10.5 MHz VFO mixed with a 46 MHz crystal to give an output of 56 to 56.5 MHz. There is no doubt that a high frequency VFO does help to reduce spurious responses in the receiver and those interested in the details should refer to the article in AR of December 1968.

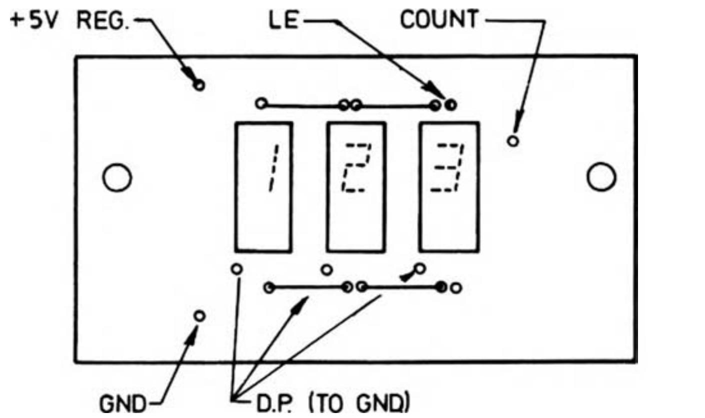


FIG. 2 DISPLAY BOARD (DISPLAY SIDE)

However, we had another reason for choosing this particular type of circuit. We had been playing with the idea of having a digital readout using a light emitting diode display instead of the normal dial. There were two important requirements; firstly that the circuit had to be relatively simple and compact and secondly that the cost should be reasonably low.

Finally, as long as the crystal oscillator which provides the timing gate does not drift there is never any need to recalibrate because the readout measures the actual frequency and not the mechanical position of the tuning capacitor.

One of the problems in using a counting circuit is that, as mentioned above, there needs to be some accurate reference frequency which can be divided down to supply the timing gate. And, of course, any additional oscillator permanently running in a sensitive receiver is another possible source of trouble in the way of spurious responses. However, in the VFO arrangement mentioned above, the problem was already solved for there was the 46 MHz crystal oscillator already in the VFO generator and this was running permanently both on transmit and receive and would provide the necessary reference frequency.

The other requirement for any type of frequency counter is to have some frequency to count and here again this particular arrangement enabled the requirement to be solved very simply. The VFO oscillator goes from 10 MHz to 10.5 MHz and by having a three digit readout and a gating system which selects the display in kilocycles it was possible to have a readout which displayed the frequency in kilocycles regardless of which band happened to be in use. One simply looked at the reading on the band change switch and added the reading shown on the display. On the 3.5 MHz band of course one had to remember to add 3.5 MHz to the kilohertz reading. For instance a digital reading of 125 kilohertz has to be added

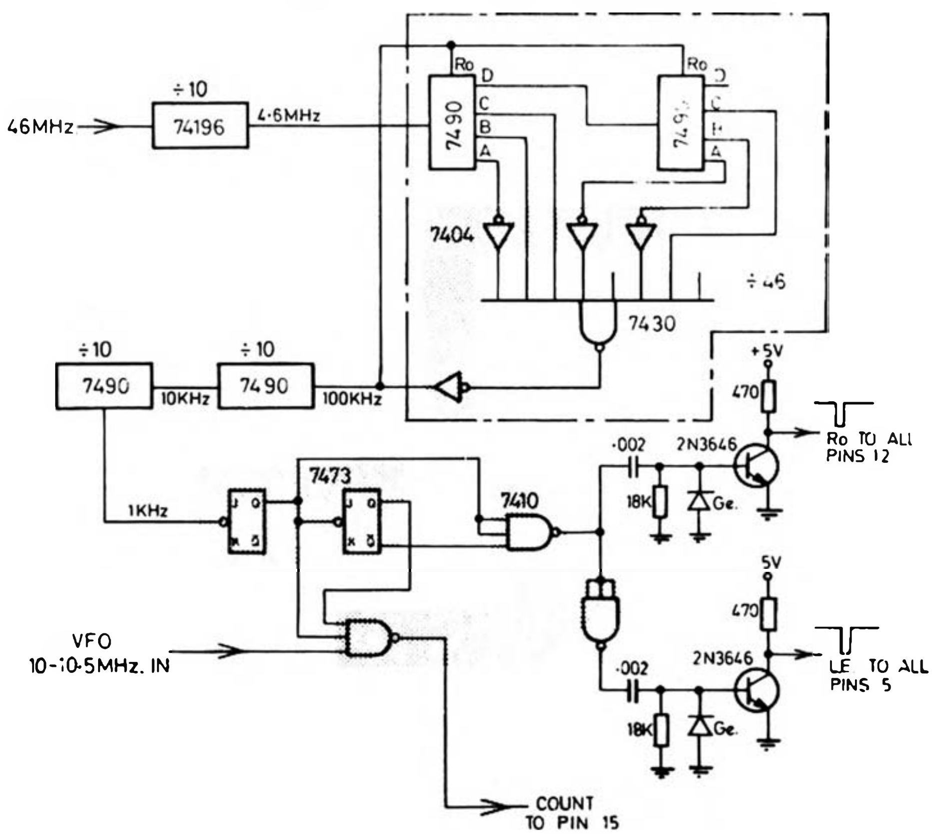


FIG. 1 CIRCUIT SCHEMATIC

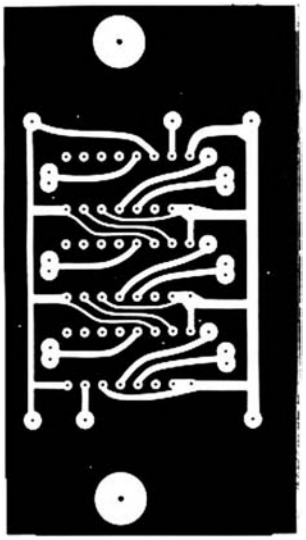


Fig. 3—Copper Copper side of display board (actual size).

not to 3 MHz but to 3.5 MHz, making the actual frequency 3.625 MHz. But on the 7, 14, 21, 27, 28 and 29 MHz bands the reading is directly as it is shown on the LED display.

For those who are interested the logic diagram is shown in Fig. 1. A high frequency decade counter SN 74196 is used in the first stage. This will nominally handle frequencies up to 50 MHz but in fact most of the ICs will go higher. Following this it is possible to use the slower speed (they still go up to 30 MHz or higher!) standard decade counters such as the 7490. These, together with the hex inverters 7404 and the 7430 which is an eight input NAND gate, make up a divide by 46 facility which brings the frequency down to 100 kilohertz. From there two more 7490s divide by a hundred to bring the frequency down to 1 kilohertz. Thus we arrive at the final timing frequency which operates the 7473 flip flop and the 7410 triple NAND gate which comprise the gating and reset system. The 1 kilocycle frequency is of course extremely stable. In fact, the crystal would have to shift by 46 kilohertz before the timing frequency shifted even one hertz. (A 46 kHz shift in the 46 MHz crystal would still produce a 9 kHz readout error.—Tech. Ed.)

Apart from the integrated circuits the only other components needed are a couple of transistors, capacitors and resistors for operating the reset and latch facilites of the LED display. Three leads, one for the count, one for the latch and one for the zero reset are the only signal connections between the main logic board and the display.

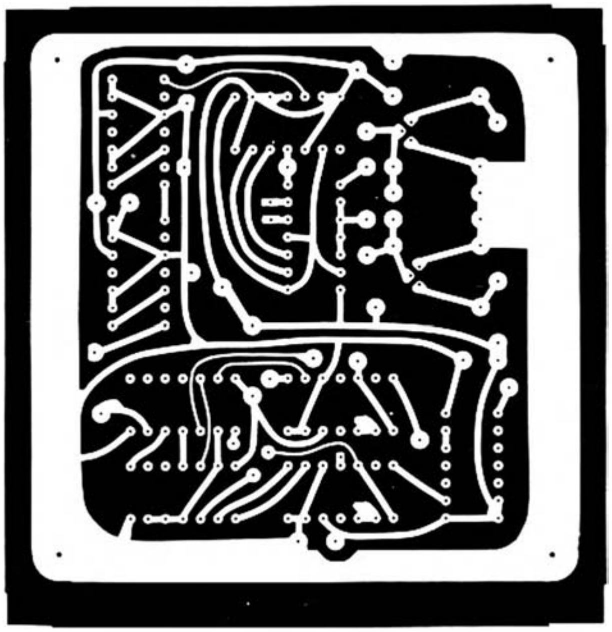
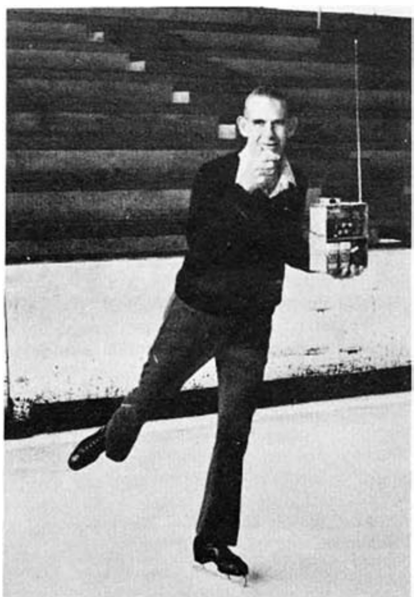


Fig. 4 —Copper side of main logic Board (actual size).



Roy, VK3AOH tries to save precious time by combining skating practice with amateur radio. Like most other projects the home brew two metre transceiver is still waiting on final modifications before completion.

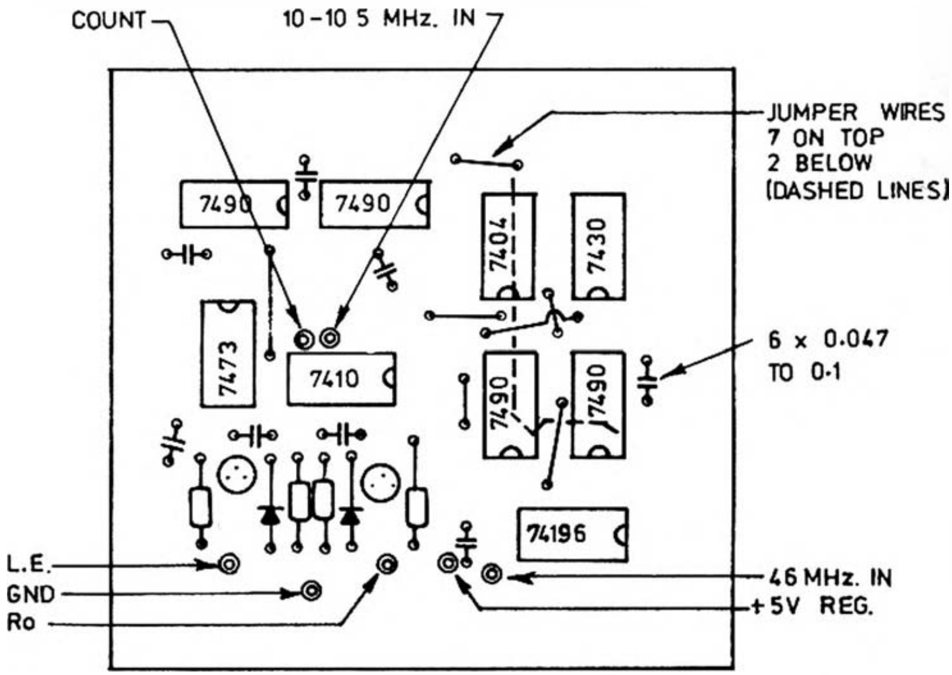


FIG. 5 MAIN LOGIC BOARD

The display itself uses three LED displays type TIL 306. These are slightly more costly than some other LED displays but they were chosen because they have built-in the complete counting logic including the counter, the latch, the decoder, and the limiting resistors for the LED display. The result is that the whole of the display system can be mounted on a board only 1½ inches wide by three inches long and this is mounted directly behind the front panel on two ⅛ inch screws. The main logic board already described is also quite small being 3¼ inches square.

These two boards are shown full size in Figs. 2, 3 and 4 respectively.

Fig. 5 shows the component layout looking at the top of the main logic board and the position of the power leads and the signal leads shown in Fig. 1 are also identified. Also on this figure can be seen the jumper leads which are on the top of the board. In addition it is necessary to make two jumper connections on the underside of the board in order to join the output of one of the hex inverters, pin 6, to the Ro connection, pins 2 and 3, on each of the 7490s which are used in the divide by 46 section.

Apart from a regulated five volt power supply this is all that is needed to provide a digital readout for any transceiver using a VFO generator similar to the one described at the beginning of this article. The simplest way of getting a five volt regulated power supply is to use an LM 309K. The only other component needed is a 0.1 microfarad capacitor at the input to the IC. With a standard heatsink the LM 309K will supply up to 1 amp which is more than enough for both the logic and the display systems. The input to the LM 309K can be anything from about 7 to 20 volts. The higher this input voltage is the more power has to be dissipated by the IC so it is wise to keep the voltage fairly low, say not more than 10 to 12 volts.

