

RF

HAM RADIO TODAY

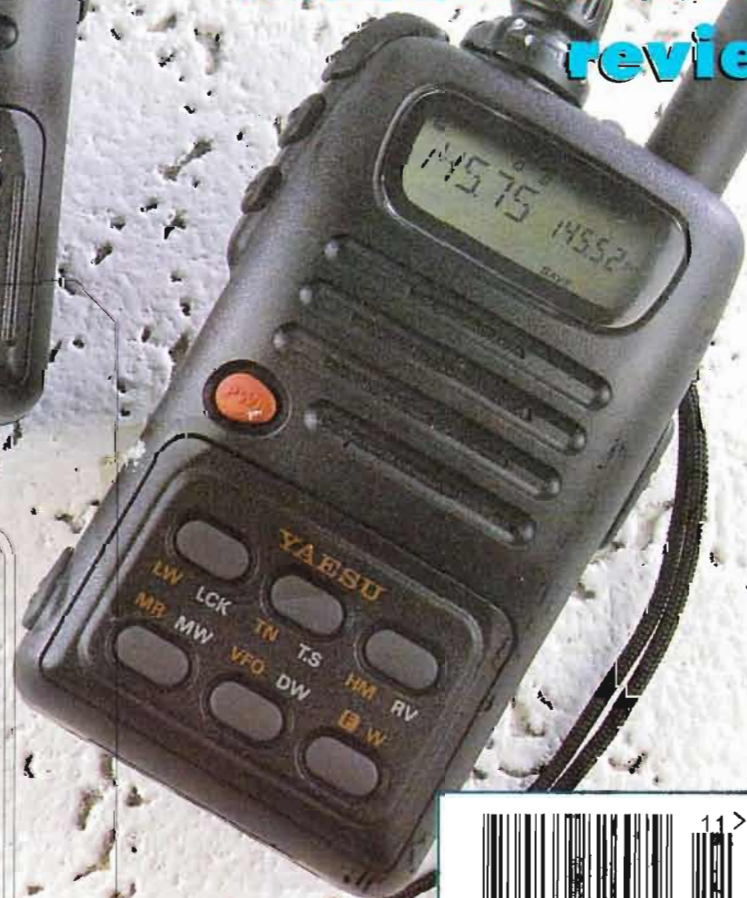
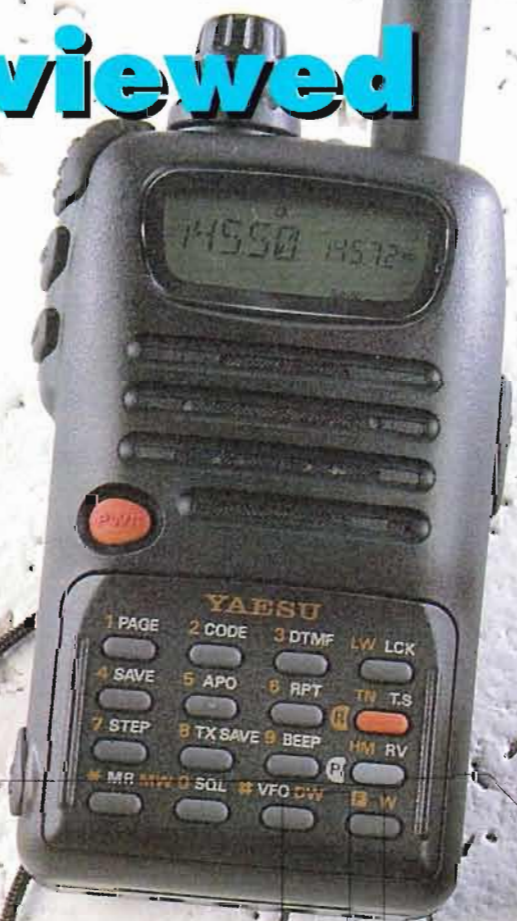
Incorporating
SCANNERS

NOVEMBER 1995 £2.50

Latest FT-10R 2m handhelds reviewed



Realistic PRO-26 wideband scanner reviewed



NO COVER
DISK

THEN ASK
YOUR
NEWSAGENT

117
9 770269 826079
NEXUS

HRT CONTENTS


 SUBSCRIPTIONS AND
 BACK ISSUES HOTLINES:
ORDERS:
 01858 - 435344
ENQUIRIES:
 01858 - 435322
 LINES OPEN 9am - 6.30pm

HAM RADIO TODAY

HAM RADIO TODAY VOLUME 13 NO.10 NOVEMBER 1995

REGULAR COLUMNS

COVER DISK 4
 There's something for everyone on this month's disk - whether you're a HF or VHF operator, or an SWL!

AMATEUR RADIO SOFTWARE COLLECTION OFFER 13
 Did you miss any of our recent software disk collections? Here's your last chance to order those you've missed!

SCANNERS 19
 Bill Robertson gives advice on where to listen and answers some commonly-asked questions

QRP CORNER 36
 Dick Pascoe G0BPS gives a few tips on using beeswax in keeping your QRP gear in tune

FROM MY NOTEBOOK 38
 Geoff Arnold G3GSR answers the often-asked component question, "Will it do?"

VHF/UHF MESSAGE 40
 Geoff Brown GJ4ICD recounts the successful Cape Verde 6m DXpedition

HF HAPPENINGS 42
 Don Field G3XTT with the latest on the IOTA and DXCC scenes plus details of new activity from Tunisia

DATA CONNECTION 44
 Chris Lorek G4HCL tries some new Windows packet programs

SATELLITE RENDEZVOUS 46
 Richard Limebear G3RWL with the AMSAT-UK news compilation

FREE READERS ADS 53
 Helplines, For Sale, Wanted and Exchange, published free

FEATURES

LEICESTER SHOW GUIDE 32
 Floor plan and exhibitors list

WHAT TO LOOK FOR AT LEICESTER 34
 The Leicester Show's this month, here's a few things to look out for!

CONSTRUCTION PROJECT

A DIRECT CONVERSION RECEIVER FOR 80, 40 AND 20M 25
 Raymond Haigh details the construction and in part 2 of his modular receiver construction project for three popular amateur bands

NEWS & VIEWS

CQ DE G8IYA EDITORIAL 5
 The personal touch!

RADIO TODAY 6
 The latest Amateur Radio news

LETTERS 16
 Our readers have their say, no censorship here

HRT SUBSCRIPTION OFFER 52
 Make sure you get your favourite magazine each month, right through your door

CLUB NEWS/RALLIES 48
 Dynamic go-ahead clubs and voluntarily-run RAE course contact details. Is your club listed? If not, why not?

NATIONAL AND INTERNATIONAL ORGANISATIONS 51
 Contact details for the RA, SSL, BARTG, ISWL, RSGB and other national organisations

ADVERTISERS INDEX 58
 Who's 'in' Ham Radio Today, trader-wise

REVIEWS

YAESU FT-10R SERIES HANDHELDS REVIEWED 9
 Different sets, same number, Chris Lorek G4HCL takes a technical look

REALISTIC PRO-26 WIDEBAND SCANNER REVIEWED 22
 Chris G4HCL goes fully wideband and tries to get rid of data

'QRZ' HAM RADIO CD-ROM REVIEW 29
 The HRT Editorial team get busy with hundreds of megabytes

All reasonable care is taken in the preparation of the magazine contents, but the publishers, nor the Editor, cannot be held legally responsible for errors in the contents of this magazine, or for any loss arising from such errors, including loss resulting from negligence of our staff. Reliance is placed upon the contents of this magazine at readers' own risk.



Leicester Show Guide (see page 32)



CQ from G8IYA

Editorial

The personal touch!

Are we getting impersonal? Or are we going the other way? Maybe you think that's a strange question, but there are a number of 'trends' in our hobby. One growing trend is that of digital communication, where people just tap messages to each other on a 'store and forward' basis, rather than have 'live conversations'. Convenience and reliability of this form of communication is one reason for its popularity, not forgetting the enormous growth of the use of computers as an operating aid in our hobby.

For many, this is just an 'aid' to the hobby, the 'real' meaning of the hobby being communication, in one form or another. Our hobby has outlets for the competitively-minded, for those who like to exercise their technical skills, those who like building, meeting people at clubs and rallies, or of course those who just like to sit in their 'shack' and chat away, either by speech, on the key, or keyboard.

But as high-tech communication becomes more affordable, are we seeing 'another breed' evolving? Right now, there are amateurs experimenting with digital speech on HF, and multimedia files are being transferred over VHF and UHF, including the packet network. Will a 'QSL UR 599 73' contact with a rare DX station in QRM-filled HF conditions soon also be accompanied by a digital file of a few seconds of compressed video of the station on their remote Pacific island? Don't laugh, how may DXpeditions in the last year *didn't* have a powerful laptop computer as an essential part of their station?

QRP DSP?

QRP enthusiasts strive, and often succeed, in getting their low power signal through in conditions the 'experts' think impossible. DSP (Digital Signal Processing) units as an 'add on' in the receive line are slowly taking over the 'traditional' audio bandpass filter - the 'razor sharp' selectivity they offer for a CW signal has to be heard to be believed. Yes, there *are* amateur homebrew designs available, like the W6GR filter, with freely downloadable software. Is it any coincidence that

every single 'top of the range' HF rig launched at this year's Stafford show had DSP receive filtering built in. One didn't have any optional IF crystal filters, it was all done by DSP.

It's significant that the US Assistant Secretary of Defense Emmitt Paige W2IPG, who has overall authority over all USA military communications, recently said "You don't need a human now to copy and translate Morse code". In this month's *QRP Corner*, we read of effective communication but at the expense of no recognition of who it is at the other end. Are we becoming impersonal?

This month's cover disk

The entire Editorial staff at Ham Radio Today are very pleased to have 'scooped' a deal with Paul O'Kane, EI5DI, to feature the full and unrestricted versions of his suite of software on this month's cover disk. Until the publication date of this issue, *Super-Duper* and *Super-Duper VHF* were commercially sold at £25 per program or £40 for both (we had to be careful not to let it 'leak out!'). The 'freeware' versions for listeners and IOTA contesters which we've featured on our software offer service in the past have been extremely popular, and I hope you'll enjoy using the programs with this magazine just as much. If not, just think of the disk as a nice coffee-cup mat for your shack!

HRT Voicebank

I can usually tell as soon as the latest issue of HRT comes out each month. The use of the automatic voicebank and fax-back information service, which runs on a powerful PC in my office, increases almost tenfold!

If you're not familiar with the concept, it's a menu-based 'information store' that's continually updated. You'll find it on 01703 263429, a 'normal rate' (as opposed to 'premium rate') number. You'll need a DTMF (i.e., touch-tone) equipped phone to use the menu - or a

DTMF keypad such as the one on your 2m handheld, playing the tones through the telephone mic. If you don't have this, then fear not, as the 'default' information you'll hear, i.e. if you select nothing, will always be the latest updates to information in the magazine, such as construction project updates, rally changes, and any 'late breaking news' such as licence changes.

If you've a personal fax machine with a handset (so you can hear the menu), then you can also instantly retrieve complete lists of information, maps to rallies going on that month, details of 'what review appeared when', and so on. Most of these are, incidentally, also available for an SAE - again just follow the voice information given.

Please note, however, that although the system has a degree of 'artificial intelligence', including optical character recognition, it hasn't yet learned to read and respond to handwritten faxes sent to it, such as "Please fax me the latest Amsat Keplers". Yes, it *does* happen. This information certainly *is* stored, ready for instant retrieval, but you'll need to tell it by DTMF what you want!

A different mag next month?

Keep a sharp eye open next month on your newsagent's shelf. You may not see *HRT* - instead you could instead see *Ham Radio Today* with a new, up-to-date logo to reflect our up-to-date hobby. No longer will people think you're reading about Hormone Replacement Therapy! (Incidentally, the title of HRT, for this mag, was used well before it's more recent medical abbreviation!)

Di-Di-Dit Dah-di-dah

Sharp eyed readers may have seen a very slight difference to the 'heading' of this Editorial page, from that in every past issue I've prepared. It's the 'from' rather than 'de'. Some amateurs will know what this means, but many readers don't, and I'm not one to get people thinking. Or am I?

Yaesu FT-10R Series Handhelds Reviewed

Different sets, same number, Chris Lorek G4HCL takes a technical look

Launched at this year's Stafford Show were the Yaesu FT-10R series of 2m handhelds. A 'series' you ask? That's right, even though they share the same type number, there are four different model 'variants', each giving different levels of operability. There's also a 70cm version, the FT-40R, which offers identical facilities but on 430-440MHz.

Versions

So, what's the difference between the versions? In steps of increasing facilities, the A06 and A16 models have 30 available memory channels, with CTCSS encode and DCS encode/decode (see below) built in, the A16 adding a DTMF keypad to the A06's case. As we go up to the A16D, this increases the number of available memory channels to 99, and adds keypad frequency entry, CW ID, CTCSS tone squelch, DTMF paging and code squelch, and DTMF auto-dial memories. Finally, the A16S has all this, with the addition of a digital voice record and reply option, i.e. a built-in 'digital answering machine' - the mind boggles! The current list prices for the sets are £269 (A06), £289 (A16), £319 (A16D) and £339 (A16S). You can easily change between versions by fitting an optional keypad unit, this containing the electronics for the various 'bells and whistles'.

Each set has two independent VFOs, which you can tune in 5, 10, 12.5, 15, 20, 25 or 50kHz steps (not 5 and 15kHz steps on the 70cm FT-40R). As well as the usual memory scanning facilities, you can also store up to 9 pairs of sub-band frequency limits for the set to



search between, in the programmed tuning steps.

A two-frequency display is used on the FT-10R, which, for example, lets you see the frequency stored in the alternate VFO. No, the set isn't a twin-bander, it doesn't have 'dual receive' capability, although it does have the usual 'dual watch' where the receiver can automatically check an alternate channel momentarily for activity every few seconds.

All the memory channels on each set are freely tunable, and each memory channel can store independent transmit and receive frequencies, tuning steps, tone selection, transmit power level, and the scan 'skip' status. Each channel can also be assigned an alphanumeric name of up to four characters, as an alternative display to the frequency or whatever.

The FT-10R can accept a wide input voltage range, of 3.5V (!) to 12V DC. Using the FNB-40 6.0V, 650mAh battery (as supplied with

the review sets), the transmitter provides an output of around 2.5W maximum. By using an optional 9.6V nicad, or plugging in an external 12V DC supply, the maximum power goes up to around 5W. Up to four power levels can be selected in each case, corresponding to outputs of 5W, 2.5W, 1W, and 0.1W.

