

**Incorporating
SCANNERS**

HAM RADIO TODAY

SEPTEMBER 1994 £1.80

GETTING READY FOR CONTESTS!

Build a portable mast
for your hilltop station

Give the 'Worked
all Europe' contest a try!



PC-CCD
MORITOW?



**FREE
HAM SOFTWARE
OFFER**



IC-820H 2m/70cm base transceiver new 'satellite favourite'?

9 770269 826048 09 > **ASP**
AMATEUR SPECIALIST PUBLICATIONS

NOVICE • PACKET • REVIEWS • PROJECTS • SATELLITES

HAM RADIO TODAY

VOLUME 12 NO.9 SEPTEMBER 1994

REGULAR COLUMNS

FROM MY NOTEBOOK 36
Geoff Arnold G3GSR continues his discussion on tuned circuits

QRP CORNER 38
Dick Pascoe G0BPS shows how to calculate your 'radio line of sight', which can be very useful when choosing a contest site!

VHF/UHF MESSAGE 40
Geoff Brown GJ4ICD looks back at Sporadic-E openings on VHF, and looks forward to getting on a plane to activate JY on 6m

HF HAPPENINGS 42
"Give the 'Worked All Europe' contests a try" suggests Don Field G3XTT, writing just after the National Field Day Contest

PACKET RADIO ROUNDUP 44
Chris Lorek G4HCL checks the latest DOS and Windows based packet software to come into the UK

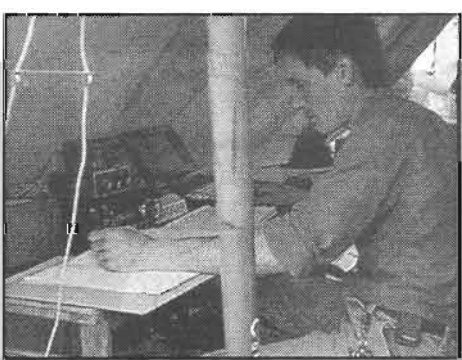
SATELLITE RENDEVOUS 46
Richard Limebear G3RWL with this month's AMSAT-UK news, including details of the new UNAMSAT-1 satellite

FREE READERS ADS 54
Helplines, For Sale, Exchange and Wanted, published free

REVIEWS

ICOM IC-820H REVIEWED..... 16
Our consultant Tech Ed goes amateur satellite hunting with Icom's new VHF/UHF base station

BOOK REVIEWS 34
A couple of the latest books from the HRT Editorial bookshelf



GETTING READY FOR CONTESTS

FEATURES

USING THE TEN-TEC SCOUT ON QRP 20
Dick Pascoe G0BPS shares his on-air experiences of the Scout transceiver

GETTING READY FOR CONTESTS 27
Steve Whitstable gives a beginner's introduction to 'Having a go' in portable contest activity

SCANNERS 31
Phil Bridges G6DLJ gives an 'an alternative guide' on the Drayton Hamfest

PROJECT

CLUB PROJECT - PORTABLE FIELD MAST 22
G3WKF describes an ideal club project for contest use, showing how to build and use a 24m/12m portable field mast suitable for large HF beams

PORTABLE AERIAL SUPPORT 26
Fancy going to a hill top for some portable contest operation? Dick Pascoe G0BPS has a simple answer for supporting your aerial

NEWS AND VIEWS

CQ de G8IYA EDITORIAL 5
Can it be easier to get a Novice licence?

LETTERS 6
HRT readers have their say

RADIO TODAY 8
The latest Amateur Radio news

CLUB NEWS/RALLIES..... 50
Dynamic go-ahead clubs and volutarily-run RAE course contact details. Is your club listed? If not, why not?

NATIONAL SOCIETIES AND ORGANISATIONS 52
Contact details for the RSGB, Radiocommunications Agency, ISWL, and many more national organisations

HRT SUBSCRIPTION OFFER..... 35
Make sure you get your HRT each month right through your door

CLASSIFIED ADVERTISEMENTS..... 57
Your local dealers, component and kit suppliers, RAE courses, and reader's classified ads

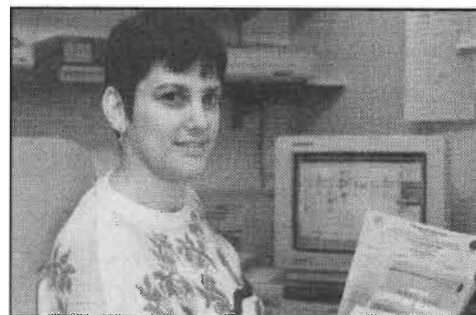
ADVERTISERS INDEX 35

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 however arising from such errors, including loss resulting from the negligence of our staff. Reliance is placed upon the contents of this magazine at readers' OWN risk

CQ de G8IYA

Editorial

Can it be easier to get a Novice licence?



The way into amateur radio for beginners is, necessarily, long and often hard. In most cases it does of course show dedication, and as such the end result is usually an enthusiastic operator. I say "usually" very carefully!

There is little doubt that a Novice licensee wouldn't know enough about our hobby to be able to act responsibly once on the air. Indeed they'll *know* how to operate, their Novice Training Course, which they need to complete successfully, shows them how to. It also shows them how to wire up coax connectors and even a mains plug, something I know that one or two people who've passed the RAE can't do.

There can be few youngsters who would go through the months-long training course, and then pay for and take the Novice RAE, just 'for the sake of it'. They'd probably use CB if they just wanted to chat with their school friends on air. The Novices I've heard on the air, young or old, have all been exemplary operators, ones that some 'Full' amateurs could learn a tip or two from on operating standards. I do however know that the difficulty and cost of taking the Novice RAE put a number off. How many, I can only guess at. But the RA tell me they're amazed at how many enquiries they get for the licence, amazed at how many successfully complete the Novice course, and how only a small minority of them go on to get a Novice licence. The ratio of the number of registered Novice instructors in the UK, to the number of licensed Novices, also adds weight to this. I'm told there's around 1000 registered instructors, where are the tens of thousands of resultant Novices?

At a recent US licence volunteer examiner test session in London, our local Senior Novice Instructor went

along to 'see how things were done'. He told my Tech Ed that he was most impressed. So, why can't we have a similar system, for the UK Novice licence at least?

Let's take a look. We already have volunteer-run Morse testing sessions around the UK. These are run by on the RA's behalf by the RSGB, where tests are conducted at rallies, radio clubs, and the like by registered amateur examiners. The tests are coordinated by a national group, in this case the RSGB, who also prepare the necessary documentation and administer the system. The end result is a venue to suit most amateurs, probably less 'exam nerves' because it's fellow amateurs who are examining you, and of course a much lower cost to the examinee than would probably otherwise be possible.

This sounds *exactly* the way the US VE tests are conducted, for both their written and Morse tests. The difference is, probably due to the size of the US plus their lean towards 'freedom', that *any* responsible national group can put a case to their licensing body, the FCC, to become a 'Volunteer Examiner Coordinator' body. There are indeed several such VECs operating over there. The largest, not surprisingly, is that run by the ARRL, which is their equivalent of our RSGB.

How about the same arrangement for our Novice licence? We already have the volunteer-run Novice training course, performed by registered volunteer instructors. We already have the Novice Morse tests, performed by resisted volunteer examiners. All we need is the Novice multiple-choice exam, performed by registered volunteer examiners. If you have any views on this, write in and I'll be pleased to air them in our 'Letters' page, to get some discussion

going. I'll also be pleased to send your views to the RA, who tell HRT they're (quote) "Always listening with open ears" regarding licensing matters, particularly the Novice scheme, and that they're (quote again) "Keen there should be no unnecessary restrictions in obtaining a Novice licence". Over to you.

Free PC Software Copies!

By popular demand, I'm pleased to announce that HRT readers will be able to avail themselves of our software copying service. This I've done in a 'small way' in the past, with things such as the Scanner database a few months ago (the requests and disks are still coming in!), and software for recent synthesized PMR conversions in HRT.

I hope to be able to offer enough ham radio public domain and shareware software and files to virtually fill a 1.44MB disk each month. Here's how it works. Send a blank, formatted, 1.44Mb PC disk to 'HRT Disk Offer - Sept 94', HRT Editor, ASP, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST, together with an SAE (or IRC for overseas) and the 'corner flash' from this month's contents page, and your disk will be returned to you, full. No SAE, corner flash, disk, or disk not correctly formatted, no returned software.

This month I'm offering a copying service for *paKet 6*, which is the very latest version of the 'best packet software in the world' (see this month's *Packet Radio Roundup*). Also, you'll get the entire FCC exam question licence pool in text form on disk for the US Novice, Technician, General, Advanced and Extra class exams, including the latest questions which were changed this year.

LETTERS

Letter of the Month

Dear HRT,

I would like to say thanks to two amateurs, Tom G0UTH and Tony G4XIV.

The story starts at 10.10am on Sunday 15th May at Goose Wood Caravan Park near York. My son Marc, who is two and a half years old, took a febrile convulsion. An ambulance was needed, so I called through GB3HG repeater and to my horror, no reply. I then tried the news frequency, a reply was instant, Tom G0UTH in Harrogate answered. An ambulance was despatched and Tom stayed on frequency until we arrived at York District Hospital. Marc was kept in hospital and I travelled back

to Sunderland with my two daughters.

On Monday I got a call from my wife Marjorie, to say Marc had taken a second fit at 2.15pm. I decided that I should travel down to York. Phil G7MJN, and myself left for York where a call through GB3CY found Tony G4XIV, who directed us to the hospital the quickest way. When we arrived Marc was sleeping. The nurse suggested I take Marjorie for a meal and some fresh air. This we did with the help of Tony, we gave Tony another call asking for further directions for somewhere to eat. We met Tony and his family after, and their hospitality was overwhelming.

Tom also heard us on frequency when we were leaving York for home

and called to see how Marc was. The good news is that Marc was released from hospital on Tuesday 17th May.

My many thanks once again to Tom G0UTH, and Tony G4XIV for everything.

Marjorie and Ian G7MFN

Editorial Comment:

Thanks for your letter, Marjorie and Ian. It's good to know that the boundless friendship that can be offered by amateur radio really does work. We've also taken the liberty of sending a little HRT 'thank you' in the post to Tom and Tony.

Dear HRT,

I think your magazine is the best, and seems to be getting better.

For some time now I have been sticking a small white label on to the top right hand corner of the front cover. On this I note the things I want to look at again at a later date. You might like to pass this simple idea on to your readers, or even leave a small blank patch on the front cover.

Keep up the good work,
Basil GMO CBA

Editorial comment:

What a good idea Basil. With a large magazine collection it's often difficult to try to remember which particular

magazine issues, from a veritable 'pile' or bound volumes, holds a particular article of interest. Maybe the many shelves full our Tech Ed has here could do with this treatment!

Dear HRT,

I agree with D. P. Kirby GW0PLP ('Letters' July 94) up to a point. But stop, I thought that the age when one can vote, leave home, become a soldier and fight in the front line, get married and have a pint in the pub, was 18 not 21, all without your parent's consent. Therefore, if you are over 18 you are an adult, paying the full whack. I agree that even novices over 18 should pay, from 14 to 18 they should pay half their licence fee. That's where I agree with GW0PLP, the system is unfair, if his

son goes on CB he will have to pay £15.

I will plead ignorance as regards Novices, I thought they had to pay a licence fee, but now I know different, one learns as one grows older, therefore the system wants changing.

J. H. Clifton G0UIU

Editorial comment:

One of the RA's aims to encourage uptake of the Novice licence by young people was to have no licence fee for under-18 Novice licensees, which sounds eminently sensible! As you say, everyone (well, most people) do learn as they get older, hence the hopeful and eventual 'upgrade' by Novices to a 'full' licence if or

£10 for the Letter of the Month

Do you have something constructive to say on the state of amateur radio today? Perhaps you'd like to put your viewpoint to HRT readers, get some discussion going, or give an answer to one of the issues raised? We'll pay you £10 for the best letter we publish each month, if your's is featured as such, we'll send you a cheque the month following publication. So write in with your views, to: Letters Column, The Editor, Ham Radio Today, ASP, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST, or fax your letter direct to the Editor's desk on 0703 263429. Please keep your letters short, we reserve the right to shorten them if needed for publication. All letters must include name and/or callsign, no 'name/callsign withheld' letters will be published. Views published here may not necessarily be those of the magazine.