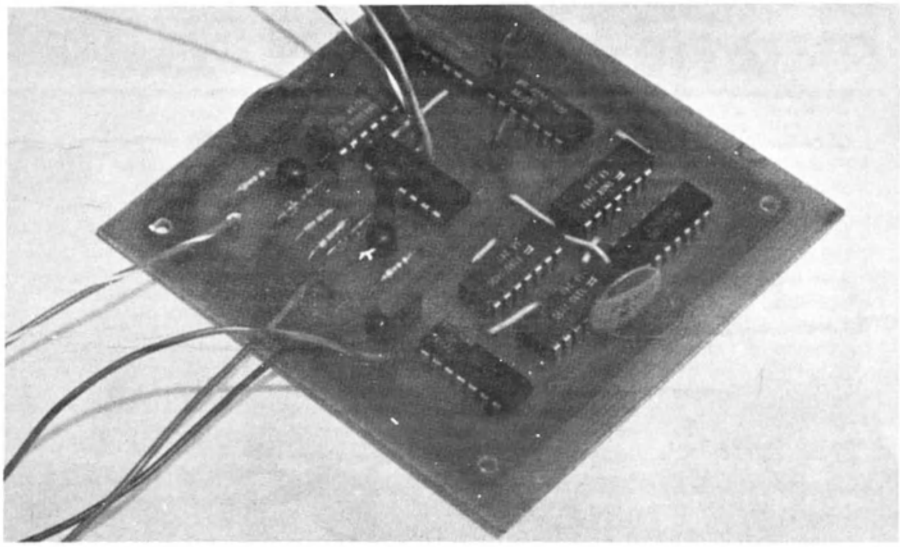
In order to operate the logic satisfactorily the 46 MHz input and also the 10 to 10.5 MHz input should be fairly low impedance — about 500 ohms, and the voltage swing should be from about plus 4 volts to something under 0.5 volt in both cases. This voltage swing is fairly critical and under no circumstances should the voltage swing higher than 5 volts or lower than ground potential otherwise the IC and even more importantly, the LED display, could be damaged. This means that it is unwise to take the signal source from any kind of tuned circuit or from any buffer stage which has a rail voltage greater than 5 volts. In most cases a VHF transistor with a suitable resistor in the base, the emitter grounded and the collector connected to the 5 volt rail through a 470 ohm resistor will provide a suitable buffer stage. But this depends of course on the type of circuit which has been used for the 46 MHz oscillator and the VFO.

Both the TIL 306 and the TIL 307 are identical except for the fact that one has a right hand and the other a left hand decimal point. Since there is little purpose in using the decimal point in this application, the decimal point input pins (pins 13) should be grounded to suppress the decimal points and whichever of the LEDs which are most easily available can be used.

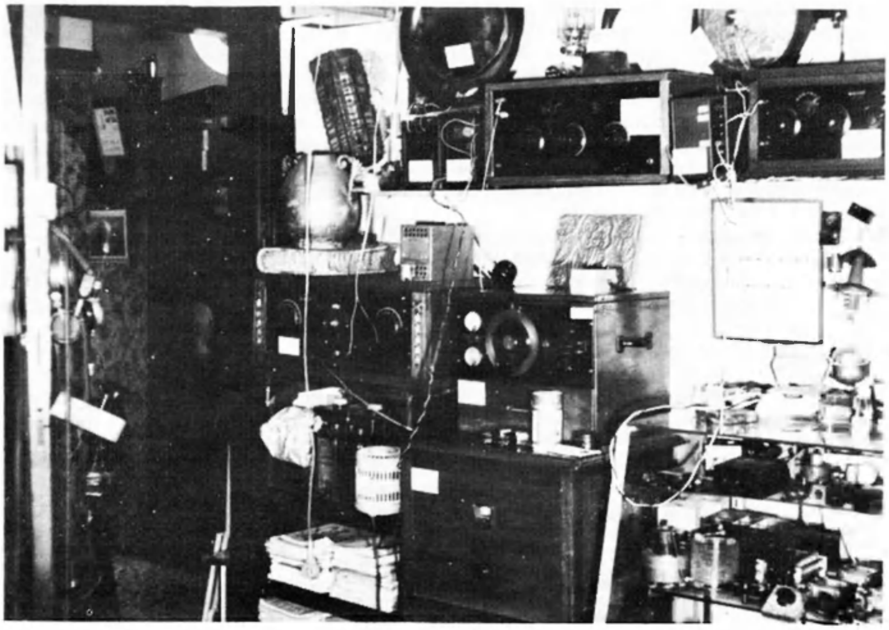
The digital readout has been in use for several months and has given excellent results. This, by the way, is in the transceiver constructed by Ron, VK3BDM. Apart from the digital logic boards and a few other bits and pieces the writer's own proposed transceiver hasn't even got off the ground.

Has anyone some spare time they would like to dispose of? Or maybe some unwanted 72-hour days?

NOTE—The VFO generator would normally be very carefully screened so that only the 56-56.5 MHz frequency would come out to the rest of the transceiver. The main logic board should also be mounted in this screened compartment. It has not been proved necessary to shield the LED display board. ●



Top view of main logic board.



Some of the magnificent old equipment at Burtoft's Amateur Wireless Museum in Links Ave., Concord, NSW. Inspection is by appointment only by telephoning Harold at 73 2369 (Priv.) or 92 0411 (Bus.). ●

An AR Special
A Review of the ICOM IC22

Over the next few months 'Amateur Radio' will be presenting a series of reviews on a selection of the latest two metre FM transceivers. In advance we would like to thank the various distributors of this gear who have made these reviews possible.

The Icom IC22 is distributed by Maico Electronics of Mount Street, Heidelberg, Victoria. It is one of a wide range of VHF transceivers produced by Icom. Details on all Icom equipment can be obtained from the company.

The IC22 is a fully solid state transceiver designed to operate over any two megahertz section of the two metre band. It employs 23 transistors, 3 FET's, 3 IC's and 16 diodes. There is provision for 22 channels which should take care of future requirements of most operators. As we will later see, the circuitry employs some very interesting features many of which are not to be found in other pieces of contemporary gear. It is also one of the smallest of the currently available FM transceivers measuring only 2-9/32" high, 6-1/8" wide and 8½" deep. The weight is 4 pounds. Construction throughout is in light-weight aluminium with a plastic front panel assembly.

Finish is in black with the metal sections in a fine wrinkle paint and the front panel in a dull non-reflecting surface with matching knobs. To offset this the meter is brightly illuminated with sharp red and green calibrations. The channel selector numbers come up in green, plus red and blue transmit and receive indicators. An excellent mobile mount with a quick release facility is supplied, as is a good quality dynamic microphone. All necessary mounting hardware is included with the set. Transmitter output is rated at ten watts with one watt in the low power position.

Power required is a nominal 13.5 volts DC, and current drain is specified at 2.1 amps on high power transmit, 1.2 amps on low power and receiver 180 mA average.

IC22 CIRCUIT DESCRIPTION

Now for a closer look at the inside layout and circuitry of the 'black box'. Both transmitter and receiver are constructed on a common printed board with the twenty two crystal channels and their associated trimmers mounted on a separate board. This of course amounts to forty-four actual crystal positions and trimmers.

The receiver is a double conversion superhet with the first IF at 10.7 MHz and the second IF at 455 kHz. Ceramic filters are employed at both IF frequencies to provide a high degree selectivity. A 3SK40 dual gate MOS FET is used as the receive RF amplifier followed with a 2SK37 FET as the first mixer. Between these two stages

are five helical resonators to give a high rejection to strong out-of-band signals and to generally improve cross modulation characteristics. The 455 kHz IF stages use two transistors and one IC to provide a high degree of gain. An IC is also used as the complete audio output section. The receive indicator light glows when the mute is opened either with a signal or by operation of the mute control. With the audio control turned off, this light gives a visual indication of an incoming signal on the selected channel. Receiver frequency control is from a 15 MHz crystal multiplied by nine with two tripler stages. This is then mixed to give the first IF of 10.7 MHz. The DC supply to the receiver goes via an 8 volt series regulator.

One of the interesting features of the IC22 is the use of solid state switching. This is not only for the supply voltage switching but also for the antenna change over. For a while, you might miss hearing the usual snap of the relay as you push the transmit button.

The transmitter section is quite straight forward. Frequency control starts with an 18 MHz crystal oscillator, followed by one buffer stage, a diode phase modulator, then three doubler stages, two more buffers and the final stage. Audio for the transmitter is handled by one IC feeding from the 500 ohm dynamic microphone. The output of the IC feeds to the deviation control via a low pass filter. Between the deviation control and the output transformer is a deviation level selector. By shifting a flying lead connector from one connector post to the other, either wide or narrow deviation may be selected. This is in addition to the normal deviation control. Strangely, this adjustment does not rate a mention of any sort in the otherwise excellent instruction manual. Low power selection is accomplished by switching a 20 ohm 5 watt resistor in series with the supply voltage to the last buffer and the final stage. The front panel meter switches automatically from 'S' meter on receive to relative output meter on transmit.

THE IC22 ON THE AIR

The channel selector was difficult to read when the set was in place under a car dash board. There was also a considerable parallax error. To accurately determine which channel was selected, a straight-on view was needed.

This is due to the small size and close spacing of the channel numbers on the selector switch. Receiver audio quality appeared to be much better than is usual with transceivers of this size. This is no doubt due to the use of a 4 inch speaker mounted in bottom of the transceiver cabinet. Provision is also made to plug in an external speaker via a 3.5 mm phone jack at the rear of the cabinet. Actual audio output appeared to be on the low side for noisy situations. This was later confirmed when the audio output was measured Transmitted audio quality was clean anu smooth, however, some reports indicated slightly on the bassy side. Deviation was set to the low position when the set arrived from the agents. This was changed to the high tapping and the deviation control reduced. This appeared to produce the best results.

Operation of the controls apart from the channel selector was excellent. The receive mute control operated with a smooth fading action as distinct from the sudden death action of many solid state sets. Audio gain could be left set at a normal point, with the power on/off switch separate and combined with the high/low power selector.

A useful feature of the IC22 is the ability to net the transmitter frequency to the receiver. After connecting a centre zero meter to the discriminator output which is available on the accessory socket at the rear of the cabinet, a jumper is connected between two test points on the board. The transmit crystal trimmer is then adjusted for a zero reading on the meter. Obviously this only applies to simplex operation.

THE IC22 ON TEST

Transmitter output was measured with a Marconi RF power meter. With a 13 volts DC supply to the IC22, exactly 10 watts output was indicated in the high power position, and .8 watts in the low power position. The final and driver stages were trimmed but output could not be increased. The multiplier stages were not touched.

Receiver sensitvity was next checked using a Marconi FM signal generator. At .5uV, 27dB of quieting was measured with signal to noise ratio at the same input showing 30dB. These are excellent figures. With the mute control set at maximum sensitvity, the receiver opened up at a level of .5uV — 8dB. With the mute hard on, it took only .5uV + 2dB to open the receiver.

The 'S' meter was checked for calibration with the following results.

Meter Reading	Sig. Gen. Setting
0	.5uV
1	1.25uV
5	4.0uV
9	100.0uV

Above 9 on the scale, the increase flattened off with the 9 to 40dB over only showing an increase of 12dB.

Receiver audio power output was measured by feeding the output to a dummy load and measuring the voltage with a VTVM. At the onset of audible distortion, .5 watts was indicated. This is well below the specified 1.5 watts, however this could be due to the fact that steady tone was used in our test. With speech output, more power could possibly be delivered.

Receiver selectivity was measured with an input of .5uV. At this level, the receiver accepted +/— 7 kHz deviation with low distortion. It was noted though, that at lower inputs, the deviation acceptance decreased somewhat, so that many stations with normal modulation tended to sound slightly distorted. This is caused by the shape factor of the filter used in the 455 kHz IF strip. If required, a better filter can be easily substituted, as the printed board is drilled to accept the top quality Matura ceramic filter.

Current drain was checked with 13.0 volts applied to the set. With full output the receiver drain was 500 milliamps. In the muted off position the drain was 300 milliamps. This is a little higher than the specified 180 milliamps. High power transmit drain was spot on at 2.1 amps.

INSTRUCTION MANUAL

In general this is well written with only a very few omissions. Printed circuit board layouts are included, as is the circuit diagram and block layout.

Maintenance, including alignment details, is covered in three short paragraphs.

SERVICE FACILITIES

In view of the lack of service information supplied, it must be assumed that most owners will rely on the dealer to provide this. Malco Electronics are well qualified in this area. They hold comprehensive spares and also stocks of crystals for all the popular channels at very reasonable prices.