The supplied set-top helical uses an SMA type socket for connection, the mating 'plug end' being on the set case. Together with an external DC connector socket, a single but rather unique four contact 3.5mm jack socket is used for connecting an optional external speaker-mic.

With the supplied FNB-40 nicad, the set measures 57mm x 123mm x 26mm and weighs 325g. A belt clip, carrying strap, and user manual complete with full circuit diagrams are supplied with the set. Optional extras include the various keypads, a nicad charger, microphone and aerial connector adapter, speaker-mic, VOX headset, protective case,



a protective rubber outer 'holster', and a dry-cell battery case.

DCS

The built-in DCS, which is short for 'Digital Code Squelch', is probably new to many amateurs, although it's been used professionally for some time. The easiest way to describe it is as a binary-based 'digital phase shift' of your transmitted signal's carrier frequency. Thus, your signal sounds quite 'normal' at the receive end, but in reality it's quietly shifting back and forth very slightly. At the reception end, the receiver's discriminator circuit produces a corresponding binary 'DC shift' output to feed a DCS decoder. When the programmed transmit and receive binary codes match up, the receiver gets a message to say 'that's the correct one', just like CTCSS or DTMF selective calling, and does whatever it should do, whether this is to raise the receiver squelch, sound an internal bleeper, and so on.

Selective calling

The DCS system, or the CTCSS decoder as provided with the 'high-

end' keypads, besides raising the receiver squelch can also be programmed to sound an alert tone when a matching code is received. With the A16D and A16S sets, 'three digit' DTMF selective calling and paging, as used by several other makes of sets as well, is also available.

A unique feature of the FT-10R series, employing the DCS facility, is that of an 'Auto Range Transpond System', or ARTS for short. If you've a couple of sets so equipped, you can command one to automatically send a 'poll' message out every 25 seconds (check your licence conditions here), to check whether the other station is in or out of communication range.

If the other ARTS-equipped station is in range, their set bleeps twice and the display indicates RANG (i.e., 'range'). To help keep you legal, with the high-end keypads your set can also automatically identify every few minutes with your callsign in Morse when ARTS is in use.

On the air

I usually have little problem in 'getting going' with Yaesu handhelds, but I'm afraid these sets were an exception in one or two instances. This is because many of the functions on the each set, including the squelch setting and transmit power level, are controlled by a combination of pressing the main click-step 'tuning knob' firstly to access a 'menu', then turning the knob to select the item required, then pressing the knob again to access the 'setting' mode, then making the necessary changes. In the 'high end' keypad versions, the keypad can be used for some of these functions, but not all.

I found this method was reasonably OK for

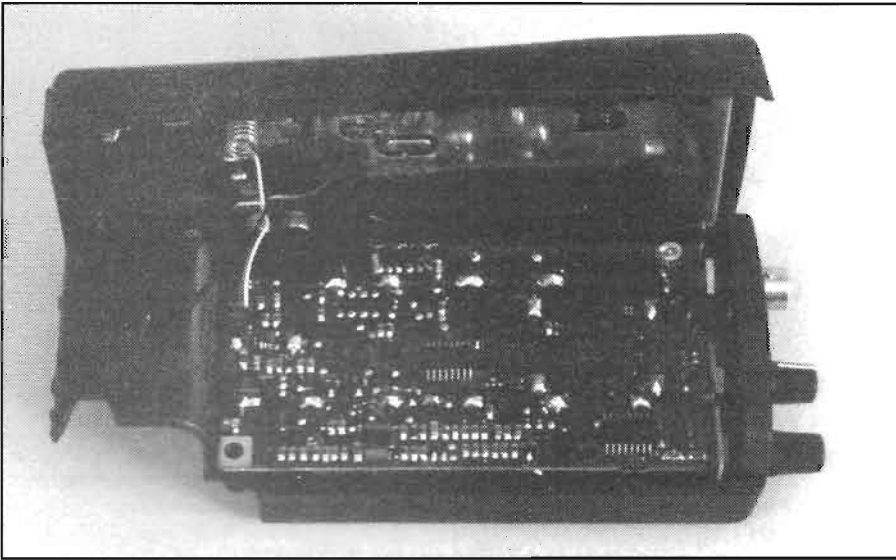
those 'set and forget' parameters, such as memory channel programming, but I found other adjustments, such as squelch level and transmit power changes using this, to be a real pain. For example, to adjust the squelch, or to just briefly raise it to check my receive volume setting, took me several operations of knob pushing, rotating, pushing, rotating, pushing again.... on both the 'low end' and 'high end' sets. Maybe handheld users never need to do this in Japan?

Having got that off my chest, I found that, otherwise, the sets were reasonably easy to use. The set fitted in my hand very comfortably indeed, the rounded corners and even the smoothly contoured belt clip made it very pleasant to hold and use. The 1750Hz toneburst button was just below the PTT bar, making one-handed repeater access easy. Also, the handy 'lamp' button beneath this nicely illuminated the LCD with a uniform orange glow, so I could see what the set was doing at night. Unfortunately this didn't also illuminate the keypad, so I initially had to 'fumble around' here at night in pressing the wrong buttons!

I did miss having a 'monitor' button facility, i.e. one that would raise the squelch momentarily and, if tuned to a repeater channel, quickly switch to the input to see if a simplex contact was possible. I did however find that, if I could dispense with the built-in 1750Hz repeater access tone, the button provided for this could be programmed to raise the squelch.

There was plenty of receive audio for use even in fairly noisy locations, which was very good for





Lab tests

The receiver uses intermediate frequencies of 17.70MHz and 455kHz, and recent 2m handhelds I've found to often suffer a problem with 'half IF' response - relatively weak 2m signals being 'blotted out' by strong paging transmitters several megahertz above 2m. Not so with the FT-10R, the receiver measurements confirmed the excellent results I'd found on air. The transmit performance was equally good, no complaints at all here.

Conclusions

Yaesu have again introduced what you could call a 'pioneering move' with their latest handheld design. Taking a 'basic set', you can match the range of facilities to suit your individual operating needs. My personal opinion is that I found some of the operating aspects to be rather user-unfriendly, i.e. the multiple 'pushing, twiddling, and pushing again' operation needed just to open the squelch briefly. The technical performance however, I found to excellent. I could happily use the FT-10R with my rooftop colinear or tower mounted beam without any blocking or overload problems at all, unlike many other handhelds I've tested.

My thanks go to Yaesu UK for the loan of the two FT-10R models used in this review.

such a small speaker - many such handhelds instead just go into horrible distortion here. I however find that I couldn't plug a 'normal' external earphone in when needed, as Yaesu's decision to use a unique four-contact jack socket for this, which I didn't have, meant that the set went onto permanent transmit each time I plugged my usual earphone in!

Using the DCS facility (I'm glad Yaesu UK supplied me with a pair of sets for review to test this!) was a novel experience. With my wife also being licensed, we find amateur radio quite useful for keeping in touch when out and about, and the DCS facility allowed us to monitor a quiet channel for each other without being disturbed by squelch breaks or whatever. It's useful to remember that, as with CTCSS, DCS normally won't work through a repeater, you'll need DTMF selective calling here.

In terms of 'on-air efficiency', I found that, with the set-top helical, I had a little more difficulty in hearing, and getting into, my two semi-local 2m repeaters than I'd have expected. But then, the supplied aerial was quite small and thin, and undoubtedly not as efficient as some larger diameter types.

Back in the shack, after I'd constructed a suitable aerial adaptor with an SMA socket (Yaesu have decided to use the 'reverse sense' of what others, such as Standard and Icom, have used for their small set-top aerial connectors), I used my outdoor 2m aerials to really put the receivers to the test. The result? Top marks. I found I could hear distant weak

repeaters extremely well, showing the receiver to be very sensitive, with no problems at all from the many strong in-band and out-of-band signals in my area. I found *not one* problem, even the 12.5kHz adjacent channel signal rejection was superb - well done Yaesu!

I also found one of the user-settable options in the rotary knob 'menu' was that of 'two-level' deviation, i.e. switching the transmit peak deviation between 12.5kHz channel spacing (with 2.5kHz peak deviation) or 25kHz spacing (with 5kHz peak deviation). This could well be worth bearing in mind for the time if, or when, we change to such channel spacing in the UK or indeed all of Europe. It's also very handy for 12.5kHz spacing packet, as already used in some areas of the UK.



LABORATORY RESULTS:

All measurements taken on 145.0MHz, using fully charged FNB-40 6.0V 650mAh nicad, high power TX, otherwise stated.

RECEIVER;

S-Meter Linearity

Display	Sig. Level	Rel. Level
1	0.25 μ V pd	0dB ref.
2	0.36 μ V pd	+3.1dB
3	0.43 μ V pd	+4.7dB
4	0.65 μ V pd	+8.3dB
5	1.14 μ V pd	+13.2dB
7	2.33 μ V pd	+19.4dB
10	4.42 μ V pd	+24.9dB

Sensitivity;

Input level required to give 12dB SINAD;

144MHz;	0.12 μ V pd
145MHz;	0.12 μ V pd
146MHz;	0.12 μ V pd

Image Rejection;

Increase in level of signal at 1st and 2nd IF image frequencies, and 'half 1st IF' over level of on-channel signal, to give identical 12dB SINAD signal;

Half 1st IF;	83.9dB
1st Image;	91.3dB
2nd Image;	>100dB

S-Meter Linearity

Display	Sig. Level	Rel. Level
1	0.25 μ V pd	0dB ref.
2	0.36 μ V pd	+3.1dB
3	0.43 μ V pd	+4.7dB
4	0.65 μ V pd	+8.3dB
5	1.14 μ V pd	+13.2dB
7	2.33 μ V pd	+19.4dB
10	4.42 μ V pd	+24.9dB

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;	61.7dB
-12.5kHz;	62.5dB
+25kHz;	71.9dB
-25kHz;	71.8dB

Blocking;

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;	80.6dB
+1MHz;	97.0dB
+10MHz;	99.7dB

S-Meter Linearity

Display	Sig. Level	Rel. Level
1	0.25 μ V pd	0dB ref.
2	0.36 μ V pd	+3.1dB
3	0.43 μ V pd	+4.7dB
4	0.65 μ V pd	+8.3dB
5	1.14 μ V pd	+13.2dB
7	2.33 μ V pd	+19.4dB
10	4.42 μ V pd	+24.9dB

Squelch Sensitivity;

Threshold;	0.08 μ V pd (6dB SINAD)
Maximum;	0.26 μ V pd (24dB SINAD)

Intermodulation Rejection;

Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

25/50kHz spacing;	68.9dB
50/100kHz spacing;	68.8dB

TRANSMITTER

TX Power Output;

Tested with fully charged FNB-40 6.0V nicad, and external DC supply.

Power	Nicad	Ext 13.2V
High	2.62W	4.95W
Low 3	2.62W	2.80W
Low 2	920mW	980mW
Low 1	90mW	110mW

Harmonics;

2nd Harmonic;	-65dBc
3rd Harmonic;	-68dBc
4th Harmonic;	<-80dBc
5th Harmonic;	<-80dBc
6th Harmonic;	<-80dBc
7th Harmonic;	<-80dBc

Peak Deviation;

High;	5.04kHz
Low;	2.96kHz

Toneburst Deviation;

High;	4.01kHz
Low;	2.46kHz

Frequency Accuracy;

+112Hz



LETTERS

Letter of the month

Dear HRT,

In response to September issue, Mr. Steele's letter on Novice awards and certificates. The Group of National Experimental Amateurs has, throughout this year, offered varying awards to Novice operators and full licence amateurs who take the time to work Novice stations.

Awards originally proposed the encouragement of CW (Quickfire Award) but have since developed to a system of progressive numbers of QSOs achieved. Novice licensees (whom our club encourage and are taught by myself as holder of the club helm), may on presentation of copy of their logs, claim for 25 contacts, 50 and 100 RAE operators, or 10, 20 etc., fellow Novices (repeaters are disallowed). Full licence holders may reciprocate likewise.

It may only be 'another' award certificate, but to our new members, something to encourage our hobby. Details may be obtained from myself - 19 High St., Watton-At-Stone, Herts SG14 3SX. We all started the same, so how about encouragement. Today's NRAE-B licence is tomorrow's HF DX operator!

Keith Bewley, G0JGV
Secretary, Group of National Experimental Amateurs

No address?

Dear HRT,

I'm not licensed, but I often listen to the ham radio 'Sunday morning news' on 2m using my handheld scanner. Being professionally involved in current radio communication technologies, I thought I'd like to get more 'into' the hobby, so I was interested in getting in touch with people who were organising ham radio activities in my area. But all I heard in the 'news' on my scanner, for several weeks (even months!) for address details was "...who is QTHR". After looking through my 'Q' code list, where 'QTHR' wasn't mentioned at all, I eventually found this seemed to mean 'correct in the current RSGB Callbook'. On enquiring from the RSGB, I asked how I could obtain a copy of the callbook. "Sorry", they said, "It's not available in a book, only in a PC disk version". Further enquiries showed that I needed a powerful PC (no XTs or 286s allowed here) to use the RSGB's callbook program, which incidentally was, I felt, rather expensive in any case. Is this the way newcomers to the hobby have to get information? To cut a long story short, I was fortunate in getting the contact details I needed from your 'Club News' section, although to be fair the RSGB did (during the phone conversation) offer to give me the address of the person involved - they obviously had one of their 'out of print' callbooks on hand!

Greg Jameson

Editorial comment:

The term 'QTHR' is not published in Ham Radio Today magazine, as many readers can't use this. Instead, you'll see contact information which can be used by anyone. I'm glad you found the information you were seeking Greg, and welcome to the hobby!

No RAE opportunities?

Dear HRT,

At the RSGB Membership Liaison Committee meeting on August 12th, considerable evidence was found to show that throughout the UK, potential RAE candidates are being discouraged.

1. Firstly from taking a course, either by impossible charges, unreturnable should the college concerned decide to terminate the course, or by straight-out refusal to offer courses.

2. Secondly, when a course is still offered, the class, previously taken by a qualified licensed radio amateur, is now taken by a member of staff who knows nothing of amateur radio.

3. Thirdly, in many areas a flat refusal by local colleges to provide facilities for external candidates to take the exam. In one case this even went to the extent of "We won't run a course, but if you want to take the exam we will charge you for a course plus the examination fee!".