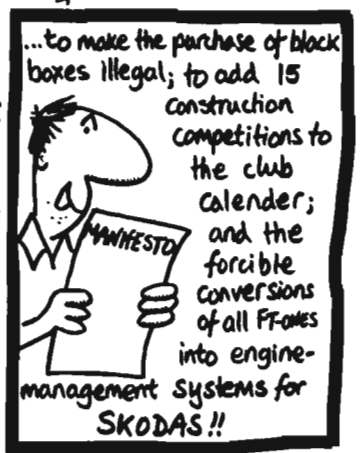
"TONE" BURST



RADIO CLUB ELECTIONS. Part 2

STORY: G7NBP

PICS: G6MEN



when they become sufficiently interested in the hobby to seek greater operating privileges.

Dear HRT,

My transmit licence expired on the 22nd June 1994. On May 18th 1994 I received my renewal notice from SSL and mailed my cheque, first class, on the same day. On May 28th 1994 I received my validation document!

Out of curiosity I phoned my bank, at that date my cheque had not been deducted from my account. Sheila, maybe your big stick is working!

Richard Marris, G2BZQ

Editorial Comment;

Not being afraid to 'rattle the cage' for the good of our hobby has always been a mark of the HRT Editor, it isn't going to stop!

Dear HRT,

Each month, HRT's letters page is filled by irate amateurs incensed at the unwillingness of the RIS to investigate incidents of jamming and illegal operating. There is also regular correspondence regarding the authorities' behaviour when investigating TVI, the apparent inability of SSL to issue licenses

efficiently, and the conflicts many amateurs have with neighbours and local authorities when erecting aerials.

Many of these problems stem from the fact that the amateur licence in this country is only a 'privilege', and that therefore amateurs have no rights or protection whatsoever. If, as in the US, the right to hold an amateur licence, subject to the necessary qualifications, was enshrined in law, then government agencies would be obliged to treat amateurs fairly and considerately in all circumstances.

Like radio amateurs, motorists are required to pass an exam, hold a valid licence, and operate their equipment in accordance with the law, yet the law also protects them and grants them rights. Surely it's time we have similar rights; in particular the right not to be treated in an arbitrary fashion by the authorities, and the right to receive the same consideration professional radio users and domestic complaints receive when problems arise.

Alistair Beaton, GM4BAP

Editorial comment;

What do other HRT readers think?

Dear HRT,

On behalf of Reg and myself I would like to thank all the members of Ripon and District ARC, N. Yorks, for their advice and encouragement. I would especially like to thank Jack Taverner G0LZT, who proved that going back to school can be fun. I would also like to say to anybody thinking of becoming a ham, go and find your nearest club and join, you'll find they're very friendly and will help you any way they can.

Henry Quigg 2E1???

Editorial comment;

I echo Henry's advice to HRT readers. A dynamic local radio club (if your local club is so inclined, of course, as some aren't!) can be a very good starting point for people interested in finding out more about ham radio.

MORE LETTERS NEXT MONTH

□ Icom IC-820H Review □

HRT's Consultant Tech Ed goes amateur satellite hunting with Icom's latest VHF/UHF base station

It's been several years now since a new VHF/UHF base station transceiver has appeared on the amateur market, and whilst attending Icom-UK's recent 'back to the future' product launch (HRT Jun 94 p.11) I was very excited to see the IC-820H 'in the flesh' for the first time. Being a keen VHF/UHF operator, I was even more pleased to be subsequently given this opportunity to test it for review in HRT.

'Satellite Ready'

To mimic an oft-used TV marketing phase, the IC-820H really *has* been designed to be 'satellite ready', for use with the current generation of digital amateur satellites as well as the analogue 'trusty favourites'. It has ten tracking satellite memories, where the frequency on each band changes automatically in line with the satellite transponder you're working through, in either 'normal' or 'reverse' transponder modes. As well as allowing CW and SSB operation with the 'analogue birds', a 9600 baud packet data connection is fitted on the rear panel, the audio from this connecting to the TX modulator and RX demodulator stages as needed for high-speed packet operation on the 'main' band'.

Features

The IC-820H is a compact set, measuring just 241mm (W) x 94mm (H) x 254mm (D) it certainly doesn't take up too much room on your shack table. Weighing just 5.2kg, you also won't run into a lot of problems in carrying it to and fro. Possibly the main reason for this is that it operates



from an external 13.8V supply, which needs to provide up to around 16A for the IC-820H's high power output of 45W FM and 35W SSB on 2m, with 40W FM and 30W SSB on 70cm. A switchable low power setting of 6W is also available if you're 'mountain topping' with the set.

For DX and contest work, an IF shift control (often only found on HF rigs) helps out with adjacent-frequency QRM, and a switchable receive attenuator can be used in cases of receiver overload problems. You can even control optional Icom masthead-mounted 2m and 70cm preamplifiers from the set's front panel, and CW addicts will like to know there's an optional CW filter available. Finally, a switchable noise blanker is fitted as standard, in case you'd like to pop the set in your car for a spot of mobile operation, the transceiver indeed being small enough to do this.

The set comes supplied with a fist mic and DC lead as standard, and a matching mains power supply, the Icom PS-55, is available as an option.

Frequency Control

The IC-820H uses a Direct Digital Synthesizer to give a tuning resolution right down to 1Hz, a 'first' to my knowledge for any VHF/UHF multimode amateur rig. The transceiver covers 144-146 and 430-

440MHz, with two digital 'VFOs' on each band, plus 100 fully-tuneable memories which can be allocated in 10 channel steps between the main and sub-bands.

The 'main' band uses the larger of the two frequency displays together with the analogue S-meter, the sub-band having its own display with an independent bar-graph type S-meter. With a push of the 'sub' button, the main tuning knob can control either band, alternatively the RIT or IF Shift knob can be used if you wish for independent sub-band frequency change. An internal speaker provides combined audio from both bands, and by plugging in an external speaker or by using stereo headphones, the received audio from each band can be separated.

Round the back of the set are a nice array of connectors, including separate aerial sockets for 2m and 70cm, linear amplifier switching including an ALC input for drive power control, and a C-IV socket for computer remote control. The 'packet' connection is selectable by using an internal switch between 'normal' packet operation (i.e. up to 4800 baud) with squelched receive audio and normal mic input level, which is the default setting 'as supplied', or 9600 baud with 1V p/p input and output levels which looks like it could be eminently suitable for connection to a G3RUH modem. The ALC connection is also internally switchable to a remote up/down input, for example for use automatic with Doppler shift correction of Low Earth Orbiting satellites from your PSK TNC.

On the Air

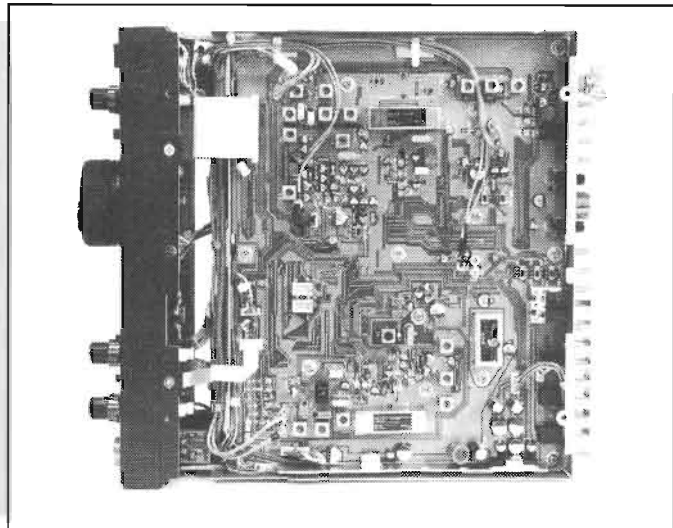
The arrival of the review

transceiver nicely coincided with the recently completed installation of my new Versatower, complete with yagis for 2m and 70cm (besides other bands). "What a good opportunity" I thought! A couple of few aerial switches allowed me to instantly compare the IC-820H with my usual HF rig and converter/transverter set-up for 2m and 70cm operation.

The first thing I found was that the IC-820H's receiver, especially on 2m, was sensitive, *very* sensitive, I was quite impressed. The Wrotham and St. Austell beacons came through very well on 2m SSB at my location on the rig, and the set coped well on SSB and FM on both 2m and 70cm with the many strong local signals I have around me.

Operation

Although I've been quite used to operating a number of Icom rigs in the past, I found some of the operating functions on the IC-820H a little different than 'the norm'. However, after a good read of the instruction book and just a little practice, I quickly found the set to be quite versatile in terms of its operating modes. The 'check' facility was quite handy, this allowed me to quickly check my transmit frequency in 'split-frequency' operation, such as a repeater input when operating on FM. I did however feel a bit constrained at one of the front panel's 'dual-function' buttons. For example, the 'PWR/Comp' button could *either* switch in the speech compressor, or switch to low power, depending upon how I'd initialised the set. I couldn't use low power (for correct satellite operation) as well as the speech compressor. However, apart from an internal low power level adjustment. I could control the output power by using an external 9V PP3 battery and a potentiometer connected to the ALC socket, although the 'dual function' of this connection meant I couldn't use the rear panel up/down switching for satellite frequency correction.



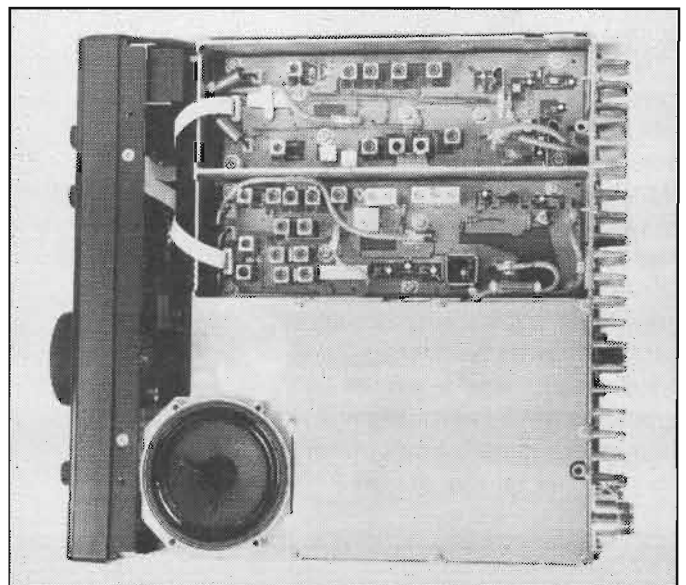
The transceiver had a useful 'set' mode for initialization, where I could cycle through individual 'menu' topics displayed on the main LCD, and customize the set's operation to suit me. Things such as frequency readout to 1Hz, RIT range, sub-dial tuning on/off, attenuator activation between bands, external preamp selection, sub-band audio mute during transmit, and the like, could be selected. I found it quite handy to have, effectively, two 'tuning dials', although the sub-band tuning was in the form of 'up/down' stepping depending on which way the smaller knob was moved. The up/down rate increased the further round the knob was moved, putting this back to the 'centre' position then halted the tuning.

