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HRT Amateur of the Year – latest Drake R8 receiver to be won

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HRT HAM RADIO TODAY

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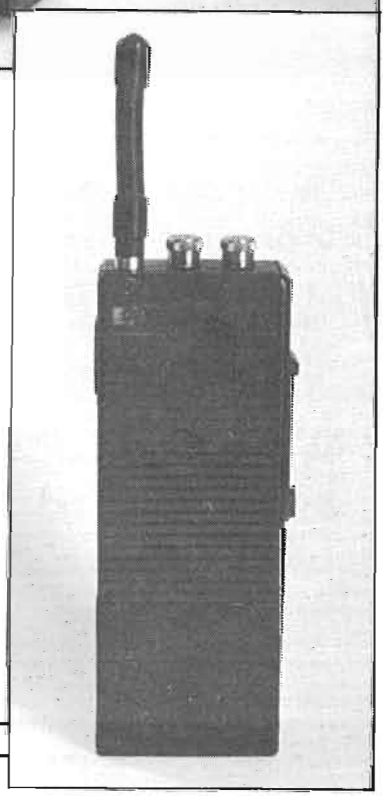

Left: **The latest Drake R8 receiver**

Above: **The RA Young 'Amateur of the Year' Awards**

Right: **Project — PF85 conversion**

CQ de G8IYA

Who'll win the HRT 'Amateur of the Year' prize?

Over the Christmas period, many of us traditionally sit down and look back over the events of past year. To the HRT staff this is also appropriate, because as I write this, just having returned from our large stand at the Leicester Exhibition, we've had the 'new look' HRT going for exactly one year. Besides the new style (and often dynamic) front cover, this 'new look' with our new style of regular columns, construction projects and kits, and of course the monthly thought-provoking 'CQ de G8IYA' Editorial, appears to have been very popular with our existing and new readers. I say 'new' deliberately, because whilst the general trend in magazines lately has been a fall in circulation, I'm pleased to say that of HRT has risen substantially over the last year.

A Big 'Thank You'

At our Leicester Exhibition stand, the six HRT staff in attendance, together with many HRT contributors who called to say 'hello' and meet readers, received not one complaint whatsoever from the many visitors. To be quite honest, I was simply amazed! We're traditionally a nation of complainers when the slightest things go wrong, but slow to offer praise when things go well. But many HRT subscribers came up to the stand simply to say 'carry on the good work', which touched us. Terry our Managing Director was also pleased to meet several readers and contributors as well as trade personnel at the show, and even with the 'big boss' in attendance at the stand on the Saturday not one reader had a gripe, even while the Editor's back was turned!

So this is a big 'thank you' to our readers, you've told us we've been giving you what you want in the magazine, stirring discussion, and most of all allowing an uncensored view of what radio amateurs are thinking about and doing. As many readers know, we don't bury our heads in the sand when a matter needs airing, but instead we investigate, and allow the magazine to be used as a 'focal point' for discussions. We 'rattle the cage'. By regularly talking to and meeting with the Radiocommunications Agency we're gaining a useful insight, and presenting them with feedback from our readers, which they've asked us to do. In the last year, this has successfully resulted in the removal of two unnecessary restrictions in the Novice Licence which many readers have told us could almost have spelled the death of the licence in terms of uptake, as we believe there is a real need to encourage forward-thinking newcomers to the hobby rather than force objectives based upon bygone principles.

A 'Thank You' to our readers

HRT 'Amateur of the Year'

As a material 'thank you', and in an attempt to help promote the work of the forward-thinking 'doers' rather than the 'sayers' in amateur radio, we've formally launched this award. You'll find full details of this in this month's issue. For the inaugural prize we've got together with the firm of Nevada, who have been extremely generous by their donation of a Drake R8 receiver. Many readers may know Drake have gained the reputation of being the 'Rolls Royce' manufacturer in the amateur radio equipment field, and this is their very latest product. I'd certainly like to win it, so would my Consultant Technical Editor Chris G4HCL (he's green with envy). But we've decided it will be someone out there, rather than us, who'll be the lucky recipient. Yet remember we need *your* nominations as to who should win the award, by Jan 21st latest. There are many deserving people in our hobby, and I'm sure that choosing between this year's nominations will be a difficult task for the award team. However it's an annual award and there's always next year, even for those nominated this time, although we may not be able to repeat such a prestigious prize! As well as the receiver and an inscribed shield, we'll be pleased to publicise the winner through as many amateur radio mediums as possible, and our national society the RSGB have already commented favourably on the award — they've even asked if they can be on the award panel (depends if a volunteer official of the RSGB gets proposed or not — doesn't it!).

The Way Forward

Starting with next month's issue, together with one or two items I have 'up my sleeve' for next year in addition to our regular articles I'm planning to regularly feature short reviews of new amateur radio computer software. This is becoming increasingly available, with programs often being 'shareware' products which may be freely copied by radio amateurs and distributed around friends. The growth in the use of computers (as opposed to computer programming, which is a totally different matter) in our hobby has significantly increased, and many newcomers to amateur radio as well as old timers are using their computer as a natural aid to the hobby. Maybe we might even get some forward-thinking converts to amateur radio.

May I end by wishing all HRT readers, throughout the world, a happy and peaceful Christmas, may your stocking be filled with many goodies, remembering that not everyone can be as fortunate as those with large equipment-filled shacks. In our small way, we at HRT are trying to put something back into the hobby of amateur radio, one based on national and international friendship.

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LETTERS

Letter of the month

Dear HRT,

With reference to the Nov 91 'CQ de G8IYA Editorial', indeed there *are* 'sayers' and 'doers'. One class may 'say' very sensible things which can usefully be acted upon (and where else would your letters come from?), and the others may 'do' vast havoc.

Von Moltke the Elder once divided officers into four classes. The idle and intelligent he would make staff officers, the diligent and intelligent he would make field officers, the idle and stupid he would make base commanders, the diligent and stupid he would shoot before they did more harm.

My nomination for 'Amateur of the Year' will be the one who gets rid of compulsory Morse, if he/she is not disqualified!!

Yours faithfully,
Sandy, GM0IRZ

Editorial comment;

Any offers?

Dear HRT,

I have been a regular reader of HRT since issue No.2 and always enjoy my reading, but over the last year or so the number of letters from readers moaning about the compulsory Morse test is getting beyond a joke. To learn to read Morse at 12WPM is not very difficult providing you really want that licence, during the war years thousands of servicemen managed it with the period of tuition of two 45 minute sessions per day, 5 days per week for 12 weeks. The incentive being an extra one shilling and nine pence *(around 9p — Ed)* per day added to their normal pay of two shillings *(10p — Ed)* per day. Surely the would-be amateur has an equivalent incentive. When the licensing authorities changed the old system of one year probation on 25 Watts CW only, before you could have a full licence, was in my opinion a grave mistake.

I see in letter of the month HRT August 1991, the writer says "he disagrees with those who say that Morse is a good method of communication, and if it is as good as people make out, it should survive on it's own merits". This from someone of the tender age of 16 years with a licence on which the ink is barely dry, is to me a huge joke. Doesn't he know that Morse has been the backbone of our communications for over 150 years and served us well through two world wars?

I admire his enthusiasm for the more modern methods of communication, but if Morse and all other methods of communication were replaced by packet, in the event of another war, I wonder how he would survive being dropped behind enemy lines, having to pack all his equipment for packet operation, and sometimes have to carry it 15 or 20 miles during the night. Would it still work after being buried in the forest for several days to avoid discovery by the enemy, could he repair it without complicated test equipment. The old 'B2' and 'suitcase sets' did the job and seldom failed us. By all means go ahead and develop more modern systems of communication, but in doing so don't ridicule the old timers and their valve sets, and above all don't knock the RSGB, without them amateur radio would be history to people of his generation. I suggest that one day he asks one of the 'Nostalgic amateurs of soap box time' to let him listen to a CW signal from a valve transmitter on a valved receiver, the quality of the signal puts modern transceivers to shame.

Yours sincerely,
W. D. Heath, G3ABS

Editorial comment;

It may interest readers to know that amateur packet radio, to the exclusion of Morse, is precisely what *was* used by British soldiers during the last war. In a recent IEE lecture entitled 'Gulf War Communications', given by Lt. Col. Whitemore of the Royal Signals, the well-presented slides of the communications equipment showed, and the accompanying lecture gave details of, the (quote) "consumer laptop PCs and amateur radio packet terminals" used by the troops. There were no slides of, nor mention of, the use of Morse, yet data communication was extensively covered and repeatedly promoted by the lecturer for its effectiveness in battlefield communication. Would any readers care to offer different facts?

Dear HRT,

Over the past several months I have been reading in HRT and other magazines, the many letters about Morse and the group 'A' licence. I have had a class 'B' licence for six years now and am enjoying amateur radio very much indeed, being particularly interested in the practical side, e.g. conversion of PMR equipment and so on. I would very much like to use HF but do not have much time (I have my own small business), nor any interest in Morse. You ask for readers opinions as to an alternative to the Morse test, so I am writing with my suggestion which I hope will be of interest.

Of course the Morse test will have to be kept, but not as a method of gaining the 'A' licence, but for those people interested in Morse. Passing the Morse test would enable the person to use it on any of the amateur bands, if licensed to do so. The method of obtaining the 'A' licence would be a further RAE type exam. The 'A' exam could not be taken until the amateur had held a class 'B' licence for 12 months or more. This would allow the person to gain practical operating experience before going on the HF bands.

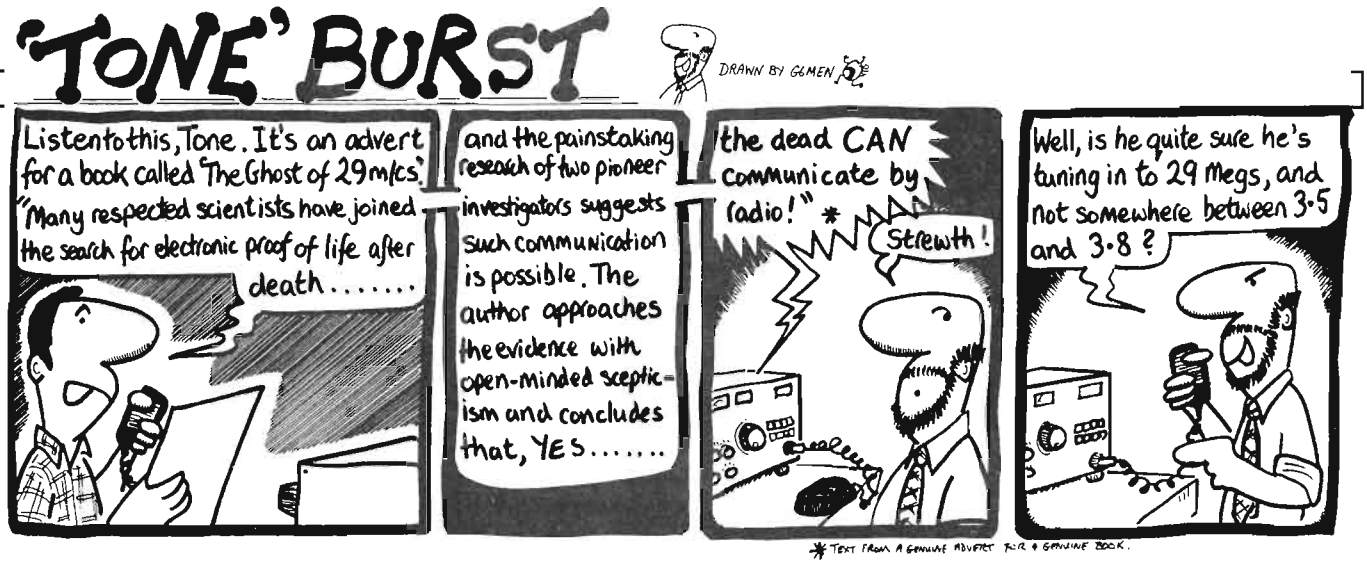
The exam would consist of three parts, part one; 20-30 questions, with multiple choice answers, on the practical aspects of HF. Part two; 20-30 questions on the theoretical aspects of HF, and part three; either a further 20-30 questions on HF operation or a verbal test on HF operation.

I think this, or a variation of it, would be a fair method of gaining the HF licence. Keep up the good work with the **best** radio magazine.

Yours faithfully,
Mr. O. W. Rogers

£10 for the Letter of the Month

Do you have something constructive to say on the state of amateur radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month. So write in with your views, to HRT, A.S.P., Argus House, Boundary Way, Hemel Hempstead, HP2 7ST.



Editorial comment;

Instead of a further exam, how about retaining our existing RAE, but instead with a 'Credit' or 'Distinction' in Part 1, the knowledge of EMC and licence conditions, being the differentiation between a Class A and B? Thus a pass in both sections will gain a Class B, and a better knowledge of potential interference-causing aspects (as tested in part 1), gains the candidate a Class A. An 'upgrade' from Class B to Class A then just requires a re-sit of Part 1. This should cause minimum disruption to 'that which is already in place' as far as the licence authorities are concerned.

Here's an extract from the letter we received in reply to the gift of books and HRT mags we sent to Nicolai RB5QRM, in response to his letter published in our May 91 issue.

Dear Chris and Sheila,

I was very thrilled and surprised when I received your letter and HRT magazines. While I was thinking of a reply to you I received your parcel with your books. I don't have any words which can best describe how thankful I am for your very dear gift, they are just the sort of books I am looking for and have helped me so much. We don't have such books over here.

With regard to your proposal *(we suggested Nicolai may like to write some articles for us — Ed)* I have some good articles for you, including the work of radio hams who worked in Chernobyl after the nuclear accident, their home-brew equipment helping very much in liquidation of the accident.

I have enclosed some space radio stamps for you, please keep them as a gift.

73 and 88 Nicolai RB5QRM

Editorial comment;

Nicolai sent us a truly wonderful collection of stamps and first day covers from his country, they are really beautiful and we shall treasure them, we were most touched. Nicolai asks if UK amateurs can help him with books, magazines etc. or even secondhand commercial HF equipment, i.e. a CW/SSB transceiver and a HF receiver, in exchange for collections of stamps etc. from the USSR. We're arranging for something ourselves, but if any of our readers would also like join in with an exchange the address is Nicolai G. Davidchenko, RB5QRM, P.O. Box 34, Energodar, 332608, USSR. At HRT we have a set of address labels written in Nicolai's native language which will help speed the mail at his end, we'll be pleased to supply copies of these to readers on request.