4. It seems evident that what a year or so ago was a minor local

£10 for 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 (normally paid during the month following publication). So write in with your views to: Letters Column, Ham Radio Today, Nexus, Nexus Ho use, Boundary Way, Heron Hempstead, Herts HP2 7ST, or fax your letter direct to the Editor's desk on 01703 263429 (fax letters for publication only, for general readers queries please see the 'Readers queries' section in the 'Who's Who and What's What in HRT' flannel panel at the back of this issue), or email to chris@radstack.demon.co.uk. Please keep your letters short, we reserve the right to shorten them if needed for publication. Letters must be original and not have been sent to any other magazines, and must include names and addresses plus callsign if held. Reader's views published here may not necessarily be those of the magazine.

"TONE" BURST by G6MEN



DXCC woes

Dear HRT,

From what I've read, it appears that, due to the sometimes illogical (or perhaps even jealously biased, "cos we never worked it!") voting of the members of the DX Advisory Committee, certain countries are not being allowed DXCC status, despite there being definite criteria laid down with which to decide these matters. As a keen UK DXer, my question really is asking, why should the Americans be the only ones to have a say in these things, when it affects many DXers in other countries as well? OK, I realise that it is their programme, but in recent times we have often seemed to be both politically and scientifically in their shadow, so maybe it's about time that we started our own equivalent programme on this side of the Atlantic, or had some sort of internationally administered system, although I have no doubt that there could be disagreements with this also. I, like most DXers, am very proud of my contacts, (let's face it, DX award collecting is really only an ego trip!) and somewhat protective of my card collection. Why should we have our cards 'checked' by someone from across the Atlantic just to prove that we are 'worthy'? We have an excellent IOTA programme and I'm sure a better sort of 'DXCC' type system could be organised over here, for those who like collecting awards, although personally, I am happy just to collect cards. What do other readers think?

Phil Wentworth G0DZA

difficulty, has become a nationwide problem.

RSGB's membership committee therefore wish to hear from all those applying for RAE courses or RAE examination places, giving details of; College applied to, colleges reply, course fee proposed, and exam fees charged. Input from non-RSGB members will be welcome.

Also, we would like to hear from individual clubs (whether affiliated societies or not) who run their own RAE course, as to the arrangements made for taking the exam, and what fees (if any) are charged for their course and for the exam.

All input will be confidential, but the data will be presented as a report, initially to Council, but if necessary to go further. The problem won't be solved overnight. Your input though will 1. Confirm there is a problem and 2. Give us the weapons with which to fight the case. All letters to me please at; 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA.

Paul Essery, GW3KFE
for RSGB Membership Liaison Committee

Editorial comment;

Surprise surprise, we've found exactly the same (and have published the fact in these pages) in the past. We're glad the RSGB have also taken the initiative, and we're happy to help in trying to get the future of amateur radio 'on the move'.

DSI report

Dear HRT,

Ref. G3TDL's remark (Sept issue HRT), "You are in danger of giving the impression that the faceless bureaucrats are trying once again to push us out of our bands". The DSI, "The Strategic Plan" page 11, i.e. read the RA's mission to facilitate access to radio spectrum, "to promote the creation of wealth, competition and choice". May I remind all concerned, that somewhere around 1985, earlier or later, the DTI came up with the idea of selling off the Radio Spectrum, and those wishing to use it would have to pay, this included all amateur radio operators. The cry by some non-RSGB members who stated that as long as they had passed their RAE exams A and B and adhered to all the licensing terms, the DTI nor the RA could stop them using the radio spectrum. I fear this is again the case, the PMR people are pressurising the government into giving them more of the spectrum that is well tried and trusted, not the UHF band of which they would have to spend vast amounts of cash to develop. As radio amateurs have vast experience of the radio spectrum, they would like us to find the answer for free.

To HRT Editorial, keep us informed. I have the DSI's Spectrum Strategy issued by the RA, very interesting reading.

J. H. Clifton, G0UIU

MORE LETTERS
NEXT MONTH

SCANNERS

Bill Robertson gives some advice on where to listen and answers some commonly-asked questions

I'm always pleased to hear from readers, either by letter, fax, or email c/o the HRT editor, and I'll try to answer your questions through this column. The Editor also kindly forwards me the many discussions on email in the 'uk.scanner' discussion group on the Internet, which I often find very interesting! I'll try to share some of this with you in this column whenever appropriate.

Jerry from Edinburgh asks what HF frequencies are used for the 'tall ships' race. My experience in the past has been that, with weight and wind loading (from aerials etc.) being a major consideration, most if not all communication is now done via Inmarsat-C satellite, with their tiny aerials and computer-based transceivers. See page 5 of the Dec 93 HRT for an example of the Whitbread round-the-world yacht race communications system. However, do any readers have some other information on 'tall ships' communication? I'll be pleased to hear from you.

AR-8000 reports

Paul Hattemore says he recently bought an AR8000, and so far he is fairly pleased with it. It seems to operate fine even when it's positioned only 15cm from his PC, which is far better than any other radio he's seen. He adds that ordinary batteries last only about 4 hours, although this of course would be different with nicads, depending upon the mAh capacity of course. He finds that HF is a waste of time with the supplied aerial, but that even but with a even a short (5m) end-fed wire attached and used indoors he was picking up hams in Belgrade and



Guide books are a useful source of frequencies

the US on 14 MHz. Adding even a short external aerial for HF can often work wonders, as it did in this case. If at all possible try to get

it as much 'in the clear' as possible - i.e. away from sources of electrical noise and especially computers which are often notorious 'noise producers'!

If you're one of the many who do like combining computers with your hobby, a handy 'snippet' comes via a message from Paul Donald, who says that for those interested in the AR8000 programming via a remote computer and have Internet access, there is an interesting WWW site at: <http://www.cpl.uiuc.edu/~tpeckish/appendix.html>, with plenty of information on bandplan data etc.

Frequencies

I'm often asked about frequencies for a specific area, and asked for advice on 'where to listen'. As an example, a message from Paul in East Anglia says that he's just purchased a Realistic PRO-43 scanner, mentioning that the purchase was done 'completely on the spur of the moment' as he previously knew nothing about scanners whatsoever. He'd like to use the set to listen to military air traffic from Mildenhall and Lakenheath, but he's had no luck to date.

I can only reiterate my earlier general advice to readers that a good scanner or frequency listing book is the best initial guide. For example you'll find 'Scanners 3' down at your local Tandy store or your local bookshop can get it for you (ISBN 1 85486 106 9), this is a good introduction to the scanning hobby also. It's published by Argus Books, Tel. 01442 66551. Alternatively, for a dedicated 'frequency list' book, you'll probably find, as I have, that the 'UK Scanning Directory' (ISBN 0 9519783 6 5, from specialist hobby radio and scanner dealers) takes a



The ILA's quarterly journal, 'Just Listening'

A useful Members Handbook from the ILA

lot of beating. It's published by Interproducts, Tel/Fax 01738 441199.

International Listeners Association

The International Listeners Association was founded in 1985 enable listeners to exchange information on their hobby. To encourage those with a competitive spirit, regular contests are arranged and awards are available for attaining certain standards in the

hobby. This includes a handsome award, which the group recently displayed at the Stafford rally, for airband listening. They publish a quarterly newsletter, "Just Listening", which lists broadcast stations heard, aircraft and shipping, data reception etc. The June issue for example has articles on the amateur bands, 'Secret Number' stations, a marine bands roundup, utilities (logging those 'funny noises!'), airband selcalls, space shuttle communications, and plenty more including letters from members plus award and contest information. Members may also use the ILA's QSL bureau facilities for SWL cards from amateurs.

Membership of the group, which also brings you a handy 'Members Handbook' packed with information, is just £5.00 per annum (£7.50 overseas), payable annually in January. Members joining after July 1st (i.e., now) pay just half the annual rate. You can pay in sterling (cheques payable to ILA) or US dollar bills. To join, or for further information (send a stamp or an SAE), contact the ILA, 1 Jersey St., Haford,

Swansea, S. Wales, SA1 2HF, Tel. 01792 467541.

'Airplot' aircraft tracking

I've been told of a new commercially available PC program called 'Airplot' that's just become available. With it's real-time tracking facilities it's reportedly very useful for HF SSB airband monitoring, although by adding various waypoints (which can be found on AERAD charts) it can also track aircraft on VHF/UHF across mainland UK.

Written by John Standen, it's priced at £25.00, and offers map generation with a grid generating utility, aircraft position display with or without callsign, flight level, and ETA, with multi-coloured displays of current position and next position, track lines, and route data tables. If you're using this program, please drop me a line to let me know how you're getting on with it. Alternatively, if readers would be interested in a review in these pages, just drop me a line or even a quick voice message on the HRT voicebank (01703 263429).

Weather satellites and pagers

Many thanks for your letters and messages - please keep them coming! For next month's column I plan to give a few hints and tips on weather satellite monitoring with your scanner, and I also plan to detail wide-area message pager decoding with just a simple interface in a forthcoming column. As always, if you'd like any other specific scanning topics covered in future columns, please do let me know, as usual c/o the HRT Editor. See you next month!

Please remember that reception of some services may not be permitted without appropriate authority. The RA's information sheet on 'Scanners' has full information for the UK.

Bill Robertson is pleased to answer reader's queries through this column - address your letters to; Bill Robertson, c/o HRT Editor, Nexus, Nexus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or by fax or email to the HRT direct Editorial contact points.



The International Listeners Association

Realistic PRO-26 Wideband Scanner Review

Chris Lorek G4HCL goes fully wideband and tries to get rid of data

No sooner had I turned round after trying out Realistic's last handheld 'do-everything' scanner, did they bring out another, with even wider coverage! The distributors must certainly be aware that handheld scanners are very popular. They've also realised that the European market requires a wideband coverage (not the US-based 'bands'), VHF frequency steps besides 5kHz, and switchable AM and FM across the range.

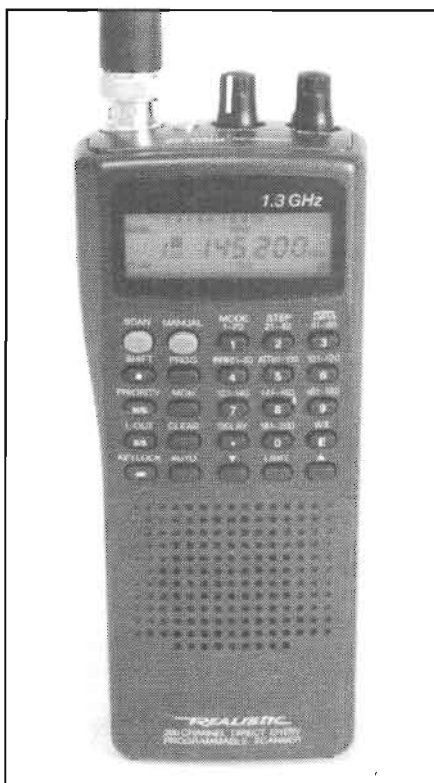
Coverage

The PRO-26 covers the continuous range from 25MHz up to 1300MHz, without the 'gap' around the UHF TV band which its predecessors had. You can program various step sizes, and switch mode between FM (narrow), FM (wide) and AM. Depending on the frequency you tap in, a 'default' mode and step size is automatically switched in, which you can if you wish temporarily change with a few button pushes.

Default mode and channel steps

Range (MHz)	Step (kHz)	Mode
25-29	10	NFM
29-54	5	NFM
54-72	50	WFM
72-81.75	5	NFM
81.75-87.8	12.5	WFM
87.8-108	50	WFM
108-137	12.5	AM
137-179.75	5	NFM
179.75-216	12.5	WFM
216-225	5	NFM
225-400	12.5	AM
400-512	12.5	NFM
512-806	50	WFM
806-1300	12.5	NFM

200 memory channels are arranged into 10 banks of 20 channels each, and



a single 'limit search' range lets you find new frequencies. 10 'monitor' memories are also fitted for temporary manual store of interesting frequencies you find in this mode. If you're not too fussed, and want to fill the memories with anything that lifts the squelch, a useful 'automatic store' is available which does just that - nicely programming your channels with frequencies found over a given range, for subsequent scanning. It's intelligent also, in not re-programming frequencies it's already found (unlike one other scanner I tested!). A 'data skip' facility is fitted, which claims to automatically skip 'data-filled' and unmodulated channels, see later.

The set scans through your programmed memories at a fast rate of 50 channels per second, and in 5kHz step 'search mode' at an incredible rate of 300 steps per

second. A handy facility is that up to 50 'unwanted' frequencies can be programmed into the set for it automatically skip during a search.

The set uses four AA size cells, and if you fit nicads nicads a 'charge' jack on the side of the case lets you recharge these in-situ. Alongside this, an DC plug lets you power the set from an external 9V DC supply, and a combined earphone/speaker jack on the top panel helps in noisy surrounds, or indeed when you don't want to disturb others. The set measures 154mm x 66mm x 42mm and weighs 240g without batteries.

On the air

There's one thing about Realistic scanners, they're easy to use, at least in the way the manufacturer intended. Programming memories, searching bands, no problem, no awkward or memory-wrenching buttons to remember having to push. On switching on, the set immediately starts scanning through the channel banks. To switch banks in and out, just press the appropriate numerical button, the set 'remembering' this for the next time you use it.

The problem I did however find was the non-UK 'default' modes and steps which always kept coming up! For example, trying to enter 200.5125MHz for Band III narrow band FM (before you ask, I am allowed to tap in that frequency - I wanted to check the Band III transceiver I'm authorised to use!) caused the set to automatically enter 200.500MHz instead, on wideband FM instead also, for me. So, every time after doing this this I had to manually change the step size, and mode, and then manually 'step up' to that frequency with the 'up' button, before I could start searching or whatever. Maybe the next generation will 'remember' user preferences as well,

like certain other scanners do.

On checking the 'data' skip facility in 'search' mode on various bands, I found the set stopped and continually monitored continuous data and paging channels very nicely. In other words, it didn't work. Maybe it only works for US-type data? It did however seem to cope with 'blank carrier' type channels fairly reasonably, and I just programmed the unwanted data signal frequencies into the 50 available 'search skip' memories, so there was little problem.

Overall, I found the set worked quite well on the air, and plugging in a hi-fi type single earphone brought superb quality - better than I'd ever heard from a handheld scanner. Coupled to my discone and rooftop VHF/UHF coliner, the set coped reasonably well with the many strong signals around. The switchable receive attenuator, built into the set, also helped with odd 'blocking' case I came across. Rejection of 12.5kHz separated signals was rather poor though, the set was obviously

designed only for 25kHz channel spacing.