In conclusion, I would like to acknowledge the help of Peter Linden VK3BX in formulating test figures for the IC22.

VK3OM

SPECIFICATIONS

GENERAL:

Frequency coverage—144.00 to 146.00 MHz or 146.00 to 148.00 MHz.

Number of Transistors and Diodes—Transistors 23, FET 3, IC 3, Diodes 16

Modulation Type—F3

Power Voltage—DC 13.5V plus-minus 15% negative ground

Current Drain—Transmit: HI (10W) average 2.1A, LOW (1W) average 1.2A

Receive average—180mA

Antenna Input—50 ohms

Size 2-9/32" high x 6-1/8" wide x 8-1/2" depth

Weight—4 lbs.

TRANSMITTER:

RF Power Output—HI 10W, LOW 1W

Frequency Control—Crystal (18 MHz) multiplied x 8

Maximum Frequency Deviation—Adjustable between 3 to 16 kHz

Audio Input— 500 ohms.

Modulation System—Variable reactance phase modulation

Microphone—500 ohms — Dynamic microphone with push button switch

RECEIVER:

Reception Frequencies—22 channels for 2 meter band

Reception System—Double Superheterodyne

Intermediate Frequencies—1st intermediate: 10.7 MHz, 2nd intermediate: 455 kHz.

Sensitivity—a. Better than 0.4 uV 20 db quieting, b. S plus N/N at 1 uV input, 30 db or more

First IF—10.7 MHz

Second IF—455 kHz

Spurious Response—minus 60 db

Spurious Gain—minus 60 db, or less

Squelch—Adjustable 5 to minus 15 db

Band width—plus-minus 8 kHz/minus 6 db point, plus-minus 15 kHz/50 db

Audio Output Power—1.5W

Audio Output Impedance—8 ohms

Frequency Control—Crystal (14 MHz) multiplied x 9 ●

HIGH RISE ANTENNA

Eric W. Bierre VK2BEK
90 Wallis Street, Woollahra, N.S.W., 2025

Living in a large block of home units can certainly have problems for the Radio Amateur wishing to boost his signal with a beam antenna.

Eric VK2BEK, has solved this problem nicely. He resides in a 13 storey block of units in Elizabeth Bay, N.S.W., and was given permission by the owners to erect an antenna on the roof. The proviso being that the structure of the building was not interfered with, and no TVI was caused.

The photograph on the front cover and those attached show how this was done efficiently and at moderate cost.

He obtained from a plumber, a base supporting 'cross', into which 4 pipes are screwed at right angles. A flange was welded to the base to hold a 1½ inch diameter mast.

Into the cross were screwed 4 pieces of 1 inch (inside diameter) pipe 5 feet long. The vertical mast is 12 feet high including the rotator, and is screwed into the flange.

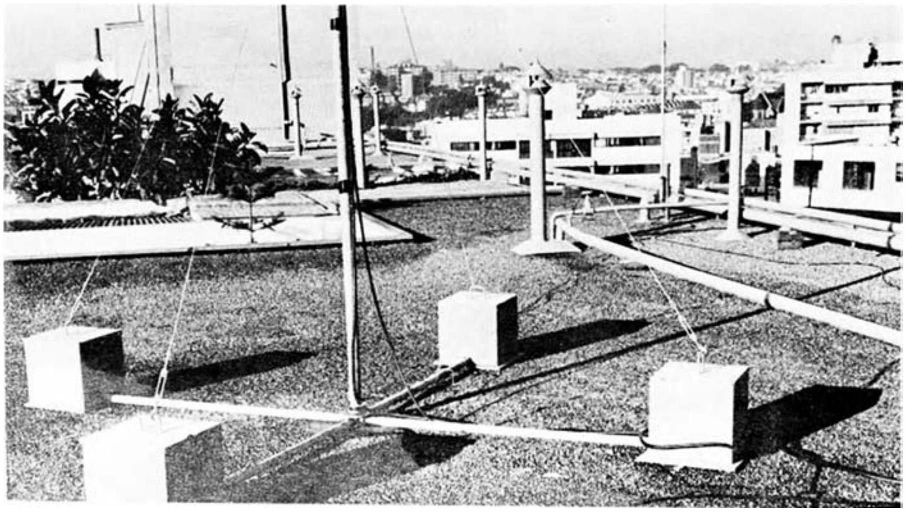
Concrete blocks, each 1 cubic foot and weighing approximately 100 lbs. were made with a groove in one side to fit over the base pipes.

Guy wires are run from the concrete blocks to the rotator, and the whole assembly is extremely rigid. Eric is confident that the strongest winds in the area will not tip the antenna over.

The beam is a Hy-Gain TH3 Junior, and behind it can be seen an 18AVT which is used for 40 and 80 metres.

It all works very well, and thanks to a low pass filter and antenna tuning unit, there have been no complaints of TVI.

Eric suggests that other high rise home unit or flat dwellers could obtain permission for a similar structure. ●



Telecommand and Telemetry of the Oscar 6 and 7 Communications Satellites Part 3

David Hull, VK3ZDH
Project Australis

This is the concluding part of the 3 part series on the telecommand and telemetry of OSCARS 6 and 7. It deals with the telemetry systems.

TELEMETRY. MORSE CODE (OSCARS 6 & 7) RTTY (OSCAR 7)

1. MORSE CODE, TELEMETRY

This system of telemetry was developed for Oscar 6 and will be used as an alternative to the RTTY telemetry on Oscar 7. The design and development of these units has been covered extensively in published papers — see references — and will be summarised only. A Block diagram is shown in Figure 3.

The analog data to be transmitted is selected and converted to two decades of digital information. After analog to digital conversion the digital word is converted into morse code and used to key the earlier of the telemetry transmitter in the following format.

Sample frame of Morse Code Telemetry:

HI	180	191	159	160	
	296	286	295	251	
	363	373	369	336	
	437	428	437	435	
	536	520	530	544	
	618	600	643	650	HI

The morse letters HI identify the beginning and end of the telemetry frame and also serve as an official callsign (by permission of the FCC). The last two figures are converted to the appropriate calibration data by multiplying the decoded number by the channel factor. The data for Oscar 6 is shown in Fig. 4.

2. RTTY TELEMETRY

This system of telemetry was developed by Australis and will be flown in Oscar 8. The data will be transmitted at 45.5 baud with 850 Hz shift page print out and much higher data rate transmission has led to the expansion of the number of parameters covered. A block diagram of the system is shown in Fig. 6 with conversion tables shown in Fig. 7.

Each data word again begins with its channel

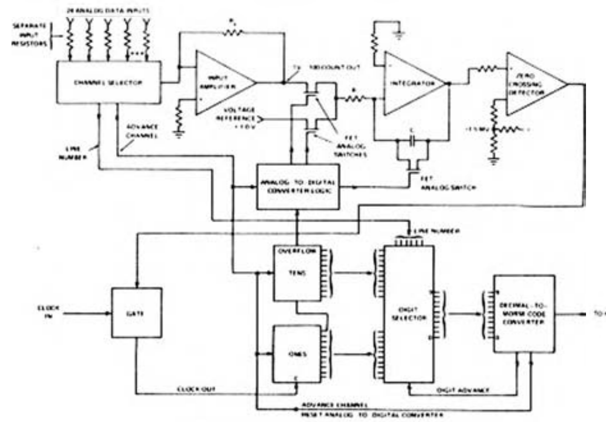


FIGURE 3 BLOCK DIAGRAM – MORSE CODE TELEMETRY ENCODER

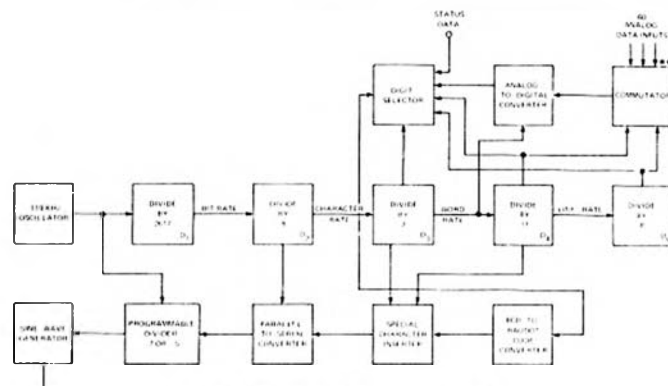
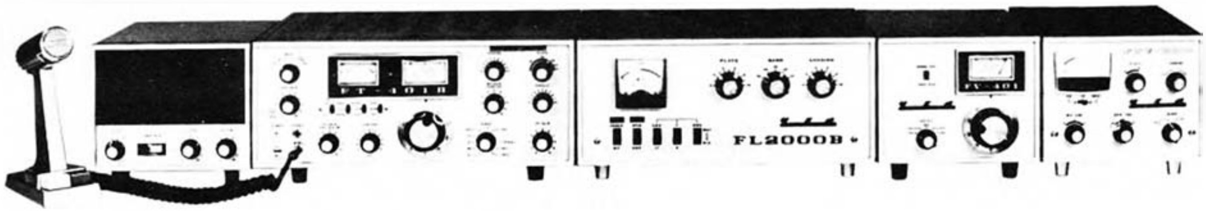


FIGURE 6 TELETYPE TELEMETRY SYSTEM BLOCK DIAGRAM

OSCAR DATA TO BE TELEMETERED BY THE MORSE CODE TELEMETRY SYSTEM

Chan.	Parameter	Unit	Parameter Range	Final Calibration Data/Comments N = Value telemetered (omit first digit which identifies the data line number)	Transmitted Format (Read left to right)
1A	Total Array	I (ma)	0 to 500 ma.	$I_T = 5.00\ N$ (ma.)	1A 1B 1C 1D
1B	+X Solar Panel	I (ma)	0 to 100 ma.	$I_{+X} = 1.00\ N$ (ma.)	2A 2B 2C 2D
1C	-X Solar Panel	I (ma)	0 to 100 ma.	$I_{-X} = 1.00\ N$ (ma.)	3A 3B 3C 3D
1D	+Y Solar Panel	I (ma)	0 to 200 ma.	$I_{+Y} = 2.00\ N$ (ma.)	4A 4B 4C 4D
					5A 5B 5C 5D
2A	-Y Solar Panel	I (ma)	0 to 194 ma.	$I_{-Y} = 1.94\ N$ (ma.)	6A 6B 6C 6D
2B	+Z Solar Panel	I (ma)	0 to 370 ma.	$I_{+Z} = 3.72\ N$ (ma.)	
2C	-Z Solar Panel	I (ma)	0 to 370 ma.	$I_{-Z} = 3.68\ N$ (ma.)	
2D	Bat. Charge or Discharge	I (ma)	-500 to +500 ma.	$I_{BAT} = 10.00\ N - 500$ (ma.) Battery charge or discharge current	
3A	Unregulated Bus	V	12.4 to 30V	$V_{BUS} = 0.174\ N + 12.4$ (volts)	
3B	½ Battery	V	0 to 15V	$V_{\frac{1}{2}BAT} = 0.161\ N$ (volts)	
3C	Switching Reg.	V	0 to 15V	$V_{SR} = 0.147\ N$ (volts)	
3D	Battery Temp.	^oC	-30 to +50°C	$T_{BAT} = -1.471\ N + 95.79$ (^oC)	
4A	Baseplate Temp.	^oC	-30 to +50°C	$T_{BP} = -1.471\ N + 95.79$ (^oC)	
4B	Transponder P.A. Temp.	^oC	-30 to +50°C	$T_{PA} = -1.471\ N + 95.79$ (^oC)	
4C	+X Panel Temp.	^oC	-30 to +50°C	$T_{+X} = -1.471\ N + 95.79$ (^oC)	
4D	+Y Panel Temp.	^oC	-30 to +50°C	$T_{+Y} = -1.471\ N + 95.79$ (^oC)	
5A	+Z Panel Temp.	^oC	-30 to +50°C	$T_{+Z} = -1.471\ N + 95.79$ (^oC)	
5B	Transp. P.A. Emitter	I (ma)	0 to 500 ma	$I_{PA} = 5.00\ N$ (ma)	
5C	Transp. Sw. Reg.	V	0 to 30V	$V_{T.S.R.} = 0.30\ N$ (volts)	
5D	Instr. Sw. Reg.	I (ma)	3.8 to 63.8 ma	$I_{I.S.R.} = 0.601\ N + 3.80$ (ma)	
6A	Transponder R.F. Power	mW	0 to 10W	$P_{OUT} = 1.0\ (N)^2$ (mW)	
6B	Beacon R.F. Power (435.1 MHz)	mW	0 to 1W	$P_{OUT} = 0.10\ (N)^2$ (mW)	
6C	Transponder AGC	V	0 to 3V	$V_{AGC} = 0.03\ N$ (volts)	
6D	Midrange Cal.	V	0 to 1V	N = 50 counts ±1	