Dear HRT,

My licence demands that I check that I do not cause interference. If I have a scanner tuned to the local police to check that I have no emissions on their frequency, am I operating within the terms of my licence?

Yours sincerely,
Harry Leeming, G3LLL

Editorial comment;

But how does one find out which frequencies one's local police force use?

Dear HRT,

I am very interested in doing a Novice Licence course, but the nearest instructors to me are about 40 miles away, can we please have an instructor in Grimsby?

Thank you,
D. L. Hughes

Editorial comment;

Come on you amateurs in Grimsby, there must be someone interested in helping newcomers into the hobby! Contact the RSGB and register now, 40 miles is a long way to travel.

Dear HRT,

On the subject of firms giving good service, I would like to say that I have received excellent service from HRT advertisers, ERA at Warrington on a number of occasions. Their products are CW and data readers, and connected items including an excellent audio filter. I have found the company most helpful in dealing with queries and problems, and prompt in response when I have had to return anything for service or repair.

A friend recently purchased one of their audio filters second hand, but was very disappointed with the performance. Although not new, I suggested that he got in touch with ERA and, on returning it to them, it was repaired and sent back within a matter of days at no cost. Apparently, before my friend bought the filter, the output stage had been blown by excess voltage being applied.

I certainly have no hesitation in recommending ERA and their products and must, of course add, that I have no connection whatsoever with the firm, other than as a satisfied customer.

73 Chris Charles, G0LWA

Editorial comment;

In these days when often 'money comes first', it's good to hear of such attentive service from amateur radio firms, let's just hope they manage to continue rather than fall by the wayside, as such firms sometimes do. Maybe at the HRT offices we should start investing in some bouquets to give to such dealers.

Project — Pye PF85 Conversion

Tony Skaife G4XIV converts the UHF PF85 to 70cm

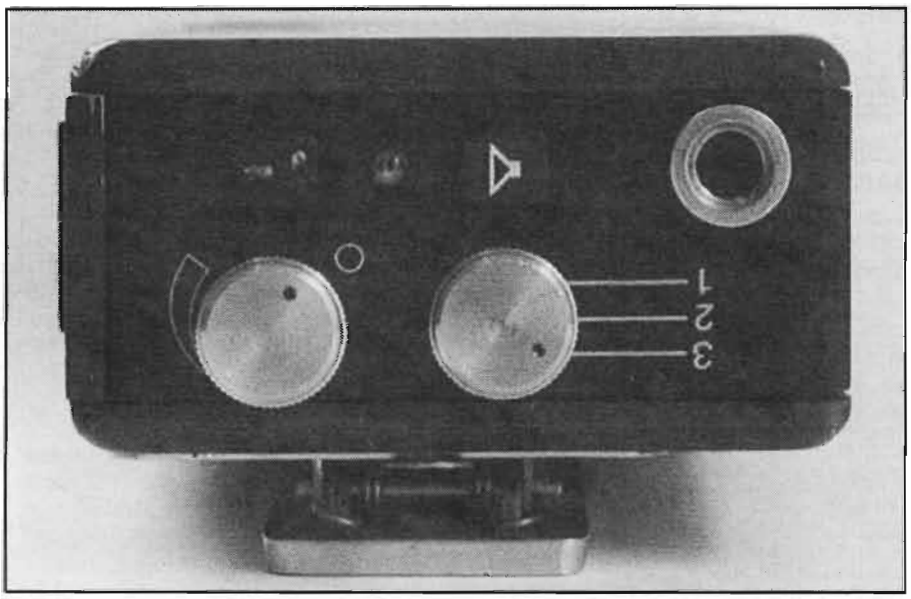
One of the later, and in my opinion better, types of ex-PMR equipment to reach the second hand market is known as the PF85 and originally made by Pye Telecom. The PF85 is normally found as a three channel crystal controlled FM handheld transceiver; there is a single channel version and no doubt it could be useful, but most amateurs would obviously prefer the multi channel version. VHF and UHF options are available, and for the purpose of this article I shall concentrate on the UHF model

The set is usually found in the 'low power' version with an output power of up to 1.7W, although even this gives quite a drain on the battery block, a more practical setting would not exceed 1.2W with a battery current of about 700mA on transmit. A different plug-in PA block option gives a higher power output of 4W.

Controls

If you look at the top control panel, you will see a button on the bottom right hand side marked with a music symbol, although I haven't yet come across a set with that function in use, this button is used for selective tone call options. The other button marked with a loudspeaker symbol is to open the squelch, other controls being the On/Off/Volume control, channel switch, TX LED indicator, and aerial socket. On the side of the set is an 11 pole facility socket which may connect to a remote speaker/microphone, with an aerial attached if required via a coax lead running up the microphone cable.

Two of the contacts on the facility socket are spring loaded (the other nine pins on the corresponding plug are also spring loaded) and are change-over switches. Their function is to disconnect the radio's speaker and aerial output and re-route their path to the remote speaker/mic when a suitable facility plug is attached. Therefore, it is worth noting that should one wish to use the speaker/mic but not want the aerial on it, the appropriate tiny pin may actually be unscrewed from the plug which disengages the aerial change-over system. However, do not lose the removed pin in case you ever want to return the equipment to its original state!



Crystals

As usual, two crystals per operational channel are required. Reduced height and wire ended must be specified when ordering the crystals, remembering to state they are required for a UHF PF85. The formula to calculate the frequency for each crystal required is;

$$\text{TX Xtal freq} = \frac{\text{TX freq}}{9}$$

$$\text{RX Xtal freq} = \frac{(\text{RX freq} - 21.4\text{MHz})}{9}$$

As well as the usual metal ended trimming tools, a small flat bladed non-metallic one is necessary. Each crystal is

tuned by a coil with a ferrite tuning slug, and unless the adjustments are made with the non-metallic tool you'll find a frequency shift when the tool is removed from the coil. You also stand a high chance of damaging the ferrite slugs.

Fitting and removing the battery is achieved by offering the battery at right angles to the set and turning it to lock in position at the base of the set. It is worth noting that in the radio's base, covered by a sliding door arrangement, is a 2.5A fuse through which the battery current will pass and with obvious consequences if it fails. Lower down on the PTT side of the set is the battery release button, which must be pressed while turning the battery for removal.

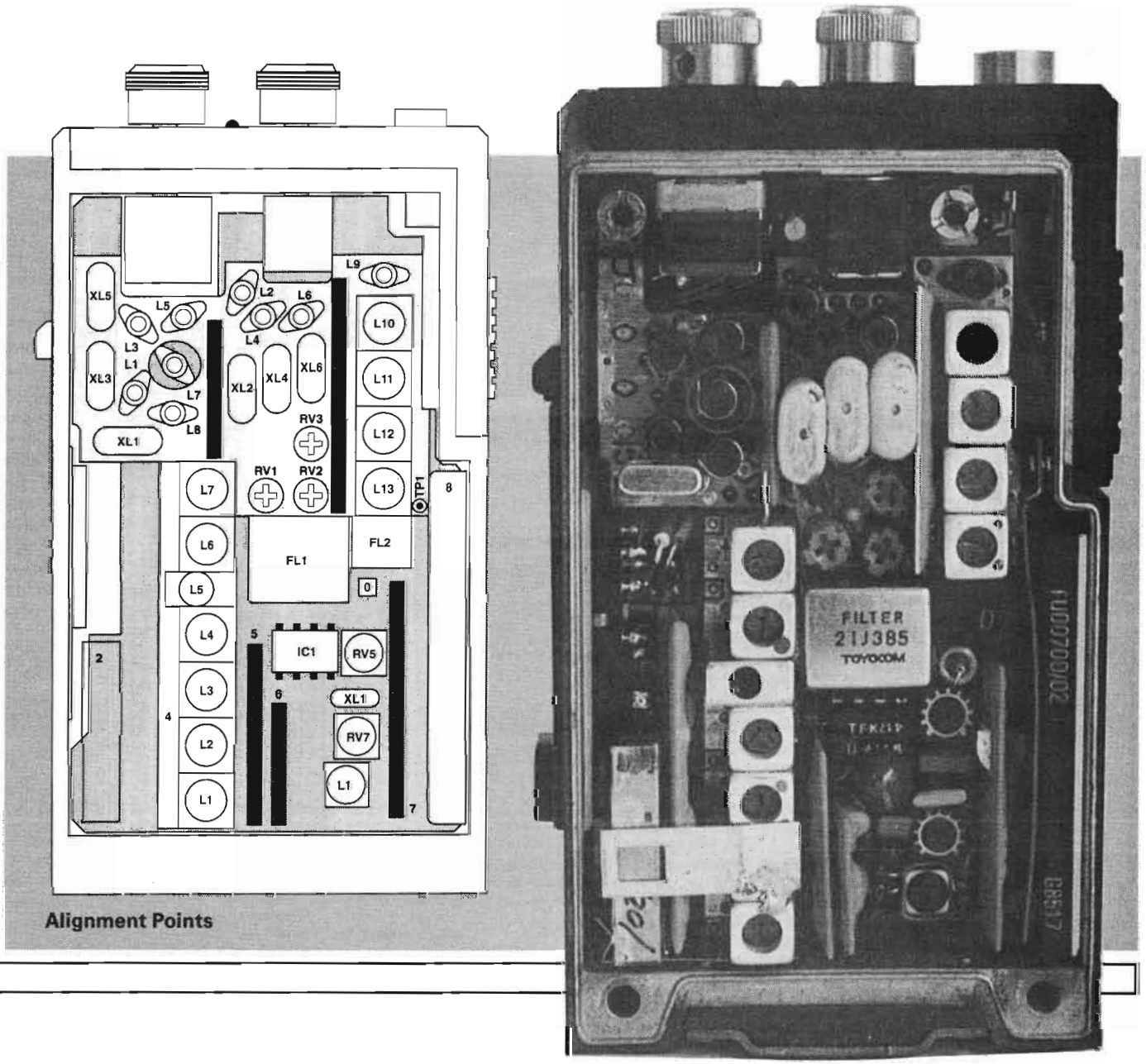
Transmitter Alignment

Four bolts secure the back plate and these must be removed to gain access to align the set. The RF generation unit is a plug- in unit which holds the transmit and receive crystals along with associated circuitry. Starting with the transmit side, the crystals number XL2, XL4 and XL6 corresponding to channels 1, 2 and 3, with their respective tuning coils adjacent. On the opposite side of the crystals are three variable resistors (RV1, RV2 and RV3), their function is to set each respective channels deviation as required.

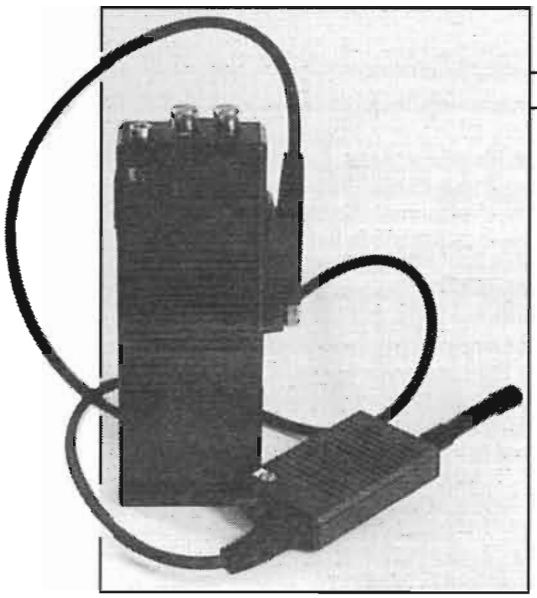
First of all, fit your transmit crystal(s), connect 9.6V DC to the set ensuring an analogue type current meter is in series with the supply, and switch on. Press the PTT, the LED probably won't light but don't worry, and you'll find the current drawn will be in the order of 45mA. Make sure an aerial is attached to the set, or a 50 ohm dummy load/power meter connected to the microphone coax lead.

Starting with the transmit output coils (L9 to L13), carefully adjust each in turn noting the current, and setting each to obtain a maximum reading on the current meter. As the reading passes 400mA the LED will light, showing that the radio is transmitting, a frequency counter if you have one will indicate the set's transmit frequency. Adjustments to the frequency are made by the setting of L2, L4 and L6 respectively for channels 1-3. After each channel in use has been set, re-tune L9 to L13 for a maximum output power indication on your power meter or a field strength meter. If more than one channel is in use then slight adjustments may be needed to ensure that each channel is transmitting the same power.

Moving on to the main board, by varying RV5 the transmit power may be set. If power measuring equipment is available then I recommend a level not exceeding 1.2W for a low power set. Otherwise, set RV5 to give a DC current reading of 700mA, less if the LED will stay on. As mentioned earlier, each channel has its own deviation control, with a little care the deviation levels on each channel can all be equalised. So, without too much bother the transmitter should now be functioning as required.



Alignment Points



Receiver Alignment

Fit your receive crystal(s) to the other part of module 1, with positions XL1, XL3 and XL5 corresponding to channels 1, 2 and 3. Note that coils L1, L3 and L5 are associated with the corresponding crystal number. RV7 is the squelch control, this should be set fully clockwise to open the squelch and thus make adjusting the radio easier. Between the aerial switch and the RF receiver board will be a metal stabilising bracket. Carefully unsolder the bracket and remove it, after which all the tuning slugs will be accessible. Do not lose the bracket, as you'll need to replace it later.

With a strong modulated signal on your wanted receive frequency, adjust that respective crystal tuning coil to obtain an undistorted signal at the speaker. Then, by adjusting the other tuning coils in the order L8, L6, L7, L1, L2, L3, L4 and L5 tune for best sensitivity whilst reducing the level of the signal you're receiving. If you've fitted other channels within the same band, switch to these and adjust the respective crystal trimmer for undistorted reception again, but you shouldn't need to re- adjust the other stages. L1 is the discriminator coil and should not need to be touched, however, it can be set for maximum volume on an on-frequency signal. Returning to RV7, with no signal applied it can now be turned anti-clockwise until the squelch just closes.

Faultfinding

Covering the facility socket, to protect it against the weather and greasy hands, is usually a plastic cover. If the cover is removed it sometimes happens that an RF burn may be felt when transmitting and this is a symptom of the facility socket having a fault in the aerial changeover switch. Whilst in that area, the connections from the aerial switch can become dry joints and here a soldering iron with a long narrow bit will be useful.