In Contact

On the air, the transceiver worked quite well on both bands, I managed to have several reasonably 'DX' contacts by taking advantage of the set's relatively high power and good receive sensitivity. Placing the speech processor

in on SSB transmit however did bring up some distortion, although it certainly helped in cases of weak signal conditions at the 'far end'. On FM, the transmitted audio using the supplied fist microphone was described as very good, and I found the high power on FM allowed me to

use quite distant repeaters that my 'normal' FM rig struggled with. The IC-820H has a 1750Hz toneburst fitted for repeater access, and an optional CTCSS unit can be fitted if required for repeater use or quiet monitoring. Note however this only operates in encode/decode mode when fitted in the UK IC-820H model, and not in encode-only mode. In satellite mode the set worked reasonably well also, although in this mode the sub band is *always* used for the receive side, so I couldn't take advantage of the IF



shift nor the narrower CW bandwidth if I'd fitted the optional filter. Because the 9600 baud facility only operated on the main band, cross-band duplex 9600 baud satellite operation wasn't possible, although Icom-UK have informed me they can modify the set internally for this upon request. For highly-elliptic orbiting satellites at 'apogee', like Oscar-13, good receive sensitivity is a 'must'. By using the IC-820H, with a short feeder cable to my 2m beam, I could get away without using my masthead 2m preamp on the stronger downlink signals - good stuff!

LABORATORY RESULTS:

RECEIVER;

All measurements carried out in USB mode, with RX attenuator and TX processor off, main band selected, unless stated.

Sensitivity;		
Input level in μV pd required to give 12dB SINAD;		
Freq. MHz	SSB/CW	FM
144	0.08	0.12
145	0.08	0.12
146	0.08	0.11
430	0.10	0.16
435	0.09	0.16
440	0.09	0.16

	145MHz		435MHz	
	Main	Sub	Main	Sub
-3dB	1.93kHz	2.11kHz	2.07kHz	2.18kHz
-6dB	2.31kHz	2.38kHz	2.32kHz	2.40kHz
-20dB	2.67kHz	2.74kHz	2.72kHz	2.76kHz
-40dB	3.33kHz	3.35kHz	3.36kHz	3.40kHz
-60dB	6.93kHz	7.02kHz	5.10kHz	5.30kHz

Tests and Technicalities

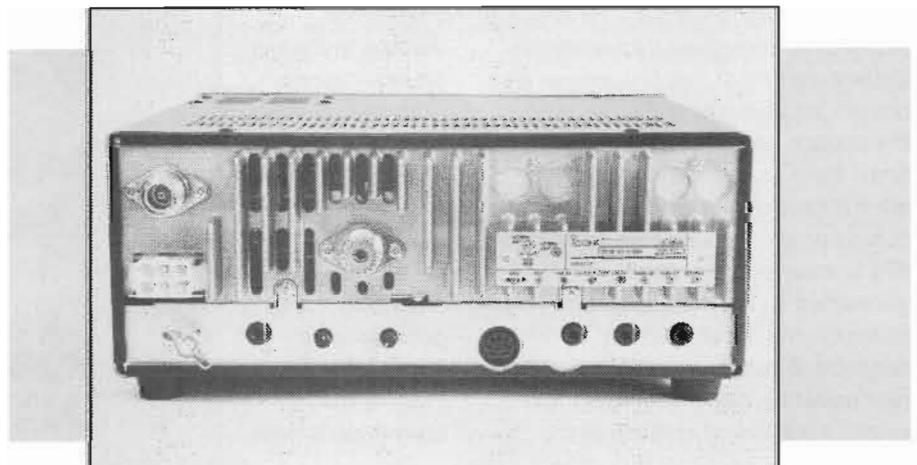
Even with its light weight, the set comes in a well-built case with nicely 'screened' insides where needed, as you may see from the accompanying photos. The receiver uses a dual-conversion approach on both bands, with IFs of 10.85MHz (2m) and 71.25MHz (70cm) on the main band, and 10.95MHz (2m) and 71.35MHz (70cm) on the sub-band. As separate circuitry and filters are thus obviously used, I initially thought that the sub-band IF filtering would have been rather 'limited' when compared to that of the main receiver. Not so, as when subjected to the rigours of my signal generators and combiners, the performance seemed very similar, as you'll see from the measured figures!

The transmitter performed reasonably well 'on the bench' on both FM and SSB, although as I'd found on air, the SSB linearity degraded somewhat when I switched the speech processor in. The figures shown were those with it at the default 'factory setting', a small screwdriver-adjustable preset at the bottom of the transceiver adjusting this. Yes, reducing the level of compression *did* improve things, although the resultant 'talk power' was naturally somewhat lower.

Blocking;		
Measured as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal;		
	145MHz	435MHz
+/-50kHz;	88.4dB	95.8dB
+/-100kHz;	94.4dB	99.5dB
+/-200kHz;	99.4dB	102.8dB
+/-1MHz;	107.2dB	104.7dB
+/-10MHz;	108.0dB	108.9dB

FM Adjacent Channel Rejection;		
	145MHz	435MHz
+12.5kHz	23.2dB	33.7dB
-12.5kHz	19.6dB	15.3dB
+25kHz	70.1dB	76.2dB
-25kHz	69.8dB	74.1dB

3rd Order Intermodulation Rejection;		
Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product, measured at 21.4MHz;		
	145MHz	435MHz
50/100kHz spacing;	81.1dB	78.5dB
100/200kHz spacing;	79.5dB	78.2dB



S-Meter Linearity				
	145MHz		435MHz	
Ind.	Sig. Level	Rel. Level	Sig. Level	Rel. Level
S1	0.46µV pd	-17.5dB	0.46µV pd	-17.4dB
S2	0.52µV pd	-16.3dB	0.52µV pd	-16.2dB
S3	0.61µV pd	-15.0dB	0.60µV pd	-15.0dB
S4	0.71µV pd	-13.6dB	0.71µV pd	-13.6dB
S5	0.87µV pd	-11.9dB	0.85µV pd	-12.0dB
S6	1.09µV pd	-10.0dB	1.09µV pd	-9.9dB
S7	1.50µV pd	-7.2dB	1.46µV pd	-7.3dB
S8	2.19µV pd	-3.9dB	2.13µV pd	-4.0dB
S9	3.42µV pd	0dB ref	3.39µV pd	0dB ref
S9+20dB	10.1µV pd	+9.4dB	9.70µV pd	+9.1dB
S9+40dB	89.9µV pd	+28.4dB	96.6µV pd	+29.1dB
S9+60dB 1	1.25mV pd	+51.2dB	1.18mV pd	+50.8dB

Image Rejection		
Increase in level of signal at the first IF image frequency, over level of on-channel signal, giving identical 12dB SINAD signal;		
	145MHz	435MHz
Main Band	78.2dB	86.5dB
Sub Band	78.4dB	88.0dB

Transmitter;

Harmonics;					
Freq. MHz	2nd	3rd	4th	5th	6th
145	-82dBc	-80dBc	<-90dBc	<-90dBc	<-90dBc
433	-79dBc	-84dBc	<-90dBc	-	-

TX Power/Current Consumption;		
Connected to stabilised 13.8V DC using supplied DC lead		
Freq. MHz	SSB PEP	FM
145	37.1W/8.95A	42.3W/9.35A
435	30.2W/10.05A	39.3W/11.70A

SSB IMD Performance;					
Measured on USB with a two-tone AF signal, results given as dB below PEP level;					
145MHz;					
	3rd Order	5th Order	7th Order	9th Order	11th Order
ALC Onset	-31.9dB/ -31.0dB	-41.9dB/ -43.9dB	-44.3dB/ -43.3dB	-51.6dB/ -54.6dB	-56.2dB/ -56.2dB
Mid ALC	-30.7dB/ -30.1dB	-39.3dB/ -39.6dB	-44.3dB/ -42.9dB	-50.6dB/ -51.3dB	-54.3dB/ -56.6dB
Proc On	-17.1dB/	-25.5dB/	-33.6dB/	-40.9dB/	-47.6dB/
Mid ALC	-19.0dB	-26.8dB	-34.2dB	-46.2dB	-53.4dB
435MHz;					
	3rd Order	5th Order	7th Order	9th Order	11th Order
ALC Onset	-29.9dB/ -29.0dB	-39.1dB/ -38.6dB	-46.0dB/ -49.4dB	-49.0dB/ -53.4dB	-53.1dB/ -54.6dB
Mid ALC	-30.1dB/ -28.7dB	-38.4dB/ -38.5dB	-44.7dB/ -47.3dB	-48.5dB/ -51.8dB	-53.3dB/ -53.8dB
Proc On	-16.8dB/	-23.0dB/	-31.4dB/	-46.2dB/	-50.9dB/
Mid ALC	-16.5dB	-29.5dB	-33.2dB	-42.0dB	-47.5dB

Conclusions

The IC-820H appears to 'break the bounds' in a high-performance VHF/UHF set capable of satellite operation in terms of its size and weight. It's eminently suitable for 'sticking in the car' and nipping up to the local hilltop for a spot of portable operation. I found the front panel controls, and the rear panel

connectors, a little 'limited' where they 'doubled up' their use, one more knob and button would not have gone amiss in my opinion.

It performed very well on air, the receiver was extremely sensitive on 2m, which is especially good for DX and satellite work, whilst retaining good strong-signal handling performance. If you're a satellite buff, the IC-820H could

be a serious contender for your station, but note that the IF shift or optional CW filters can't be used in this mode. Even so, I still wish I had one permanently in my station!

The IC-820H is currently priced at £1695, with the optional PS-55 mains supply at £245. *My thanks go to Icom-UK for the loan of the review transceiver.*

Using the Ten-Tec 'Scout' on QRP

Dick Pascoe G0BPS shares his on-air experiences of the Scout transceiver

Some time ago, the top men from Ten Tec sent out a questionnaire asking what operators would like to see in a budget transceiver. I know several UK QRP club members who completed this questionnaire including the author. At the 1993 Dayton Hamvention they put their answer to the comments made on display. It was called the Ten Tec Scout.

After spending some time examining this radio, and chatting to a sales person I discovered that whilst it was intended for the QRP man it delivered 50 watts of RF with a minimum power level of about four watts, adjustment being made by a preset found through a hole in the case. A real QRP version was promised "in the fall, we hope".

I wanted to try out this new offering from the US and was delighted when the HRT Editor offered me the opportunity. By chance it was just a few days prior to the annual gathering of the G-QRP club at Rochdale. With several experienced operators from all over Europe expected to attend as well as many very high quality UK operators, this was an ideal event to put the rig through its paces.

The radio arrived at the home of Rev. George Dobbs G3RJV where I was staying, and an all-time record was broken when the covers came off within one minute of the rig arriving!

First impressions on a radio of this type are important. I liked it. The compact overall size is very good, with compact controls and apparently simple to use. But would this prove to be the case on the air? The main tuning knob was a little 'clicky' with a tuning rate of about 25kHz per turn. I found this a little difficult to get used to, but it would be ideal for mobile or portable use.

CW

The Scout is obviously designed with the CW man in mind with the SSB facilities a close second. The built-in Curtis keyer was very nice, but again

the key was fitted to the back panel. A nice touch was that two 3.5mm jack sockets were fitted, one for a paddles and the other for a straight key, either could be used at any time. The full break-in provided was a delight to use and provided no problems to any of the operators.

One thing that I hated is when the radio is switched on, the CW speed control is automatically set to 25WPM. I had to change it each time the radio was switched on to the slower speed I preferred. Having said that it was not too difficult to change the speed. Select 'speed' on the middle switch, touch the right paddle and the speed increased, the left to decrease the speed. But when in the middle of a contact and asked to slow down it could cause some problems.

On The Air

The first job to do before I went on the air was to reduce the output power. The manual says that the rig is designed to provide an output power level from five to fifty watts, much to our surprise we found that the internal drive control could be set to provide just under four watts of RF out. More than enough for us.

Having so many operators wanting to try the rig was in some ways a blessing, but in others not so good. I sometimes found it impossible to get near it!

My first venture on the air was on SSB. Good reports from Scotland and the home counties told me that it sounded OK, and that distance in daylight hours seemed fair. My overall impression was that this would provide a lot of pleasure to an SSB operator.

As I mentioned earlier, I think that this is really a dedicated CW operator's rig who may occasionally venture onto the air with a microphone. In this manner it worked supremely well. On receive sensitivity was more than adequate, better in fact than G3RJV's

FT707 on the same aerial. The Jones IF bandwidth filter takes a lot of getting used to, but practice and patience overcomes this and the filter soon becomes a boon to the avid CW man. Another thing I noticed was that the internal sidetone generator was far too loud, and the internal control for this would just not lower the sound to a satisfactory level.