One 'oddy' I did find, on searching the VHF Marine Band in the 'default' steps, was reception of what appeared to be 900MHz cellphones. Investigation showed this was indeed the case, and despite the set having a high (380.7MHz) 1st IF it was receiving strong 'Image' signals here at 12.5kHz offsets from the marine channels. Well, I can't help unintentional cellphone listening while I'm going about my lawful business listening to Marine band with the set on a boat, can I?

Lab Tests

My measured lab results showed the set was indeed quite reasonable in terms of sensitivity, and in rejection of most unwanted strong signals - something most handheld fall down badly on. The '1st IF image rejection' (reception of signals 761.4MHz above the tuned frequency) confirmed the

cellphone reception I found on VHF, also the 12.5kHz rejection, but otherwise the set was quite reasonable.

Conclusions

Realistic's new PRO-26 will I'm sure be even more popular than it's predecessors, and 'as usual' its wide availability will be the fact that helps it sell. It's a little unfortunate that the pre-programmed 'default' channel steps and modes can't be programmed into 'memory' for day-to-day operation, but fortunately they can be changed in use by a few key presses each time. The set has the useful ability to receive AM as well as FM throughout it's very wide coverage range, and its fast scanning action lets you keep an ear on the action rather than listening to a lot of silence between channels!

My thanks go to Link Electronics in Peterborough for the loan of the review scanner.

LABORATORY RESULTS:

All measurements taken at 145MHz, NFM, unless stated.

Sensitivity;

Input signal level in μ V pd required to give 12dB SINAD;

Freq.	Level
25MHz	0.33
30MHz	0.29
35MHz	0.32
40MHz	0.28
50MHz	0.25
60MHz	0.24
70MHz	0.22
80MHz	0.25
100MHz	1.01 (WFM)
120MHz	0.54 (AM)
145MHz	0.26
165MHz	0.25
200MHz	0.25
250MHz	0.33 (AM)
300MHz	0.39 (AM)
400MHz	0.39
435MHz	0.47
450MHz	0.46
500MHz	0.54
520MHz	1.60 (WFM)
760MHz	1.26 (WFM)
800MHz	1.06 (WFM)
900MHz	0.15
934MHz	0.12
1000MHz	0.68
1296MHz	0.96
1300MHz	0.99

Squelch Sensitivity;

Level of signal required to raise receiver squelch

<i>Threshold;</i>	0.23 μ V pd (11dB SINAD)
<i>Maximum;</i>	0.96 μ V pd (29dB SINAD)

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;	0.3dB
-12.5kHz;	7.4dB
+25kHz;	51.1dB
-25kHz;	52.3dB

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;	63.5dB
+1MHz;	69.6dB
+10MHz;	88.5dB

Intermodulation Rejection;

Measured as increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product;

25/50kHz spacing;	55.4dB
50/100kHz spacing;	56.8dB
100/200kHz spacing;	55.5dB

Image Rejection

Difference in level between unwanted and wanted signal levels, each giving 12dB SINAD on-channel 145MHz FM signals;

1st Image(+761.4MHz);	33.7dB
2nd Image(+116.15MHz);	77.6dB
3rd Image (+910kHz);	34.6dB

Maximum Audio Output

Measured at speaker/earphone socket, 1kHz audio at the onset of clipping (10% distortion), 8 ohm resistive load;

196mW RMS

Attenuator Level

17.3dB



SUBSCRIPTIONS AND
BACK ISSUES HOTLINES:
ORDERS:
01858 - 435344
ENQUIRIES:
01858 - 435322
LINES OPEN 9am - 6.30pm

A Direct Conversion Receiver for 80, 40 and 20m

Raymond Haigh details the construction of his modular receiver construction project for three popular amateur bands

The first part of this article appeared in last month's issue - if you missed it then back issues are available from the HRT Back Issues Dept.

Following on from last month, the specified Toko coils and the NE602 mixer/oscillator chip are available from Cirkut and Bonex.

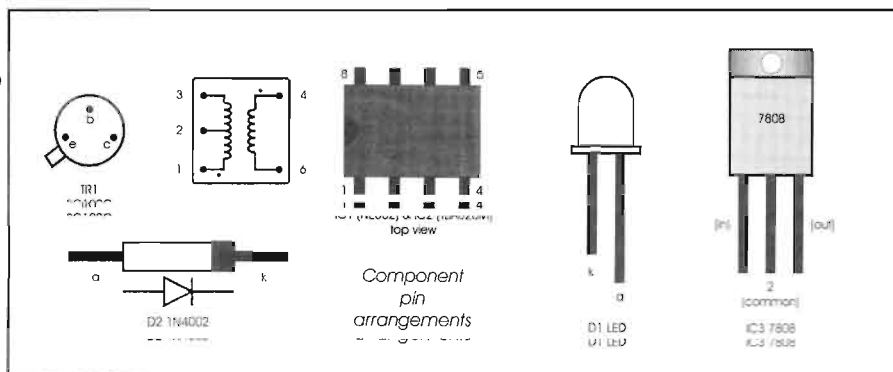
These firms, together with Maplin and others, can also supply the remaining components, and no difficulty should be encountered in obtaining parts. In view of the deliberately restricted audio response, a 100mm diameter loudspeaker will be perfectly adequate.

Construction

I adopted a modular form of construction with an individual front-end printed circuit board for each band, together with separate boards for the audio amplifier and the final filter and power supply circuits. This gives more flexibility in the layout of the receiver and makes it easier for constructors to build only those sections of the design which interest them.

The copper track side of the RF and mixer/oscillator boards is shown in Fig. 5, and the component side in Fig. 6. Although the boards are identical, different coil and capacitor combinations are required for the three bands, as detailed last month.

I used a holder for the NE602 IC, and fitted Vero pins at the lead-out points in order to ease the task of wiring between the boards. It's also



a good idea to fit Vero pins at the C13 position. This component determines the effective swing of the tuning capacitor, and the pins make it easier to make adjustments after final assembly in order to precisely confine coverage to the particular amateur band. Note that C13 is replaced with a link wire for the 80m band. Also, with a 68pF capacitor fitted for the 40m band, coverage will be between 7.0-7.3MHz. If you wish this to be restricted to 7.0-7.1MHz, use a value of 15pF here instead. Capacitors C3, C5, C12 and C13 should be close tolerance (5%) ceramic types with zero temperature coefficient.

For clarification, the type numbers of L1, L2/L3, and L4 coils are given in the components table in abbreviated form, the full types are;

- L1** 80m; 154FN8A6438EK, 40m; 154FN8A6439EK (yellow), 20m; KXNK3767EK (pink);
- L2/L3** 80m 154FN8A6438EK (violet), 40m 154FN8A6439EK (yellow), 20m KXNK3767EK;
- L4** 80m 154AN7A6440E (white), 40m 154AN7A6441E (green), 20m KXNK3767EK (blue).

Constructors who wish to try just one of the front-end boards before

attempting the entire receiver are advised to choose the version for 80m. Although this band can be badly affected by noise, it is active for a greater proportion of the time, and the lower frequency makes

setting up and operation slightly easier.

If a different audio amplifier is used, remember to fit DC blocking capacitor, C15, and to follow it with the audio filter components. These are mounted on the AF amplifier PCB and are essential to the functioning of the front end. Constructors seeking the greatest possible economy can connect C15 to the base of TR2, increase the value of C18 to 330nF and delete C16, C17, L5 and L6.

The copper track side of the audio amplifier PCB is shown in Fig. 7, and the component side in Fig. 8. Again, I fitted a holder for the TBA820M IC and Vero pins at the lead-out points. Resistor R10 is connected across the contacts of S2, there is no provision for it on the PCB.

Figs. 9 and 10 give details of the final filter and power supply PCB. L7 comprises 300 turns of enamelled copper wire wound reasonably evenly on a 50mm length of 8mm diameter ferrite rod. The diameter of the rod is not critical, but use 26 SWG or thicker wire to minimise insertion losses. Card end cheeks glued to a strip of card wrapped and glued around the rod help to contain the winding.

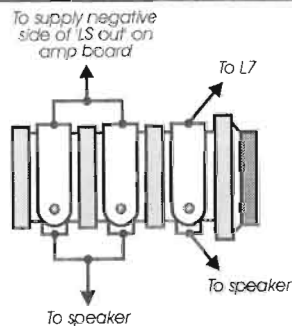


Fig. 4 Phone jack Wiring

Inter-board wiring

The PCB layouts detail the various connections between the boards, switches, potentiometers, tuning capacitors, speaker and power supplies. If this guidance is followed, it will be possible to operate the receiver from a simple mains power supply without any trace of hum. The single earthing point and the power supply connections are particularly important.

Screen the signal leads between the front-ends and the audio amplifier board, and connect the screens to earth at one end only or hum problems will be caused by multiple earth paths. This screening was omitted from single band versions of the receiver during the development process without any ill effects. It is, however, a wise measure when all of the boards are brought into close proximity and band switching increases the length of the inter-connections.

The connections between the front end boards and the tuning capacitor gangs must be short and direct and made with reasonably heavy single strand wire.

Housing the Receiver in a Cabinet

Provided a few simple precautions are observed, the layout of the PCBs within a cabinet, and the positioning of the controls on the front panel, are not particularly critical. Whatever arrangement is adopted, the assembly must be strong and rigid and the inter-board wiring held firmly in place. To receive SSB signals on the 20m band, the oscillator has to be held steady to within a few Hertz at frequencies around 14MHz, and any unwanted movement of the components will make the operation of the receiver erratic and difficult.

I adopted a traditional approach to housing the receiver, with the

9mm plywood front panel which supports the speaker and controls bolted to a standard 203 x 152 x 63mm chassis. The three front-end boards are arranged around the tuning capacitor beneath the chassis, and the audio amplifier PCB is mounted, on stand-offs, to one of the chassis sides.

Softwood blocks, 30mm thick, are fixed beneath the chassis by self-tapping screws, and the front-end PCBs are mounted on top of these on short stand-offs. This makes the inductor cores and C13 pins very accessible, and imparts rigidity and mass to the chassis. A framework of aluminium strip restrains the plywood front panel, keeps the receiver level on the bench when work is being carried out to the underside, and provides an anchor for the power-feed and speaker wiring. The final filter and power supply board is mounted on this framework at the opposite end of the chassis to the audio amplifier. Ample space is available for the 12V battery supply, I accommodated a

the speaker is to be housed in a separate cabinet, C30, L7 and S3 could be placed with it and C31 may not then be necessary.

All of this sounds rather daunting, but the receiver is quite easy to set up in practice and, as direct conversion circuits go, is particularly non-critical. There are no microphony problems, even when the loudspeaker is operated at high volume.

Terminals, sockets and controls are all mounted on the front panel for ease of access. Three coats of cellulose based sanding sealer followed by three coats of car spray paint were used to finish the panel, which was annotated with white, rub-down transfer lettering. A little

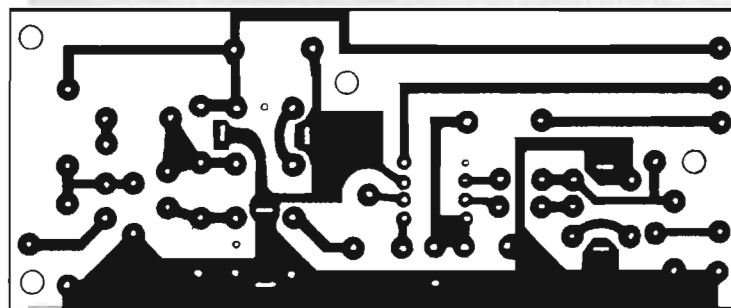


Fig.5 RF Front End PCB, track side

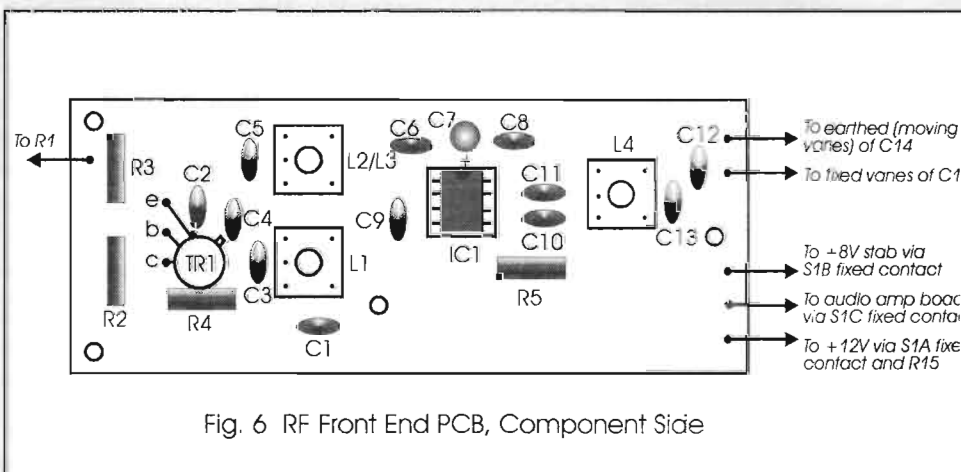


Fig. 6 RF Front End PCB, Component Side

pack of eight AA cells in a plywood housing.

The external field of inductor, L7, can interact with the front-end boards and, what is more likely, the ferrite-cup-core inductors, L5 and L6, which are sited on the audio amplifier board. Whatever arrangement is adopted, mount the audio amplifier and final filter boards in such a way that the core of L7 is at right angles to the cores of L5 and L6, and keep the final filter assembly as far away as possible from the other boards. If

oil based varnish was applied over the lettering to protect it.

The chassis and front panel slide into an open fronted box constructed from 6mm plywood and given a French polish finish. Constructors who don't want the bother of making a housing for the receiver could use one of the excellent instrument cases retailed by Maplin, Cirket and others. Indeed, if the plywood and finishing materials are not already to hand the expense won't be that much greater.