Most of the modules are not repairable, they must instead be removed and replaced with new ones, this concept probably contributing to the reliable reputation this radio has obtained. The TX power amplifier is such a module, and one fault I have encountered is that the radio will transmit at the correct level and frequency but there is no indication from the LED. After testing the LED on one occasion I found the fault proved to be in the PA unit, as it is an output pin from the PA that drives the LED and this had failed. To change the PA can be expensive, so perhaps here is a fault that one can ignore?

Another strange fault can occur when fitting a fully charged battery, in that the squelch stays open but the set behaves normally with a used battery. This fault is caused by the IF amplifier and it should be replaced for a more stable one.

The final two modules worth a mention are the regulator and the controller. The regulator is a three pin plug-in device which gives a regulated 7.4V output from the 9.6V battery input. However, the controller which switches voltages during transmit and receive, has four of its ten pins soldered. Again these are a 'replace if fail' job.

That's it, have fun!

PMR Conversions in HRT

Where to find those missed PMR conversions

Many readers contact us each week to ask for details of PMR conversions, and in many cases these have been published in HRT. You asked us for a 'roundup' index, so here it is!

PMR Radio Featured	Appeared in Issue Dated
Pye A200 Amplifier for 2m, 4m and 6m	Apr 1986
A200 'M' band conversion to 2m	Apr 1987
Burndept Ex-Police UHF Portable to 70cm	Dec 1990
Burndept BE448 to 2m	July 1990
Pye Europa MF5/MF25 to 2m and 70cm	Mar 1989
E Band Europa to 4m	Sept 1987
P Band Pye Europa Conversion for 4m	Jan 1991
M Band Pye Europa Conversion for 2m	Aug 1991
VHF Pye Olympics, M202 range including M band, for 2m and 4m	Apr 1991
UHF Pye Olympic, M212 range to 70cm	May 1991
PF2/PF5 Pocketfones to 70cm	Feb 1986
PF2/PF3 Pocketfones to 4m	Sept 1987
Pye PF1 Pocketfones conversion to 70cm	June 1986
MF6AM Reporter to 4m AM	Sept 1987
SR1 Pager to 2m monitor Receiver	June 1987
Pye SSB130 100W HF rig	Jan 1989
Storno CQM 713E conversion to 2m	Mar 1987
VFO for 4m and 6m ex-PMR rigs	Nov 1986
Pye Westminster to 2m and 4m FM	Mar 1986
Pye W15AM and W30AM Westminsters to 4m AM	Sept 1987
Pye Westminster E band conversion to 6m	May 1989
Pye Westminster P band conversion to 4m and 6m	Nov 1990
M Band Westminster to 2m	Mar 1991
W15U Westminster to 70cm	Apr 1986

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NOVICE NOTES

Arthur Gee G2UK discusses the benefits of Morse, and gives helpful hints on 'cracking the code'

Should the Morse test be kept as the *only* means of obtaining a class A licence, or should we, not abolish the code altogether but introduce a alternative route to a class A licence? This is the question which has regularly been cropping up.

I'm old fashioned enough to take the view that Morse code, or 'CW' as it is usually called by the amateur, actually adds an extra dimension to the hobby, it adds an extra language to one's communication ability. When one gets proficient in using it, an extra degree of pleasure is achieved from communicating in this way. As one progresses through the various phases of amateur radio, one increasingly finds how useful a knowledge of the code can be. Those who like communicating with far-off countries may often find it far easier to do so using Morse, DXing is a very popular and interesting phase of the hobby and in many cases it is far easier on CW than on any other mode. The SWL will also find a use for it in deciphering stations using it for identification purposes. Those who like to extend their interest to new and experimental modes may even find that CW is the mode of choice, in fact it is often the only mode that can be used. A typical example is getting started on satellites, here it's far, far, easier on CW than trying to do so on SSB, with the latter's requirement for higher power and/or more elaborate aerial systems.

Get Your Head Down

It's true that learning Morse code does need considerable application, and advancing years do not help the aspiring beginner. There are those who, as with learning a foreign language, find it hard going whilst others pick it up easily. Memory plays a great part and comes more easily to the young - witness their ability with computers.

I had the benefit of learning the code as a member of the RNWAR, a pre-war voluntary organisation known as the Royal Naval Wireless Auxiliary Reserve. Regular weekly attendance at the local navy depot and on-the-air exercises helped greatly to make progress, and one soon felt competent to be able to 'communicate' effectively. Nowadays there are numerous classes to which the beginner can go, many radio clubs arrange Morse classes, so there are plenty of opportunities to get Morse instruction. Maybe a few ideas may be helpful, gleaned from my experience of helping beginners to learn the code.

First of all learn the individual code characteristics thoroughly. It's quite a good idea to try and compose a list of words or phrases which help you remember the characters, these are called mnemonics. The letter 'A' for instance is a dit and a dah. The word 'able' when spoken consists of a short syllable 'a' followed by 'ble' which spoken is longer than the 'a'. 'Able' therefore is a good mnemonic for the letter 'A' in Morse code, and so we can continue through the alphabet. The accompanying table shows a suggested list of words which I drew up to illustrate the idea. Using such an method will very soon get the letters and their code characteristics firmly fixed in your memory.

Mastering the Mode

Once you have mastered the code, you can profitably exercise your memory by noting letters, or groups of letters, as you go around during the day and repeating them to yourself in Morse. You can also write short letters to a friend, who is also learning the code, in Morse. This is quite fun — especially if it is with a friend of the opposite sex! A good source of mixed letters and figures are on passing car number plates, a useful way to spend otherwise wasted time in a traffic jam!

There is plenty of Morse to be heard on the air, such as station identification signs, with all sorts of messages being sent in code. But remember it is illegal to intentionally listen to, and especially repeat or record messages, being sent unless they are amateur transmissions or legitimate broadcasts intended for general reception. Listening on the shipping channels, in countries which allow this (i.e. not the UK) will produce a lot of messages relating to weather or navigational warnings and so on. You'll soon see that Morse is not going out just yet!

So why not have a go this winter at learning the code properly and give yourself the pleasure of acquiring 'another language'.

Letter	Code	Mnemonic Division	Syllable Pronunciation	Syllable
A	.-	ABLE	A/BLE	Short-long
B	-...	BEES	B/E/E/S	Long-short-short-short
C	-.-.	COCA COLA	CO/CO/CO/LA	Long-short-long-short
D	-..	DEE	D/E/E	Long-short-short
E	.	Eh	Eh/.	Short
F	..-.	FANCIFULLY	FAN/CI/FULL/Y	Short-short-long-short
G	--.	GOLD	G/OL/D	Long-long-short
H	....	HI HI	H/I/H/I	Short-short-short-short
I	..	IKE	I/KE	Short-short
J	.---	JOHN	J/O/H/N	Short-long-long-long
K	-.-	KIT	K/I/T	Long-short-long
L	.-..	LEMONADE	LE/MON/A/DE	Short-long-short-short
M	--	MA	M/A	Long-long
N	-.	NOT	NO/T	Long-short
O	---	OWL	O/W/L	Long-long-long
P	.--.	PHOTOS	P/HO/TO/S	Short-long-long-short
Q	--.-	QUEEN	Q/U/EE/N	Long-long-short-long
R	.-.	RAT	R/A/T	Short-long-short
S	...	SEE	S/E/E	Short-short-short
T	-	TAR	/TAR/	Long
U	..-	URN	U/R/N	Short-short-long
V	...-	VITAL	V/I/T/AL	Short-short-short-long
W	.--	WIND	W/IN/D	Short-long-long
X	-..-	XMAS	X/M/A/S	Long-short-short-long
Y	--.-	YOUR	Y/O/U/R	Long-long-short-long
Z	--..	ZONE	Z/O/N/E	Long-long-short-short

AR - 2800 Review

The AR-2800 put through it's paces by our resident reviewer Chris Lorek

If you've seen AOR's AR-950 in the past you'll notice a similarity, as the lightweight but rugged case has been used for the AR-2800. But inside the cabinet, there's rather a difference! This one has wider frequency coverage including HF, an internal nicad battery pack for portable use, and last but not least a switchable BFO (Beat Frequency Oscillator) so you can resolve some of those 'hidden' signals on short wave and the like.

Coverage

The AR-2800 covers a wide frequency range of 500kHz-600MHz and 800MHz-1300MHz, this allows reception of a very wide variety of stations and services which if I listed them all they'd fill the entire magazine several times over! Also, if you have come across an AR1000 scanner or the newer AR-2000 then you'll be familiar with the features of the set (see our AR-1000 review in Scanners International No. 3). Briefly, the scanner has a rotary click-step tuning knob for channel/frequency change in user- selectable steps of 5kHz-995kHz in 5kHz or 12.5kHz increments, 1000 memories in 10 banks of 100 channels each, and 10 programmable frequency search bands, a comprehensive keypad arrangement being used for the scanner's many modes of operation. But as well as having AM, FM and Wide FM reception modes, the AR- 2800 has a switchable BFO to allow reception also of Lower Sideband, Upper Sideband and CW (Morse) signals as well as RTTY etc. Although the scanner may only tune in coarse frequency steps, two fine-tune knobs (one +/-5kHz, the other +/-0.5kHz) are fitted to allow interpolation between the 5kHz steps for accurate SSB reception.

A bar-graph LED S-meter is fitted next to the large LCD panel to show you the relative strength of incoming signals (I've always found this very useful), and a small front panel attenuator switch lets you to reduce the levels of monster HF signals to reduce the possibility of receiver overload. The rear panel of the set is very uncluttered, the only switch there being the 'AF Scan', used to differentiate between scan halt mode on a frequency with either carrier only, or one containing audio as well.

The set is powered from a nominal 13.8V DC supply, a mobile mounting bracket being supplied for use in the car. With the set measuring 150mm x 55mm x 180mm, this should fit beneath most car dashboards easily. For home use, an AC mains adaptor is provided which also charges the internally fitted large nicad, this being very useful when popping the scanner in one's briefcase for use at lunchtimes down at the office! A BNC aerial socket is fitted on the rear panel, and a telescopic whip terminated in an angled BNC plug is also supplied with the set for use when an external aerial isn't available.

The AR-2800 base/mobile scanner

On The Air

As I have already been used to operating the AR-1000 scanner, using the AR-2800 was second nature! However for newcomers a read of the comprehensive instruction book thoroughly reveals all the operating modes and functions. With the scanner coupled to my external discone aerial, I found the receiver to be very sensitive on VHF and UHF, and extremely so on 934MHz. My semi-local 144MHz amateur packet radio station did break through though when I used the receiver on a nearby 145MHz FM (2m amateur band) frequency, also the semi-local fire station transmitters operating just above 146MHz, but switching in the attenuator helped this considerably. 433MHz FM reception was however no problem. Coupling my rooftop log periodic yagi to the set also allowed me to listen into amateurs operating on 50MHz, 144MHz and 432MHz SSB very clearly, an initial tune with the click-step dial being followed by rotation of the 'main shift' and 'fine shift' tuning knobs.

On coupling the scanner to my external wire aerial for short wave reception, the first thing I found was that I certainly needed the attenuator switched in! The 'blasting' from megawatt broadcast stations often made the international broadcast bands and frequencies either side

An uncluttered rear panel

sound like an indecipherable mess. But adding an ATU (Aerial Tuning Unit) in line certainly helped me resolve the weaker stations on adjacent bands. Reception of short and medium wave AM stations was quite satisfactory, although of course not as good as a purpose-made HF communications receiver. Tuning to the amateur bands and switching in the BFO gave adequate reception of SSB and CW when the bands weren't too crowded, although due to the wider-than- optimum filters used on SSB (these really being suitable for AM) some adjacent channel signals tended to come through.

Conclusions

A brief set of laboratory results were taken which confirmed the good sensitivity found on air, the strong signal handling performance of the set being quite acceptable with larger frequency separations. On VHF/UHF the set gave a good account of itself, although I found on HF some form of external selectivity was beneficial for anything apart from casual listening around the bands. It is of course difficult to provide everything from such a versatile set as this, but for the current selling price of £395 you get a good base and mobile VHF/UHF scanner with the added advantage of a switchable BFO, and HF coverage 'thrown in' for good measure.

My thanks go to AOR (UK) for the loan of the review scanner.

LABORATORY RESULTS:

Sensitivity;

Input level in uV pd required to give 12dB SINAD;

Freq MHz	*AM*	*FM*	*WFM*
5	0.95	—	—
10	0.92	—	—
15	0.76	—	—
20	0.57	—	—
25	0.46	0.31	—
50	0.52	0.35	0.98
75	—	0.26	0.76
100	—	0.25	0.73
125	0.31	0.20	—
145	0.31	0.20	—
175	0.42	0.25	—
200	—	0.21	—
300	0.35	0.23	—
435	—	0.28	—
470	—	0.32	—
500	—	0.34	1.09
935	—	0.29	—
1295	—	0.65	—

Adjacent Channel Selectivity;

Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal;

+12.5kHz;	34.5dB
-12.5kHz;	31.5dB
+25kHz;	46.0dB
-25kHz;	45.5dB

All measurements taken at 145MHz FM unless otherwise stated.

Blocking;

Measured as increase over 12dB SINAD level of interfering signal modulated with 400Hz at 1.5kHz deviation to cause 6dB degradation in 12dB SINAD on-channel signal;

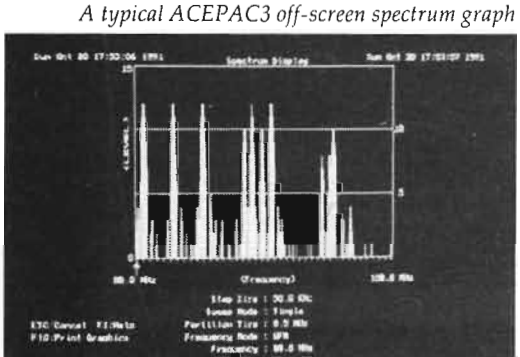
+100kHz;	*56.5dB*
+1MHz;	*75.5dB*
+10MHz;	*97.0dB*

ALEPAC-3 Review

G4HCL extends his horizons with computer-controlled scanning

The AR-3000 is a very powerful scanner with its frequency coverage from 100kHz to 2036MHz, LSB/USB/AM/FM/WFM modes of operation, and a range of memory and scans/search modes. But couple this with the virtually unlimited flexibility of external computer control, and the mind starts to boggle! Well this is just what AOR have done in their ACEPAC3 program which I was recently pleased to test, following the review period AOR certainly had to wrench it back off me due to the fun I was having!