With a good aerial connected, on 20m CW we were working the world with this low power level. Operators during the weekend included myself, WB9TBU, G4JFN, G3RJV, G3VTT, with other Swedish, Norwegian, Dutch and UK operators. All liked the radio with small certain reservations as mentioned above.

The highlight of the weekend for me was breaking a pile-up to work into 5T5 on 40m. No mention of the power level was made, and the addition of "QRP" was *not* added to the call.

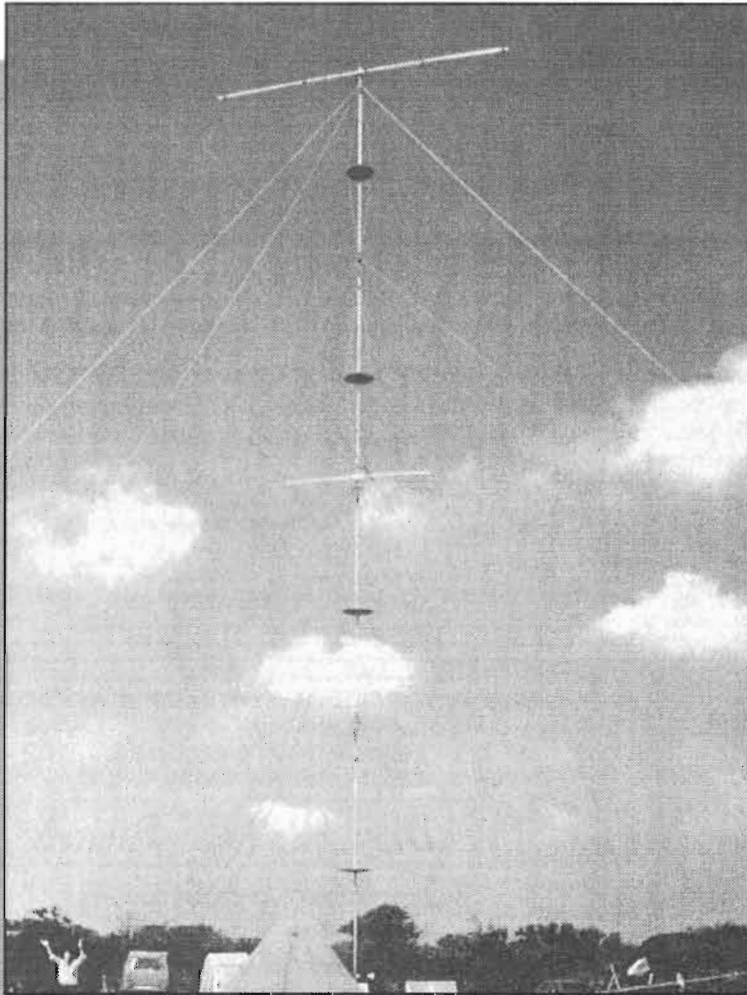
The Bottom Line

My final impressions of this radio were good, I liked it and so did most of the other operators attending the weekend. Yes, there were a few niggles, but none of the other transceivers I have tried have been perfect either. The Scout is compact and has some of the facilities lacking in transceivers costing several thousands of pounds. In my opinion this radio will also be very beneficial for the tourer, the caravanner and the mobile operator, and will provide hours and hours of fun for any operator short of space. Being able to turn down the wick from 50W to under the five watt level makes it very appealing to the QRP operator.

The Ten Tec Scout costs £499.00 from Waters and Stanton Electronics, complete with one band module on 7MHz. Extra band modules are available at £39.95 each, the optional microphone is £41.95. Many thanks must go to Waters & Stanton Electronics for the loan of the review model which I hated handing back.

Club Project - Portable Field Mast

M. Richards G3WKF describes an ideal club project for contest use, showing how to build and use a 24m/12m portable field mast suitable for large HF beams



On holiday in Cornwall with the BA155 and two 21MHz/28MHz 3 element Elans stacked at 24m and 12m

G3WKF and company 'go for it' in a big way these days. There's nothing like aerials high in the sky for low angle radiation for DX results. I expect we have all been in the situation when DX is rolling in, only to receive a dismal signal report, if any! Have a good signal and end-stop the S-meters worldwide. Here is a way of commanding world attention on HF, overcome the "we'll call them" syndrome, let them call us for a change! We have spent over ten years experimenting and felt it was time to write an article on the subject. The aim of this article is to

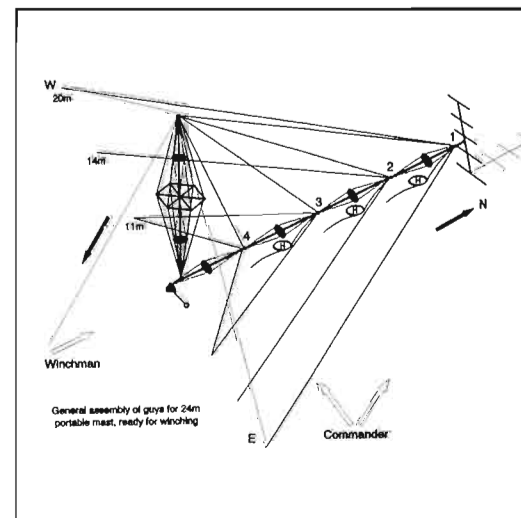
describe in detail the construction and erection of a 24m rotatable mast using aluminium scaffold poles (a 30m mast is under design for future use). The following mast design is well capable of supporting one of the set-ups listed here; A 3 element 20m mono aerial, a 5 element 15m mono aerial TH3, or a pair of 3 element Elans. Maximum weight must not exceed 16kg at 24m.

To assemble and erect the system safely is no mean task to undertake. Five practical persons are required, one being in overall command of the operation. Even with this number of

people it takes four or five hours to erect the system safely. Well having read this far you must be interested, so let's get down to the nuts and bolts of how to do it.

Description

The design is based on the yacht mast principle. A 750mm disc of 2.5mm dural, which has a 200mm length of dural tubing welded in a central position, with strengthening ribs radiating outwards and six holes drilled on a pitch circle diameter of 730mm, forms the main brace for each pole. The bracing wires are stainless 450kg 3.2mm diameter with the correct crimps fitted, held at each end of the pole by a special bracket made from 2.5mm dural folded into a 'U' shape, with a 150mm dural disc welded to the bottom of the 'U'. A hole to clear the pole must be machined through the centre with six drilled holes on a pitch circle diameter of 130mm, for the wires and two holes on each leg for the exhaust clamps 'U' bolts. One of the end brackets has the wire permanently connected to each hole,



the wire must be passed through the corresponding hole in the main disc before the threaded bolts are attached to the other end of the wire. At the end of each pole half the circumference of the pole is cut back for a distance of 25mm. This is done so that the poles lock together when assembled and to stop rotation of the poles in high winds.

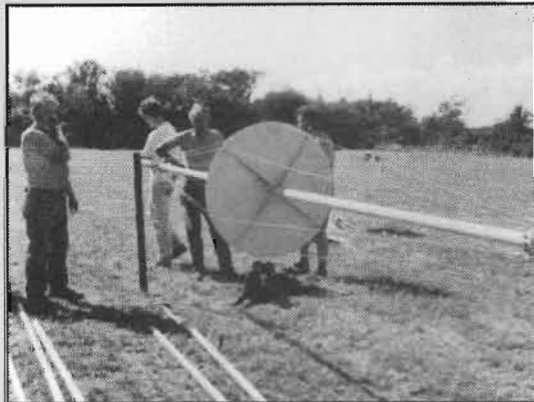
Assembly of the Pole Sections

Two 1.5m angle iron stakes with a 'U' section welded at the top are driven in 5.5m apart, this greatly assists with the assembly of each section. A pole is rested in the 'U' section, the bracket with the fixed

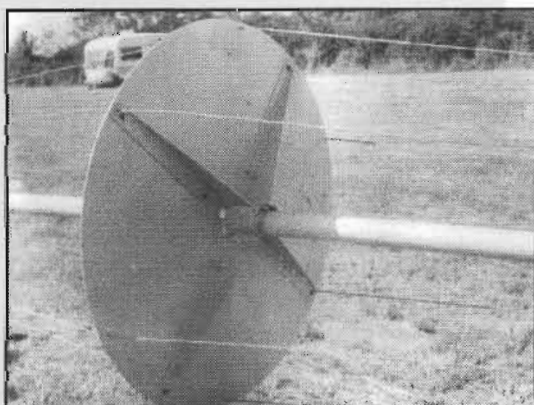
tighten the exhaust clamps. The final tension is then achieved with the threaded bolts, this need not be 'bow string' tension but enough to make the pole spin true. Finally tighten the collars either side of the central disc and put to one side for the complete assembly. No holes should be made in any of the six scaffold poles.

The Mast Bearings

In order that the mast rotates freely, 4 bearings must be employed. These are old ball races having an inside bore of about 55-60mm. Nylon bushes which reduce the bore to 50mm are turned out on a lathe. Four guy lugs are welded to the bottom edge of each bearing holder, these take the D shackle to which the guy ropes are attached. The bearings should be a tight fit in their holders.

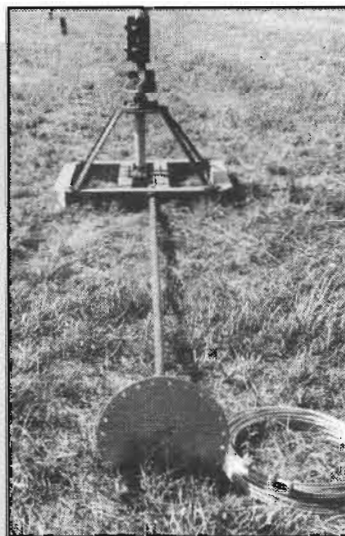


Assembly of each pole section



Pole strengthening discs, 750mm diameter

wires is then slid on one end followed by a collar, centre disc, another collar and finally the bracket with the threaded tension adjuster bolts. Making sure the wires are in line with each end bracket, pull the brackets outwards by hand and



The mast base with extension shaft fitted

When the bearing assemblies are in position on the mast, a collar must be secured tightly underneath each one.

The Stakes

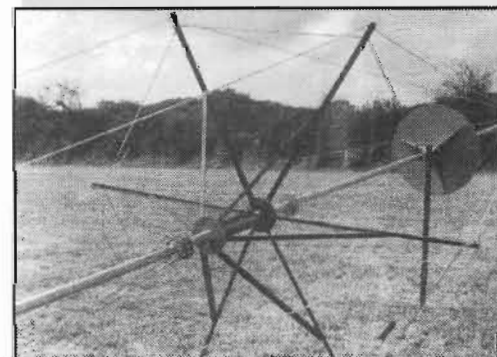
The stakes are made from angle iron and have one end tapered. You need eight 50mm x 50mm x 750mm long, four 75mm x 75mm x 910mm long, one winch stake 75mm x 75mm x 1200mm, and one winch support stake 50mm x 50mm x 760mm long.

The Mast Base

The mast base is made from 75mm x 50mm alloy channel and approximately 600mm square. At the centre of the base a special hinge is made which enables the mast to pivot. Mounted underneath the hinge is a cement mixer gear box giving 30:1 reduction, this makes rotating the mast easier. An extension may be fitted to the input shaft so that the mast can be rotated from inside the tent while watching the S meter. This is of great advantage to the operator. The base must be secured to the ground by stakes.

The Gin Pole

Now let's look at the 12m gin pole arrangement. The gin pole is made up with two scaffold poles. Each pole has one centre disc, two special end brackets and strengthening wires. These are made up in the same way as the mast poles. Because the gin



The gin pole fitted with its large spider disc

poles take the entire load when raising and lowering the mast, another disc must be added. This disc is much larger and is fitted close to the centre of the 12m gin pole. It is made from 25mm angle iron having 6 radial arms. Around the circumference of these arms a wire rope is attached by D shackles. At each end of the 12m gin pole a special bracket is fitted having a 200mm disc with 6 holes in it. The gin strengthening wires are fastened to the 200mm disc at one end, fed through the D shackles around the

large centre disc assembly and secured to adjustable eye bolts which are attached to the 200mm disc at the other end of the gin pole. Again each wire must be under some tension and is 450kg 3.2mm with a plastic coating which aids gripping of the D shackles.