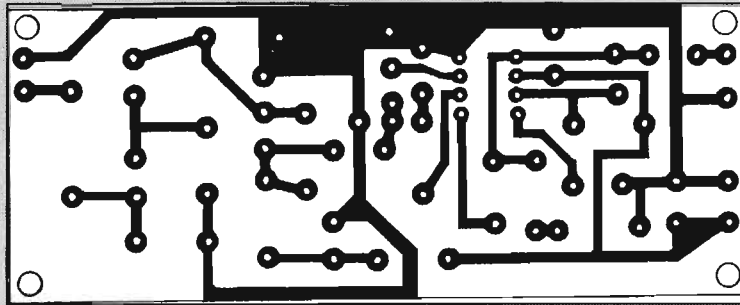


Fig. 7 Audio Amplifier PCB, track side

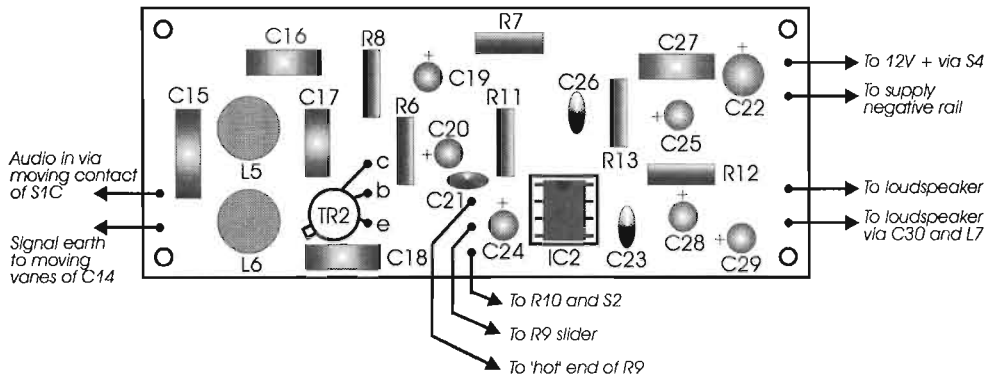


Fig. 8 Audio Amplifier PCB, Component Side

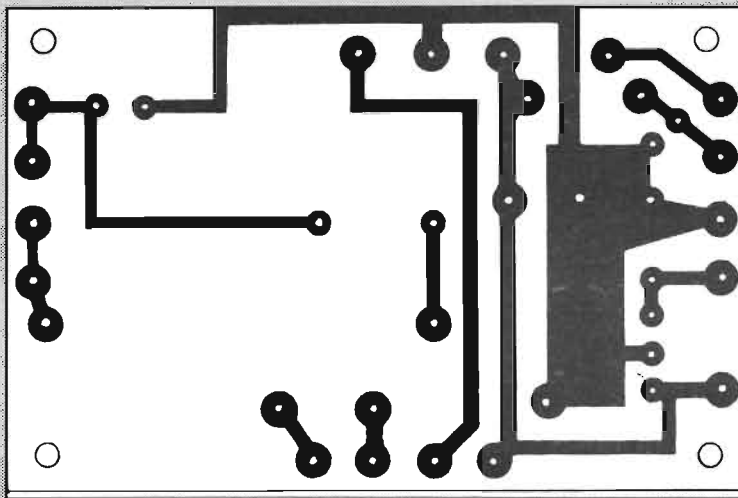


Fig. 9 Voltage Stabilizer and final audio filter PCB, track side

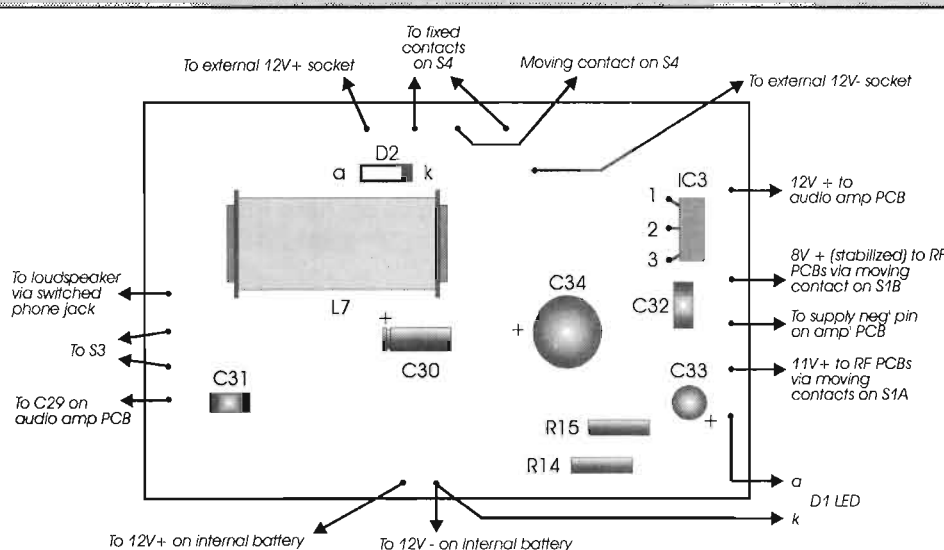


Fig. 10 Voltage Stabilizer and Final Audio Filter PCB, Component side

Setting up and alignment

It is a good idea to connect up the boards on the bench and carry out the initial testing and alignment before confining them in a case. Take the front-end boards individually and mount them, with the tuning capacitor and drive, on an old chassis, or even bracket them off a piece of thick plywood. Temporarily wire up between the front-end, audio amplifier and power supply boards, and connect the potentiometers and loudspeaker. Don't bother with the band-change switch at this stage.

Check component placement, particularly the orientation of the transistors, ICs and electrolytic capacitors, and check for poor soldered joints and any bridging of the copper tracks on the PCBs. If everything appears in order, connect a fresh 12V battery pack. The current drawn by the receiver should be approximately 16mA under no-signal conditions, rising to about 50mA at normal speaker volume. Dry battery power supplies are, therefore, perfectly feasible.

A signal generator makes alignment easy, but a receiver covering the three amateur bands can be used instead. Many constructors will not have a signal generator, but most will own or have access to a decent receiver with the necessary coverage. At a pinch, a transistor portable will do, but these receivers do not usually cover the 80m (3.5MHz) band and the second harmonic of the NE602 chip must be tuned in on 7MHz.

Planned for a future issue of HRT, is a construction project for a simple and very inexpensive signal injector which will pinpoint the 80, 40 and 20m amateur bands and considerably ease the task of aligning the receiver. So, constructors who lack both signal generator and a suitable receiver should not despair.

QRP corner

Dick Pascoe G0BPS gives a few tips on using beeswax in keeping your QRP gear in

I forgot to mention last month in my column that during my Friedrichshafen trip I found a spot of news that should be of benefit to many of those amateurs waiting to get hold of one of the new *QRP Plus* rigs. I have heard through various sources that Index Labs in the USA, the manufacturers of this rig, are having a lot of trouble keeping up with the orders. It now appears that a German company is producing the *QRP Plus* index under licence. Hillock Projects, of Funktechnik Elektronik, Fruhlingstr; 10, D 89438 Holzheim Germany may be able to keep up a little better.

It also came to light that a string of modifications have appeared in Europe for this little rig. A packet message from my other Dragonslayers QRP members brought to light the following floating around on packet in Germany and Holland. Thanks to Pete PE1MHO for the translation, the following is from Peter DL2FI. I met Peter at Friedrichshafen when he spent some time helping on the club stand and enjoyed his company a lot during the show. He is a dedicated QRP man and writes for one of the DL Magazines. He is currently trying to get the German QRP Club up and running. I have not checked these modifications out personally so usual disclaimers etc.....

It would appear that the *QRP Plus*, when seen on a spectrum analyser, is not too good. Some worst cases saw the spuri at only 20dB below carrier. His suggestion comes also from N6CM & PA0RBC, make the IF amp (Q3) resonate exactly on 50MHz. Two rigs have been tried and the spuri have vanished.

The ALC also appears to attack at very low levels, a variable pot of about 2.5k fitted between R16 and R15 on the transmitter board should help. When set to zero ohms, the ALC will be as factory set. Adjust with a Two Tone Generator and Scope.

The output transformer could also be improved. Using a FT43 mix twin hole body use six turns bifilar. To make this bifilar, use an battery driven drill and wind the wire with this. This winding of the wire gives

much better coupling.

It also appears that the 'Plus' has problems with mismatched aerials, it radiates at all known and some unknown frequencies until you open the key, or until the power FET dies. With the famous Matchbox front end by Ha-Jo Brandt DJ1ZB, it will never happen (this unit can be found in the G-QRP Antenna Handbook).

In this packet message I got a couple of circuit ideas to improve this little rig. An SAE to the address below will get them from me. It is always amazing to see that a company brings out a dedicated QRP rig that, on the face of it, appears to be an excellent performer. Usually within a few months a batch of "modifications" appear from owners who come up with "improvements". Note the inverted comma's! In many people's opinion, not all modifications are improvements to the basic rig!

More uses for Beeswax

Another message from Kevin G0UHD reminded me of a tip first mentioned by Ian G3ROO who used to keep bees. Apart from the beautiful honey produced by the bees, the wax has a myriad of uses and several within the hobby. At the Brighton rally I was asked to suggest a way of making a waterproof connector for standard 300 ohm ribbon and coaxial cable.

"Easy" I said, take one plastic film canister, drill a hole in the end of the canister big enough to take an SO239 bolt in socket. Trim back the two ends of the ribbon. Slide the nut and the washer over the ribbon and then push the wire through the canister and the hole. Solder one leg of the ribbon to the SO239. Pull the ribbon back through the hole and solder the other leg of the ribbon to the washer lug. Now the difficult bit, push the socket into the hole and tighten the nut over the washer. What is left is a fairly waterproof connection but will be even better if beeswax is melted and the canister filled.

I also use beeswax in my VFO's. After winding the coil and getting the VFO on the required frequency, I use a lump of wax to hold the coils of wire in place on the former. This ensures that any change in frequency is one that is intended. Of course, if a change is needed, a hot air hair dryer will suffice to melt the wax and enable the changes to be made. A few drops into the top of transformers in receivers also stops drift. Don't be tempted to use candle wax, this is much more brittle when cold. Beeswax has a flexibility when solid and is much easier to use.

A request from Johnny G3LIV, he has recently acquired an elderly TS130S and would love to use this radio at low power levels. He suggests disabling the PA and just running it from the driver. The old trick of feeding a negative voltage from a PP9 battery via a 'pot' may be of use, but Johnny wishes to make the mod more permanent. Anyone out there with the answer? Please drop me a message if you can so that I can share it with other readers.

Norman G0NEE / DL6NEE wrote after our meeting in Germany. He has a few ideas about single sideband bandwidths and has done some experimentation. He suggests limiting the transmitted audio bandwidth to about 800Hz - 1kHz, most of our audio power is within this anyway. This restricted bandwidth means that our output power is concentrated into this smaller bandwidth.

He was not convinced that it would work, but with a variable bandwidth outboard audio filter, listening to SSB signals he was able to copy SSB at a width of 1kHz easier than with a wider filter with his local QRM. The speaker's voice, however, was not recognisable.

Using a simple 1kHz, two pole filter in the transmitted signal has lifted reports by between one and two 'S' points. Critical listeners have said that the signal is "not too good" but all have agreed that the signals were perfectly readable. If readable then I would think that the gain would far outweigh the loss of recognisability.

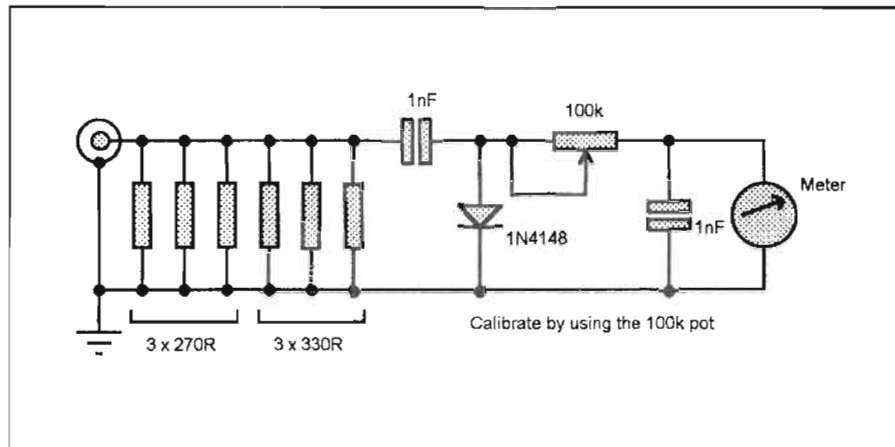
His next idea was to make the

filter switchable with his normal one and switch between the two when required, when more punch is required the filter is brought into use. His comment of "two 'S' points" couldn't be easier to find. Has anyone else out there tried this? I would love to hear from you if you have any further information.

Left-handers

During the QRP Contest, back in June, readers may remember the Dutch and German visitors to my shack. During the contest we used CW for a couple of contacts, and much to my amazement, all of these operators used their paddles in the reverse way to ours and with their left hands. Now the chances of all of them being left-handed was not on, so the question was asked.

The answer was so obvious that I wondered why I was still sending Morse with my right hand, and have since put another paddle to use the "wrong way round". Convention has it that, when using a paddle key, for a right handed operator the dots are formed with the thumb on the left paddle and the dashes with a finger



Simple QRP termination wattmeter

on the right.

Their idea was to reverse this sending with the left hand, the dots with the left hand thumb and the dashes with the left hand finger. It takes a little practice. I first tried to send with the left hand with the paddle the conventional way round, but found the change much easier to handle.

The reason for the change of hand? You can send and write at the same time - simple! I am still practising, so if you hear some left handed Morse on the bands, sending

a bit sloppily, it might be me.

Just to finish off this month, a simple circuit for a QRP termination wattmeter, ideal for handhelds if the connector used is a BNC. Keep all leads as short as possible and use a metal box. The meter can be any value, from 50µA Full Scale Deflection (FSD) to 250µA FSD.

So, that's it for this month, news and views to me via the Editor, via packet to GB7RMS direct to Seaview House, Crete Road East, Folkestone CT18 7EG or via Email to Dick@kanga.demon.co.uk.

B&W

AP 10 Portable antenna
for hotels, flats etc.
40 thru 2m. £89.95

VS300A Transmatch A.T.U.
300W 1.8 - 30Mhz £142

Wideband dipoles	BWD 1.8 - 30 (Mhz) 90ft. long	£249.95
(2kW P.E.P.)	AC 3.5 - 30 (Mhz) 90ft. long	£239.95
	AC 5 - 30 (Mhz) 65ft. long	£239.95

Model AC 1.8 - 30	110ft. end fed, needs only centre support.	
(2kW P.E.P.)	Covers 1.8 to 30Mhz	£249.95

Anode & Filament chokes for linears. Wide range of coil stock

**NEW* Syon Super 8 coax cable similar loss to
RG 213**

**but only 6.2mm dia. and very flexible - 80p/m
Jackson ceramic end variables 1000pf. 2kW £22**

SYON TRADING

16 THE RIDGEWAY, FETCHAM, LEATHERHEAD, SURREY KT22 9AZ
Tel: 01372 372587 Fax: 01372 361421
Callers by appointment only

See us at Leicester
on stand S30
Special show offers

Radio Bygones

The vintage wireless magazine,
is now **bigger!**

More pages, more features

IN THE CURRENT ISSUE...