A typical ACEPAC3 off-screen spectrum graph



Features

ACEPAC3 is designed to run on an IBM PC or compatible, and uses the computer's RS-232 port for controlling the AR-3000 using a standard RS232 cable. The program is supplied on both 3.5in and 5.25in disks, and may be run either from one of the supplied disks or from your computer's hard disk.

Virtually all the things you can do via the keypad of the AR-3000 are replicated through computer control, e.g. frequency entry, step size, scanning etc., a large bargraph S-meter is also replicated on-screen. In addition to programming frequencies into various memory banks for scanning, you can also enter a different text comment, such as 'Heathrow Tower' or whatever, for each memory channel. This is displayed on your computer screen alongside the other parameters such as mode, frequency etc. — a very useful memory jogger. By using the memory capabilities of your computer, you may of course program far more 'memory banks', and even transfer these as needed to the AR-3000's internal memory for subsequent field use without a computer.

But that's only the start. An activity 'count' mode is available, where you can set the scanner searching a given bank of memory channels with the program performing a percentage count of the activity on each channel, over whatever period you leave it on for — overnight, all day, or all week, giving a printed report at the end! I'm sure many readers, like myself, can imagine the variety of uses this could be put to — such as for professional applications of testing frequency occupancy for a given set of frequencies. Another feature is that of a 'spectrum analysis' graph, where a single or multiple sweep of a given frequency range is performed with the results of signal level against frequency plotted on-screen — useful in seeing how busy a given band is.

The program is compatible with all types of screen displays, e.g. CGA, EGA etc., although MDA (text only) systems cannot of course display the graphical functions, and you'll also need a printer attached to a parallel port if you'd like to use the 'report' features. At £119 inc. VAT (it'll cost you $279 in the USA) the program I feel would be very useful indeed to AR3000 owners in extending the scanner's versatility enormously. My thanks go to AOR (UK) for the provision of the program and AR-3000 scanner for the review.

AM on FM Only Scanners

Using a cheap and cheerful chip to extract an AM signal from the FM IF strip of scanners by Peter Rouse GU1DKD.

The idea presented here is more by way of an experiment for you to play around with rather than a finished project. However, it does provide some interesting possibilities not only for detecting AM signals from a scanner but also for simultaneous AM/FM coverage.

The idea started when attempts were made to receive AM on the Tandy/Realistic Pro-38 (identical to the Uniden 50XL). The method used can be extended to other scanners using the MC3359 and MC3357 IF chips.

The modifications that follow largely resulted from the discovery that the two FM only scanners in question could easily be modified with a single resistor to cover the air band. Credit here must be given to my friend David Lamb who happened to spot that the dedicated control chips used by the manufacturers on these scanners were identical to the ones used in their more expensive receivers as well. A comparison of circuit diagrams showed that it was simply a question of grounding one pin through a resistor for the key-pad to accept entires in the range 118-138MHz. At first David thought that his discovery was merely academic - there's no point in being able to dial-in the band if you can only receive in FM. I already owned a Pro-38 and so I felt that some further experimentation was in order.

Although both scanners offer excellent value for money the lack of AM restricts their use; air band is not the only band where AM is used in Britain. The modification that follows is cheap and relatively effective but I urge you to carefully read the following notes before attempting it. Suggestions for using the same circuit on other scanners follow at the end of the article.

The Pros, the cons and a steady hand

The good news is that for the outlay of just seven components you can complete this modification and it really does work. However, before you contemplate any work please note that not only is it relatively difficult to carry out the work but there a few minor penalties: The airband section nor the AM detection is very sensitive and the modification does introduce a degree of noise to all but the strongest FM signals. Even so, if you are prepared to live with those penalties then read on.

The high degree of miniaturisation of the circuitry means you will need not only a steady hand but a soldering iron with a fine tip. You should of course note that the modification will invalidate the guarantee.

How it works and how to do it

The modification for airband coverage is the simplest part of the modification but please note that sensitivity is not brilliant and decreases noticeably towards the lower end of the band. Attempts to re-tune the v.h.f. (high band) coils made little difference and so it is best to leave them alone.

AM is resolved by adding a small circuit based on the Ferranti ZN414 circuit. This tiny device looks like a plastic cased transistor but is in fact a 10 transistor circuit for RF amplification, AM detection and a.g.c..

It is fed with a small amount of IF signal taken from the output of the scanner's 455kHz IF filter. Output from this circuit is fed directly to the 'hot' end of the volume control (the squelch circuit will still kill the output).

Naturally, it is not necessary to carry out the air band modification if you just want AM but whilst you have the set opened-up it seems pointless not to to do the work for the sake of a single resistor.

With the six case retaining screws removed, carefully prise apart the plug-in from the ribbon cable that connects the control panel p.c.b. to the main circuit board. The two halves can now be laid flat, side by side. Connect the 10 Ohm resistor as shown between pin 67 and ground. That now allows the key-pad to enter frequencies in the range 118-138MHz.

Glued to the top of the IF IC (MC3359) you will see an electrolytic capacitor. Gently pull it off and bend it to one side. Now connect the ZN414 and its associated components as show. Note that all the components are self supporting and must lie flat on the top of the IC as the electrolytic capacitor will have to go back on top of these components. A short length of hook-up wire is use to connect the output capacitor to the 'hot' end of the volume control on the reverse side of the circuit board.

Before reassembling the scanner you should plug the ribbon cable connector back in and the battery pack and check that all is working. If you have a suitable FM signal source you should also check the setting of the quadrature coil as it may need slight readjustment.

Further thoughts

This same method of achieving AM detection can be applied to other scanners using the MC3359 IC or indeed its predecessor, the MC3357.

Points to watch concern where you take the IF from and where you take the audio output to. Ideally the ZN414 should be preceded by a high impedance FET buffer to avoid the slight loading effect that occurs with the modification described in this article. In the case of the scanners mentioned here the 'hot' end of the volume control is effectively grounded during squelch but this might not be the case with other scanners and so experimentation may be necessary. The best place to try is on the audio output pin of the IF IC. Voltage to the ZN414 should not excede 1.6V and so you may need to adjust the series resistor from the supply line accordingly.

Naturally, this is an area for considerable experimentation. So much so that I must warn that I am not prepared to enter into any correspondence on how any of this can be achieved with individual models.

AM on FM Only Scanners

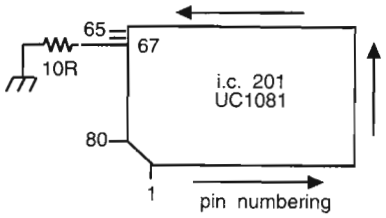


Fig 1: On the Realistic PRO-38 and Uniden BC50XLa 10R resistor between pin 67 and ground will provide air band coverage (118-136 MHz).

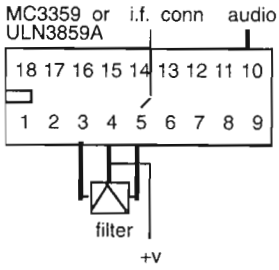


Fig 2: Connections to the IF integrated circuit (MC3359).

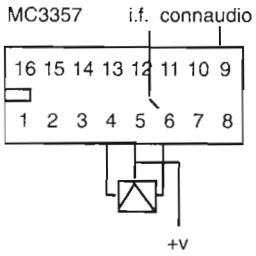


Fig 5: Connecting points for the MC3357 found on some older scanners.

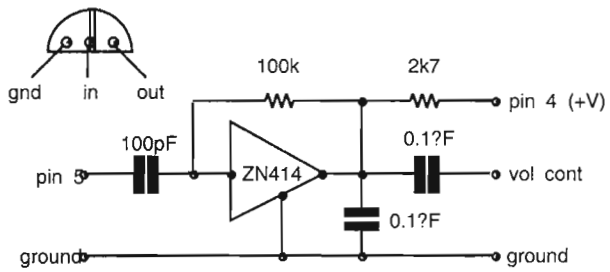


Fig 3: Using the Ferranti ZN414 for AM detection.

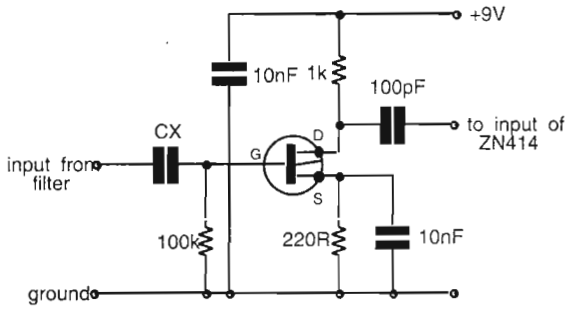


Fig 4: Input buffer amplifier. CX should be selected on test for minimum loading effects (47pF typical). Fet is BF 199 or similar (not critical).

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Metrewave

Jack Hum G5UM, takes his customary look-back at the metrewave scene of the passing year

Amateur radio is a house of many mansions. In one corner of it dwell the DXers dedicated to working rare countries, squares and anything else that offers a challenge to their expertise. Across the other side of the building are the 'talk to my friends down the road' category. To them DX has little attraction, they are well content if a contact pops up on a continental repeater under lift conditions. Between them dwell the major corpus of hams in the United Kingdom, to whom amateur communication means conversation, to the next city or continent in a friendly and relaxed way.

During 1991 a brand new annex was built onto the structure. Its purpose, to accommodate the Novice licensees. Was it the most significant thing to British amateur radio during the year? Or was it a nine-day wonder, likely to evaporate as the youngsters quit the hobby for the lure of other hobby interests, or the magnetism of that captive of the young, the *computer*? Maybe 1992 will indicate whether the Novice initiative goes on to new strength or droops by the wayside.

Every radio amateur who has built equipment by himself, for himself, will declare that one of the magic moments of life was when 'the heap' was tried out on the air for the first time, and to the amazement of all it worked and it talked. In other words, the *hands on* experience. It is expected that Novice licensees will be very *hands on*, the power levels of the equipments they use on the bands they are allocated are so low that not many commercial transceivers are suitable. The answer, home brew, and after a Novice has experienced the enjoyment of do-it-yourself here is a convert to ham radio for the rest of life.

Some of the intending Novices of more mature years have been converts for a long time. They see the Novice Licence as a useful method to extend their electronic horizons. Of all the allocations made available to the Novice, those in the microwave region are the most challenging from the 'made-it-myself' viewpoint (they are to the seasoned microwaver). Most metrewave Novices are likely to see what they can do on the rather 'easier' bands of 70cm and 6m. Indications towards the end of 1991 were that Novices favoured these bands and more especially 70cm where the additional facility of repeaters is available.

To those lured by the computer ethic, a generous allocation in the 50MHz band has been provided specifically for Novices' data operation. What is significant is that the Novice Licence does not embrace the 2m band. One of G5UM's local cynics remarked "just as well too, they won't get into any bad habits!".

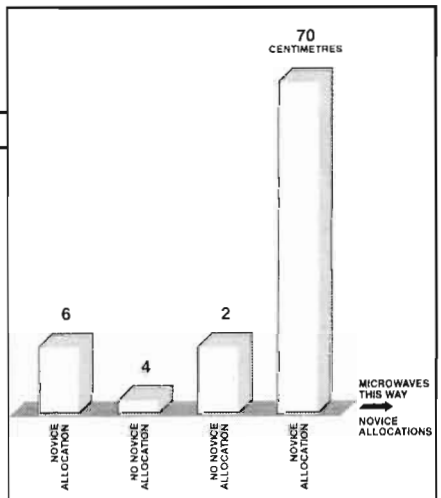
The Repeater Scene

In spite of what is sometimes heard, it must be declared that much of the through-repeater conversation is quick-fire, and mindful of the fact that other users may be waiting. It still remains difficult to persuade some users not to go 'rabbiting on' or to check the input to decide if a direct contact, a *real* QSO, is possible. Very often it is. As for 'rabbiting on' either via a repeater or direct, there must be something about a microphone that promotes garrulity. In normal face to face conversation it is the usual thing to keep sentences short and to the point, and to listen to the other person attentively. Not so when a microphone is in the hand, or in some hands. Resolution for 1992 - don't overstay one's welcome.

Problem Band

Two bands lower down, meaning 'six', problems persist in profusion. The 50-52MHz band has earned the reputation of being the place where nobody wants to talk to you. This reputation stems from the illusion that 'six' is a DX band, which for 80% of the time it isn't. The occasional dramatic openings often made 50.2MHz sound like 14MHz on a busy day. The conversation generated was minimal, and in half a minute your 6m QSO partner in a distant country was itching to work the next UK station in the pile-up that developed on his frequency.

Whoever felt critical of poor operating standards on 'two' needed only to listen on 'six' during one of the 1991 openings. Breaking in on somebody else's QSO to try to catch that elusive bit of DX was all too prevalent. So was the apparent use of more than the permitted power. All of which denied the fact that 'six' is a 'natural' VHF one and not a DX one. Once upon a time it was used for television, which required a line of sight 'plus' coverage, 50MHz provided it. That is its genre today. When this fact of electronic life comes to be more widely recognised, that will be the time when 'six' attracts back to itself the operators who to date have become disillusioned with it.



There's more room on top; of the four most used metrewave bands the 430-440MHz one offers room for all

Two significant developments during 1991 suggested that even now there is hope for 'six'. One already mentioned is the availability to the Novice, 140kHz of the band in the lower MHz for data use, and no less than 500kHz in the upper MHz for voice. The other ray of hope is provided by the increasing use of FM, and, thanks to the long awaited permission to use vertical aerials, to go mobile (at last).

Upstaged

In the opinion of many metrewave persons, vertically on 'six' should have been allowed a long time before it happened in the spring of 1991. By then 'four' had upstaged it, no wonder it had a four year lead.

In mid 1987 when 4m and 6m were made available to B licensees there was a surge of interest on 70MHz. The aerials were smaller than those required for 'six'. The gear was cheaper, no Japboxes were to be had. What *was* to be had at knockout prices was a profusion of ex-PMR transceivers which could be made to give excellent service on 'four'. This has brought about radical change in the character of the band.

In early AM/CW days, the favoured calling frequency was 70.26MHz. Today when most of the traffic on 'four' uses FM the calling frequency has become established as 70.45MHz. Yet even on 'four' one particular problem arose during 1991, people hogging 70.45MHz and yes, rabbiting on unduly, as some operators in the less populous parts of the UK possibly believed that only one channel was needed, and that 70.45MHz would suffice. In practice it won't, you never know who may be listening in an attempt to generate a QSO, often those who are listening become increasingly frustrated by the hoggers of the calling frequency.