The Pole Couplers

The pole couplers are modified TV types having 5 nuts and bolts each side. These couplers must be reinforced by welding a length of steel bar down each side at 90 degrees to the nuts and bolts. If this is *not* done we *know* they will break, disaster will be your's, so **do it**. You should also knock out the pole stop position in the couplers.

Putting it Together

You should by now have secured the use of a field, not made up ground, for field trials. The field should be well away from overhead power lines and ideally in a quiet location. Five practical people only are needed to safely carry out the following sequences. It is much safer if each person is given the responsibility of a certain task.

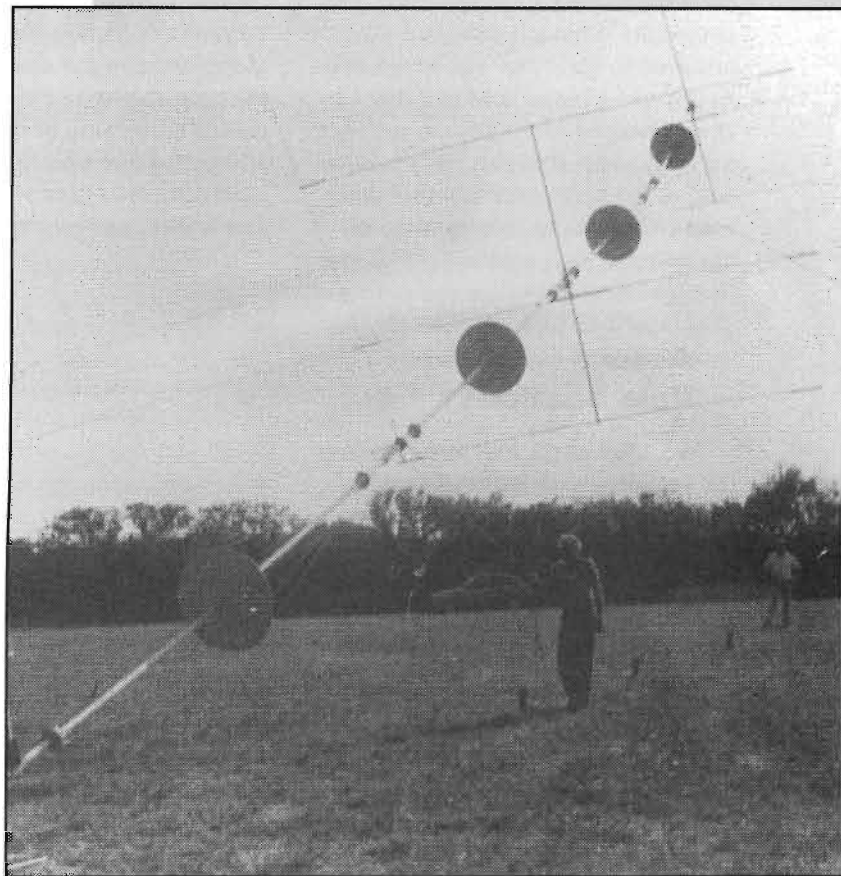
Secure the base at the centre. Measure out and drive the N and S stakes in, make sure the W and E stakes are at right angles to the N and S. Six poles should now be fitted with their discs and strengthening wires. The four poles are now coupled together with their bearings and joiners facing the north stakes.

Slip the bottom of the mast into the base swivel assembly. You should consider the base as the centre of a circle, and the top of the mast as north. Now the west, north and east guy ropes from bearings 1, 2, 3 and 4 are made off to their appropriate stakes, the north guys being slack in this position. Make up the gin pole as described earlier, when this is done slot the gin pole into its mounting socket so that it lays eastward. At the top of the gin

pole two ropes are attached, these secure the gin pole when it is in the upright position. Tighten the gin pole in its socket. Leave the mast swivel socket loose until the gin pole is raised up to the vertical position and secure it by its guy rope each side. The gin pole needs to be about 85 to 88 degrees to the mast, this allows for rope stretch.

The mast south guy ropes from bearings 1, 2, 3, and 4 are attached with the winch wire to the top of the gin pole. The top guy must be given more tension than the rest to create the downward bow.

The commander must take up a position near the outermost east stake and direct operations. Safety must be considered at every stage, the ropes, shackles and winch must all be in good condition. It is advisable to refer to a check list as you go along. The commander's main concern is to keep a downward bow in the centre of the mast when being raised. This is achieved by having the top guy under more tension than the rest, this is of vital importance. The jig pole needs to be about 85 to 88 degrees to the mast, this will allow for rope stretch. The winch-man can keep an eye on the poles as the mast is winched up. The three helpers must keep a little tension on the north guy ropes as the mast is being raised. They must



Raising the field mast

stand slightly to one side incase anything should go wrong. When the commander says the mast is vertical tie off the guy ropes to their stakes.

Raising the Mast Safely

Only five people are required, any others should stay outside the radius area and helmets should be worn. The gin pole is now raised to the vertical position and its east and west guy ropes are tied off. Tighten the swivel socket at the mast base and double check that all fixtures are tight on bearings 1, 2, 3, and 4, guys, D links, etc. Check that the winch is double staked, when the winch wire is fully extended always have 4 to 6 turns on the drum.

All orders must come from the commander only, who takes advice from the winch-man. The commander must take up a position

near the outermost east stake and directs the operation. He and the winch-man must maintain station. The commander's main concern is to keep a downward bow in the centre of the mast as it is being raised. This is achieved by having the top guy under more tension than the rest. This is of vital importance. The winch-man can keep an eye on the mast as it is being winched up. The three helpers must keep a little tension on the north guy ropes as the mast is being raised. They must stand slightly to one side just in case anything should go wrong.

The commander gives the order to

the winch-man to winch up slowly. When the mast is vertical some adjustment may be required to the north guys. With confidence growing, lower the mast and secure a weight to the top of the mast equivalent to the aerial, being a maximum of 16kg at 24m. Now raise the mast again in the same manner as before. Lower the mast again and remove the weight. This checks the system before the aerial is attached, allowing slight adjustments to the guys if required. You can now fit the aerial by driving your van in, underneath the partly raised mast, then fixing the aerial to it. Make sure

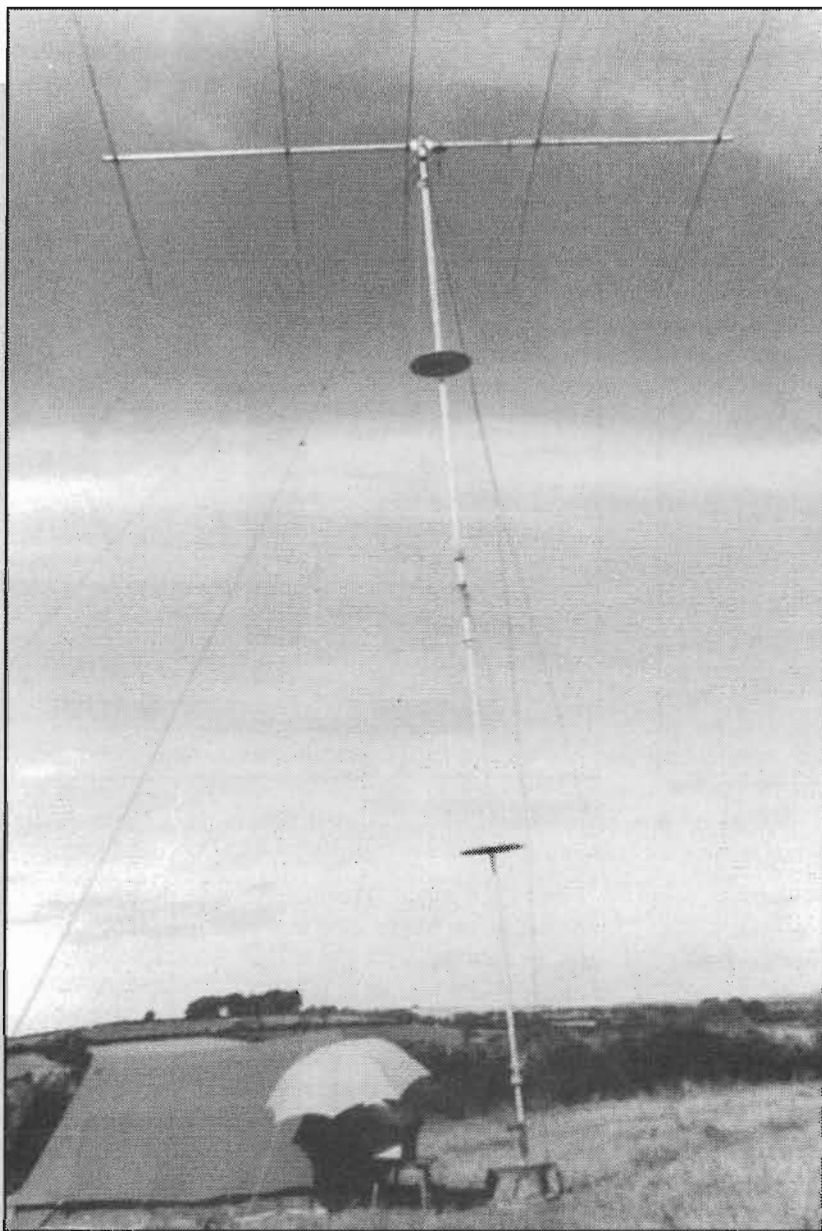
you have enough slack cable at the top in order that the mast can rotate without putting any strain on the coax cable. Tape the cable down one of the ropes.

Well, this is the crunch time, so take it nice and easy! After winching up, have two of the crew remove the guys, one by one, from the gin pole eye and tie off to the appropriate south stakes. The gin pole is then removed and put to one side or used for another aerial. All OK? Well, let's see if we can find a PL259 plug to fit the coax. Yes, we are ready to fire up, SWR perfect! Call CQ and listen to the pile-up come back. Two things you ought to do at this stage are; rope off the area for a radius of 30m, and have some flashing road type lights around the outside so visitors can see the danger area.

The only real physical effort required is to raise the gin pole vertical. Sometimes this may require a small 6m gin to assist all other operations or technique. It is advisable to take out public liability insurance for the period. The mast is most suited to a long radio contest or holiday, it takes, with a practised team, four or five hours to erect in the field. If a gale should arrive, check the outer windward stakes (I have never found them move yet). One point worth mentioning is that by making a half size version, 2 poles plus 1 gin pole with the discs fitted, it is possible to cover 14MHz, 21MHz and 28MHz with only five poles. This is the 12m/6m version which is quite suitable for the average radio club.

I hope this article has given you some food for thought to play real *low cost* amateur radio, and really *enjoy* yourself. Over the years I must thank my good friends and members of the ECC Radio Club, without whose help none of this would have been achieved.

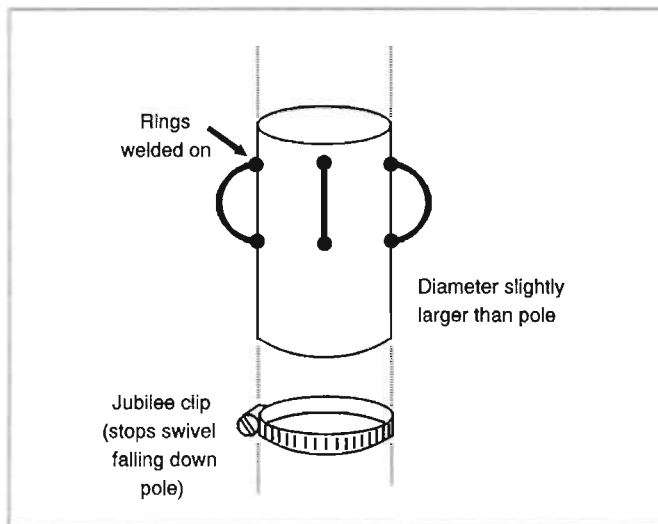
Plans and details of how to erect the mast are available from the author, write to; Mr. M. Richards G3WKF, Wayside, Penwithick Road, Penwithick, St. Austell PL26 8YH, enclosing a stamped self-addressed envelope.