- Eddystone 730/4 communications receiver
- Frequency-changer valves
- Getting the most from crystal gates
- Philips "Theatrette" broadcast receivers
- The Post Office W5 transmitter
- Essential Work - a WWII ship's operator ashore

PLUS...

- News • Letters • Adverts • Books by post •
- Readers' Sales and Wants • Book reviews •
- Plus the usual Colour photo-feature

See you at the Leicester Show, October 20-21

Annual subscription (6 issues) £18.50 in the UK,
£19.50 to Europe; £23.75 the rest of the world, by airmail,
or send £3 or a US\$5 Bill for a sample copy

Please make cheques payable to G C Arnold Partners

G C Arnold Partners (H11), 9 Wetherby Close, Broadstone
Dorset BH18 8JB, England. Telephone/FAX: 01202 658474

From My Notebook

Geoff Arnold G3GSR answers the often-asked component question, "Will it do?"

My topic for this month and next was suggested to me recently by a reader of *HRT*, and might well carry the title "Will it do?". Basically, I shall be setting out to explain the decisions you have to make when building or fixing a piece of radio or electronic equipment, when you don't have quite the right component to effect the repair.

Why should you wish to fit a "makeshift" component, rather than waiting until you can purchase the correct item? Well, there could be several reasons - first of all, it may be that you need to make an urgent repair. Under the terms of Murphy's Law, a vital piece of equipment is most likely to fail at a time when spares are not available; when your local component shop (should you be lucky enough to have one) has just closed, for example! Or it may be that you need a component that is no longer made or otherwise not freely available - for a piece of vintage or ex-military equipment. Either way, you need to know how to select the best available substitute.

For all the components I shall talk about, physical shape and size is usually important, although if you are needing to replace a vintage component, this is probably the least of your worries, for everything was so much larger in those days. Fixing hole arrangement, or pin arrangement for PCB-mounted components, can also be crucial.

Fixed resistors

For fixed resistors, we only have two connections to worry about, unless you're talking about one of the large, tapped, wire-wound resistors as found in the power supply sections of TV receivers and AC/DC radios.

Obviously, the replacement must have the same ohmic value, or near enough to make no difference to the operation of the circuit. You may have to achieve this by connecting a couple of resistors in series or parallel. Occasionally, you may need to use more than two resistors, but

this is fairly rare. Remember, you connect resistors in series to produce a value larger than any of the individual components, but connect them in parallel to produce a value which is lower.

The simplest case of two identical resistors in parallel will yield a value equal to half their individual values. The general case of any two resistors in parallel can be worked out from the short-hand formula "the product over the sum". In other words, if we had a 22 ohm and a 47 ohm resistor in parallel, the net value would be 22 times 47 (1034), divided by 22 plus 47 (69). If you work this out you will find it gives almost exactly 15 ohms.

If you have to go to more than two resistors in parallel, you are faced with a formula which says that the reciprocal of the total value is equal to the sum of the reciprocals of the individual values. That's as good a reason as I know for sticking to no more than two in parallel!

Related to ohmic value are tolerance, how close is the actual value to that which is marked on the resistor; and temperature coefficient, how much is the value likely to vary as the resistor heats up? Tolerance is expressed as a percentage, and stability in parts per million per degree Celsius (ppm/deg.C).

At one time, "ordinary" resistors (often solid carbon) were used in run-of-the-mill circuit positions, but for positions sensitive to excessive noise (at the input of high-gain, low-level amplifiers, for example) "high stability" resistors would be used. Those high stability resistors were considerably more expensive than the ordinary types, which is why they weren't used everywhere. With developments in materials and manufacturing technology, all resistors made nowadays equal or exceed the old high stability types in performance, and precision resistors are available with a standard of performance which was once inconceivable outside a laboratory situation. Remember though that all resistors produce *some* noise of course - it is an inescapable fact of physics.

Resistor tolerance is another area where things have changed drastically over the years. Only 40 or 50 years ago, most resistors used in radios had a tolerance no better than 20 per cent, in other words a

nominal 10 kilohm resistor could actually have a value anywhere between 8000 and 12000 ohms. More critical positions used the more expensive 10 per cent variety, or possibly even 5 per cent. Nowadays, nothing worse than 5 per cent types seem to be made, and 1 or 2 per cent resistors are quite common.

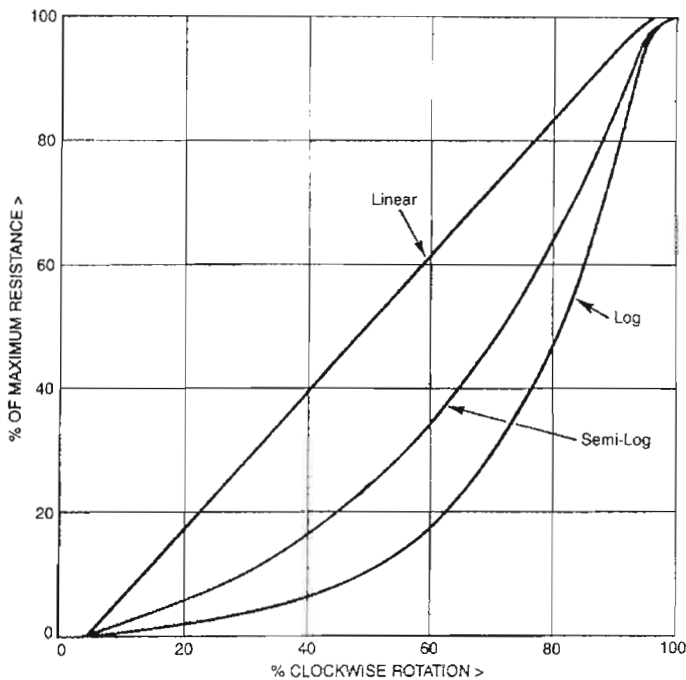
If you connect two resistors having the same percentage tolerance in parallel or series, their combination will have the same tolerance, regardless of their individual values. If, instead, you have two resistors of different tolerances, the tolerance of their combined value will depend on their individual values and tolerances. I'll leave you to work out one or two random examples - pick any values you like, it can be quite illuminating.

Power and Voltage

The next resistor ratings to consider are maximum working voltage and maximum power dissipation. You may think that the two go hand in hand, power being proportional simply to the square of voltage. For some resistance values, this may be true, but in higher values the safe voltage limit may well be reached long before the power dissipation limit. For example, from a simple power versus voltage calculation, a 470 kilohm half-watt resistor dissipating its full rated power would have 484 volts across it. If it's a standard metal film or carbon film component, its maximum safe working voltage is likely to be 350 volts, so you could never safely run it at its full rating. Smaller resistors (quarter or eighth watt) are usually rated at no more than 250 volts. Of course, it is not good practice to run a resistor so hard anyway - something nearer 50 per cent of maximum power is a much safer figure.

For most circuit positions, it is wise to take the HT supply rail voltage as the maximum likely to be applied to a resistor. For solid-state equipment there will usually be no problem, but for valved equipment - say an amplifier running at 450V HT - this means that you should not consider fitting a resistor of less than 1 or 2 watts rating, corresponding to typical safe working voltages of 500 or 700 volts.

Wirewound resistors, whether of the traditional type wound on a ceramic rod or tube and coated with dark green vitreous enamel or a grey cement, or of the more modern



types with ceramic bodies or aluminium housings, generally have a tolerance of 5 per cent. Low values (typically less than 10 ohms) are commonly 10 per cent.

Because of their high power handling capabilities, compared with carbon, carbon film or metal film types, it is sometimes tempting to use wirewound resistors as loads for the output stages of power amplifiers. Whilst you may get away with this for audio frequency amplifiers, the self-inductance of the winding becomes significant at RF, and would produce most unsatisfactory and erratic results.

Summing up for fixed resistors, value and tolerance are the two most important characteristics to be matched, followed by power rating. For valved equipment, maximum working voltage also comes high on the list. If you should be working on an older piece of equipment, you will find that virtually every modern resistor is smaller than the one it would replace. Don't forget to consider noise in low-level stages, and self-inductance in RF circuits.

Variable Resistors

More or less everything I've said about fixed resistors applies to variable ones as well. A variable resistor has three connections compared with the usual two for fixed resistors - two of them go to the ends of the track along which a sliding contact (the third connection)

runs. In the early days of radio, the track would have been either carbon or wirewound. Then in around the 1960s came a type called Cermet, having a metal-glaze resistive element on a ceramic base. These had the advantage of being longer lived and also less noisy, in terms of "scratchy" contact between the sliding contact and the track, than their carbon track predecessor. More recently, a type using a conductive plastic track has come upon the scene.

The most significant added feature of the variable resistor is its "law". This describes the relationship between the change in resistance value which results when you move the sliding contact by a similar amount in different parts of the track. Thinking for the moment of a rotary control rather than a "slide" pot, if turning the knob through the same angle always produces the same change in resistance between the slider and one end of the track it is in, the resistor is said to have a "linear law". This also means that if the sliding contact is at the centre of the track, the resistance between it and each end connection will be the same.

Another common law, used for things like AF Gain ("volume") controls, is a logarithmic one - "log law" for short. When the sliding contact has moved from one end of the track to the half-way point, the resistance measured from slider to starting point will be just 10 per cent of the total track value. Because of its use in audio circuits, this law is sometimes known as an "audio taper".

The reason for using a log law is that it corresponds to the ear's perception of changes in sound levels. If you replace a log law AF Gain control with a linear one of the same value, you will find that the variation is "squashed up", with virtually all the change in level occurring in the first few degrees of rotation, not very satisfactory.

Occasionally, you will encounter a variable resistor with a different law or taper - they have been made in up to six different varieties! The one you are most likely to come across is the inverse log, which is just what it says, and the resistance value at the half-way rotation point will be 90 per cent of the total. This law is sometimes used in tone control circuits. Another is the semi-log, in which the value has reached about 25 per cent of maximum at the mid-rotation point.

If you need to replace an inverse log law control, you have problems. To all intents and purposes they are unobtainable. The only solution usually is to use a log law component, with the connections to the two ends of the track reversed, and accept the fact that the control will henceforth work "backwards", perhaps not the end of the world if it's a tone-control circuit.

There is a way of modifying the effective law of a linear variable resistor by connecting a fixed resistor between the sliding contact and one end of the track, but I don't propose to go into that here (perhaps it's a subject for another day).

The total angle of travel of rotary variable resistors has unfortunately never been completely standardised, and may typically be anything between 270 and 300 degrees. Usually, this is not too critical, although where there is a calibrated dial or bezel to the control, a differing travel can at best look scruffy, or at worst entail recalibration of a dial.

Size and shape of a replacement variable resistor, whether of a rotary or a slider type, can be a particular problem, because so often they mount on or just behind a front panel. It's not just the size of the body of the control, but also the diameter and length of the fixing bush, and of the shaft.

Life gets even more complicated for dual controls, as used in stereo amplifiers, where right and left channels must be varied together to maintain the stereo balance. Worse still are "dual concentric" controls, where the equipment designer ran out of front panel space for all the various controls and had to combine some of them in pairs, with small and large knobs. Finding replacements for these is an especial nightmare, particularly where there is an on/off switch thrown in on the back for good measure.

In next month's column, I shall be looking among other things at capacitors, chokes and transformers.

VHF/UHF Message

Geoff Brown GJ4ICD recounts the successful Cape Verde 6m DXpedition

Having being involved in organising the Jordan expedition, I decided to ask around the 50MHz fraternity to see what country was needed by most European amateurs, and, was within possible sporadic "E" distance, so that a possible DXpedition may be mounted in June 1995.

Monaco and Hungary were the most popular requests, but, it was highly unlikely that a permit would be granted to an "outsider", as their own residents were not even permitted to use 50MHz.

After the success of Eric 5T5JC in Mauritania, I looked at the Cape Verde Islands with interest. These Islands are situated just a few degrees further south of Mauritania, about 600km out in the Atlantic Ocean.

The distance from Europe seemed possible via "ES", and so, having worked D44BC in 1989 via F2, I wrote a letter to Julio D44BC to see what he thought about the idea. On returning from the Jordan expedition, a reply was received.

Julio, without hesitation, offered the expedition his shack and call. Now operators, equipment, flights and a hotel had to be found. The 1994 50MHz JY7SIX operators were approached, unfortunately Paul G4CCZ and Mike G3SED were already "booked" for the Camel Trophy event in Belize (V31RD). This left Neil GOJHC, Nick G3KOX and Tom DL7AV. Neil was game, but he had work commitments. Tom DL7AV did not want the chance of missing a new country, he was at the "top of the 50MHz ladder in Germany" and wanted to stay there! Nick G3KOX was thinking about it, as, the cost was quite high and he never knew what part of the world he would be in at that time. In fact, speaking of costs, here's an account of just what costs go into giving "you" a new country on the band.

Basing costs on leaving the UK, the flight to Lisbon, then Sal, then onto Sao Vicente, 14 nights in the hotel, and then returning back to the UK, was £1200 per person. This may I add, is not including food, equipment insurance and health insurance, and

flights to the UK. So, around £1800 per person would seem the 'norm'. "Was it going to be worth it?" we asked ourselves.

By mid-January a kind lady called Marilyn at Travelmaker in Jersey (part of the Co-Op Homemaker group) came up with a package that was just right, it fitted our needs perfectly. There were a few hiccups like inter-island flights that were not running after everything was booked, but Marilyn ironed them out.

Towards the end of January, Julio was contacted several times by phone and fax, everything was coming together and the final details needed fine tuning! By mid March our very kind lady at the travel shop had received all the reservations from London, Lisbon and the Cape Verde Islands. It was now a question of having a few inoculations, settling the bill, and just waiting.

With only two months before departure, equipment and operator briefing had to be gone through. No mistakes could be afforded, as, we were operating within Julio's house, plus there's no way on Cape Verde to get that odd plug or cable that may be required.