The swing to FM in the 4m band parallells what has happened on 2m (and

with luck might happen on 6m), a division into local conversation at the top end and multimode DX at the bottom.

The Same Trend on 'Seventy'

What of 'seventies' as many people seem to call the 433MHz area? To many operators this is the most fascinating and rewarding of any band in the metrewave spectrum. Why? First of all, because there is so much of it, ten gorgeous MHz, five times that available on 'two' or 'six'. The 'spread-out-a-bit' tactic was increasingly developed during 1991, and phone nets were established in the more remote parts of this usefully wide band. Because it is so wide there is plenty of room to accommodate specialist forms of amateur communications such as moonbounce, television, and of course the ubiquitous packet.

Now secondly, 'Seventy' demonstrates on occasion intriguing characteristics of penetrability, of 'going where the others can't get', caused no doubt by the phenomenon of multi-order reflections in a band where the quarter wavelengths are close to one another. Thirdly, there are three times as many repeaters to enjoy on 70cm than there are on 145MHz, to enhance mobile communication. Fourthly, aerials for the 70cm band are almost invisible which helps to make them neighbourhood friendly, but not too invisible.

Final-Final

Altogether it has been an eventful metrewave year, but then most of them are, yet 1991 has been specially significant for the creation of that brand new body of British hams, the Novices. The younger among them will be looking during 1992 for help and example from their elders. For in a few years time they will have become the elders and in turn will be offering assistance and advice to the Novices of their day. Handing on the torch, if you like.

What of the brand new 1992? It will be a year to remember in one special context, it will be the twentieth year of the inauguration of the UK repeater chain, started all those years ago with the GB3PI experiment and now representing the biggest collective technical exercise in British amateur radio. If anything was 'hands on' this was it. There ought in 1992 to be some kind of recognition (celebration?) of the enthusiasm of the repeater groups for their work in building and continuing to develop Britain's repeater chain to its current level of efficiency and service to all who wish to use it. If you don't like repeaters, as some operators state they don't, it is always possible to go away and do something else. Amateur radio is like that, there is never any shortage of 'things to do' as 1991 amply demonstrated. Be assured the same will be said of 1992.

Identifying the Metrewave Novices

2E1 + 3 = Novice stations in England
2M1 + 3 = Novice stations in Scotland
2W1 + 3 = Novice stations in Wales
2I1 + 3 = Novice stations in Northern Island
2D1 + 3 = Novice stations in the Isle of Man
2U1 + 3 = Novice stations in Guernsey
2J1 + 3 = Novice stations in Jersey

All the above are equivalent to the Amateur Licence B. The equivalent to the Amateur Licence A is as above except that the numeral is 0 in place of 1.

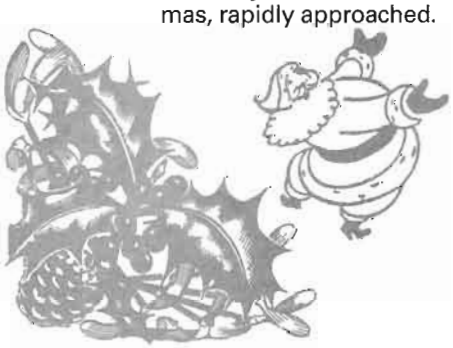
The Young Novice's Rig

Our Traditional Christmas Chiller

Simon, now in his final year at school, had always been a bright lad where electronics was involved. It started with his parents buying him one of the popular 'Electronics Constructor Kits' several years ago, with which he built his first short wave receiver. The acquisition of a multi-band portable radio came next, on which he quickly found the HF and 2m amateur bands, spending many enjoyable evenings listening into local amateur ragchews. Being a member of his local scout group, his involvement with last year's 'Jamboree on the Air' station finally fired his enthusiasm, and during this year's school summer holidays he decided he'd like to go in for the new Novice Licence which the Radiocommunications Agency had launched at the beginning of the year.

Even though he lived on the outskirts of a large city, he couldn't at first find any local Novice courses running at all, the nearest being over 20 miles away. But to his joy, no less than a couple of weeks later he heard that his school's Craft and Design Technology teacher was, with the help of two local radio amateurs, about to start a school Novice course at the beginning of the autumn term. That summer he persuaded his parents to take him along to a couple of radio rallies, which raised his enthusiasm even more, and Simon couldn't wait until the day he'd be able to have his first QSO.

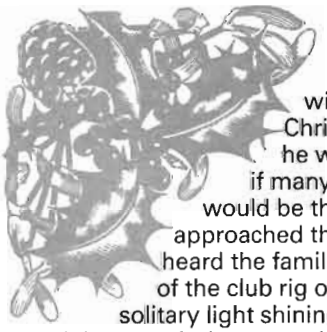
Together with a handful of other pupils from the school, and another teacher who'd also decided to 'have a go', he started the course with anticipation. Most of it he found very straightforward, and the great 'day' of the City and Guilds Novice Exam, just after Christmas, rapidly approached.



By this time, he'd started visiting his local amateur radio club, who to his surprise used one of the side rooms in the Scout HQ as their clubhouse and 'shack' for their weekly meetings. It had always been kept locked during scout meetings, and Simon had thought that the aerials at the rear of the Scout HQ were there just for the annual Jamboree on the Air. The radio club had regular 'evenings on the air', and Simon was sometimes allowed to pass a greetings message to other amateurs when the club used it's 'GX' prefix. He'd always stay until the end, sometimes being one of the last members to leave, as there would nearly always be a kind soul there who'd try to answer the many questions he asked. He found new faces to talk to at nearly every meeting, although as Christmas approached the numbers became less and less, no doubt due to late-night shopping trips and other family activities diverting the 'regulars'.

As Simon wasn't able to afford a Japanese 'black box' transceiver, one of the club members had given him an ex-PMR Pye Europa, which had come out of service from his firm's delivery lorry when they upgraded their UHF two-way radio system. Simon had ordered the two pairs of crystals needed, one pair for his local repeater so he could chat to the club members, the other for the packet channel the local node operator had put on the air in the Novice segment, linked as a Novice 'gateway' to other stations operating on 70cm, 2m and 4m.

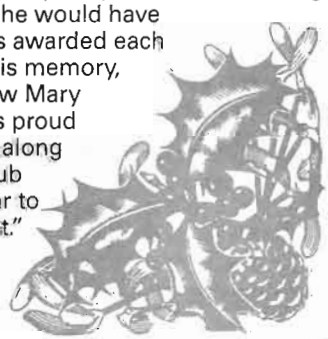
Simon didn't have any test equipment, so one evening decided he'd take his newly-crystalled set along to the club to see if any of the members could help him tune it up, the club shack having a multimeter, soldering iron, RF power meter, even a frequency counter and a 50ohm dummy load. It was the week before Christmas, and there were only a couple of club members in that night, Bill and Charles, having a chat about the 'good old days' of radio in the 1930s. Although they were happy to offer help, the two gents who had been brought up on valves couldn't help Simon a great deal, although they did manage to get the early stages of the set tuned up. As Simon hadn't yet sat his exam, yet alone possessed his Novice licence, he was reluctant to try tuning it up at home into an aerial. Bill suggested that maybe at the next meeting a few more members would be along, so later that night Simon went home sadly clutching his set. He knew his father, who had just been made redundant from work, wouldn't be able to buy him a nice shiny set for a Christmas present even though he would have treasured such a gift. On the same night next week, a hopeful Simon went



back to the club, although with it being Christmas Eve he was unsure if many amateurs would be there. As he approached the door, he heard the familiar sounds of the club rig on the air, a solitary light shining from the club room. As he entered, a friendly 'Hello Simon' greeted him, even though the amateur by the rig was in mid- QSO. After an exchange of '73 and Merry Christmas' on the air, the chap introduced himself as Ken, one of the club's oldest members, as Simon hadn't met him before. Ken said he'd heard of Simon from the other club members, but his advancing years made his getting to the club more difficult each week. Seeing Simon's rig under his arm, Ken asked if he'd like it tested on the air, a dismayed Simon replying that he certainly would, if he could find someone to tune it up for him.

Much to Simon's surprise, Ken asked him to put the set on the shack workbench and remove the lids. After taking a look inside, Ken suggested Simon switched the bench soldering iron on, and asked him to reach for the club's copy of the 'Surplus 2-Way Radio Conversion Handbook' from the bookshelf. Ken explained to Simon that a couple of audio links needed to be made in the set, and with a bit of guidance Simon had this done in a couple of minutes. After a few tuning operations, aided by Ken's step-by- step advice, Simon had a working rig, the look on his face being a sight to behold. A call on the local UHF repeater using the set unfortunately didn't gain a reply, but it was reasoned that many amateurs would probably have been with their families that night rather than on the air. After chatting for a short while, Simon was conscious he'd had instructions from his parents to get home early that night, so after having thanked Ken for his help he started getting ready to leave. As Simon left, Ken suggested that although he may not be able to make it to the club for a while, perhaps Simon would give him a call on the local repeater using his new 2E callsign, for they both knew it would be *when*, not *if*. Simon readily agreed, and after having thanked him again he set off for home.

At the next club meeting, Simon returned proud as a peacock with his newly-operational rig, hoping some kind member at the club would try the set out again on air. This time, success, the rig worked fine, with excellent transmit audio, and Simon was thrilled to pass a greetings message using his very own transceiver for the first time. Later on whilst the other club members were talking about the latest handhelds and accessories their partners had bought them, Simon asked Charles, who he knew had been one of the founder members of the club, about Ken. "Ah, Ken" he said, "very helpful chap, you know he had a son just like you, mad keen on radio, would have done anything to have got him on the air as well". "Why didn't he?" Simon asked. "Lad went off and emigrated," Tom replied, "took a job abroad and hardly saw his father at all". "That's a pity" replied Simon, "I'd have liked to have met him.". "Never mind" said Tom, "but Ken was always a helpful sort of chap, in fact you see that cup up there, awarded by the club for the amateur who best promoted amateur radio in the last year". "Yes" replied Simon inquisitively, "did Ken win it?". "No, unfortunately" replied Tom "although I'm sure he would have done. It's awarded each year in his memory, his widow Mary is always proud to come along to the club each year to present it."



From My Notebook

Geoff Arnold G3GSR discusses how to measure frequency

Back in the August issue, I was talking about different ways of quoting frequency accuracy, and I promised to look at how we go about measuring frequency. No matter what method we may use, what we are doing in every case is comparing a test signal (the unknown) with a standard. That standard is usually a stable oscillator of known frequency, but there are exceptions.

Absorption Wavemeters

The simplest instrument for measuring frequency is something called an *absorption wavemeter.* This is simply a variable LC tuned circuit, with some form of indicator coupled to it such as a neon or filament lamp or a meter.

The standard in this case is the inductor-plus-variable capacitor combination and the calibrated dial fixed to the capacitor. When a test signal is coupled into the wavemeter LC circuit (the inductor is usually arranged to stick out the end of the wavemeter case to make this possible), an RF voltage is developed across it. The indicator shows how large that voltage is, by how brightly it glows or how far the meter needle deflects. Adjusting the wavemeter dial to bring the LC circuit into resonance with the test signal will increase that indication to a maximum, and then you simply read off the frequency of the unknown signal from the dial.

The absorption wavemeter is not very accurate, for two reasons. First, it requires a substantial amount of RF power to be coupled from the test signal source into its tuned circuit to operate the indicator. If that source is simply an oscillator without any buffer amplifier on its output, the simple act of bringing the wavemeter tuned circuit close to it is likely to change its frequency. Secondly, the Q of the wavemeter tuned circuit will not be very high, so the peak indication as the dial is swung through resonance will be quite broad.

The absorption wavemeter is not very accurate, but it is cheap. It offers one other major advantage apart from its cheapness, and I shall come back to that later.

Heterodyne Wavemeters

Somewhat more complicated, but still in the realm of analogue methods of measurement, is the heterodyne wavemeter. In its simplest form, the heterodyne wavemeter is very much like an absorption wavemeter with the indicator replaced by an amplifier, connected so that the tuned circuit plus amplifier forms an RF oscillator. You still need some sort of indication of when the wavemeter tuned circuit is in resonance with the incoming test signal, of course. This is done by monitoring the 'beat' between the test signal and the wavemeter oscillator as the two are brought close in frequency.

I'm sure that you will have heard the heterodyne beat as a communications receiver, with its BFO or carrier insertion oscillator switched on, is tuned past a transmitter emitting a carrier. As you approach the transmitter frequency, the beat note, due to the frequency difference, starts off high in pitch and falls lower and lower as the two signals approach the same frequency, then increases again as movement of the receiver tuning control continues.

When the receiver frequency and the transmitter frequency are exactly equal, the beat note falls to zero. The heterodyne wavemeter uses a simple detector to extract the audio component from the beating of the two RF signals, and some wavemeters are fitted with centre-zero meters whose needles can follow the slow oscillations at very low audio frequencies, actually becoming stationary at zero beat.

The heterodyne wavemeter requires no power from the test signal and will not therefore disturb its natural operating frequency. The ultimate accuracy of a heterodyne wavemeter depends on the quality of the tuning capacitor and dial mechanism, the stability of the tuned circuit, and the care taken in calibration. A good quality instrument will incorporate a crystal-controlled oscillator and harmonic generator which can be used to make checks of the dial calibration, perhaps every 100kHz, and a small mechanical or electrical trimmer which can be adjusted to correct the dial calibration at the check-point nearest to the test-signal frequency.

In this way, the heterodyne wavemeter virtually transfers the accuracy of the crystal oscillator to the test measurement, as it is required only to interpolate between check-points. Its ultimate accuracy depends, indirectly, on the crystal, which can have a tolerance of just a few hertz at its basic frequency.

Digital Frequency Meters

Digital frequency meters (DFMs), or frequency counters as they are sometimes called, depend directly on an internal crystal for their accuracy. That crystal, which is very accurate even in quite inexpensive DFMs, will normally operate at 1MHz or 10MHz. The output of the oscillator controlled by the crystal is fed to frequency divider and squaring circuits to produce a 'clock' signal consisting of rectangular pulses lasting typically 10 milliseconds (0.01s), or 0.1, 1 or 10 seconds depending on the setting of the resolution/range switch.