Figure 4 OSCAR 6 Morse code telemetry



FT-401 TRANSCEIVER: SSB, AM & CW, 80/10 Mx, PA two x 6KD6, 560 W peak input SSB. Full coverage on 10 Mx, WWV, two auxiliary (blank) ranges, PTT, VOX, RIT, Cal., fan, noise blanker, **$595.**

FT-101B TRANSCEIVER: 160/10mx, SSB, AM, CW, PA two x 6JS6C, 300w. peak input SSB. Built-in dual AC/DC power supply. Low current drain transistorised except for transmitter driver and PA. I.F. noise blanker, fan, FET receiver RF, clarifier, built-in speaker. Ideal for portable/mobile from 12v. DC, or in the shack on AC, **$598.**

FT-201 TRANSCEIVER: 80/10 Mx, similar basic features, power and appearance to FT-101B, at lower cost, 230 V AC **$498.**

FT-200 TRANSCEIVER: 80/10 mx, PA two x 6JS6C, 300w. peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator. Operates from a separate power supply. **Real value at $351. FP-200:** Yaesu AC Power Supply for FT-200, in matching cabinet with in-built speaker, **$98.**

FT-75B TRANSCEIVER: SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised, a superb little rig 80 W PEP. Microphone and five crystals included, **$268.**

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FR-101D RECEIVER: All solid state, 23 bands inc. all amateur bands 160/10m plus 6 & 2m, FM, CW, etc, etc.! **$675.**

FR-101S RECEIVER: Economy version of FR-101D. Amateur bands only 160/10 Mx and less other options, **$530.**

FT-501 DIGITAL READ-OUT TRANSCEIVER: 80-10mx, SSB CW. 500w peak input, includes 2-speed cooling fan, noise blanker, clarifier, VOX and etc. Inc. matching AC PS, **$850.**

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FL-2100B LINEAR AMPLIFIER: Similar to FL-2000B but styled to match FT-101B, **$429.**

FT-620 SIX METRE SSB AM, CW, TRANSCEIVER: 10w solid state, **$395.**

S200R TWO METRE SYNTHESISED FM TRANSCEIVER: 200 channels, 10 W solid state. Simplex, repeater, reverse repeater & priority channel facilities, **$438.**

FTV-650 SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. Primarily designed for coupling with Yaesu transmitters and transceivers, **$185.**

FT-224 TWO METRE FM TRANSCEIVER: 10 W, 23 channels, PLUS one priority channel. Includes B, 50, and four repeater channels, installed, **$259.**

FT-2AUTO FM TRANSCEIVER: Similar to FT-2FB but with addition of automatic scanning facility, etc., **$398.**

YC-355D FREQUENCY COUNTER: 200 MHz, **$335.**

YC-355: Similar to YC-355D but reads to 30 MHz, **$288.**

YO-100 MONITORSCOPE: Matches other Yaesu Equipment. Inc. IF for 3180 kHz. (IF kits for 455 kHz and 9 MHz optional extra), **$179.**

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MATCHING EXTERNAL SPEAKERS for FT-401, FT-101B, FT-201, FR-101, **$32.50.**

MATCHING VFOs: FV-401, FV-101B, FV-200, each **$120.** FV-50C (for FT-75B), **$65.00.**

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand. PTT switch, and PTT is actuated when lifted from deck, **$39.50.**

Hand-held PTT **DYNAMIC MICROPHONE, $18.50.**
VC-75 VOICE CONTROLLER: Speech compressor with VOX unit included. With lead and connectors to suit FT-75 and FT-620, **$58.00.**

As the sole authorised Yaesu agent for Australia, we provide pre-sales checking of sets, after-sales service, spares availability and 90 day warranty.
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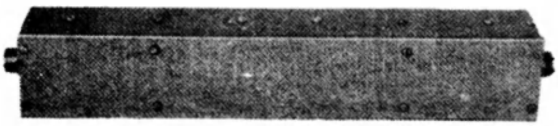
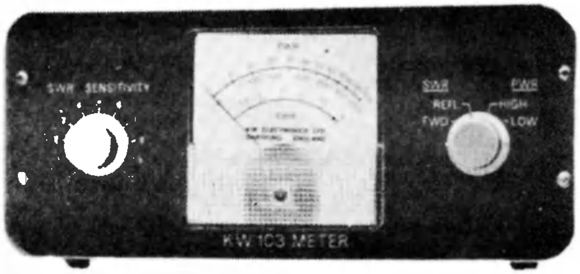
KW2000E 160-10m SSB-CW transceiver, 180 W, PA 2 x 6146. Mechanical filter, Calibrator, VOX, PTT, IRT/ITT/IRTT, ALC. Beautiful construction and appearance, excellent audio quality. Price, incl. PS **$635.00**

KW1000 Linear Amplifier, 80-10m, 2 x 572B/T160L in GG circuit. Fan cooled. Panel meter indicates plate volts, current, and SWR. Matches KW equipment, and is compatible with other equipment. **$449**

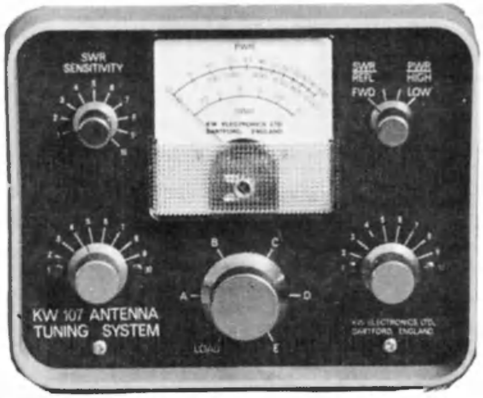
KW-108 MONITORSCOPE, connects in antenna line for visually monitoring your transmission. Includes built-in two tone oscillator. **$245**



KW LOW PASS FILTER, for TVI reduction. A very effective 5 section filter, with attenuation in excess of 60 db. Fitted with SO-239 UHF sockets. **$29.50**



KW-103 SWR/power meter, toroidal pick-up type for accuracy and reliability, 0-30 MHz. A quality unit. **$45**



KW-107 SUPERMATCH, an all in one unit, combines an E-ZEE match, Antenna switch, Dummy Load and SWR/PWR meter for balanced or coaxial feeds. Wide impedance matching range at up to IKW PEP.

KW ANTENNA Switch, 3 position co-ax switch with UHF type teflon connectors, usable up to 500 MHz, 1 KW PEP, cross-talk better than —80db. **$18.50**

KW E-ZEE MATCH, an efficient coupling unit of the Z match type for use from 80 to 10 metres over a wide impedance range. For use with balanced or coaxial feed lines. **$64.50**

KW MULTIBAND antenna traps. Comprises two special trap coils, ceramic centre "T" insulator and instructions for a 108 ft. 80-10m dipole, using co-ax or twin 70 ohm feeder. **$24**

KW-160, an "L" network coupler especially for 160m, can also be used right through 80 & 40 for single wire or co-ax feed. Similar size and appearance to the E-ZEE. **$52.80**

KW BALUN, 1 : 1, for 50 or 75 ohms, screw terminals, 1 KW. Ideal for dipole use, lightweight & waterproof. **$13.50**

KW DUMMY LOAD, air cooled, up to 1 KW, 0-70 MHz, 52 and 75 ohm. **$29.00**

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Figure 7.

AMSAT-OSCAR 7 TELETYPE TELEMETRY SYSTEM

Channel No. XX Measurement 123

Channel	Measured Parameter	Measurement Range	Preliminary Calibration Equation.
00	PA Temp. - 70/2 Rptr.	-30° to +50°C.	$T_2 = 95.79 - 0.1471\ N$ (°C.)
01	+X Solar Panel Current	0 to 2000 ma.	$I_{+x} = 2000 - 2\ N$ (ma.)
02	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
03	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
04	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.)
05	+Z Axis Orientation	0 to 90°	$\theta_z = \arccos\ (N/N_{max})$(deg.from Zaxis
06	+X Solar Panel Current	0 to 2000°	$I_{+x} = 2000 - 2\ N$ (ma.)
07	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
08	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
09	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.)
10	-Z Axis Orientation	0 to 90°	$\theta_{-z} = \arccos(N/N_{max})$(deg.fromZaxis)
11	Battery Voltage	6.4 to 16.4 V.	$V_B = 0.01\ N + 6.4$ (volts)
12	Half-Battery Voltage	0 to 10 V.	$V_{½B} = 0.01N$ (volts)
13	28V. Regular Voltage	0 to 34 V.	$V_{28} = 0.034\ N$ (volts)
14	10V. Regulator Voltage	0 to 15 V.	$V_{10} = 0.015\ N$ (volts)
15	9V. Regulator Voltage	0 to 10 V.	$V_9 = 0.01\ N$ (volts)
16	Bat. Charge Reg. #1 Vtge.	0 to 10 V.	$V_{cr1} = 0.01\ N$ (volts)
17	Bat. Charge Reg. #2 Vtge.	0 to 10 V.	$V_{cr2} = 0.01\ N$ (volts)
18	Ground-Zero Telemetry Cal.	0 V	$V_o = 0.00$ (volts); $N=0 \pm 1$ count
19	Total Solar Panel Current	0 to 3000 ma.	$I_T = 3\ N$ (ma.)
20	Bat. Charge-Discharge Curr.	-2000 to +2000 ma.	$I_B = 4\ N - 2000$ (ma.)
21	+X Solar Panel Current	0 to 2000 ma.	$I_{+x} = 2000 - 2\ n$ (ma.)
22	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
23	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
24	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.)
25	+Z Axis Orientation	0 to 90°	$\theta_{+z} = \arccos(N/N_{max})$(deg.fromZaxis)
26	+X Solar Panel Current	0 to 2000 ma.	$I_{+x} = 2000 - 2\ N$ (ma.)
27	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
28	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
29	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.)
30	-Z Axis Orientation	0 to 90°	$\theta = \arccos\ (N/N_{amx})$(deg.fromZaxis)
31	RF Pwr. Out - 2/10 Rptr.	0 to 10,000 mw.	$P_{2/10} = (N/10)^2$ (Milliwatts)
32	RF Pwr. Out - 70/2 Rptr.	0 to 14 watts	$P_{70/2} = 14\ (1-0.001\ N)^2$ (watts)
33	RF Pwr. Out - 435 Beacon	0 to 1000 mw.	$P_{435} = 0.001\ N^2$ (milliwatts)
34	RF Pwr. Out - 2304 Beacon	0 to 1000 mw.	$P_{2304} = 0.001\ N^2$ (milliwatts)
35	Battery Temperature	-30° to +50°C.	$T_{Bat} = 95.79 - 0.1471\ N$ (°C)
36	Baseplate Temperature	-30° to +50°C.	$T_{bp} = 95.79 - 0.1471\ N$ (°C)
37	+X Facet Temperature	-30° to +50°C.	$T_{+x} = 95.79 - 0.1471\ N$ (°C)
38	+Z Facet Temperature	-30° to +50°C.	$T_{+z} = 95.79 - 0.1471\ N$ (°C)
39	2304 Beacon Temperature	-30° to +50° C.	$T_{2304} = 95.79 - 0.1471\ N$ (°C)
40	Midrange Telemetry Calibr.	2.500 ± 0.001 V.	$N = 500 \pm 1$ counts
41	+X Solar Panel Current	0 to 2000 ma.	$I_{+x} = 2000 - 2\ N$ (ma.)
42	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
43	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
44	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.)
45	+Z Axis Orientation	0 to 90°	$\theta_{+z} = \arccos\ (N/N_{max})$(deg.fromZaxis)
46	+X Solar Panel Current	0 to 2000 ma.	$I_{+x} = 2000 - 2\ N$ (ma.)
47	+Y Solar Panel Current	0 to 2000 ma.	$I_{+y} = 2000 - 2\ N$ (ma.)
48	-X Solar Panel Current	0 to 2000 ma.	$I_{-x} = 2000 - 2\ N$ (ma.)
49	-Y Solar Panel Current	0 to 2000 ma.	$I_{-y} = 2000 - 2\ N$ (ma.0
50	-Z Axis Orientation	0 to 90°	$\theta_{-z} = \arccos\ (N/N_{max})$(deg.fromZaxis)
51	Battery Voltage	6.4 to 16.4 V.	$V_B = 0.01\ N + 6.4$ (volts)
52	Half-Battery Voltage	0 to 10 V.	$V_{½B} = 0.01\ N$ (volts)
53	AGC Level - 2/10 Rptr.	0 to 27 dB	$AGC = 10 \log_{10} (N - 500)$(dB)
54	TX Osc. Test Pt.-70/2 Rptr.	0 to 100%	$TX = 0.10\ N$ (percent)
55	RX Osc. Test Pt.-70/2 Rptr.	0 to 100%	$RX = 0.10\ N$ (percent)
56	Modulator Out. - 70/2 Rptr.	0 to 10 V.	$MOD = 0.01\ N$ (volts)
57	Envelope Test Pt.-70/2 Rptr.	0 to 10 V.	$ENV. = 0.01\ N$ (volts)
58	AGC Level - 2/10 Rptr.	0 to 27 dB	$AGC = 10 \log_{10}(N - 500)$ (dB)
59	CONV Osc. Test Pt. - 70/2 Rptr.	0 to 10 V.	$CONV = 0.01\ N$ (volts)

number followed by the measurement. The frame begins with two identical lines of status information about the satellite sub systems and includes an indication of the last command received by the satellite. This is used to verify command acceptance and as a cross check for other command stations. In addition to the continuous page style of printout the encoder will continuously telemeter any one channel and may be stepped from one channel to the next. These functions are available upon command.