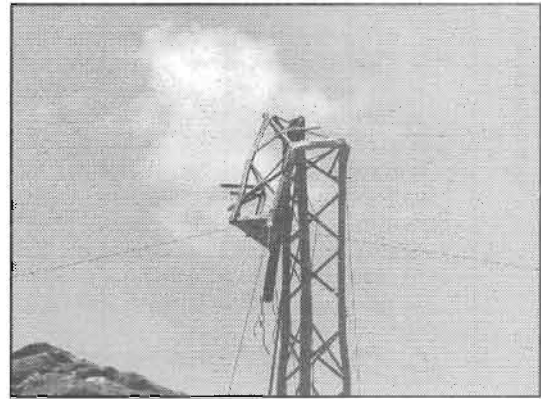
Two months to wait!

Well two months is not that long to wait, time just flies and there we were, May 1995 and ready to leave. It was hoped that another two operators would be traveling with us, but this did not materialise due to the cost involved. However, with a total of three operators, and a possible visit of Nick G3KOX, we thought that we could handle the operating sufficiently. Armed with radios and equipment, off we went.

May 30th

It was an early start as Anthony, GJ7DTA and I were on the 0715 from Jersey to Heathrow. On arrival at London, we were greeted by rain, rain, and more rain.

After a couple of hours waiting, we boarded our first long-haul flight to



What a greeting!

Lisbon, a few hours later and we stepped into 25 degrees of beautiful sunshine. But where was our tour representative to meet us? We hunted around the airport but it seemed that our transfers to the hotel were just not there. Rather than waste any more valuable time, we jumped into a taxi (mistake number 1!), it seemed that we had got "a Nigel Mansell taxi driver". He weaved and dodged everything in sight, what an experience! At last, we arrived at the Hotel Penta in Lisbon. "Room 1632, Sir" a voice said. It was on the 16th floor and the lift worked!

Up went the dipole and out came the FT650. Guess what? Buzzzzz, yes "CT" video at S9+, so we quickly packed up the radio and departed for the bar.

May 31st

After breakfast we returned to Lisbon airport, but when we checked in there was a little hiccup regarding our visas in Cape Verde. We did not have them in our possession as the travel company had made arrangements. Luckily I had a letter with me to state that fact, otherwise we may well have been refused to board for Cape Verde. So, off we went to Sal International Airport, which was a 3 hour 40 minute flight.

Anthony and I were becoming a little confused with the time differences, when we arrived in

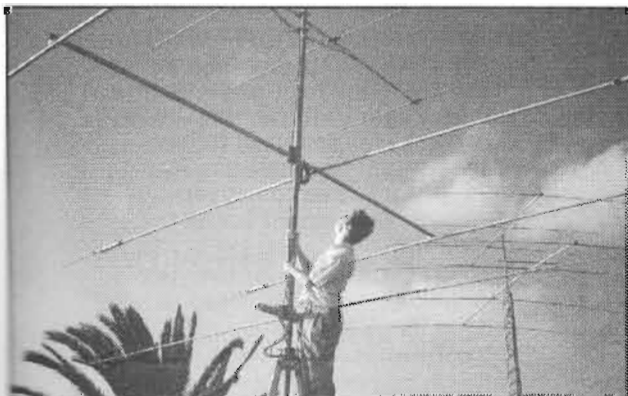
Lisbon we had to add one hour, on arrival in Sal we had to go back 3 hours, what really was GMT? Well, it was one hour ahead of local time, which seems strange when in the UK we are GMT or one hour ahead of GMT! As we touched down in Sal and disembarked, the heat hit us, we had gone from cold wet London to Sal, with an increase in temperatures of at least 18 degrees.

Our last flight was onto the Island of Sao Vicente, which took another 40 minutes. This time as we touched down, we both thought that we had landed on the Moon. The landscape was incredible, no trees, just volcanic mountains.

Julio was waiting for us, and after baggage collection he whisked us away in his gleaming white Audi. We arrived at the hotel to be greeted with "Sorry but we do not have a reservation for you". "Oh dear, what happens now?" I thought. Julio's charm sorted things out, and we were allowed to stay in the hotel until June 12th. After a few formalities at Julio's house, he then took us onto the flat patio roof. At first sight I wanted to go home!

Number one tower was very badly damaged, the top was bent clean in half. Number two tower also had serious problems, the rotator brake and gears were destroyed in the gales earlier in the year.

Mountains surrounded us, what were we going to do? After a 4500km trip we had to make the best of things, they couldn't get any worse could they? Well, the answer was yes! Julio's trusty friend "Champ" (an eight month old Rottweiler) came to see what was going on, he had a good sniff at us both as we stood frozen to the floor and not daring to move. Then along came the three German Shepherds, could there be any more surprises? Eventually we got to bed, thinking that June 1st would be some working day.



Anthony on the system we built up from nothing

June 1st

It's 7.00am and time to go to work. Get the 50MHz beam up first; that's the priority and that's what we did. Lela, an employee of a local company, had been seconded for a few days to help with the rebuilding of the aerials. This was a great help, as lifting massive beams required more than one person.

We hadn't brought any silicon rubber to waterproof the aerial connections, Julio then told us that it wasn't a problem as it had not rained for three years! The island by the way is totally dependent on a desalination plant to provide all the water. Electricity is provided by the local power station which is subsidised by 30% with wind generators donated by Denmark (I'm glad we worked some OZ's!).

At 1430z, the first signal was heard on 50MHz, CU3URA/6 was S8, however there was no sign of Costas, CU1EZ. We then brought the TS940 from Julio's old shack and placed it in the new operating area in his house. Unfortunately when I switched it on it was dead, what else was going to go wrong?

An hour later it was working, and the rest of the day was spent building and improvising on the aerial system. We needed 28.885MHz, but the 10m beam's centre insulators were all broken except one. After careful thought, the boom was chopped off together with the reflector element. It was then tuned to make a rotary dipole, and it worked very well!

June 2nd

The 28MHz aerial was fitted to the stub mast, then we salvaged the 18/24MHz beam and also fitted it to the stub mast. We now had three aerials working on 4 bands.

At 1330, very strong RTTY was copied to the west on 50.066MHz, but no beacons or stations were heard. Eric G2ADR was copied on 28.885MHz telling his news about the 4K6 he had just worked, we were very envious and went back to aerial building.

June 3rd

Most of the hard work had been completed and Julio now had a few bands to work

on. After careful thought, I decided to change our strategy. We were on air at 9.00am each day, which meant 1100 local UK time and 1200 in Europe. This was much too late and we were losing half the day, and so we changed our operating schedule to 7.00am local time. At 1200 things began to happen. 48.2514MHz video was copied, then ZB2VHF, and at 1317z our first contact. GM3WOJ was calling CQ and was 599.....here we go. GM, GI, CT, G, EH, EH8, GD, GW, 9A, CT3, I, HV and 5T6/X/B were worked on both CW and SSB at strengths up to S9. It was a relief to hear those stations.

June 4th

At 0940 local, EA video came booming in at S9, then ZB2VHF was copied. Many calls were put out on 50.108MHz but no takers. On tuning around, I found G7BXS (IO70) at S9 chatting to a CT on 50.110! Call after call was made to him, but the CT's were obviously much stronger than our signal, eventually he vanished.

This emphasises how important it is to keep European traffic away from this segment of the band, and not to encourage inter-continental traffic, as G7BXS lost a nice country. At 1350z the band opened again. G's, GW's, CT3FT, GJ's, GU, and PA's were worked, Dennis, GJ3YHU was S9+ on SSB. We then copied GB3MCB for 90 minutes with no takers, ZB2VHF was also S5. The band died with us at around 1700z.

June 5th

We now had 15 countries in the bag and about 70 stations. It really was hard work on 6m, calling and calling with no takers, so we decided to establish ourselves on 18MHz. After doing so, we had fantastic pile ups.

18MHz proved to be our link into Europe, South America, South Africa and the USA for passing on information about 50MHz. Later that day Eric 5T6E was worked for country No. 16, he was S9++ on SSB.

Lots of European beacons were copied on 28MHz at very good strengths, but we seemed to have the 49.999MHz saga again! You can read more next month!

See next month's VHF/UHF Message for part 2.

DATA CONNECTION

Chris Lorek G4HCL tries some new Windows packet programs

If you went along to the British Amateur Teledata's rally at Sandown park in September, I hope you managed to pick up a few data bargains. I will only have had a short time there unfortunately for my own visit (i.e. a quick 'look round' before it closed), as I found that I'd been previously 'booked' to give a lecture on HRT Equipment Reviews the same day at the HF and IOTA convention that weekend - bad planning on my part! The XYL tells me she's buying me a diary.

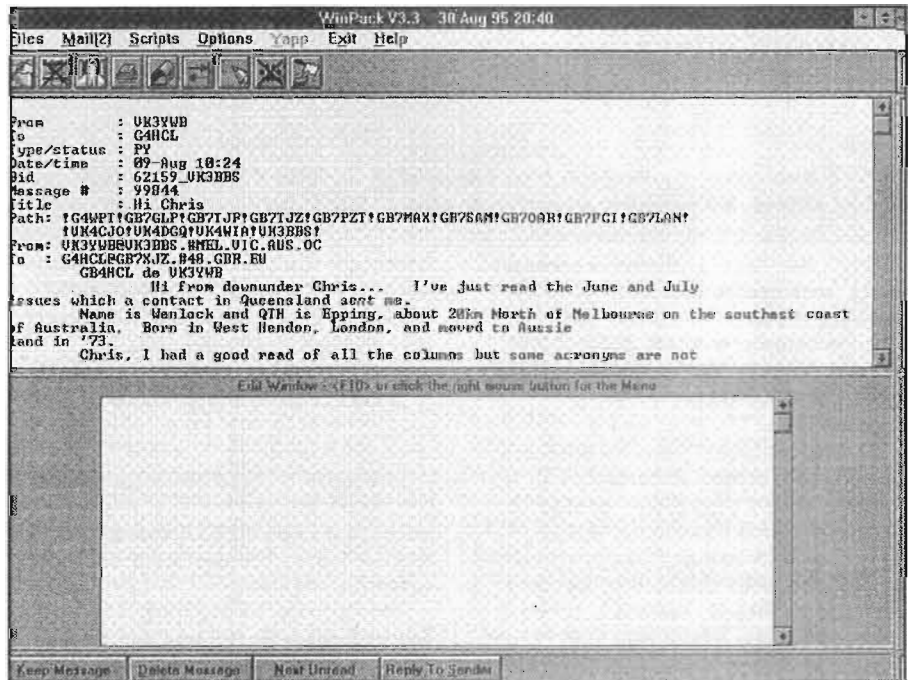
Windows packet programs

Many amateurs happily used DOS-based programs on their PC for packet, including simple 'terminal emulators' to keep things nice and straightforward. On the other hand, users of 386 machines and above may prefer to use the power of their machines to perform various multi-tasking roles, for example running packet in the 'background'. Some time ago I tested an early demonstration version (limited to 30 minutes use at any one time) of the commercial program **UltraPak** by Tim G4WFT. At that time, I unfortunately found it to be a bit limited, in not having the automatic 'script' files and the like (for automatic 'background use) as the G7JJF DOS-based program I used had. Tim has however just released version 3.0 of UltraPak, which has a host of extra facilities, including such script facilities and a fully-featured personal mailbox with a capacity of up to 400 messages and automatic forwarding capabilities. The program can handle multiple connections and do all the 'usual things' you'd expect. Registration of the program will cost you £25.00, but if you'd like a demonstration version to try out (again limited to 30 minutes use) I've arranged for this to be available via this month's software offer for just the price of a blank disk and return p/p. See the 'Software Offer' elsewhere in this issue for ordering details.

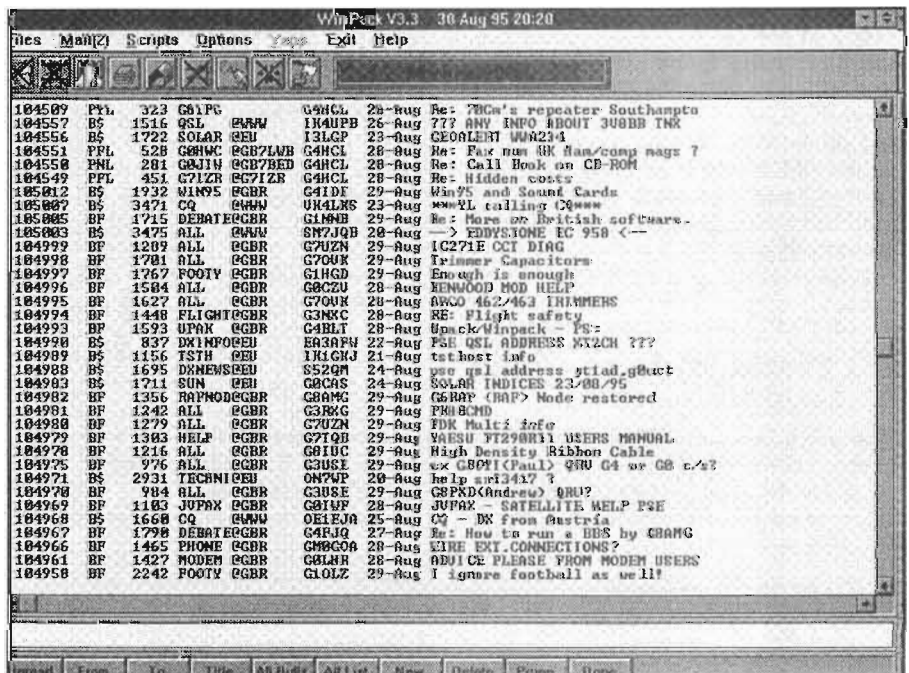
Another fully-featured Windows program is **WinPack**, version 3.3 by Roger G4IDE. Although this doesn't currently have an internal mailbox facility, it does have plenty of 'bells and whistles', including a automatic 'BBS mail routine' which automatically connects to your local BBS (including handling passwords for FBB and NNA BBSs) uploads and downloads your personal mail, downloads list of

bulletins, reads those of interest to you, then automatically logs off. You can then mark any listed messages of interest to you, and the program will automatically download them - it'll even automatically decode 7+ files after all the parts have been received. I use this program myself now, and find it extremely useful indeed. The