The clock signal is used to control a gate or switch which is connected in line from the DFM input socket to its digital counting and display circuitry. When the gate is opened for the period of the pulse, the test signal passes to the counter. If, for example the gate pulse was one second long, and the test signal was on 3.51MHz, 3,510,000 cycles would be passed to the counter and the display could show 3510000 or 3.510000 directly, depending on the display format chosen by the designer.

That assumes that you have an 8-digit counter. DFMs with fewer digits will 'chop off' the last few figures, and perhaps display just 3.510 with a 'MHz' indicator at the end.

After each measurement, the counter circuits are reset, another clock pulse opens the gate for a second, and the display is updated at the end of the measurement. In early DFMs, the display used to reset to zero and then follow the counting process with digits flashing past the eyes in mind-blowing fashion, steadying at the end of each count. Now, thank goodness, DFMs incorporate latch circuits which hold the display steady whilst each new count goes on.

Beware, though, for that steady readout can create a false impression. What the display is telling you in the above example is not actually that the test signal is steady on 3.510000MHz but that, over a period of one second, it averaged that frequency. If the test signal is completely stable, that is of course the same thing, but if is changing, either due to drift or because the source of the test signal is being retuned, it is not the same thing!

With a gate-time of 100ms (0.1 seconds), you get an update on the frequency of the test signal roughly ten times a second instead of only once a second, but at the expense of resolution and accuracy. The counter will only receive one-tenth of the number of cycles that it would with a one second gate time, but the decimal point on the display is shifted one place to the right, multiplying the result of the count by ten. The effective resolution of the instrument has therefore been reduced by a factor of ten, so that it indicates tens of hertz instead of units of hertz.

To check whether the test signal is suffering from severe short-term drift, or when you want to use the DFM in adjusting a variable oscillator to a new frequency, it is better to use a shorter gate-time.

Accuracy and Resolution

A basic DFM operating with a one second gate time has a resolution of 1Hz. Its accuracy, on the other hand, will depend on how closely the internal crystal was set the last time the instrument was calibrated, and its subsequent stability, both long-term and short-term. As with all measuring instruments, from the humble school ruler upwards, initial calibration is done against some other standard, which in turn is checked and adjusted against another standard, and so on, back to national and international standards.

Accuracy and resolution are not the same thing. You may have a wrist-watch which you can read to the nearest second, but if it's a couple of minutes fast that fact is unimportant, except when you use it to measure time intervals — relative time as distinct from absolute time, for example for how long it takes you to walk to the station.

Uncertainty

As mentioned before, the crystal used in the DFM clock generator will normally be very accurate. However, that's not the only factor which affects the ultimate accuracy of a DFM, or any other instrument which uses digital counting techniques.

The test signal which we want to measure will generally not have a rectangular waveform, with a clean, fast rise and fall to it. It will more often be a sine wave, maybe even a modulated sine wave. To provide an input with sharp transitions for the counting circuit, that waveform will be passed through a Schmitt trigger circuit, which changes state very rapidly when a certain level is reached in each cycle. The counter then has to respond to well-defined events — fast positive-going or negative-going transitions, rather than slowly varying signals of indefinite waveform.

Because the clock signal and the test signal are not synchronised or time-related in any way, the gate can open at any time during a cycle of the test signal. The result of this random phasing between the two signals is that even if an absolutely constant frequency test signal is being monitored, the number of cycles counted may vary up or down by one in successive measurements.

This means that the last (i.e. right-hand) or least significant digit of the DFM display will be constantly changing up and down by one, no matter how steady the test-signal frequency. In the maker's specification for a digital instrument, you will always see that the accuracy is quoted as a percentage, or a tolerance in parts per million, or whatever, but plus or minus 1 digit. This is sometimes referred to as the uncertainty of the measurement.

Whether this uncertainty is significant depends on the frequency being measured. One hertz at 21MHz is quite unimportant, and in any case will be totally swamped by the inaccuracy of the crystal oscillator. One hertz at low audio or power-line frequencies is a different matter.

You could use a 10 second gate time, giving a resolution and final digit weight of 0.1Hz, but you have to wait an awful long time for each measurement update, and you have no idea how much the test signal changed or drifted during the 10 seconds.

A better solution for very low frequency measurements is to use a what is known as a timer, rather than a counter — some instruments can perform both functions. In a digital timer, the inputs to the gate are transposed, so that the test signal is used to open and close the gate, and the counter counts cycles of the internal crystal oscillator. Depending on how low the frequency to be measured is, the gate is opened either for one cycle (called period measurement) or for a number of cycles, normally a multiple of ten. In the latter case, the resulting count is divided by a factor equal to that number of cycles before being displayed. This is called period average measurement.

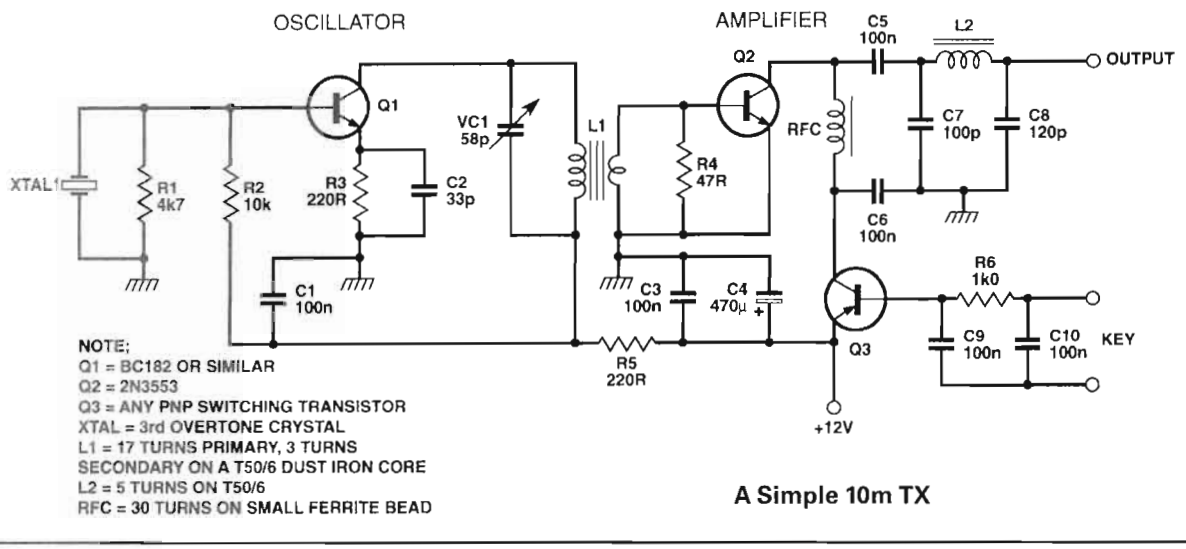
If a 1MHz crystal oscillator is used, the counter circuit will receive a stream of transitions at intervals of one microsecond (the period of a 1MHz signal is 1 microsecond). An uncertainty of a microsecond in the measurement of, say, a 50Hz mains frequency signal with a period of 20 milliseconds can be ignored. On the simplest timers, you have to do a little maths to convert the period displayed into frequency — a simple reciprocal calculation. More sophisticated timers have a calculator circuit built-in to convert the reading to frequency before displaying it.

Dealing with Harmonics

If you have a test signal with heavy modulation or lots of harmonic content, a DFM will be frantically trying to count all the transitions it sees, and the display will be a constantly changing nonsense. For the same reason, you can't use a DFM to measure the output frequency of an SSB transmitter unless you modulate it with a single steady audio tone, not forgetting to add or subtract the tone frequency from the reading you obtain, depending upon whether it's lower sideband or upper sideband modulation.

A heterodyne wavemeter will deal fairly happily with modulation on the test signal carrier, although it may make it more difficult to decide exactly where zero beat comes. Heavy harmonic content is another matter, and its very easy to get misled into measuring a harmonic rather than the fundamental, especially if you're trying to set up a frequency multiplier chain in a VHF transmitter, for example.

This is where the cheap and cheerful absorption wavemeter scores, simply because it needs a significant amount of test signal power to make it work, and relies for its operation on indicating the amount of power it's receiving. So, for checking for the avoidance of excessive harmonic radiation, the absorption wavemeter is the thing to go for, even if you have a DFM for accurate measurements of frequency.



A Simple 10m TX

QRP CORNER

Dick Pascoe G0BPS gives advice on QRP rigs and a circuit for a 10m TX

As you read this, the QRP Winter Sports will be in full swing, and soon it will be time to make those New Year Resolutions. One of my resolutions each year is to spend just a little more time on the bands, QRP of course, with my trusty Argonaut 515 taking pride of place in the centre of the operating position.

I am asked many times by those who wish to 'go QRP', *which is the best radio to get?*. This question is much the same as asking a salesman *what car shall I buy?* It all comes down to; *a)* What can you afford? *b)* What performance you require? and *c)* Do you buy or build?

Build or Buy

If you prefer to build your own, there are many kit manufacturers who will be only too pleased to send you their lists, scan the adverts! If you prefer to build, but not from a kit, then a fair knowledge of construction is assumed. Here the G-QRP club magazine *SPRAT* can be of help. Recent issues have included a series of articles by members on an all band, all mode HF transceiver. PCBs are available but it is not recommended for the beginner. Other projects more suited for the beginner are also available, famous ones include the 'OXO' and the 'ONER' transmitters. Designs for receivers are also available, perhaps the best known recently being the *Sudden* designed by the club Secretary the Rev. George Dobbs G3RJV.

Commercial QRP Rigs

Commercial rigs abound, but not many are specifically for the QRP enthusiast. Most of the 'big name' radios have a facility to reduce the output power, but in most cases this will only reduce the power down to 10 watts or so. Much too high for QRP CW. Modifications may be made to these radios, but this is not always easy.

Until recently, the best known commercially available QRP rig was the well known Heathkit series of the HW7, HW8 and the latest HW9. It was very sad to hear that they had ceased production. Expect to pay about £50 for the HW7, about £90 for the HW8 and £200 or more for the HW9, these prices are for very clean unmodified examples and do not include any extras such as power supply, SWR meter or ATU.

Another popular radio is the Ten-Tec *Argosy*, two models are found these being the *I* and *II*. Both of these radios have the facility of high power (50 watts) and low power (5 watts), these levels being controlled by a switch on the back of the radio. A drive control on the front panel permits total control of the output power in the range selected. In the low range, just a few milliwatts may be used to advantage. Expect to pay about £180-£250 for the *I* and £400-£450 for the *II*, again in clean condition.

The *Argonaut*, both the 509 and the 515 models, are very difficult to locate secondhand, they both had a limited production run and thus not many found their way into the UK. The 509 will fetch whatever the seller thinks the buyer will part with, and the 515, should you spot one, will probably be in the region of £300.

You also may spot a *Century 21* or *22*, their performance in my opinion is limited as what appears to be a superhet receiver is in reality a double direct conversion.

Oriental Offerings

The selection from the Far East includes the now elderly *FT7* (cheek — I had great fun with one of these — Tech Ed) and the *FT7B* as well as the Kenwood *TS120S (and one of these as well! - Tech Ed)*. The FT7 and the TS120S are both nominally 10 watt rigs, but on the FT7 it is awkward to reduce the power level, as this is done by inserting a trimmer tool into a hole in the rear panel and turning a pre-set (but see a future HRT on how to bring this control to the front panel). A very clean FT7 sells for as little as £200, the FT7B will cost about £50-£100 more depending on its condition.

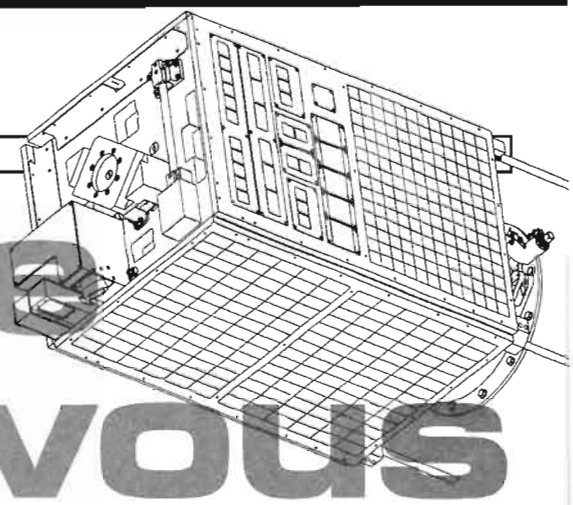
If you are considering buying a rig solely for QRP use, as in all other cases *do* check fully before parting with your money, and if possible get a guarantee. The prices quoted are for clean, used equipment, as seen at a variety of rallies over the past year or so.

Novice 10m Frequency

I've been asked several times about Novice activity on the 10m band. The G-QRP Club has agreed to use 28.360MHz (in the Novice allocation) for the centre of SSB activity, so hopefully this will generate some interest.

The circuit here shows another simple crystal controlled transmitter, with values given for the 10m band. Output will be only 100mW or so, so enjoy it! A VFO can be used in place of the crystal and, of course the crystal may be 'pulled' a few kHz if needed by use of the variable capacitor.

That's it for this month, comments and ideas to me via. HRT editorial at P.O. Box 73, Eastleigh, Hants SO5 5WG, or packet via GB3SEK, or to 3 Limes Road, Folkestone. 72s to all.



Satellite Rendezvous

Richard Limebear G3RWL with the latest Amsat-UK news on the Oscars

UoSat-5 Oscar-22

As I write this a couple of months after the satellite's launch, UO-22 continues to operate nominally with the CCD camera providing outstanding images of the Earth. The Earth images, stored by the camera as bitmaps, are transmitted by UO-22 using the PACSAT Broadcast Protocol. Although the files are over 300 kbytes long, the efficiency of the Broadcast Protocol means that a complete error-free image can usually be downloaded in one moderately high pass.

Two mechanisms for displaying the CCD files have evolved. Many users convert the CCD bitmaps into the standard 'Graphics Interchange Format' (.GIF), and then use .GIF viewing software to look at the result. Public domain and shareware GIF viewers are available for most popular types of personal computers, and several have been posted to the UO-14 BBS for downloading.

Because there are so many video cards and so many computers to support, UoS is not planning to provide raw CCD file display software. They will supply algorithms to aid the .GIF conversion process, and, of course, will keep us abreast of any changes to the raw file format.

The latest modifications to the CCD camera support software add a 256-byte header to each raw CCD file. This header tells you when the image was taken, the image sequence number, and the CCD exposure settings. To get full details of the latest format, check the UO-14 BBS or the broadcast downlink on UO-22.