SUMMARY:

The successful command of Radio Satellites by amateurs was first demonstrated with the Australis built Oscar 5. Oscar 6 has already exceeded its design life by 50 per cent and this is due in no small part to the success of the command network, the command system and to the ability to monitor the satellite sub-systems through the telemetry read outs. The author would like to acknowledge and thank Mr. Larry Kayser VE3QB and Dr. Perry Klein K3JTE of AMSAT for permission to quote part of their papers on command and telemetry. Thanks are also due to Mr. Robert Wills VK3SF, the Melbourne University Autronautical Society and the Astronautical Society of Australia for computer times and programmes, and Mr. John Nott, VK3ZQN for help with Radio frequency and Antenna hardware.

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(1) "SMART-SYSTEM MULTIPLYING AMATEUR RADIO TELECOMMANDS". By L. Kayser VE3QB. Presented to the ARRL Technical symposium on Space Communications Reston, Virginia, USA, September, 1973.

(2) "Spacecraft Telemetry Systems for the developing Nations". By P. Klein, J. Goode, P. Hammer and D. Bellair. Presented to the IREE National Telemetering conference, April, 1971.

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

INCREASED OUTPUT FOR THE FT200

Dave Smithdale VK6DX reports on a simple modification on the final of the FT200 to increase output particularly on the higher bands.

"Anyone who has an FT200 should give away that nasty wirewound shunt in the cathode of the finals, and replace it with a good carbon resistor. The results are amazing, I am getting 125 watts out into a dummy load on 28 MHz after this modification. Prior to this the maximum was about 80 watts. The original shunt varies considerably with temperature".

It is also possible that the wirewound shunt has a fair degree of inductance putting the final cathodes well above earth. Whatever, Dave's modification appears to be very worth while.

METER ACTION ON THE FT200

Some time ago in this column, it was suggested that the meter action on the FT200 could be slowed down to give more accurate 'S' readings. K. Moore VK4IJ takes this one stage further.

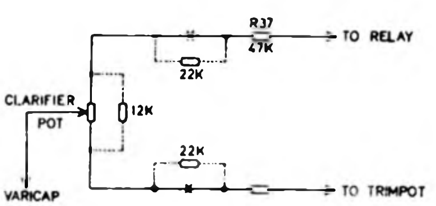
"A previous article in AR suggested a 1000 Mfd. capacitor across the S meter. I tried this and while it was a great improvement on receive, I did not like the action on transmit and felt it was not showing the true plate current peaks.

Examination of the remote VFO switch showed an unused bank of contacts, so one of these was used to switch the 1000 Mfd. capacitor in and out circuit. This switch is rendered inoperative by the blank accessory plug at the rear of the chassis when the remote VFO is not being used. Now I operate with the 1000 Mfd. normally out of circuit and switch it in when I need to give signal reports".

CLARIFIER ACTION ON THE FT200

Another one from K. Moore VK4IJ. This time he suggests that the clarifier covers too wide a frequency range and that the tuning can be made less critical with a few simple modifications.

"The clarifier on my FT200 was as critical to set as the main tuning and covered an unnecessarily wide range for my purpose. The following modification was carried out.



This leaves the total resistance of the network unchanged and gives a much smoother action to the control. It now covers about 1/5th of its previous range.

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

SUBSTITUTE ALIGNING TOOL

In an emergency the pointed clip from a ball-point pen can be used for turning slugs in Neosid formers. Being plastic they do not damage the slugs. If the tapering portion is trimmed off the clip will reach to the bottom of the Neosid former. (Only pens branded "Bic" appear to have this type of clip.—Ed.)

BACKLIGHTING PRINTED CIRCUIT BOARDS

An aid for checking the wiring of printed circuit boards from the component side is to use a back light from a 35 mm slide viewer. This is an even light and will shine through the p.c. board enabling component placement to be checked with the copper configuration.

TOOTHPASTE TUBE KNOBS

The white caps from toothpaste tubes make an inexpensive source of control knobs particularly for miniature gear. The centres can be partially filled with Araldite so that when set, a flat is provided for a corresponding flat filed down on the spindle for a push on fit. Alternatively the caps can be tapped for a grub screw. (Or a metal tube insert may be cemented in.—Ed.)

Don Gilder VK3AHG

Newcomers Notebook

with Rodney Champness VK3UG
44 Rathmullen Rd., Boronia, Vic., 3155

It is nearly Christmas again, time to review activities for the year, and to plan for the forthcoming year 1975. This may well be the year that Novice Amateur Radio Operators start to make their appearance on the bands.

Whether you be an associate of the WIA, or a full member, the advent of Novice licensing will affect you in some way or another. As an associate who perhaps feels that he or she isn't up to the standard of the full licence the Novice licence may be just what you have been waiting for. There will no doubt be problems that will need to be ironed out as the Novice licence is introduced. Regretably, there will be some full call amateurs who will resent the new Novice and will make life hard for the Novice by deliberately interfering with his QSOs and-or refuse to operate with him. Fortunately there will be others ready and willing to assist the Novice operator. I would like to point out that the licence as it has been proposed is for two year tenure only, so you will need to up-grade to the full or limited ticket within two years. I would suggest that any Novice should concentrate the majority of his operating on CW to get his morse speed up for the 10 wpm exam. CW is an excellent DX mode of operation; ideal considering the power proposed for Novice use.

I am hoping this coming year that I will have sufficient time to build a Novice style 80 metre transceiver suitable for CW or AM-CW use. I anticipate describing as completely as possible how each section works and presenting it as a workable project.

An additional club in Melbourne has started tuitional classes for aspiring amateur radio operators. This is the **Eastern and Mountains District Radio Club, P.O. Box 87, Mitcham, 3132.** Have other States got clubs who are running tuitional classes for aspiring amateurs? If so why not let me know so that it can be published.

Thought for the New Year — support the WIA, help it to improve amateur radio. If you think that the WIA is not doing things the way it should, don't just criticise, get into it and try to improve things — there are too few who help. Merry Christmas and a Happy New Year.

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With Syd Clark, VK3ASC

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A Simple 146 MHz Antenna for Oscar Ground Stations; An Experimental Frequency Standard Using ICs; Additional Frequency Ranges for the Collins 75S-3; Phase-Locked Tuning in a Two-Metre Receiver; Off-Centre-Loaded Dipole Antennas; Learning to Work with Semiconductors, Part VI.

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VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

DECEMBER 1974

AMATEUR BAND BEACONS

VK0	VK0RSA, Macquarie Island	52.160
	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney x	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth x	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTT, Carnarvon	52.900
	VK6RTW, Albany	144.500
	VK6VF, Perth	145.000
VK7	VK7RTX, Devonport	144.900
VK8	VK8VF, Darwin	52.200
P29	P29GA, Lae, Niugini	52.150
3D	3D3AA, Suva, Fiji	52.500
ZL1	ZL1VHF, Auckland	145.100
	ZL1VHW, Waikato	145.150
ZL2	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

x denotes a change from last month

Some changes to beacon listing this month. Firstly, I have had a communication at long last from Sydney, through Roger VK2ZRH, of the correct frequency of the VK2WI 2 metre beacon. Roger also advises awaiting news from the PMG Dept. regarding 432 and 1296 MHz beacons.

The Perth beacons will be using their new call sign VK6RTV, and comprehensive testing carried out on them shows the 6 metre beacon to run about 17 watts output with low pass filter in place, and the 2 metre beacon 9 watts out. These beacons are listed as it seems likely they will be operating in time for the end of the year DX. Thanks to the VK6 VHF Group News Bulletin for the above info.

The final change concerns JA1IGY in Tokyo. It appears there is just not enough operating room in the six metre band in Japan to be able to accommodate a beacon, not even 3 kHz! So JA1IGY is off the air until further notice. I suppose one could say with that type of band occupancy there may be little need for a beacon! Perhaps VK could take one of the leaves out of the JA book and use it to help fill up some of the spectrum space which amateurs with suitable equipment do have, but who come on the air only for about one month a year.

AMATEUR TV

A letter arrived from Noel, VK5EI (ex-VK3AGF) who works and lives at Ceduna, on the far west coast of S.A. (the same area as Kerry VK5SU), which was too late for inclusion in last month's notes. Noel is very interested in running skeds, over a long period, with a view to increasing the present ATV record. He proposes that as Adelaide, Melbourne, and northern Tasmania are in a direct line from Ceduna, that interested stations in these areas could come on together. He is also interested in skeds to VK6. 40 and 20 metre skeds would be maintained at the same time where practicable.

Present ATV tests are being carried out on 433.3 MHz, but this will be varied according to what other stations are using. Gear consists of modified Pye industrial CCU and camera. Home brew transmitter, wired for ATV, FM and CW at 20 watts. Geelong ATV Club converter, 16 element collinear antenna. It is intended to run 432 MHz carrier, with CW or FM identification as time permits, other than sked times.

Noel asks if interested stations could contact him by letter (Noel Ferguson, 4 George St. Ceduna 5690) or on HF (7130 MHz 0200Z Sundays). Channel 40 FM will also be monitored, beaming east, and for local contacts. Also available this year will be 6 metres SSB using an FTV650, FTDX560 and a 4 element yagi. Good luck Noel with your ambitious projects.

While still in the Ceduna area, a letter from Kerry, VK5SU, contains some news for the coming DX season. He advises his antennas are up, and have withstood various gales so far. Has worked VK3ACM on 6 metres. During skeds on 80 and 40 with VK5PB and VK5MT he has heard their signals from Adelaide on 2 metres every time they have tried, sometimes just in and out of the noise, but the path is 551 km.

Kerry also mentions Bob VK6BE advises "The Albany beacon was put back into service a month ago . . . There is a move to have the beacon (VK6RTW) located on top of Mt. Adelaide, one of the hills in Albany, which also accommodates the 135 MHz tropospheric beacon . . . The six metre beacon has been built and should be on air shortly, all solid state, one watt output . . . The Channel 2 repeater has been operating for some months now. It is located on Mt. Barker at the old beacon site. It is a fairly late model Pye base with solid state receiver . . . there is an improved antenna on the way and should be up before Christmas . . . they hope to extend the present 60 mile radius considerably . . . The W.A. Group are putting a Channel 4 repeater on a hill about midway between Perth and Mt. Barker".

SIX METRES

With the DX just around the corner at the time of writing, there are bound to be a few openings to other areas. HL9WI was the subject of quite a few contacts around Australia when he broke through the barrier around 0300Z on 19/10/74 on 52.010. He was to be on again on Sunday 20/10 but no reports of any working. VK3's also through to VK5 on 29/10 1200Z.

PORTABLE OPERATIONS

With the DX coming, and well here by the time you read this, it now seems the right time to pass on news of various DX-peditions taking place during December and January. Some people have written, others have telephoned, some off-the-air info, and the remainder the grapevine.

Steve, VK3ZAZ, is still hoping to follow through with his planned DX-pedition to Norfolk Island, planning to be away for 5 weeks, but due to accommodation problems, now only three weeks from 2/12/74. He will use the call sign VK3ZAZ/9, and will be operational on 6 metres, listening mainly 52.0 to 52.1, using 52.05 calling freq. (52.1 for benefit of VK2), or if the lower portion of the band gets crowded will operate from crystal position 52.325 MHz. On 2 metres he will call and listen on 144.100. Both bands will be SSB at 400 watts. 432 MHz equipment will also be going along but contacts attempted by appointment only. Site will be on the northern end of Island, about 1,000 feet a.s.l. There will be an official QSL card. VK3TV the official QSL manager. Box 66, P.O. Avoca, Vic.

Steve advises considerable complexity with arrangements, due to remoteness, insufficient accommodation available for that time of the year, uncertainty of arrival date of equipment, escalating costs of air and sea fares, which all adds up to say the above information sets out what is proposed, and confirmation of whether the actual expedition has taken place will be confirmed through the WIA Official broadcasts, there is no other way under the circumstances. Anyway, good luck Steve and Ian, we hope your trip eventuates and proves successful.

NEW ZEALAND

Don ZL3RW sends a brief note advising that a group of Christchurch VHF enthusiasts intend to "ASSAULT VK" on the New Year weekend, intending to go to a location at Denniston near Westport (2000 ft. a.s.l.) on the South Island of New Zealand, operating 2nd to 4th January inclusive. (Pity. The weekend before would probably suit VK better . . . 5LP).