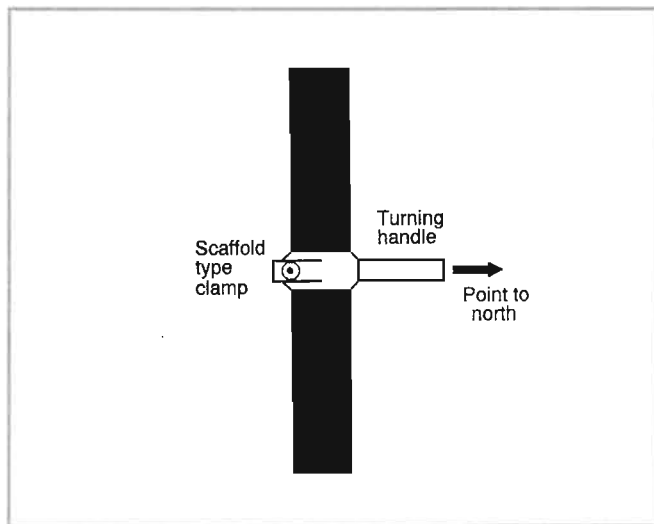
The half size field mast

Project - Portable Aerial Support

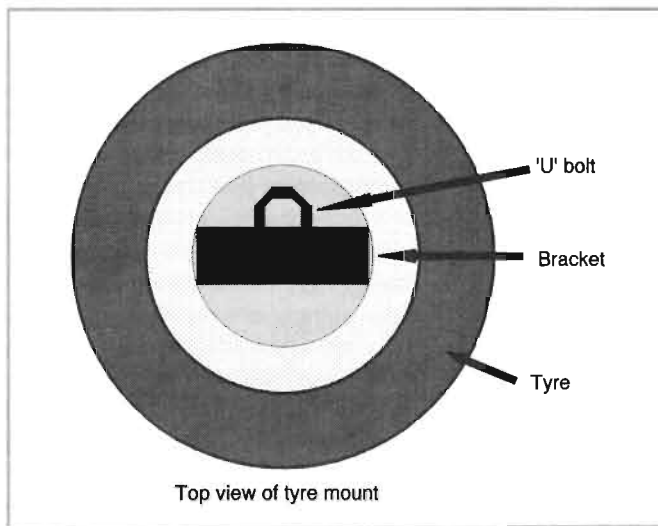
Fancy going to a hill top for some portable contest operation? Dick Pascoe G0BPS has a simple answer for supporting your aerial



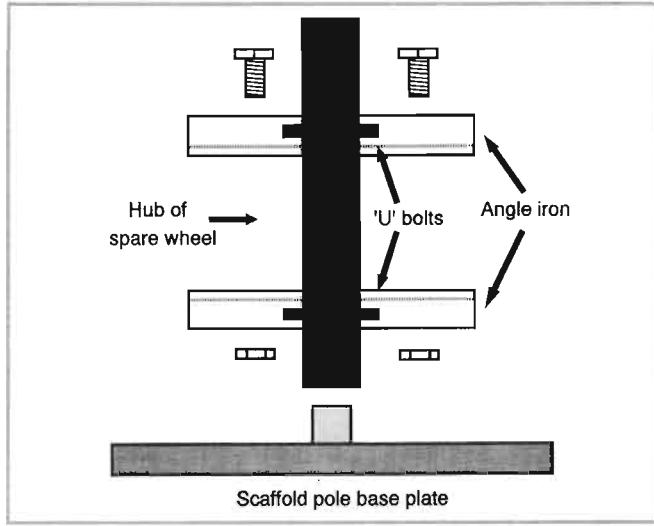
Simple guy bracket



Turning handle



Top view of tyre mount



Base arrangement

Those who enjoy operating portable now have the answer to what has been a major problem for many. Just how do you mount your aerial mast when out portable?

I've used everything from fence posts, stakes hammered in the ground, small trees and even an extra large roof rack with the pole strapped to that and a stake in the ground. *No more! We all carry a superb aerial base in the boots of our cars!*

Take out the spare wheel and find a strong piece of angle iron. Cut the angle iron so that it's short enough to fit inside the rim and over the wheel nut holes. Now cut another piece the same. Next cut out two holes to take a 'U' bolt the correct size to take your small portable mast.

I first used some *Dexion* angle iron that was surplus to requirements, but I found this was not really strong enough as it flexed while in use. It will be good enough though, if you intend to guy the mast as well.

Aha, I see that you are ahead of me! Yes, with the base of the mast bolted into the two pieces of angle iron, which are bolted to the spare wheel, your portable mast is steady. Mine has carried an eight element 2m beam at 5m in quite a steady wind with no problems, and it is a neat easy thing to store too.

One of the problems with this system is that it cannot be rotated, but the addition of some guy lines, a scaffold base, and a short lever solve these too!

SCANNERS

Bill Robertson returns with a regular new scanners section!

Hello again! After a short break, I'm pleased to be able to announce that HRT has a regular monthly 'Scanners' section once more!

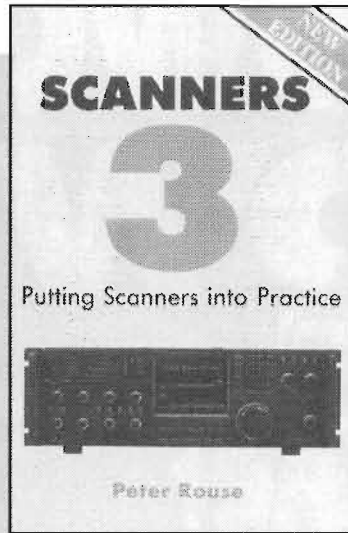
A degree of restructuring has taken place, which has allowed a little more freedom combined with an extension of deadlines, so that I can get the very latest news into this column, each month. I'm hoping to be able to make this section very much into a 'two-way' affair, and I'll be very pleased indeed to receive your letters and queries about scanners and scanner-related subjects, to answer through these pages.

As well as news relating to listening aspects of hobby radio, you'll certainly be seeing a few scanner reviews as well, starting next month in fact, including full technical results as measured in the HRT lab. These have proved extremely popular in the past, even the new 'Scanners 3' book by the late Peter Rouse has drawn upon these extensively as a guide to the 'real' performance of the latest scanners on the market. What's that? - you haven't seen Scanners 3 yet? Let's take a look...

Scanners 3

Just published by Argus books, Scanners 3 is the latest in a series of the very popular Scanners series of books by Peter Rouse. As many HRT may know, Peter is now sadly no longer with us, having died of leukaemia in June 1993 after lengthy treatment of the illness. But his name will be kept alive with this, the 4th revision of his original Scanners book, having introduced many readers into the exciting world of 'listening in'. This edition has seen a very large number of changes, and is in fact a virtual re-write, with Chris Lorek G4HCL editing and adding the 'finishing touches' to Peter's book in line with his requests.

As well as giving an introduction to



Scanners 3, just published

scanner types and how to use them, plus an easy-to-understand section on how radio works, a considerable amount of the book gives actual frequency listings of virtually all the two-way radio services in the UK - even I had one or two surprises in reading through these! There's also a very useful section detailing virtually every scanner on sale in the UK at the moment, with measured technical results included for a real 'side-by-side guide' to help the reader in choosing a new scanner. With 271 pages, it's published at £9.95 plus p/p, ISBN 1-85486-106-9, and should be available from bookshops, scanner and amateur radio dealers, or direct from Argus Books on 0442 66551.

New AR8000UK

The other 'hot news' this month is that of the new AR8000UK wideband handheld scanner. With non-stop coverage of 500kHz up to 1900MHz, FM, WFM, USB, LSB, CW and AM reception modes, and tuning steps down to 50Hz, this looks to be a very mean contender for the Yupiteru MVT7100. AOR (UK) say it has an independent +/-2kHz filter for SSB use, and as well as the set-top helical aerial there's also an internal

ferrite rod aerial fitted to help LF reception, like airshow and motor sports commentaries at these public events. A large dot-matrix LCD gives an alphanumeric display, not just frequency and channel numbers but 'real' displays of 'auto-store', 'power-save', 'low battery' and so on! A signal-strength bargraph is provided, even a bandscope to

The new AR8000UK, planned for review in next month's issue



show channel occupancy. Retailing at around £449, you should see a full review on this tiny powerhouse in next month's issue, don't miss it! The HRT Ed tells me I'll be able to get my hands on the review model next week, my fingers are getting very itchy!

Your input please!

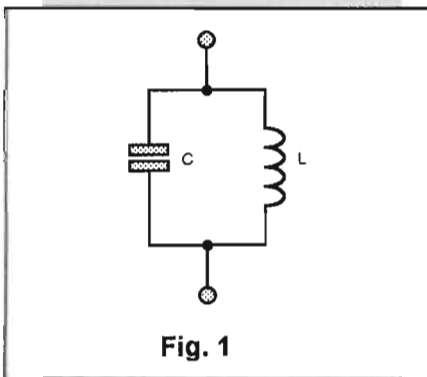
Please do feel free to write in, I'll try to answer all your queries through these pages (but please note that I can't reply individually). If you've any topics you'd like to see covered, such as aeriels, problems, legalities, or whatever, again please do drop me a line, so we can make this monthly section as useful and interesting as possible. Maybe you'd like some modifications for your scanner; I'll be pleased to oblige if at all possible! Write to: Bill Robertson, c/o HRT Editor, Argus Specialist Publications, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST. See you next month.

From My Notebook

Geoff Arnold G3GSR continues his discussion on tuned circuits

Following on from last month, when a capacitor and inductor are connected in parallel (Fig. 1), instead of in series as in the acceptor which I talked about, they form a rejector circuit. Each component reacts to rising frequency of V^m in exactly the same way as they did when connected in series. In other words, the reactance of the capacitor gets smaller as the frequency increases, whereas that of the inductor gets larger, and at some frequency, the resonant frequency, they will be equal.

The effect of the circuit at resonance is very different from that of the acceptor. A quantity of energy is stored within the circuit, constantly being exchanged between the



electric field within the capacitor and the magnetic field around the inductor, producing a current which circulates or oscillates back and forth around the LC circuit.

Obviously some energy has to be fed into the circuit in the first place, but if the capacitor and inductor were without losses, then once established this circulating current would carry on indefinitely, requiring no further energy supply from outside. If it requires no energy, it draws no current from the outside world, and if it draws no current, it looks to the outside world like an open circuit!

At frequencies above or below resonance, the reactances of the capacitor and inductor are not equal, and the amount of energy stored by each will not be equal. There will, therefore, be a net current flow through the LC circuit at frequencies off resonance.

In practice, the losses in the inductor and capacitor dissipate some of the energy at each exchange of the circulating current, and even at resonance a small amount of current is drawn from the outside world to make good those losses. So the LC circuit is not quite an open circuit at resonance, but it does present a very high impedance to the outside world. It resists current flow through it at its resonant frequency, which is why it is known as a rejector.

Using the Rejector

Again, there are different ways of connecting and using the rejector circuit. The use which seems more appropriate to its name is where it is connected in series with the signal flow (Fig. 2(a)). It then rejects (or notches out) the unwanted frequency but allows signals higher or lower in frequency to pass through.

The alternative use, shown in Fig. 2(b), is where the rejector circuit is connected across the signal path. In this case it forms what might be called a frequency-selective short

circuit, shorting away to the 0V rail all the unwanted frequencies, but presenting a high impedance to the wanted signal at its resonant frequency, allowing that signal to pass on to the V^{out} terminal and on to the following amplifier stage.

To complete this brief description of parallel-tuned (rejector) circuits, there are a couple of particular applications worth mentioning.