Oscar 13

The current transponder schedule of this is;

Mode-B : MA 000 to MA 095 — until Dec 18
Mode-JL : MA 095 to MA 125 — S/C attitude: ALON/ALAT 181/0
Mode-LS : MA 125 to MA 130 — S beacon
Mode-S : MA 130 to MA 140 — S transponder. Mode B is off.
Mode-B : MA 140 to MA 256 — Perigee eclipses, Min 10, typ
Omnis : MA 230 to MA 030 — 29, max 60 mins until end 1991.

Please **do not** uplink anything on mode-B between MA 130-140. Although you can hear the B beacon, the transponder is *off*. Mode- S transponder is however *on*, and spurious B uplink signals severely disrupt the mode-S users.

Up-to-date details of operations from the AO-13 controllers, are always available on Oscar-13's PSK, RTTY and CW bulletins. RTTY is at UTC xx15-xx20, xx45-xx50 and CW is on xx00-xx05 and xx30-xx35. The frequencies of these are 145.812MHz and 435.656MHz, plus or minus Doppler shift of course.

The re-orientation to Alat/Alon 180/20 was completed on Aug 15 and the transponder schedule changed to continuous mode-B. This attitude gave a Sun angle of 31 degrees, resulting in an effective illumination of 86% but with the satellite aerials pointing 20 degrees out of the orbit plane, 'squint' or 'pointing' angles were very poor. Jim G3RUH then reduced the attitude latitude, 2 degrees at a time, to see what happened to the battery state, and ended up with 73% illumination (the worst value at which they have ever operated AO-13) but WOD tests showed that the battery remained adequately charged (just) during the heaviest usage at a weekend.

The implication of this test is that during future attitude changes over the next two years they now know that out-of-plane ALAT values can be restricted to about +10 degrees instead of the +25 degrees which had be feared, and this will ensure continuous service on mode-B at those times.

There has been some discussion recently about the usefulness of mode-L, basically that too much time is devoted to a transponder used too little by too few. The command stations would welcome constructive comments about this. Suggestions as to alternative ways of structuring the schedule would be welcomed but we you to remember the following constraints:

1) Modes L and S are only useful when the squint angle is less than 20 degrees.
2) Mode S transponder is only *on* when mode-B is selected, and works FAR better if mode-B's passband is *off* (no transponder).
3) Mode S beacon only when L is *on* and J is *off*.
4) Mode J can only be ON when mode L is *on*.

When all the feedback is in, hopefully by Christmas, the suggestions will be assessed and we'll see how best to reconfigure the flight software to accommodate them where possible. Please send your comments on packet to either James G3RUH @ GB7DDX, Peter DB2OS @ DK0MAV and UO-14/FO-20, or Graham VK5AGR @ VK5WI. The response at the time of writing has been underwhelming!

ZRO Tests Continue

The ZRO Memorial Technical Achievement Award Programme, or just 'ZRO Test' are continuing this month on AMSAT-OSCAR-13. This activity is a test of operating skill and equipment performance. The following schedule of Mode B and JL tests were chosen for convenient operating times and favourable squint angles into the USA but can all be heard over here, albeit with squint angles over 20 degrees. On December 8, the B tests run by WA5ZIB can be heard at 0500 UTC on 145.840 MHz and the JL test run by N5EM at 0600 UST can be heard on 435.945 MHz.

Listener reports with date of test and numbers copied should be sent to WA5ZIB via Amsat-UK. Reports will be returned verifying the level of accurate reception.

Oscar 10

This satellite is currently available for Mode B operation when it is view, but *please do not* attempt to use it if you hear the beacon or the transponder signals FMing.

Russian Satellites

Until the establishment of a new government for the renewed Union, all new budgeting decisions are forbidden but the organisations so far heading Soviet spaceflight will continue their work. Operations based on international agreements go on, so the preparations for the tenth expedition and the Austrian and Kazakh missions continue.

The Soviet Union has announced a change in mission/crew plans for the rest of this year that may be of interest to Amateurs. As many are aware, the current crew consists of Anatoli Artsebarski and Sergei Krikalev (U5MIR). Sergei has been active and was supposed to return in October. However, recent reports said that the Soyuz TM14 mission has been cancelled and the crew for Soyuz TM13 has been changed. The result is that Sergei will instead be joined by his old mission commander, Alexander Volkov (U4MIR), and Sergei will be staying on for another 6 months for a total time in orbit of approximately one year.

MicroSats

AO-16 is now running the same level of software that is on UO-22, which is that same as was on UO-14 plus some bug fixes. Visible and not so visible changes in the software are as follows:

In file broadcast only one file per user is allowed in the broadcast queue. If you request a second file while you have another file in the queue, the first one is replaced. Files are removed from the queue after 10 minutes to avoid having large files still in the queue after LOS. A queue status message is sent every 10 seconds to let you know if your file is still on the queue, and when you might expect to see your frames. If a command station has marked a file for permanent broadcast, the file number followed by "L" is displayed. The left-most call has frames sending, the next call will be next etc. Each call gets 10 seconds. The hole fill command is now implemented so if some frames are missing, use the Fill command rather than using the Begin command a second time.

Error messages; *NO-2* means the file does not exist, and *NO-1* means that the BBS is shut or the broadcast queue is full, ten files can be on the queue at one time.

The file system wash has changed. Previously, only the in- use file blocks got washed. Now, all file blocks will be washed. A side effect of this is that it will not (and has not) been valid to plot SEU's vs sub-satellite point since it can take up to four hours to get to a particular block. The name of the error log is now ELTLOG instead of ELTLOGXX and the internal error functions have been altered.

Satellite Gateways?

The Satellite Manager of the DARC has been in touch to ask people's opinions and comments about a possible future development which is presently emerging in Germany. They are talking about 'Unattended Gateways via UO-14 and other OSCARs'. Packet satellite operators will already have heard of these, so please will they give input on this. Send comments to Norbert at 'DF5DP @ UOSAT3' or to 'DF5DP @ DB0IZ.DEU.EU' or via FAX to +49- 2323-46150.

STS-45 Shuttle Operation

NASA astronauts Brian Duffy and David Leestma have recently passed the Tech Class amateur radio operator license examinations plus 5 WPM Morse test. Brian is currently assigned to be pilot on STS-45, Atlantis, due for launch in May 1992, and David is assigned as a Mission Specialist on the same flight. Both are currently awaiting their call-signs. Atlantis will carry a total crew of 7 on an 8 day mission. Because of space and power limitations, they will be restricted to battery powered FM voice operation on 2m. This will be a high inclination orbit, much like those flown by W5LFL and W0ORE (57 degrees) so they will pass over most of the populated areas of the world.

As planned, this will be a *CQ* mission, meaning there will be several attempts to work as many people as possible. There will also be some school contacts arranged, but working details will not be available until approximately 60 days before the launch. SAREX plans to release the time table and frequencies as soon as they are available, probably around March 1992. The mission's prime objective will be to use an Atmospheric Lab for Applications and Science, which will be carried in an igloo in the payload bay.

You can get further information on Amsat-UK from; AMSAT-UK, c/o Ron Broadbent, G3AAJ, 94 Herongate Rd, London, E12 5EQ. Big SAE gets membership info, and SWLs are welcome.

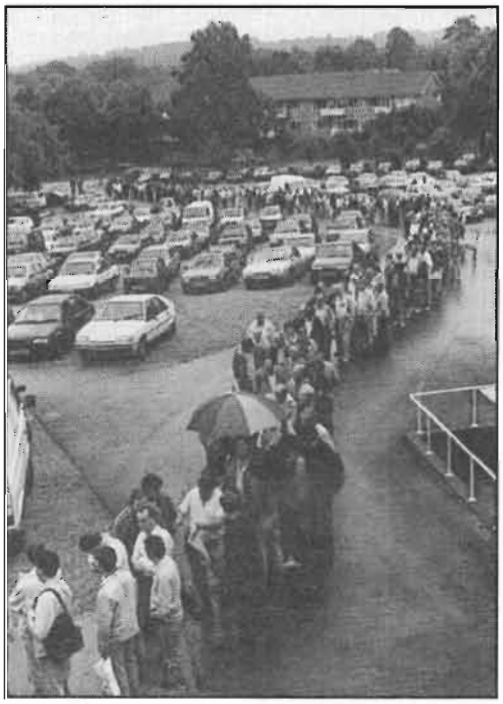
Keplers

SAT:	OSCAR 10	UoSat 2	AO-13	UO-14	FO-20	AO-21	UO-22	RS-10/11
EPOC:	91260.96366258	91267.58955745	91261.49251617	91264.20485573	91267.86857102	91268.20114352	91261.68914843	91268.97546953
INCL:	25.7947	97.8901	56.7207	98.6621	99.0394	82.9465	98.5399	82.9316
RAAN:	124.2291	308.7614	71.4530	343.0774	231.1591	159.7446	334.9359	344.3795
ECCN:	0.6058201	0.0011006	0.7234787	0.0010601	0.0541456	0.0035947	0.0008633	0.0010430
ARGP:	277.1414	210.6100	264.9212	245.3435	75.6581	343.1010	39.9245	267.8841
MA:	21.8049	149.4471	16.9328	114.6648	290.4014	16.8945	320.2572	92.1118
MM:	2.05877870	14.67399275	2.09707823	14.29258400	12.83188626	13.74411387	14.36173247	13.72215654
DECY:	1.32E-06	1.963E-05	-2.01E-06	5.56E-06	3.1E-07	1.37E-06	6.97E-06	1.75E-06
REVN:	3415	40402	2501	8670	7634	3276	913	21341

SAT:	PACSAT	DO-17	WO-18	LO-19	RS-12/13	Mir	SARA
EPOC:	91258.07416740	91257.48876669	91263.47616424	91269.46475343	91268.77630581	91269.15013895	91269.23394211
INCL:	98.6671	98.6673	98.6666	98.6662	82.9207	51.6040	98.5373
RAAN:	337.3811	336.8614	342.8663	348.8953	29.5247	140.0633	342.3627
ECCN:	0.0010272	0.0010359	0.0010827	0.0011372	0.0030246	0.0008782	0.0005775
ARGP:	267.7331	269.0545	249.1405	229.1199	1.7854	208.4819	22.2543
MA:	92.2673	90.9448	110.8620	130.9003	358.3406	151.6120	337.8895
MM:	14.29331739	14.29425560	14.29464263	14.29550526	13.73925762	15.55990022	14.35929192
DECY:	5.14E-06	5.61E-06	4.92E-06	5.51E-06	1.19E-06	3.4119E-04	2.985E-05
REVN:	8583	8575	8661	8747	3195	32091	1021

Packet Radio —Roundup—

Chris G4HCL visits a machine-gun guarded Packet Conference



The queue of amateurs waiting to get into the 1991 BARTG Rally

It was nice to see the faces of the many packet sysops who came along to the SysOps12 conference at the Royal School of Signals in Blandford, I'm sure it's the first time many amateurs have had their callsign verified by a machine-gun carrying soldier before being able to enter an amateur radio meeting!

Decisions, Decisions

The conference, hosted by the Sunpac group, was a very well-planned programme of lectures and discussions, even with overhead projector presentations by UK BBS and Node software writers - very professional! One of the most interesting lectures was that given by Richard G3RWL of AMSAT-UK on Packet Satellite operation and gateways, telling how UK sysops were missing out on the packet mail forwarding facilities available on our Low-Earth-Orbiting amateur satellites.

During the discussion periods, following a paper by Brian G8ASO a decision was made by the 50 plus delegates present to propose a national SysOps group, with sub-divisions representing BBS, Node, PacketCluster, TCPIP operators and the like. This would co-ordinate packet SysOps throughout the UK, to provide a united front for direct liaison with the RA and other bodies. It's planned for this to be finalised and voted upon at SysOps 13, it will be interesting to see what happens!

BARTG Rally

This annual event took place again this year at Sandown, with over 2200 visitors and 55 traders in attendance. Ian G4EAN, the BARTG publicity officer, has kindly sent on some photos of the event which we're pleased to publish — thanks Ian. At the rally just about everything was available for packet, from TNCs to computers to transceivers and aerials, in fact everything to do with amateur radio with data communications naturally at the forefront, a flea market also allowed lots of small 'bargains' to change hands. The queue of amateurs waiting to get in was an indication of the rally's popularity, one which I'm certainly not going to miss next year. If you'd like to write it in your diary, it's on Sept 13 1992, details from Ian Brothwell G4EAN, 56 Arnot Hill Rd, Arnold, Nottingham. NG5 6LQ. Tel. 0602 262360.

Packet Group News

Danpac; Margaret G6CLI of the Danpac (Derby and Notts) group tells us she's now the group's new contact person, taking over from Denis G0KIU. You can get details on the group by sending an SAE to Margaret Clayton G6CLI, 215 Vale Road, Colwick, Nottingham, NG4 2GP, or obtain information via packet by a message to G6CLI @ GB7BAD.

Maxpak; This one's a postal address correction rather than a change of person. The contact details for this active group, who publish an excellent quarterly magazine, are; Richard Nicol G1NZZ @ GB7MAX, or by post to 37 Thicknall Drive, Stourbridge, West Midlands. DY9 0YH, and not the address given in previous HRTs which was incorrect.

Mike G6AWD, author of the 'Practical Guide to Packet Radio in the UK' holds a copy of his new edition, on sale at the BARTG rally

Sunpac, the Southern Users packet group, have recently been having a busy time hosting the SysOps12 convention, but their Secretary Paul G0AFF took the time to say that since the group's mention in this column he's been getting letters from as far afield as Kent and Merseyside! You can contact this active group, who publish various packet guides and also offer a software service, with an SAE to Sunpac, P.O. Box 73, Eastleigh, Hants SO5 5WG.

CTRL-Z, End of Message

Not quite all on packet because the RLC-100 plug-in TNC is also reviewed in this issue, budding SysOps take a look. Once again thanks for all your letters and packet messages, have a happy and peaceful Christmas, and see you next year. You can contact me either on packet, or by post to the HRT Editorial address, or by phone on 0703 262105. Until next year, 73 de Chris G4HCL @ GB7XJZ.

Bargain-hunters galore at the BARTG rally

VHF/UHF Message

Geoff Brown GJ4ICD, with Cycle 22 and 50MHz

The spectacular news this month is that cycle 22 looks to be having a 'double hump' situation. This can be seen by Geoff G3ENY's solar figures for the 54 months so far.