Equipment will be SSB, 52.0 and 144.2 MHz, the usual channels for working VK/ZL. Other working bands to be used will be 80, 40 and 20 metres for liaison for VHF contacts.

MOUNT GAMBIER, S.A.

Colin VK5DK advises there will be portable DX from the Mt. Gambier area again this year, on 28th and 29th December, and could be 30th December if that day is a public holiday. Operating from Mt. William using 6 metres AM and FM, 2 metres SSB and FM, will be Peter VK5ZCW, Robin VK5ZAT, Dale VK5DA and Tony VK5ZCH. Probable call-sign, VK5DA/P.

Another party with Colin VK5DK, Trevor VK5TH Bob VK5ZHR propose operating from The Bluff, using VK5DK/P, and operating 6 metres SSB, 2 metres SSB and FM, and possibly 432 MHz SSB. Operating dates similar to the other party.

VICTORIA

It appears Daryl VK3AQR is arranging for one group to go out portable, no other details available. Mike VK3ASQ proposes to again be on Mt. Cowley for the fourth time. No other details.

Nothing heard from VK2 or VK7. Maybe someone will be going out from VK1, who knows? I don't! In VK6, the Albany area will be the one to watch, where there should be 6 and 2 metre activity, and possibly some 432. Bear in mind also Kerry VK5SU at Ceduna, who is likely to be available much of the interesting operating times for DX.

SOUTH AUSTRALIA

No advice of any other operations than that of my own expedition, starting on 26th December and concluding on 1st January inclusive. Full details of operating equipment was listed in August AR. Some changes are necessary with the passage of time, and the amended information as of this date is as follows: 6 metres SSB, CW and FM. 2 Metres the same. 432 MHz SSB and CW. Calling and listening frequencies: 52.050 SSB, 52.525 FM, 144.100 SSB, Channel 40 FM (146.000) or such other FM channels as required. 432.110 SSB. General practice will be to use the calling frequencies when the band is quiet, but at other times 52.110, 144.110, and 432.110 will be used, with the idea of getting off the calling frequencies to leave them free for other distant places to use and get in on the act. The site for the expedition is Myponga Hill, which is 4 km south east of Myponga, and approximately 54 km SSW of Adelaide, and 479 metres high. It has a good take off in all directions. All Dxers know where to point their beams on Adelaide, so aim a few degrees to the south of that and you will be on Myponga Hill. At this stage it seems 432 MHz gear will be OK but unlikely to make it with 576 MHz this time, still too much schoolwork for enough time to finish the construction work.

THE DX IS COMING

It is for sure. A few helpful hints for those perhaps new to the game, and maybe some others could learn too. Prime requirement:— Good stable equipment, for both receiving and transmitting, especially the latter. I repeat, good **STABLE** equipment. There are so many narrow bandwidth transceivers around today that they just cannot handle satisfactorily a drifting signal, let alone one with FM on it as well. If you are in doubt about your home built VFO, then arrange for your equipment to accept a crystal oscillator, and switch over to this for the important occasions. A crystal will be OK if you keep out of the bottom 300 kHz when the band is wide open, you would be unlucky to strike someone else's crystal locked on your frequency. If you are running AM, please see your signal is well modulated, very well modulated in fact, if you want to be resolved successfully by those transceivers. Plenty of audio will ensure you are received in the exalted carrier position, and received therefore in the same manner as a sideband signal, using one sideband only — that's why you need modulation. 50 watts of RF carrier at AM with 25 watts of modulation may be OK as far as the text books are concerned, but you will need more than this to be a success with modern SSB receivers. Reduce your carrier signal to about 30 or at the most 35 watts and impress the 25 watts of audio on it — you will be surprised how much louder it sounds. Watch out for splatter however. For correct results, you should use a high pass filter under these conditions and properly adjusted you can run the same amount of audio as RF power in watts and still provide a clean, narrow signal.

And haven't some of you boys ever thought about looking on your own transmitter frequency after calling CQ? Nothing is more frustrating to zero in on someone calling CQ and have him conclude by saying . . . "tuning from the band-edge up . . ." Operators using transceivers will almost invariably be found on your calling frequency, unless they are lucky enough to have an additional VFO to give them split frequency tuning ability, but most prefer transceive these days. Therefore, you chaps who separately tune the bands, whether you are crystal locked or not, always look on your own frequency first, and say something like this throughout your calling . . . CQ DX CQ DX here is VK . . . calling CQ DX, will be listening this frequency before tuning from band-edge up." You'll save a lot of curses if you do that, and will gain more contacts too, because the other operator will know in advance what you intend doing. If you do wish to tune from band-edge up, then say so during the period of your calling so others will know what you are going to do.

Some AM operators feel true DX stations are not interested in working them. This idea is probably largely mythical, and certainly so if the operator is crystal locked, say on 52.3, and the DX station is on 52.04. All the transceiver operators and others with a VFO will come up on the DX frequency, and that operator will simply work them one after the other for as long as they exist. When he runs out of callers on his own frequency he may tune up the band further and find you. Moral: Build yourself a VFO, or if you don't feel capable of making a stable one, they can be bought ready made, and often using an output range adaptable to most modern transmitters.

And for heaven's sake make sure you have a BFO or a product detector to enable you to resolve SSB. You will soon become branded on the band, and in no uncertain terms, as being the station which cannot resolve side-band. If you cannot resolve such signals it will not be long before there will be almost nobody for you to work, at the present rate AM stations are disappearing from the VHF bands. Perhaps an excuse can be made for an operator not having a VFO, but no BFO seems to be incomprehensible.

Now just a few points about propagation conditions. I guess there is really no need to go into the why's and wherefore's of sporadic E reception on 6 metres particularly, but how this is related to reception of DX on 2 metres might be briefly discussed. It is not always true to say DX on 2 metres will come when Es is at a peak on 6 metres, but nearly always. The most likely time for 2 metre contacts is during a day of intense overall activity, when contacts have been made on 6 metres all around the country. Suddenly, out of the blue extremely strong signal will come in on a short skip path, e.g. Adelaide stations will suddenly find they can work Melbourne. That's the time to think about 2 metres — as the skip distance shortens the MUF (maximum useable frequency) goes up. If you want any confirmation of this, have a look on your TV set, you may well find some stations occupying channels on which you normally see nothing. Channel 3 may suddenly become alive with signals from North Queensland, you may even see something on Channel 5A (which is just below our 2 metre band), or even Channel 6 which is above it. Under such conditions it is possible you may be able to make contacts over paths of 1000 miles or more on 2 metres with very strong signals. Such conditions may only last for a few minutes or even an hour or two, but they don't usually last for lengthy periods. You may find it hard to draw yourself away from 6 metres when everybody seems to be 20 over 9, but believe me, it's worth the effort. The more experienced operators of past years will already know who amongst the interstaters have good 2 metre equipment, and if you keep an ear on these chaps you will learn quite a lot. And while on 2 metres, don't overlook the FM channels, they too can be good pointers to likely long distance operation because they are invariably active, and you don't have to tune for stations. So keep your FM receiver going, just loud enough for you to hear, but not enough to be heard through your microphone. Last season, and I use that word very reservedly, as it's generally acknowledged that the VHF bands never really close, only the operators do! so the word "season" is perhaps a misnomer, but anyway, the FM channels certainly gave a warning of impending 2 metre operation, and were invaluable for this.

So, from all the above, perhaps a few of the less experienced operators might find something to help them enjoy the stirring thrill of working all STATES in one day, perhaps working across to New Zealand, and maybe even making some long distance 2 metre contacts. So good luck!

Well it's Christmas time once again. May I take this opportunity of wishing all my readers the compliments of the season, may you enjoy plenty of DX, and perhaps this coming year you will be able to purchase that piece of sophisticated equipment you have been longing for, now that you have bought the XYL a new washing machine and a fur coat! I hope the notes during the past year have contained something of interest to all of you at some time or other, they have not been prepared without some difficulty during these past two years anyway.

I would like to thank all those kind people who have sent items of interest from time to time, those who have written with news and words of encouragement, and those people, who, as representatives of various Clubs and Groups throughout Australia regularly send me their bulletins, these are very much sought after, and I am thankful to have them. All the best to everyone in 1975.

Closing with the thought for the month: "The only suitable gift for the man who has everything is your deepest sympathy".

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,

Often it is said that the law is an ass. Perhaps we, as citizens are donkeys for letting it remain so. It has irked me for years to know how the amateur service is treated by various government authorities in related matters.

I feel that I — as a citizen of the world — have an inherent right to make use of things provided by nature, if I have the will and expertise to do so. One such thing is the EM Spectrum. Provision of this has not cost any government anything, so we should not be beholden for insisting on our rights. Argument is put forward that this spectrum should be used for the public good. Listening on the SW bands — particularly the BC bands — makes one wonder how some of this argument can be substantiated.

In similar vein, argument could be put forward as to why national parks, aboriginal reserves, race courses, golf courses and other recreational playing areas should be converted to housing estates, freeways, aerodromes, etc.

The radio amateur, in using the EM Spectrum does so at his own expense, not costing the government one cent. However he is also improving his technical skills, which are in turn used by government and private concerns. Those skills otherwise would have to be provided for by these concerns — no doubt at some cost.

Perhaps for this reason alone the amateur service should be encouraged, not discouraged.

As a means of propounding goodwill between nations there is not better means.

Friendship is needed between nation and people, for peace to exist in our troubled world. Do governments provide this?

I am of course aware that certain rules are required for orderly conduct.

Statements made by politicians in vouching for our democratic system include that justice is equal to all. I feel somewhat restrained when speaking to other amateur friends, that I cannot speak of some things which could be sent via the normal provided communication services. One reason, I am told, is that these services are provided at great cost to the taxpayer and must be used.

Therefore, with this reasoning, owners of automobiles should only be allowed to travel around their neighbourhood and use public transport (provided at great expense by the taxpayer) if they wish to go elsewhere. The same principle would also be extended to owners of aeroplanes, and ocean going yachts etc.

We should then, as loyal citizens, use our efforts to see that our privileges are extended to other apparently unaware fellow citizens. These underprivileged people are obviously unaware of the lack of justice they are suffering.

Ray Jepson VK3JI

The Editor,
Dear Sir,

I would like to have recorded in AR my commendation of the WIA morse code course as run during 1974 by Bert VK3BAW. He did an excellent job on the training during a difficult period when the WIA headquarters were being moved from East Melbourne to Brunswick St.

To anyone wanting to pass the PMG CW exam, I would say that if you commence the WIA course under Bert's instruction and put in regular practice, you will pass.

Congratulations for a job done thoroughly and well, Bert! (Incidentally, Richmond Tech.'s rooms are warmer than WIA's).

Graeme Scott, ex VK3ZIP
(VK3?)

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

My apologies for the absence of this column over the past couple of months.

The winner of the President's cup for 1973 was Jack, VK2CX. Jack becomes the first to receive the cup under the new rules established by the Key Section. Congratulations, Jack.

The Presidents Cup is awarded annually to the amateur who wins the most credit in the four VK contests — the Ross Hull, the John Moyle national field day, the Remembrance Day, and the VK/ZL contests. Since the ease with which points are obtained in these varies quite a bit, the points in each of the above are weighted by factors of 100, 80, 40 and 1 respectively, to bring about the same value in each of the four contests.

It is with regret that I advise that Pete VK5FM, has retired as co-ordinator for the South Australian Division. Pete was the first co-ordinator for VK5 and contributed very much in getting the section set up. Thanks, Pete.

A surprising number of people have responded to my comment about Japanese Morse by sending me letters and articles. I am compiling a contribution for this column on the subject for future publication, but the code is a little incomprehensible without some knowledge of the way the language is written using Roman letters. I want to be a bit surer of my facts on that before flying into print.

Now the VK3 division has a station permanently set up in the science museum, they are naturally keen to have it manned during the times people are visiting the museum. There is a "Black Art" aspect about CW operating which some find fascinating and Vic. Div. would be grateful for any operators who would care to do a bit of pounding in public. It is a standing order I would think; the bands are almost too unreliable to make it worth while going out to the shack at the moment let alone making a trip to the museum.

VK6 tell me they are running slow morse each Monday, Tuesday, Wednesday and Thursday at 2030 local on 3550 kHz. They are operating under the official call sign VK6AWI. VK6NK, who was kind enough to tell me, would appreciate operators to help, and also reports on the transmissions. A good effort, for the various slow morse transmissions available in the eastern states are not much help in VK6.

December brings Christmas, and portable operations. Let me finish by wishing you the appropriate sentiments for the season, and this year not only remind you to pack your key if you go away but to have a sympathetic ear for the weak ones on 80 in January who are not only using wet string in the middle of a mosquito ridden swamp to talk to you, but are draining vital coulombs out of the battery of their automatics to do it.