First, the ability of the circuit to store energy gives rise to the name tank circuit when used in output stage of a transmitter. Although there, energy is being drawn off to feed to the aerial, which means that the transmitter output stage has constantly to replenish it.

Secondly, because the parallel-tuned circuit is a closed circuit, you can couple energy into it by transformer action - no wired connection being necessary. The circuit of Fig. 3 shows the idea, where a tuned circuit is inductively coupled to the collector load L_1 , absorbing energy at the resonant frequency of L_2-C . This sort of circuit has been used, for example, to remove unwanted residual sound signal energy which has found its way into the vision IF strips of TV receivers. There, it is expressively known as a sound suck circuit!

Exactly the same principle of operation as the sound suck circuit is used in the grid-dip oscillator and its modern solid-state equivalent, the

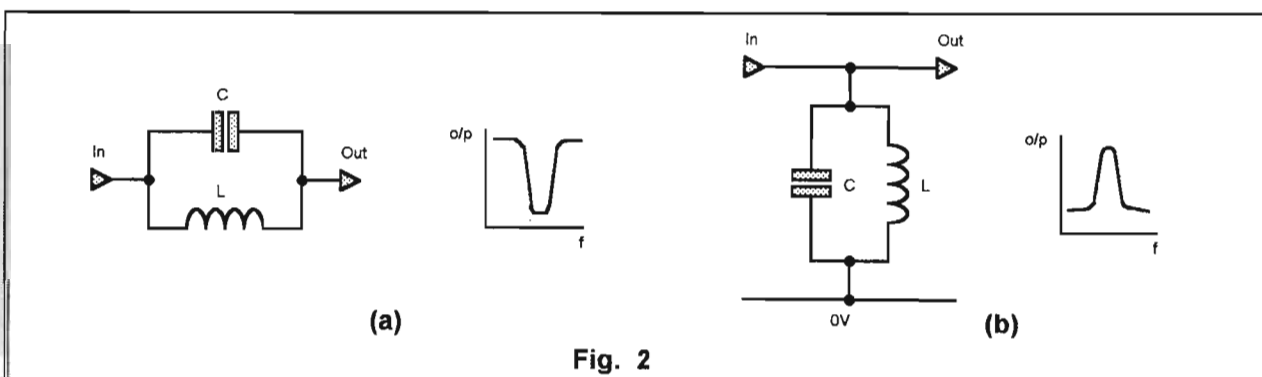


Fig. 2

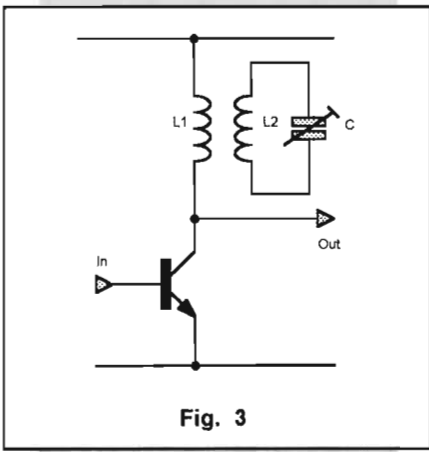


Fig. 3

gate-dip oscillator. The GDO consists of a tuneable RF oscillator with a meter which monitors the RF voltage across the in-built tuned circuit. When brought close to another tuned circuit, energy will be absorbed by that circuit, with maximum absorption occurring when the resonant frequencies of the two tuned circuits are the same. Having tuned the GDO for maximum dip on the meter (maximum absorption of energy from it), the tuned frequency of the two circuits can be read from the GDO dial.

The ability of tuned circuits to present low or high impedances to signals of various frequencies is of course essential to the whole mechanism of radio communication. It is the basis of the tuning necessary to select one signal from many others in a receiver.

Remember that an acceptor circuit placed in series with the signal path, or a rejector in parallel with it, will favour a signal at one frequency (the resonant frequency of the tuned circuit) and attenuate signals higher or lower in frequency. On the other hand, a rejector circuit placed in series with the signal path, or an acceptor in parallel with it, will attenuate a signal at its resonant frequency but allow signals above and below it to pass more or less unhindered. Which circuit arrangement you should use will depend on the effect you are trying to achieve.

Wider Applications

It is not only assemblies of conventional capacitors and coils which have this property of rejecting or accepting - even magnifying - signals at various frequencies; it is also found in aerials, transmission lines, resonant cavities and so

on. Making measurements of its effect can give us useful information about the electrical value and quality of components. In the Q-meter, (Fig. 4), a known RF voltage is injected into the coil to be measured, L_x , by connecting a very low value resistor R_i (typically 0.04 ohms) in series with the earthy end of the coil and feeding a known RF current through it. The VFO and RF milliammeter provide the known RF current.

By measuring the voltage across the coil when it is tuned to resonance with a low-loss, calibrated capacitor C , the voltage step-up provided by the coil can be calculated. This step-up, or magnification, is the Q of the coil. At VHF, the losses caused by the presence of the injection resistor in the tuned circuit become too large to be ignored, and it is replaced by a reactance, but the principle of operation is the same as for the resistive version.

A somewhat similar approach can be used to make measurements of resonant frequency with nothing more than a calibrated RF oscillator and an RF voltmeter (Fig. 5). As the frequency of the oscillator is swept past the resonant frequency of the tuned circuit under test, LC , the RF voltmeter will indicate the maximum voltage across LC (or the minimum voltage, if LC is a series-tuned circuit). The resistors $R1$ and $R2$ are there merely to reduce any loading of the tuned circuit by the test instruments. Since you are merely looking for a voltage peak, rather than measuring the voltage, the

losses they introduce are of no consequence. You could use the same set-up to check an acceptor circuit, rather than the rejector shown in Fig. 5. Then, you would be looking for a dip on the voltmeter.

One of the readers' suggestions for topics for this column was how a boxful of unmarked rubber duck aerials could be sorted by frequency band of use. The tuned circuit of Fig. 5 could just as well be an aerial. There are better and more effective ways of doing it if you have the equipment, of course. Best of all, but unlikely to be available outside a professional laboratory, is a network analyzer, which will resolve the various reactive and resistive components of any tuned circuit connected to it. A rather less expensive alternative is an aerial SWR analyzer, such as the MFJ-259 reviewed in the May 1994 HRT.

It is also possible to use a GDO to check the resonant frequency of an aerial, or even of lengths of metalwork such as mast-stays, pipes, etc., if you are looking for strange resonance effects which may be upsetting aerial tuning or polar patterns. It can be difficult to achieve adequate coupling between the GDO and the aerial or other metalwork, and for something like a dipole it will help to connect a small coil of two or three turns at the feed-point and couple the GDO to that.

Until Next Month

In the meantime, I would be delighted to receive further suggestions for topics you'd like covered in future Notebooks, so please keep them coming. Send them to my home address, 9 Wetherby Close, Broadstone, Dorset BH18 8JB.

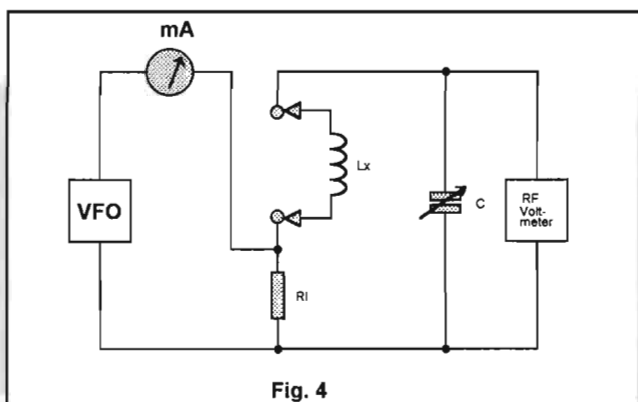


Fig. 4

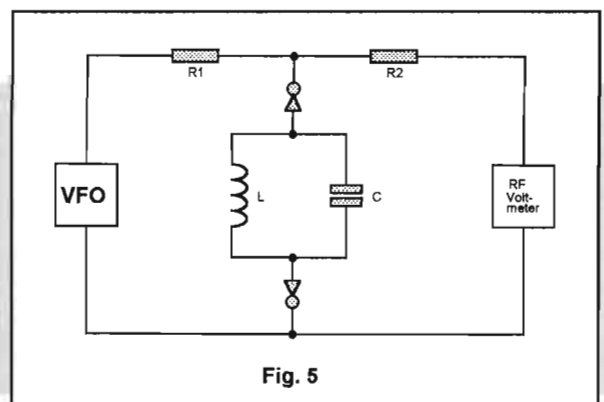


Fig. 5

QRP Corner

Dick Pascoe G0BPS shows how to calculate your 'radio line of sight', which can be very useful when choosing a contest site!

I can remember vaguely that, when at the Merchant Navy college in London in the (very) early sixties, one of the things I had to study was of course navigation. Part of this was to calculate the distance from objects on the shore some miles away to the ship I



was on. Of course, if the distant object happened to be a lighthouse stuck on top of a cliff, you had to know that height. These are marked on charts, not only lighthouses but all large objects that may be used for navigation purposes.

"What has all this to do with amateur radio?" you may ask? Well, we all know that if we sit on top of a cliff or hill we can see further than we can at the middle or bottom. If we know the height of the cliff / hill then we can actually calculate the distance to the horizon (the most distant point that can be seen).

For the VHF DXer or QRP man this could be important. If you take the height of the hill and multiply the square root by 1.4 we get the distance to the horizon, over water. Thus at my home, on top of the hills overlooking the channel, I am at about 300m ASL (Above Sea Level). Given this, the square root of 300 is 17.32, multiplied by 1.4 gives an horizon (over sea) of 24.25 miles. Which is almost exactly right because I can see the beaches at Cap Griz Nez near Calais on a clear day! There are of course differences in

built-up areas or in the countryside, buildings or houses will stop this line of sight.

Aerials et al

In last month's column I looked at some very good books on aerials, one of these being "Reflections". In the first chapter, the author Mr. M. Maxwell expounds a theory that I have agreed with for several years. The suggests that we as amateurs have too high a regard for a low SWR (Standing Wave Ratio). Where else but in this hobby would we hold a ratio of two things in such high esteem? "My SWR is 1:1" we may hear. But what does this mean and more importantly what does it prove? We could fit a 50 ohm dummy load to the end of the feeder, and if the owner didn't know about it he would be delighted! "Wow! I've got an SWR of 1:1, my signal **must** be getting out!"

Our aim must be to get the maximum amount of our generated RF power up to the aerial and out into the ether. The more we low

power enthusiasts drop our power levels, the more important this gets. A 1:1 SWR can also be generated by water filled coaxial cable. Have you ever taken off a PL259 plug and watched the water flow out? I have! Co-axial

cable seems to be the norm these days, but what of the better-known open wire feeder of yesteryear?

One other thing that is often overlooked when reflected power is discussed is where does this reflected power go? Say we have a mismatch so severe that 50% of our transmitted power is reflected from the aerial back down the feeder. Where does it go? "Back to the transmitter" you may say, but then where?

Back up the feeder of course! By re-reflection from the transmitter. It does not magically vanish into thin air. We have tended to think that they just do that, vanish somewhere, never to be seen again. Of much more interest to the amateur should be the condition of feeder and cables. It is Murphy's Law that the moment something breaks it will be just as that final country for DXCC appears or there will be a blizzard blowing.

To stop water getting in my feeder, I tend to tape my joints with weatherproof tape, which usually works. I have found though that a check of the older cable in use has

Coming Next Month

HRT's Listeners Special!

How to get started on listening around the bands
What equipment do I need?
What should I avoid?

UK Exclusive - AR-8000 wideband receiver reviewed
and Bill Robertson continues with his monthly *Scanners* section

Other planned features;

Trio TK-701 ex-PMR conversion to 2m
Yaesu FT-2500M high power 2m mobile reviewed
Hustler 6BTV 6 band HF vertical reviewed
Free Ham Radio Software copying offer

Plus all our regular features;

*From My Notebook, HF Happenings, Packet Radio Roundup, QRP Corner,
Satellite Rendezvous, VHF/UHF Message,*

plus

Readers Letters, Radio Today, hundreds of Free Readers Ads, and much more

To make sure you don't miss this exciting issue, why not place a regular order with your newsagent!