Already (as predicted in Nov HRT) there have been openings on 50MHz to VK and JA during October. If 1989 when the first peak occurred was anything to go by, then the next four months should provide spectacular DX. Very strong daily openings are occurring to south and central West Africa, this should continue until at least April 1992. Extracts from my own log during early October include; 0900z JA and VK, 1200z ZS6, FR5, Z23, ZA, 5V7 (Togo), 9L1US, TU4, TR8, V51, A22, CN8, ZS9, 9J2, etc. Most of these have also been worked in the UK.

Due to requests, here are just a few of the 50MHz beacons you may well hear when beaming south during the next few months;

50.018MHz — V51VHF
50.021MHz — ZS6PW
50.0225MHz — FR5SIX
50.0325MHz — ZD8VHF
50.050MHz — ZS6DN/B
50.091MHz — 9L1US/SL
50.321MHz — ZS5SIX

The UK Six Metre Group produces a comprehensive guide to all known 50MHz beacons, and full details on this and current membership is available from their Secretary who is Chris Gare G3WOS, Old White Lodge, 183 Sycamore Rd, Farnborough, Hants GU14 6RF.

50MHz Reports

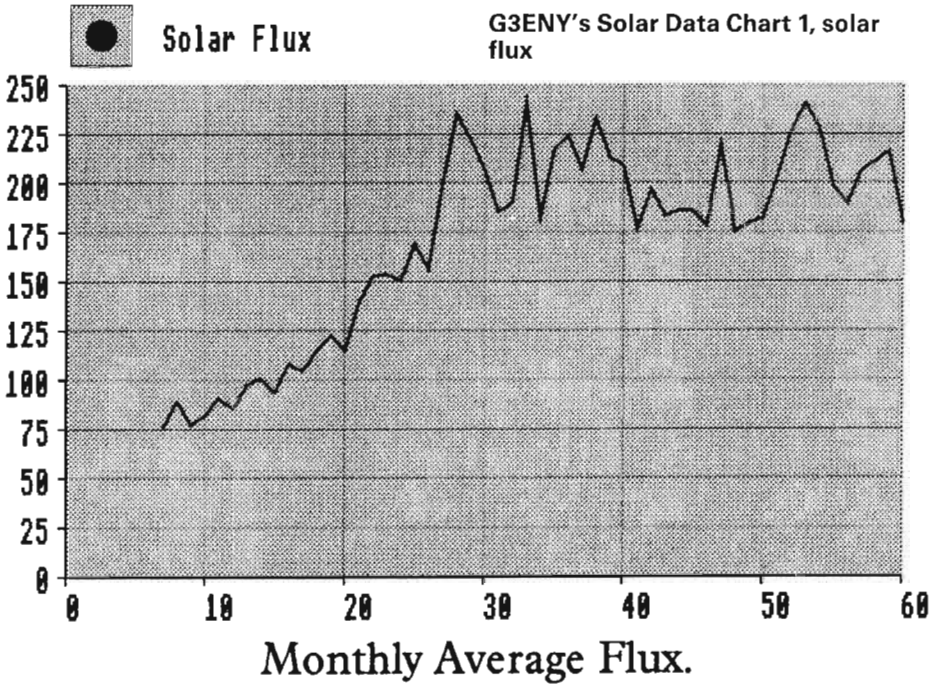
Ela G6HKM reports hearing ZS9H and V51KC on September 19, and it's worth noting that these TEP signals have now been heard about the same time for the past three years!

Conditions from mid September continued to improve with G3WOS working 9Q5EE for his 100th legal country, and many reports have been received of TU2OJ, TU4DH, and TR8CA all being worked into central England. On the 18th, the first VK video was heard by many UK amateurs on 46.172MHz, this TV transmitter is located in the VK4 area of Queensland and can be a very useful beacon. On the 25th September, the CU beacon under test in the Azores on 50.877MHz was copied at S9+ for nearly two hours, obviously via sporadic 'E', and the beacon should (when complete) be activated around 50.013MHz.

Towards the end of September and during early October, more reports were received of VK stations making it into the UK. G4AHN (Surrey) worked VK6JQ and some reports of VK4FP were received from the Netherlands. The 'best' reported day of September (and please remember the 28 day cycle) had to be the 28th, when it seemed that virtually everybody worked everything going. In the morning of the 28th, reports of JAs having been heard in the UK were duly noted from all over the south of England. Later at 1400z, a very welcome addition to anybody's log appeared in the shape of Gerard 5V7JG at S9++ (Togo, West Africa), his locator was given as JJ06, the QSL information being via F6AJA. I listened to him for over two hours, and this time propagation was very widespread from GM, GI to LA, PA, etc. Gerard worked over 16 countries and had over 270 QSOs that day, having only been QRV for six or seven days! He had already worked PY, 9H, ZS, and SV, all within a week! G3WOS picked up two new ones during the month, 3DA0BK in Swaziland was worked for DXCC 101, and 5V7JG in Togo for DXCC 102.

Propagation was very good down here in GJ, with the first report of the FY7VHF beacon (50.039MHz FSK) in French Guiana/South America been received for quite a few months. The DX of the month has to go to G3WOS, Chris worked ZA1A on the 5th October around 1120z, this brought his score to 103 legal countries and now ranks near the top of the UK DXCC list.

G3ENY's Solar Data Chart 1, solar flux



Nice DX on 144MHz

Despite conditions being poor down here, I am very glad to see some reports of 'nice tropo on 144'. Once again our lady in Essex, Ela G6HKM showed us how to work real DX. Ela reports September 4th was a great day starting with OZ6OL (JO65), DG6YGG (JO41), DH0LAI (JO44), and later that day the band livened up with Y22UC (JO63), DL6NVC/P (JO73), and at 2213z Ela called CQ 'SP' and was rewarded with; SP1HLE (JO73), SP1EO1 (JO73), and SP2BDR (JO83). This last one was a new square, and a distance of 1180km! More SPs followed with SP3EPX (JO83), SP3RBF (JO71), and SP2MKO (JO83) at 1191km. Ela, I really would like some of those SPs down here in GJ, so would you like to do a deal with some VKs on 6m?

Ela continued with the DX on the 6th, with strings of OKs and OEs, OE/PA3CNX (JN77) was another new square, the 7th brought Y31UK/P (JN57), and HE7PMF (JN46). By now Ela had decided to save her voice for the RSGB/IARU contest and have a rest, but by the time the contest had started (yes, you've guessed it again) the gremlins came along and destroyed the propagation! But all the same, it's nice to see such good DX on 2m.

Poland on 432MHz

Now Ela really rubs it in! September started off well with the 4th bringing in (yes, here we go again) SP3RBF (JO71), her first SP on 432MHz, SP2DDV (JO93) at 1197km and this was Ela's best DX ever on 70cm.

The RSGB contest during the weekend of 5/6th October again brought very poor conditions. Many stations were struggling with the weak signals brought by the foul weather yet again! My best DX was JO03, and I only heard a handful of stations. Still, the autumn usually brings some nice openings on 70cm, so let's hope for better things to come.

1296MHz — What, no SPs?

Once again Essex is the 'hot spot' for DX, possibly because of its proximity to the sea ducts that exist more on this band than 432 or 144. Again Ela grabbed a choice few on the 4th September with DF9QX (JO42) and a new square, DL3YEE (JO42), lots of PA0s and finally DF1AS (JO52) for another new square. I can remember, only a few years ago, when I would call and call all night long for a QSO on 23cm, but there was never anything doing.

QSL info

9J2HN — via JH8BKL, note new address from JR3HED K. Kawase, 1655. Shinkai-douri 9 chome, Teshio-cho, Teshio-gun, 098-33 Japan.
PY5CC — P. Sprengel, P.O. Box 7, Mathinos, PR83260, Brazil.
5V7JG — via F6AJA J. M. Duthilleul, 515 Rue du Petite Hem, Bouvignies, F-59870 France.
7Q7JL — P.O. Box 2907, Blantyre, Malawi, Africa.
TR8CA — via F6CBC, J. Charron, 183 Ave Carnot, F-33150, Cenon, France.

Late News

Polish amateurs hope to be QRV on 50MHz by early 1992, the PAR (the Polish licensing authorities) are planning, very carefully, the introduction of 50MHz, although no visitors to Poland will be able to arrange a permit.

Lebanon now has 50MHz privileges. OD5SK is awaiting a transverter for the band, and the UKSMG is also organising the donation of a beacon.

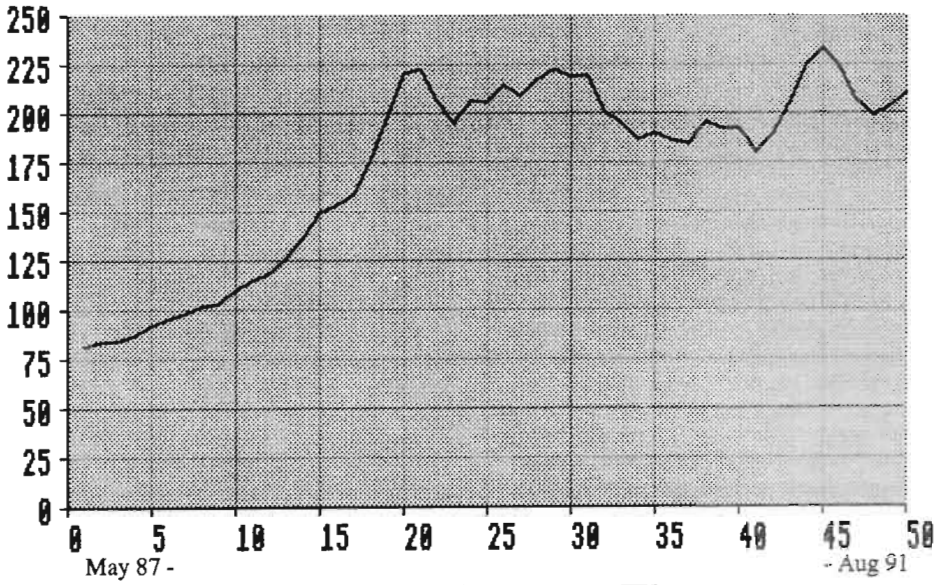
TZ6VV in Mali, central West Africa, is awaiting equipment for 6m from the USA. Other stations known to be active just recently in Africa are 9X5HN, 9U5HU, 9Q5EE, and 9Q5TE.

G4CCZ made the first QSO ever on 50MHz from the UK with 9X5HN in Rwanda on 5/10/91, during the 'big' South African opening.

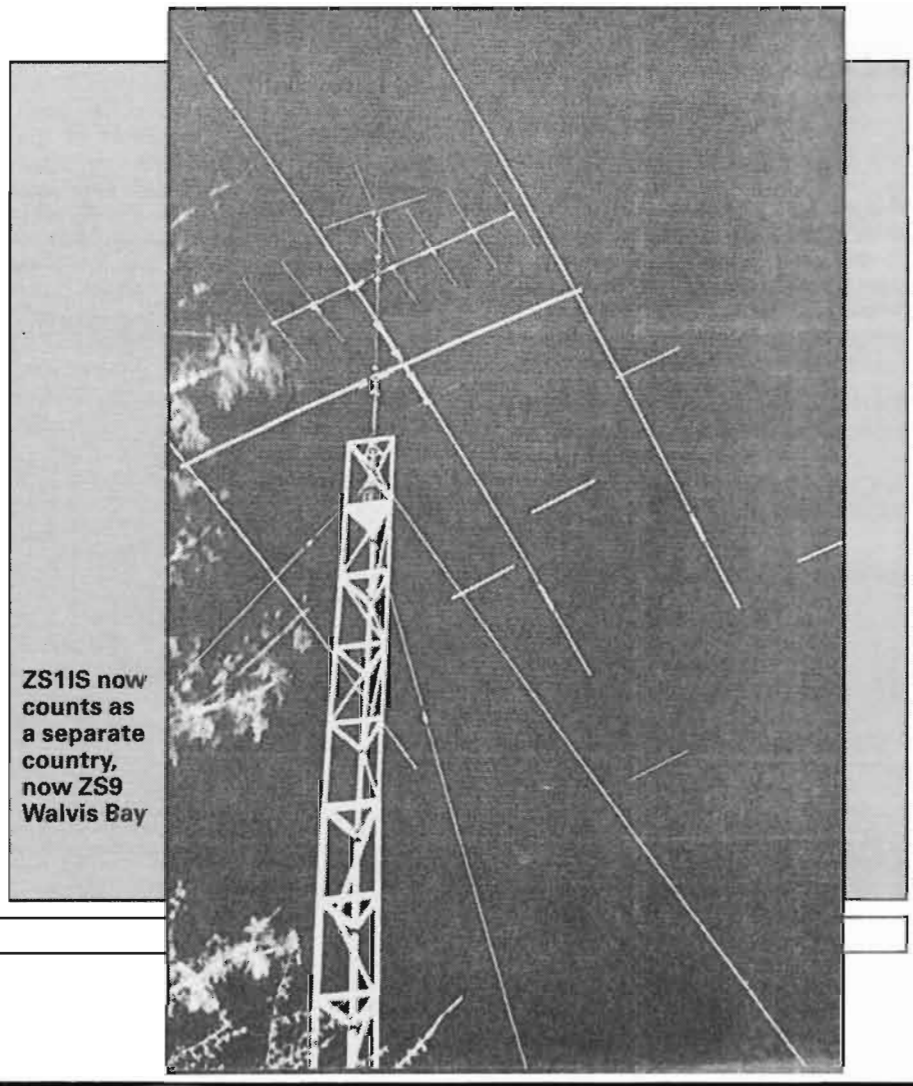
The 14th October brought the return of the Far Eastern DX on 50MHz. I worked 27 VK2s, VK3s, VK4s, and VK6s plus dozens of Japanese stations, this was a predicted opening in an earlier HRT. I also managed to work VK2FLR on 'Six' for a new British Isles distance record at over 17000km. *(Congratulations Geoff - Ed.)*

So that's it for this month, thank you for all your reports and news. Please send your news and reports to; GJ4ICD, TV Shop, Belmont Rd, St Helier, Jersey JE2 4SA, Channel Islands. You can phone on 0534 77067 daytime, this number switches to fax after 6pm. Urgent news items can be phoned on 0860 740725 24hr. 73.

G3ENY Chart 2, 3 monthly average



3 Monthly Average Flux.



ZS1IS now counts as a separate country, now ZS9 Walvis Bay