QSP

1974 DRAGS ON

The APO Research Laboratories in Time Service Notice No. 25 advises that the Bureau International de l'Heure has announced that a positive leap second will be inserted in the scale of Co-ordinated Universal Time (UTC) at the end of December 1974. The last minute of 31st December 1974 UTC will be 61 seconds long and the APO's scale of UTC will be adjusted accordingly including a step adjustment to VNG, Lyndhurst.

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JANUARY - DECEMBER 1974

Trade Review

The C.T.C. range of RF Power Transistors is now available from Ampec Engineering Co.

C.T.C. has one of the most extensive ranges of RF Power Transistors in the Communications Industry. This range of Transistors includes:—

Land Mobile 12V — 50 to 960 MHz, some devices proving 70 watts output.

Hand Held 8V — 175 and 470 MHz.

AM Transistors 13V — 150 MHz up to 120 watts peak.

Military 28V — 80 MHz to 960 MHz devices available.

Linear — Frequency ranges include 2-30 MHz, up to 1000-2500 MHz.

Microwave — up to 3000 MHz with 5 watts output.

A new product listing is available. This listing shows all the devices currently available and standard packages.

As well as this range of devices, several RF amplifier kits are available ready for assembly. These kits include the transistors, all components and printed circuit board. Circuit diagrams with design and assembly hints are also provided. ●

Contests

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

REMEMBRANCE DAY CONTEST

Forty nine certificates have been awarded and these will be posted as soon as possible. About 70 entrants forwarded comments with their logs and many remarks were similar to those from Jim, VK2BO, "This was an excellent contest operated in the best spirit I remember in any contest". Only a few queried the scoring table, usually asking how certain scores were determined. Well, the more one thinks about that scoring table the more involved the problem becomes. Roy, VK2TR says his 2 watt CW transceiver "is a dream to use".

From the gyrations of my own S meter many other stations were killing watts to some order! So, on power alone the scoring chart has deficiencies. Eric, VK3's inward QSL manager has commented "I think the event was better patronised than is usually the case. One growl. The use of BK without signing doesn't help the CW SWL contestant — call signs should be sent at all times". That's a good point, particularly as CW contacts count double.

Murray, VK4KX wrote "Unfortunately once again 28 MHz nil and 21 MHz almost nil". Quite a number of others commented on that situation. Another VK4 with a powerful neighbour suggests contestants should have to QSY after five consecutive QRZ type contacts. John, VK5ZZ/T says 15 and 10 did not open at his QTH. Also a number of local stations using heavy compression made operating at times impossible. Tom, VK5QP writes "It was particularly pleasing to hear so many Z calls working on the 2m FM section of the bands. The contest procedure was very much superior to that heard on 20 metres, where very often stations were failing to confirm numbers received".

Neil, 6FI said "Nothing much heard on 15 and 10. I find the RD the best AR event of the year". Leonard, VK6LG comments "At 73 still enjoy it, but — require two SYT's as log keeper and check sheet". Tom, VK7AL said he enjoyed it immensely as usual. Most of the other comments from VK7 hint secession unless repeaters can be used in the RD and Norman, VK7NR has made out a very good case. Yes Norman, you have "bashed the wrong ear" but the right ear will hear about it. Bruce, VK3AZ found "21 MHz and 28 MHz were virtually non-existent and 7 MHz was not much better". Doug, VK8KK reported similar band conditions, also said "Spirit of contest was truly great, best ever! Clarifiers should be banned or the operators shown how to use them. The number of split frequency QSOs were staggering". Kiwis Frank, ZL4BE, Claude, ZL2KX and Eddy, ZL1ACL all commented about the enjoyment they gained from our contest.

In the August issue of "The Radio Bulletin" in the column headed Editor's Soapbox, the value of contests is questioned. An extract from the final paragraph reads "Is your goodwill increased by working a hundred stations for about thirty seconds each? If so, how? Do you get fun from breaking into contacts already in progress and harassing other stations for numbers? If so, why? Is your goodwill increased when you are driven off a frequency (particularly if it is a net) by stations calling "CQ Contest" over the top of the station you are trying to work? Surely not! Perhaps the value of contests has been exaggerated. What do you think".

Well Glenn, VK6KY covered that question in the letter which accompanied his RD log "It was good to find so many stations who were willing to take the time to give their "handles" this year. Everyone I worked was, at least, very friendly. Given more time to chat, rather than rushing to get numbers across, one could make a lot of new friends. It's a pity that the majority of amateurs don't have the time, other than during the RD, to spend populating our bands. Still, at least, we do have the RD and it gives those of us that have lots of other important things to do as well, an excuse to "forsake all others" and devote our attentions to getting on the air and renewing old friendships and meeting new amateurs. In general, thanks for the RD Contest and may it stay one of the best parts of amteur radio in Australia".

RD CONTEST RESULTS

STOP PRESS—Due to mishandling at a post office the following logs which were posted about 16th/19th Sept. were delivered to FCM today 28th Oct. 1974. Subject to confirmation of scores claimed there are new section winners listed here. The first figures are points scored and the second contacts made:—

RECEIVING:	M. Wojtynski (VK2)	142	61
Phone	VK2FM	88	23
	WT	74	28
CW	GT	59	22
Phone	VK3AUG	313	120
	ZML	219	129
	PW	158	49
	ARS	137	77
	SX	33	23
	VK5ZFJ	101	101
	ZAP	56	56
	VK6DG	368	177
	II	360	256
	AB	218	94
	ZDA	200	202
	WA	114	50
	VK7LP	1096	510
	VK8AS	528	119
OPEN:	VK7CIC	390	11

CONTEST CALENDAR

December 6 —Ross Hull Memorial VHF-UHF starts. Rules in Oct. AR.
December 7 —TOPS CW.
December 6-8 —ARRL 160 CW.
December 14-15—ARRL 10 metre.
December 14-15—Spanish CW.
December 22 —Hungarian.

TOPS CW CONTEST

1800 GMT Dec. 7 to 1800 Dec. 8.
CW activity between 3.5-3.6 MHz with DX on the low end. RST report only. For details send SASE to FCM.

John Moyle Memorial National Field Day Contest Rules - 1975

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. 8th, 1975 to 0800 GMT, Feb. 9th, 1975.

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

1. In each Division there are 8 sections.
   (a) Portable field station, transmitting phone.
   (b) Portable field station, transmitting CW.
   (c) Portable field station, transmitting open.
   (d) Portable field station, transmitting, phone, multiple operation.
   (e) Portable field station, transmitting, open, multiple operation.
   (f) VHF portable field station or mobile station, transmitting.
   (g) "Home" transmitting stations.
   (h) Receiving portable and mobile stations.
2. In each Division, 24 or 6 hour, the operating period must be continuous.
3. Contestants must operate within the terms of their licence.
4. A portable field station must operate from a power supply which is independent of a vehicle or permanent installation.
5. No apparatus may be set up on site more than 24 hours before the contest.
6. All amateur bands may be used but cross band operation is not permitted.
7. Cross mode is permitted but note rule 21.
8. All operators of a multi operator station must be located within approximately an 800 metre diameter circle.
9. Each multi op transmitter should maintain a separate log.
10. All multi op logs should be submitted under one call sign.
11. Only one multi op transmitter may operate on a band at a time.
12. RS or RST reports should be followed by serial numbers beginning at 001 etc.
13. **SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.**
    Portable field stations and mobiles, outside 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 (10-160) during the period of the contest provided that four hours elapse after the previous contact with that station on that band.
16. VHF portable-mobile field stations may contact any other VHF portable-mobile field station repeatedly provided that two hours elapse after the previous contact on that band.
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, 1975. 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.

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA 5152

ADDITION TO ARRL COUNTRIES LIST OF KINGMAN REEF, KP6

Geographically, Kingman Reef is located at the northern-most tip of the Line Islands in the Pacific Ocean. It is owned by the United States. Submissions of Kingman Reef confirmations for DXCC credit may be made starting October 1st, 1974 (Sept. QST).

DMP AWARD

1. The award is available to licensed amateurs and shortwave listeners (on a "heard" basis).
2. Contacts on and after 30th July 1947 are valid.
3. Do not send QSL cards. A list showing full details of the contacts should be certified by the Awards Manager of a National Society.
4. The fee for the award is 10 IRCs.
5. The address for applications is:

    REP
    Av. Marginal 61-1° DE°
    Dafundo-Lisbon 3,
    Portugal.

Requirements:

One confirmed contact is required with each of the following areas:

1.	CT1	Portugal
2.	CT2	Azores
3.	CT3	Madeira
4.	CR3	Port Guinea
5.	CR4	Cape Verde
6.	CR5	St. Tome and Principe
7.	CR6	Angola
8.	CR7	Mozambique
9.	CR8	Port Timor
10.	CR9	Macao

AAA AWARD

1. The award is available to licensed amateurs.
2. Contacts are valid from November 1946.
3. Do not send QSL cards. A list, showing full details of the contacts and the country should be certified by the Awards Manager of a National Society.
4. The fee for the award is 10 IRCs or 50 cents (South African currency). It is, however, issued free of charge to members of SARL.
5. The address for applications is:

    Awards Manager
    South African Radio League
    Post Box 3911
    Capetown
    Rep. of South Africa

Rules: Only mainland stations count. Islands round the coast of Africa are not valid.

Where countries have changed prefix or name, like ZS9 to A2 then either prefix is valid.

Where countries have been subdivided, like French West Africa (FF) — then either the old prefix (FF) is valid or one only of the subdivisions—FF or one (only) of TU, TY, XT, 5T5, 6W8, 5U7, 3X.

Requirements:

Confirmed contacts are required with

ZS1	ZS6
ZS2	ZS7/ZD5/3D6
ZS3	ZS8/7P8
ZS4	ZS9/A2
ZS5	

plus 25 call areas from the list of call areas.

Y.R.C.S.

with Bob Guthberlet

3 Bandon Tce., Marino, S.A.

Two excellent publications have been sent for my perusal . . . 'Let's Talk Transistors' and 'Space Science Involvement'. The first deals with the structure of Matter and its applications to transistors, transistor circuits, transistor circuit operation, etc. This is a very useful booklet, published by ARRL. The second, also published by ARRL is a curriculum supplement for classroom use, and outlines Space Science, Physics, Mathematics, Astronomy and Communication. Questions and answers are given at the conclusion of chapters. For the instructor and student I can recommend both. Copies have been sent to the YRCS Federal Education Officer, Allen Dunn, 18 McKinlay Ave., Elizabeth Downs, SA 5113, who can supply further information on cost (one free and one modest in price) and how to obtain them.

The year 1974 is rapidly drawing to a close and supervisors will be seeking statistical information from club leaders. I hope we shall be able to report increased interest and membership. During the YRCS Federal Conference I emphasised the need to publicise the Scheme, as without such we cannot hope to achieve support from the great number of youth, who with greater leisure time than ever before, surely need what we can offer.

This has not been an easy year for YRCS, and the revision of our educational programme has been difficult, mainly due to the uncertain date of the commencement of Novice licensing. Under the guidance of Allen Dunn, we anticipate an improved uniform syllabus for club instructors.

I shall be leaving Kadina on December 31, 1974, and my new address as from early January 1975 will be: 3 Bandon Tce., Marino, S.A. Phone 269 8472.

As this will be my last printed communication for this year, may I wish for all interested in, and working for YRCS, a happy Christmas, and a New Year of successful operation in Clubland.

PROJECT AUSTRALIS

with David Hull, VK3ZDH

The following are the "on" orbit equator crossings for Oscar 6 for December. Times are GMT. Days are local.

Orbit No.	Time (Z)	Equator Cross (°W)	Orbit No.	Time (Z)	Equator Cross (°W)
Sun. 1 Dec.			**Mon. 16 Dec.**		
9720	2137	12	9914	0926	189
9721	2332	41	9915	1121	218
9722	127	70	9916	1316	247
Mon. 2 Dec.			**Thurs. 19 Dec.**		
9739	1002	198	9951	820	173
9740	1157	227	9952	1015	202
9741	1352	256	9953	1210	230
Thurs. 5 Dec.			**Sat. 21 Dec.**		
9777	1051	211	9976	815	172
9778	1246	239	9977	1010	200
9779	1441	268	9978	1205	229
Sat. 7 Dec.			**Sun. 22 Dec.**		
9802	1046	209	9982	1945	344
9803	1241	238	9983	2140	13
9804	1436	267	9984	2335	42
Sun. 8 Dec.			**Mon. 23 Dec.**		
9807	2021	353	10001	810	170
9808	2216	22	10002	1004	198
9809	0011	51	10003	1200	228
Mon. 9 Dec.			**Thurs. 26 Dec.**		
9827	1041	208	10039	900	183
9828	1236	237	10040	1055	211
9829	1431	266	10041	1250	240
Thurs. 12 Dec.			**Sat. 28 Dec.**		
9864	936	192	10064	855	182
9865	1131	221	10065	1050	211
9866	1326	249	10066	1245	239
Sat. 14 Dec.			**Sun. 29 Dec.**		
9889	931	190	10069	1830	325
9890	1126	219	10070	2025	354
9891	1321	248	10071	2220	23
Sun. 15 Dec.			**Mon. 30 Dec.**		
9895	2101	3	10089	850	180
9896	2256	32	10090	1045	209
9897	0051	60	10091	1240	238

OSCAR 7

By the time this AR is circulated Oscar 7 (if successfully launched on Oct. 29) should have settled into a normal routine as follows:—

Sundays GMT—Mode A 2m to 10m Repeater on 435 beacon operable.
Mondays GMT—Mode B 70cm to 2m repeater on 145.98 MHz beacon on.
Tuesdays GMT—Mode A.
Wednesdays GMT—Mode D. Recharge mode 435 beacon operable by command.
Thursdays GMT—Mode B.
Fridays GMT—Mode A.
Saturdays GMT—Mode B.