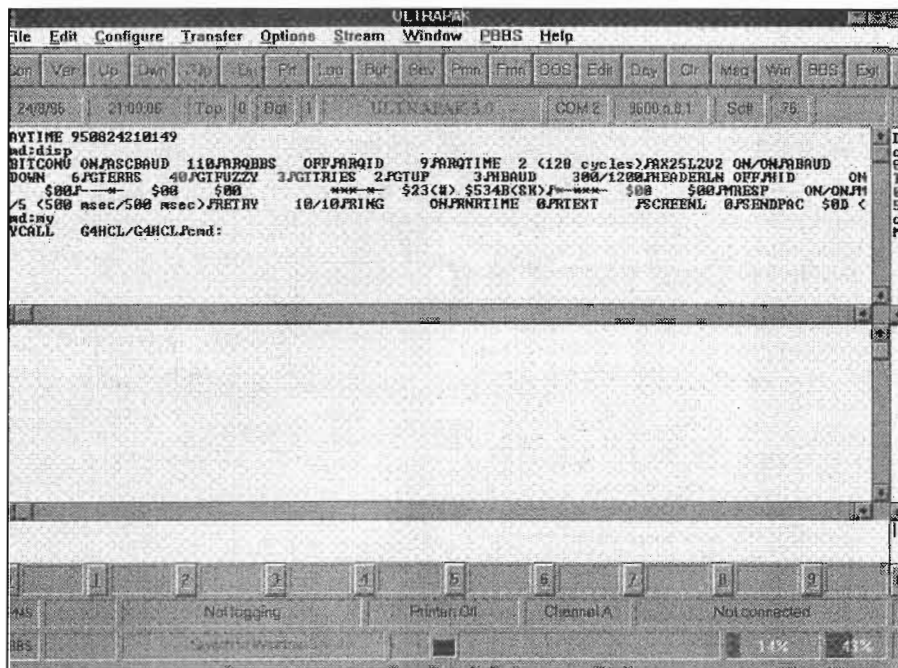
difference is that WinPack V3.3 is *freeware*, i.e. it costs you *nothing* and you can happily make copies and distribute it to your friends, no-one will pester you for 'registration'! Right now, this program has my highest recommendation. You can obtain a copy by sending a 1.44Mb disk and sufficient return postage



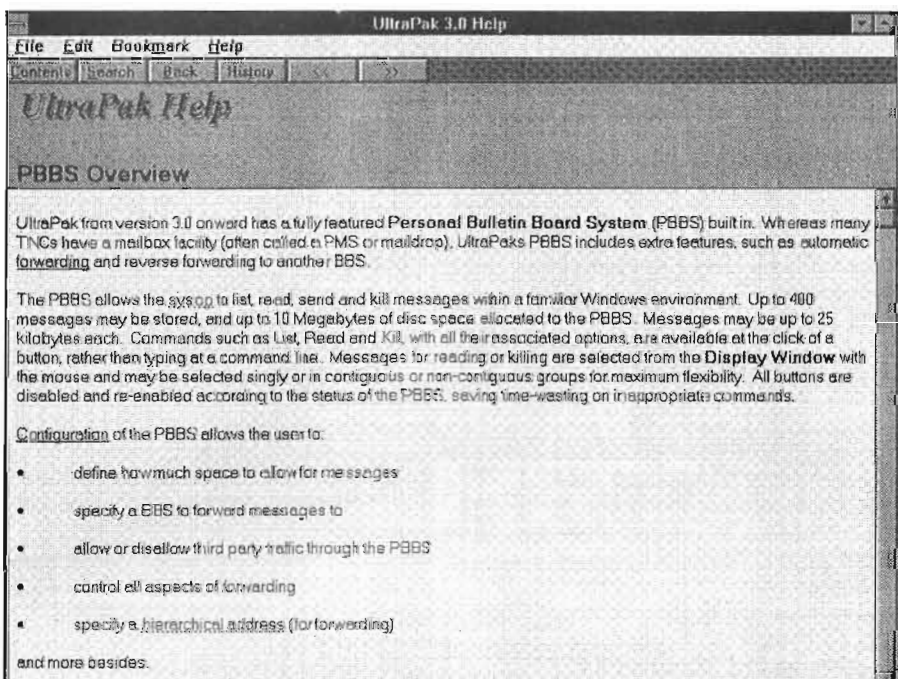
Mail 'reply' screen on Winpak



BBS listings with WinPack



UltraPak 'connect' screen



UltraPak on-line help

and packaging (you may send IRC's or US dollar bills to cover postage if you wish, but no other currency) to the UK distributor who is Mike Marriott (G0OPC), Greenfield View, March Road, Friday Bridge, Wisbech, PE14 0HA. Alternatively, I've again arranged for this to be available via this month's software offer for just the cost of a disk and return p/p if you'd prefer this, again see the 'Software Offer' elsewhere in this issue for ordering details. WinPack is still being developed and Roger says he welcomes comments on the program and any desirable improvements - send your comments to Mike G0OPC @ GB7OPC who'll pass them on.

SV2AGW has also developed a series of packet programs for Windows, although I haven't yet had a

chance to try these. There are three current programs with a further four under development, all having **AGW** as the first three letters of the program name. AGWPE.EXE runs as an icon and is the 'heart' of the system, handling traffic between the packet applications and the TNCs. You can attach any number of external TNCs for the other packet applications to have access to them. AGWFWD.EXE can automatically receive a BBS list, and in compressed form receive and send messages from and to your local BBS, including multimedia or other binary files. AGWBBS.EXE works with this, handling the incoming and outgoing data and lists. You can manipulate these in a 'Folder' mechanism, each folder containing a sub-list. e.g. DX, RSGB, Software, etc. If you'd like to try

the AGW collection, you'll need to send a blank formatted 3.5in disk in with an SALE (with 2 IRCs for Europe, 4 IRCs elsewhere) to SV2AGW, Rossopoulos George, G.mistakidi 49, 54250, Thessaloniki, Greece. If you do try it, let me know how you get on!

MaxPak news

MaxPak, the Midlands AX 25 packet group, have been building up some of their MAX-01 packet modem at the stands at the Stafford, Telford, and Malvern rallies. So if you're after a 'ready built' modem (see the review in HRT Aug 94) they may well be able to supply one. It usually costs £32.50 to non-members (£30.00 to members) for a kit, the price of ready-built ones is available on application!

Other news from the group is that a BayCom USCC card has been installed at the GB7MAX, and is working well, and that a 9600 baud user port will soon be available on this BBS. You can get further information on the group from Richard G1NZZ @ GB7MAX, or Tel. 0973 262287 19.00-22.00 Mon-Fri or 10.00-22.00 weekends.

BayCom software

I often see packet, and other, messages asking "Where can I obtain BayCom V1.6 software for the packet modem I've built?" It may be a surprise to many amateurs, but BayCom V1.5 and V1.6 is *not* public domain, shareware, or whatever. It's a commercial program, and you're *not* allowed to distribute it or copy it to your friends - I have this in writing from the BayCom team in Germany. The organisations in the UK that I know of who *are* licensed to supply it are Siskin Electronics, MaxPak, and the NWPUG (North West Packet Users Group) - see past columns for contact details. So now you know!

CTRL-Z, end of message

Please do keep me in touch with what you're doing, and as always if you've any thoughts on data modes over ham radio that you feel would be of interest to others, do let me know. You can contact me either by packet direct, or via Ham Radio Today Editorial by fax or email. Until next month, it's 73 from Chris G4HCL @ GB7XJZ.#48.GBR.EU.

Satellite Rendezvous

*Richard Limebear G3RWL with the
AMSAT-UK news compilation*

The crew on *Mir* is asking all amateurs to refrain from using the Mir Personal Mail System for messages to other amateurs on Earth. Please use the existing terrestrial packet network to send messages via packet. They are currently relying on the PMS for important technical information, from specific stations in the USA and Russia. It is important to keep the PMS clear of other messages except the Mir keps from N6JLH. The only other "ALL" messages you should see are messages from the Mir crew.

Mir Astronaut Norm Thagard has returned to Earth, thus ending a very active period of ham activity on Russian space station. QSLs for contacts with Norm are available via the following address: Dr. Norman Thaggart, Mail Code CB, Johnson Space Center, Houston TX77058, USA.

Oscar10

Oscar 10 functions best when closer to earth due to the poor gain of its omnidirectional aerials. Particularly good signals have been reported on the second half of the orbit when the satellite approaches Earth in the range of 25,000km or less. Given the several months of great operation, AO-10 seems about due for another "sleep" phase due to poor solar cell illumination.

The satellite is still operational in Mode-B. Despite good signals from the transponder, there are very few stations using it! It's currently available when in view but *please do not attempt* to use it if you hear the beacon or the transponder signals. FMing.

Microsats

Until further notice, AO-27 will run its weekend schedule even on weekdays. This is because no commercial experiments are, at the time of writing, being performed. The uplink frequency is 145.850MHz and the downlink is 436.800MHz, the mode being FM.

WEBERSAT

OSCAR-18 is currently sending telemetry information and whole orbit dumps of solar array currents, i.e. it is not transmitting any images at present. In addition to these

transmissions, the satellite is acting as a digipeater with an input on 145.900MHz and downlink on 437.102MHz.

LuSat had a crash over a month ago, but the software reload still has not been completed.

Dove's voice experiment remains off and due to seasonal power variations the S-Band transmitter has been turned off as well.

Short bursts

The launch of Ariane 502, the mission on which Phase 3D is manifested, is now set for May 29, 1996 rather than April 3, 1996 as it had been. This follows a reschedule of the first in the Ariane 5 series, Ariane 501, from November of this year to mid-January 96.

In other Phase 3D developments, a recent trip by WD4FAB and W5DID to Marburg has resulted in the exchange of much valuable information. For example, all necessary data to complete the wiring harness is now in hand. That task will move into high gear just as soon as the propulsion plumbing, now in the final stage of fabrication, is completed. Also, DB2OS has recently returned home from a trip to Arizona where he spent an intensive ten days with WA7GXD and N0ADI. This visit resulted in significant accomplishments in the finalization of the flight version of the IHU and the CAN Buss. They have now completely built five engineering IHU units and tested them including the CAN bus.

The CAN is a small circuit board that can be placed in various locations in Phase 3D to gather data (such as temperatures) and also provide control of various devices. It was also recently learned that Motorola would be able to supply the 16 processor chips for the CAN boards and will do so at no cost to AMSAT.

AMSAT-NA

The following people have been nominated to serve on the AMSAT-NA Board of Directors: Dick Daniels W4PUJ; Junior de Castro PY2BJO; Bob Diersing N5AHD; Steve Grant N8AJD; Joe Holman KA7LDN; Bob Myers W1XT; Bruce Paige KK5DO and Bill Tynan W3XO. Four seats on the seven member Board must be filled this year.

CERISE MicroSat

The *CERISE* microsatellite, using a satellite platform manufactured by Surrey Satellite Technology Limited (SSTL) for Alcatel Espace (France), was launched successfully on 7 July as a secondary payload on Ariane flight 75. The microsatellite is fully functional, and SSTL is conducting platform commissioning operations prior to turning the satellite over to Alcatel Espace for payload commissioning and mission operations; it has been described as a spy satellite.

CERISE is the ninth mission to use SSTL's modular microsatellite platform. The next SSTL microsatellite scheduled to be launched is *FASat-Alfa*, built by SSTL for Fuerza Aerea de Chile. *FASat-Alfa* is scheduled to be launched in mid-August on a Ukrainian Tsyklon launcher from Pletesk.

Roddy G3CDK

Sadly, AMSAT-UK report the death of Roddy Clews, G3CDK, during the afternoon of Sunday 23 July 1995. Aged 78 years next month. AMSAT-UK and members send condolences to Muriel and family.

Roddy was a staunch member of AMSAT-UK. He has donated cash every month to P3D funds, was



Roddy G3CDK (photo courtesy Oscar News)

always willing to help others to get onto the satellites, and had some down-to-earth opinions about our

hobby. Most of his remarks, and indeed his concerns on operation practices, or lack of, on satellites have proven only too true. AMSAT members will miss him on the birds and the nets; a true gentleman in the finest tradition of amateur radio.

AMSAT-UK news

Ron G3AAJ has announced the formation of a program whereby individuals making a donation of £150 sterling or more to the AMSAT-UK Phase 3-D Fund will have their personal names and/or call signs placed in the spacecraft prior to its launch in 1996. Similarly, commercial, governmental or trade organizations will have their names inscribed in the satellite for a donation of £2000 sterling or more under the same program.

Plans currently call for a small aluminum plate to be photo-etched with the names and call signs of donors. The plate will then be placed into the spacecraft prior to launch. Also, prior to launch, the plate will be photographed, and a copy of the photo, together with a small engraved certificate or plaque,

will be sent to the individual donor as a permanent memento of their support of the Phase 3-D satellite project.

Latest Keplers available

Amsat-UK Keplers are put out on packet fortnightly, sent to KEPLER @ GBR. The latest satellite Keplers as supplied by Amsat-UK are also available by fax from the Ham Radio Today fax-back line, 01703 263429, request fax document 50 from the satellite menu for this month's. You can also get a copy in the post by sending an SAE together with the corner flash from this page to the HRT Editor, marking your envelope 'Keplers' and stating whether you want *all amateur* satellites (one A4 page) or *all* satellites (10-15 A4 pages).

For further information about Amsat-UK contact: AMSAT-UK, c/o Ron Broadbent MBE, G3AAJ, 94 Herongate Rd., London, E12 5EQ. Big SAE gets membership info. SWL's are welcome. All new joiners get the USAT-P tracking program on 5 1/4" disk.

ARE YOU MISSING OUT EVERY MONTH?

Are you having trouble getting a copy of your favourite HRT magazine every month? Are you missing out on the great news, views and features that we pack in these pages? Are you losing the race to grab the new issues? Do you want to help yourself or a friend keep in touch? If the answer to any of those questions is yes then simply fill in your name and address on one of these coupons and hand it to your local newsagent and he will order or save a copy just for you!

HRT Ham Radio Today Preparing SCANNERS INTERNATIONAL
HAM RADIO TODAY
 Dear newsagent,
 Please deliver / save me a copy of Ham Radio Today Magazine every month.
 Name _____
 Address _____
 Ham Radio Today is available from: SM Distribution, 6 Leigham Court Rd., London SW16 2PG
 Tel: 081 677 8111
 (ISSN No: 0269-8269)

HRT Ham Radio Today Preparing SCANNERS INTERNATIONAL
HAM RADIO TODAY
 Dear newsagent,
 Please deliver / save me a copy of Ham Radio Today Magazine every month.
 Name _____
 Address _____
 Ham Radio Today is available from: SM Distribution, 6 Leigham Court Rd., London SW16 2PG
 Tel: 081 677 8111
 (ISSN No: 0269-8269)