It is hoped to include orbit details in future ARs once orbit parameters are known. Latest information may be obtained from your local state co-ordinator and/or WIA broadcast.

Hamads

- Eight lines free to all W.I.A. members. $6 per 3 cms. for other amateurs and S.W.L.'s.
- Copy should be in block letters or typescript, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Excludes commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

FOR SALE

Beckmann DVM Model 4011 RVP with handbook, $20; **Geloso** TR222 AM Transmitter, $20; **AWA MR3** 2m FM with Ch A, C and T, $40. VK3TX, QTHR.

FTDX 400 in good cond., open to any reasonable offer. Apply to Charles Lloyd VK6CZ, 88 Callison Way, Koondoola 6064, W.A.

Bendix Freq-meter BC 221-c, CW 2-1 MHz crystals, 2 books, 2 spare valves & AC-PS, $30; **HB Tape recorder** with 12 - 7" reels of misc. tape, Mic. & Bulk eraser, $15; **AM/CW/DSB Transmitter**, 3 band, 2-807, 80 watt Mod. Sp-amp, and AC-PS (Want the bench space), $20. VK3EM, QTHR. Ph. (03) 58 7745.

AR7 with all coil boxes, power supply with 2 metre converter. Good order $50. WIA NSW Divn. Blue Mts. Branch, c/- VK2BHS, QTHR.

While they last — **AWA Car Phones** FM, Tx and Rx, 70-85 MHz with power supplies, some cables and hand sets. Best offer. See L. D. Sykes, 6 Somme Parade, Edithvale, 3196. Disabled Radio Amateurs' Club VK3ZZ.

150W CW/AM Station. Table top Tx, Geloso with pair of 6146 in final, 80-10m Rx, Lafayette HE30 ant. SW unit with RF meter, switch operation, $125. VK2XD QTHR. Ph. (02) 653 1246.

TCA 1677 hybrid mobile TRx 3/20 final, MPF121 front end, Ch 40 (B) xtals, $80 ONO; **Trio 9R59DS** Rx plus spkr., phones, AR mods, xtal calibrator, $115 ONO; **TCA 1674** remote control base, 6/40 final plus manual, coax, 25 ft. rotatable mast and 2 x 6 over 6 skeleton slot array. Best offer. All must go — heading for G-land in March. Mike VK1ZMV, 13 De Chair St., Deakin 2600. Ph. (062) 81 1312.

WWV Receiver, Beckman 905, crystal locked 2.5, 5, 10, 15, 20, 25 MHz, as new, $75; **Collins** 2300 MHz parametric amp. with control and power unit, spare klystron, $235. VK1VP, QTHR. Ph. (062) 48 5882.

Rx — homebrew, 16 tube double conv., xtal locked, hambands only, 80-10 metres, BFO, noise limiter, inbuilt 240 V PSU, Kokusai mech. filter, $135. B. Hannan, WIA-L3185, 17 Heroes Ave., Emerald, 3782. Ph. (059) 68 4571.

Yaesu FTDX 401 Transceiver, $375; Prop. Pitch Motor AC operated, Selsyn indicator units fittings, and loops for spider triband quad (see QST Dec. 1967), $90. Call or write J. Moyle VK2OZ. Unit 572 Bowden-Brae 50 Pennant Hills Rd., Normanhurst, 2076.

FT-2 Auto. All 8 channels fitted with crystals. Deviation plus-minus 7.5 kHz. No spurious outputs on any frequency. Aerials available, ¼, ½ and ⅝ wavelengths mobile plus coaxial dipole for fixed use. Two manuals, JA and English, in original carton, $375. Ivor Morgan VK3DH. Ph. (03) 82 3020.

Back issues of AR 1949 to date inclusive, good condition. Packed and freight paid, $25. Yeats, PO Box 1088, Orange 2800.

Precision regulated PS, rated at 1.5 amp. at 13.8 V, $18. 2 x QQE06/40s, 2 x QQE03/20s, 2 x 6146s, all as new, never used, what offers? Will swap part of foregoing for antenna rotator. VK4ZFM (ex VK2ZKA). Ph. (072) 40 3210. Write: 11 St. Patricks Ave., Kuraby, Qld. 4113.

Antennas, Gem fibreglass quad, Mosley trap vertical 40-20-15-10 metres, Heathkit Marauder transmitter, SSB, AM, FSK, 180 watts PEP, Heathkit OM 12 CRO VTVM, and condenser bridge, all with manuals, 600V/250 mA power supply, 50-100 new valves, 4 x 250 etc., boxes of resistors, capacitors, transformers etc. all new, many other goodies, $400 takes the lot. J. Parsons, 16 Aramac St., Keperra, 4054.

Hallicrafters Comm. Receiver, the famous SX-122A; matching speaker; 100 kHz Plug-in Cryst. Vibrator; Selectivity System. As new, with many refinements. Reasonable offers considered. Dr. (engineer) A. C. Pittas, 14 Manresa Court, Sandy Bay, Tas. 7005.

WANTED

CTR 18 Crammond Karphone Circuit/Manual wanted for Serial No. B1587 AM 12 V 7.5 watt. VK3ZLA, 5 The Close, Frankston, Vic. 3199. Ph. (03) 93 0311, AH 783 7717.

Amateur band or general coverage receiver. Write details and price: R. N. Jacob, 429 Kothoff St., Lavington NSW, 2641.

BC348 4 Section tuning gang or incomplete or not working chassis for redevelopment. Command Rx, 7-9 MC wide spaced tuning gang or similar chassis as above. I. D. Stockton VK2AAJ, QTHR. Ph. (02) 48 4721.

R388, R389, SP600 JX, R392, R391. Cond. secondary importance. Spares or incomplete units, technical handbooks. Also US Armed Forces technical manuals, army uniforms, American, even airforce uniforms or pieces, and military badges, etc. PRC9A, 10A, 8A, 28, 74, 77 6. Also SSB receiver adaptor. Dusty Leopold, L5134, PO Box 83, Warradale, 5046.

175 kHz Tapped Osc. Coil. Cheap VLF Rx 10 kHz-500 kHz ADF RAK RBA RBL DZ RE etc. Jeff Silvester, SWL, 30409, 9 Goodwood Drive, Springvale, Vic. 3171. Ph. AH (03) 546 3940.

Campmobile wanted by ZL2AX on DXpedition VK from March 1975. Replies to 20 Thompson Rd., Napier, New Zealand.

AR7 Coil Boxes in good order, full set or singly, condition and price to VK2PT, QTHR.

Valves — Types MS4, 27, DU2, UX250 and X281 for use in restoring a rather elderly wireless. Peter, VK2ZPX, QTHR. Ph. (058) 81 1253 AH.

Exchange Eddystone 770R Mk. II VHF Rx 19-165 MHz in very good condition, with workshop manual, for any HF gear or will sell. Particularly want linear with PSU suitable for following a KW2000A. Bill Senior, VK2BZA, "Birkenau", Bundarra Road, Armidale, 2350. Ph. (067) 75 1158.

Details of small SSB/CW 20 and 40m "back-pack" rig under 5 lb. weight including batteries of a kind available anywhere. Please contact Sam Kaufman, VK2SK, QTHR.

20 Years Ago

with Ron Fisher VK3OM

Technical articles were the main stay of the December 1954 issue of 'Amateur Radio'.

First was 'An Electronic Keyer' by E. A. Marstella VK2AEZ. It was a simple device when compared with todays highly complex solid state keyers. VK2AEZ used only two tubes plus a small AC power supply.

Ladies Beware, or the tale of the purloined tea strainer, was reprinted from the RSGB Bulletin. It told how the XYL's favourite tea strainer was converted into a microphone with the addition of a cheap crystal insert. During the 1950s the old AT5 transmitter was a popular choice in many amateur shacks. Of course it was not ideal in many respects so modifications were many and varied. A. W. Winter VK5DR presented his version with an article entitled 'AT5 Rebuilt and Modified'.

Tom Athey was still at it with his Complete Amateur series "A System For Monitoring your Outfit" told how to construct a simple 'scope' and showed how to connect it to a transmitter to obtain the usual patterns. 'Stable VFO operation at 144 Mc'. Quite a problem in those days. Dr. Robert Black VK2QZ overcame it by using the method of beating a 3MHz VFO against the sixth harmonic of a 7.5 MHz. crystal and the tripling the resultant output to 144 MHz.

Reports for the month include the full results of the 1954 Remembrance Day Contest. Top scorers in each State were VK5MS, VK6TK, VK7LJ, VK3XK, VK4TN, and VK2AKV. This is also the order in which the states finished in contest.

The NSW South Western Zone Convention held at Tumut was described in great detail even to a full list of those attending. ●

Silent Keys

Bob Wookey, VK3IC, passed away in Geelong, on Sunday 29th October. Bob was originally licensed in 1925 and would have been one of the longest standing members of the WIA. He was a foundation member of the Geelong Amateur Radio Club, and served the Committee in various capacities over the 26 years of the club's existence. Bob was active on the HF bands and was always a willing worker in club activities such as working bees, field days and in recent years, the Geelong Hamfest.

Bob will be sadly missed, not only by his many friends in Geelong, but also by those who had made his acquaintance over the air. Our sincerest thoughts go to Bob's sister Edith, brother George, and the remainder of Bob's family.

Alan Bradley, VK3LW
President, GARC

FRANK COX VK2APO

Newcastle & Ham Radio are the poorer for the loss of Frank Cox VK2APO who passed away suddenly in early October aged 62.

Frank enlisted in Army Signals in 1929, was Commissioned in 1939, saw service in the Middle East and New Guinea, was awarded the OBE in 1958 and retired from the Army in 1962.

Since 1962 he has been active on the Air and in WIA as well as being deeply involved in Civic Affairs. He was a member of the Hunter District Water Board at the time of his death.

He leaves a wife Jean and a daughter. He was a good citizen.

VK2KB

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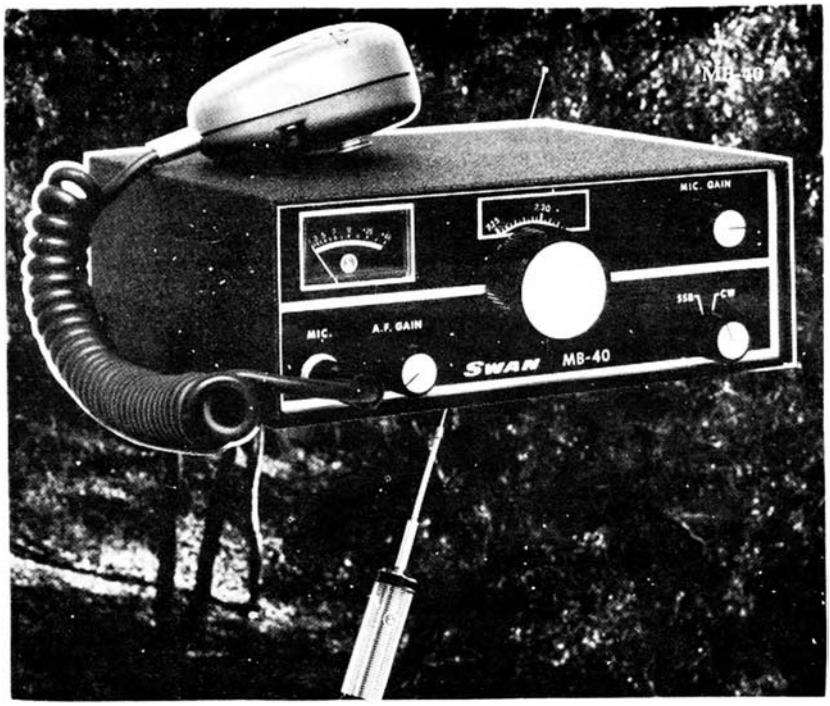

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