Planned articles subject to magazine space being available

shown some corrosion of the inner core. Anything like this will dampen our signal. For HF work I still prefer open feeder and if you have trouble finding any, try DeeComm, they usually have a couple of reels available

I know I tend to harp on about this subject, but just occasionally I see something that triggers it, just like the aerial advert that quotes a gain of 10dB. with no reference. Is it 10dB over a dipole, an isotropic or a dustbin? Maybe if we are really lucky it may be 10dB over a 30m dish! Again wishful thinking.

Components

A very interesting letter from Dennis G3MNO dropped onto the desk recently. He had apparently been intrigued by some of my comments about air spaced variable capacitors. He seems to have beaten us all to it, realised that they would become scarce and has been

collecting these for several years. He delights in having a very deep junk box.

I always used to work on the principle that "Oh! that looks interesting. It must be worth hanging on to, it must be of use in *that* project soon."

The amount of valuable stuff that I collected over the years soon became apparent when I started packing to move house. Moving from a large three storey Victorian house to a much smaller bungalow with no spare storage space at all showed just how valuable some of this junk was. The local dustmen commented a few times on the weight of our bags!

Back to Dennis. He apparently gained a reputation for collecting valuable equipment, and soon pieces from all over his local area started to find their way to his shack. A batch of 100pF capacitors here, a few dozen Eddystone 140pF here (Silver plated and new!). He even tells us that he dived under a collapsed shed to

rescue some components. Dennis is obviously a real amateur radio hero, a man to be looked up to, a man to befriend and nurture. He might have that missing component in his junk box.

Back to reality, he also gives some real advice about cleaning some of those old items. It can be done with detergent and *very* hot water, drying on a radiator or similar. He obtained a dentist's ultrasonic cleaner which he used, and then wrapped the clean components in polythene bags. Spindle sizes are not a problem with capacitors, they can always be packed out to fit knobs etc. His comments on 'Homebrew' are interesting too; "Have you ever met the keen model engineer who is going to make a loco? His first step is to locate a source of iron ore, make a smelter and start building a lathe....."

That's it for this month, news and views to me via HRT Editorial or direct to Seaview House, Crete Road East, Folkestone CT18 7EG. 72 de Dick G0BPS

VHF/UHF Message

Geoff Brown GJ4ICD looks back at Sporadic-E openings on VHF, and looks forward to getting on a plane to activate JY on 6m



Ken G4IGO has monitored Band I, II and III TV, along with 50/144MHz Sporadic-E openings, for the past 19 years. This has resulted in comprehensive records, listing in many formats the most likely times and dates of Es openings from his QTH. If anyone would like copies of his findings please send him a large SASE and £2.00 to cover printing costs to: Ken Osborne, 7 Winchester Cottages, Seavington St. Micehal, Ilminster, Somerset, TA19 0QJ, UK.

The first major 'ES' of 1994 occurred on the 18th April, with stations in the UK working Italy, and stations in France working Slovenia (S5). Other openings later in the month were also reported on 50MHz.

An expedition is due to have taken place between June 10th and 24th 1994, to N. W. Scotland and the Western Isles, by members of the Worked All Britain Group (WAB). Team members included G7BXA, G7HSP, G7DKX and G0NES. Rare WAB and locator squares were activated including IO66 and IO67. A special QSL card is available via G7DKX; Derek Green, 6 Brick Rd, Sunk Island, Patrington, North Humberside, HU12 0QN, UK.

Activity on 6m from Latvia before the summer of 1994 had been limited to a couple of short weekend operations from YL/ES9C. From the

beginning of the year, all Latvian amateurs holding Class 1 licences can operate (no special permit required) on 50.0/52.0MHz, with 50W maximum output power. Operation near the TV transmitter on Channel R1 (Kuldiga region) requires a special permit.

New regulations beginning January 1st 1994, state band limits from 50/54MHz. 50.0/50.5MHz is available for all holders of Estonian class A and B licences and all holders of CEPT class 1. 50.5MHz/54.0MHz is only for those with Class A privileges and a special permit. 400W PEP is now available on SSB.

LA5TFA/P operated from KQ00 between 10-12th June. If you worked this rare field QSL via LA5TFA: Aasmund Birger, Jakobsen, Graatindvn 1, N-9100 Kvaloysetta, Norway.

Good tropospheric conditions existed in early May, all VHF/UHF bands were a "little more alive than usual" as one reader puts it. High pressure dominated the UK for several days but no fantastic DX was reported.

Early May continued with minor 'ES' openings, and a tropo opening on 144 on the 2nd from GM to Norfolk (a good old sea path!), 50MHz openings were on the 1st between EA-/GJ, 2nd GM-EA2, 6th Northern G to SP (Poland).

Conditions for the 432MHz Trophy contest on the 7/8th were the usual poor ones, However Alan, GJ4ZUK/P (ex GM4ZUK and now working/living in Jersey, and after my DX!) running 100W reported that he made contacts up channel into PA0.

Meanwhile on 50MHz, on the 7th 5T5JC was reported into France via 'ES', and on the 8th Italian stations were heard/worked by many via meteor scatter. In GJ, IK2GSO was continually heard for an hour or so at S2 via some form of troposcatter, there was no sign of any sporadic 'E', even on 27MHz. During the second week of May, stations in the south of

England reported hearing ZD8VHF on 50.0325MHz but no contacts took place.

The 14th brought real signs of things to come. 5T5JC was worked around the UK and most of Europe, OD5SK reported the 50MHz beacon was still operational and he had nice openings to OH, PA0, YU, S5, ES and other European countries. On the 15th OD5SK (300km from Amman, Jordan!) again reported an opening from 0700z lasting for three hours and again working most of Europe on 6m. The same day brought the first 144MHz opening of the season as reported by EH6FB, but I didn't catch the area he worked.

The 16th was even better! All day long 'ES' on 50MHz and 144MHz, on 6m 5B4CY was S9+, OD5SK was also heard, SV's galore, DL, OK, YU, C31, EH, 5T5, F, I, IT9, 5B4, Z32, SP, OZ, SM, YO, TK, OE, OM, 9H and the list goes on. On 2m SV's reported working SP during the day, and at 2100z the bands were still open.

On the 17th it was chaos. At lunch time CN8ST had a stateside opening and Z32BU was on the band for a new one for everybody. The opening this time extended down to 7Q7 at 1720z, 7Q7RM was S9+ with me and also worked into the UK. At 1820z I heard the FY7 beacon, and, at the same time EA8/DJ3OS heard the VO1 beacon in Canada. Eric 5T5JC was again into the UK at S9+, CU1EZ was logged from the Azores, and at 1912z EA8/DJ3OS started to work W's including W1OUB, and K1TOL at 5100km.

More on this opening in a future HRT as I now have to catch a plane to JY.

Beacon News

The Royal Jordanian beacon JY6ZZ



Famous microwave man, Bill James

(a strange call for a beacon, but it's the Royal Jordanian Amateur Radio Society Club's call) was completed by Lawrence GJ3RAX and myself and duly soak tested for many hours before it was taken out to Jordan by myself. I spent many hours testing the 'box' and the spectrum output was very clean with everything (harmonics and spuri) down by at least 65dB. Lawrence's unique design seems to be proving itself by the reliability of the beacons, (I just wish I could get him to crack on with the 70MHz SSB transceiver design!). The power output is 8W and the frequency is 50.075MHz. In Jordan just recently the temperatures reached 32 degrees C, and that was in April, so we find that 8W output is adequate for beacon use as in some of the hotter countries 25W would I'm sure cook the PA. The beacon was sponsored by your's truly to help further propagation reports from the Middle East, as it looks like that Band I TV may soon be decommissioned there.

Our next beacon project will be the building of the 8R1SMC beacon which will be located in Guyana, South America. Like the FY7 50MHz beacon, this will be an invaluable propagation indicator.

I was pleased to learn that another of our 'Jersey built' VHF beacons went on air in April/May. This was 9M6SMC located in Malaysia, and should prove useful to our Australian friends. This beacon was sponsored

by SMC Ltd., reports so far indicate that it has been heard in Japan.

Two new beacons have recently appeared from Poland. They are SR5SIX on 50.023MHz in KO02 and SR6SIX on 50.028MHz in JO81.

A long letter has been sent to Julio D44BC (Cape Verde Islands in the Atlantic), who many amateurs worked on 6m via F2 in 1989, asking him if it is possible to obtain a 50MHz permit for the Summer of 1995 for 'ES' tests, and to obtain permission for D44SIX a new 50MHz beacon to be built. After the results of working Eric 5T5JC at the end of the 'ES' season (October 1993) it does look possible that D44 could be

2EØAAX



2EØAAX
23 Falconsway
Salisbury
SP2 8NR England
QRA 1091CB

First 50MHz Novice contact to GJ

worked in Europe via multi-hop 'ES', some say no, but, take these facts into consideration.

In 1992/93 many European stations, including UK stations, worked 9K2 (Kuwait) at distances of

up to 4700+km (IO92/IO70 as examples). D44 is located mainly in grid square HK76, which works out at 4470km from IO92 (even less from GJ!). Given that such strong signals were received from Eric 5T5JC (S9+20dB) when he had his beam stuck to South Africa and was using 60W it really does look possible, especially during the peak months of 'ES' here in Europe. Plus, the EA8 beacon is heard many days during June/July at S9+ for hours on end.

Cape Verde is not an easy place to get to, it's also hot during June/July and I am told suffers from regular Sahara sand storms. Enquiries regarding flights are currently being made, as this trip looks even costlier than JY.

Next Month

Well next month I should be back to normal activities. The Jordan trip has thrown me a little, early deadlines for HRT on my side, and clearing the backlog of service work at my company have not helped in getting things out at the right times. So apologies for the delays, when I return it should be possible to start a two or three part story on the VHF DXpedition to the Middle East complete with photos, who we worked and what went wrong before we even got there. Thanks must go to the following sponsors for all their generous help: SMC Ltd., Nevada Communications, Waters & Stanton, RN Electronics, R. A. Kent (Engineers) plus members of the UKSMG, Graham G8HVY and YL, Royal Jordanian Airlines, plus others, a full list will follow in a future HRT.

My belated 'get wells' to Ela G6HKM and Ken G5KW who are now on the mend after a short while of not being active on the bands.

Thanks to all readers and writers for their news and views especially the UKSMG.

News, reports, photos please to: Geoff Brown, GJ4ICD, TV Shop, Belmont Rd., St. Helier, Jersey. C. I. or Fax/phone 0534 77067.

Packet Radio Roundup

Chris Lorek G4HCL checks the latest DOS and Windows based packet software to come into the UK

Following my review on the Maxpak MAX01 modem in last month's HRT, Ed G4ZXS @GB7MAX (in the 'heart' of Maxpak country) has been in touch to say he's also built an MAX01, and it works at treat with TPK software. Ed's now thinking of buying a case for the modem to smarten it up a bit! He adds that the review is due to be reproduced in the Aug/Sep 94 issue of Maxpak's bi-monthly journal 'Digicom', which is free to their members.

The previous issue, which has just landed on my doormat, as usual is informative as ever, this issue containing the first part of a national nodes listing together with the group's latest network and BBS news. You can get details on the group, and further information on their TNC kit and software offerings, from their Membership Secretary Richard G1NZZ @GB7MAX or Tel. 0384 373682 between 20.00-21.00.

paKet 6 - a Free Copy Service

Regular packet users will no doubt have heard of, or even use, the extremely popular paKet 5.1 program. There was a review on this

in the Sep 1992 *Packet Radio Roundup*, which can give you an idea of the great flexibility this program can offer. An 'eye on the network' will reveal that the latest version, paKet 6, is now available! This retains the many, many features of its predecessor, adding a few more like remote operation of 'script' files. A very user-friendly 'installation' routine also guides you through the various stages of setting the program up for use with your particular TNC. The manual, which includes a useful 'background' to packet and PCs, is a mere 323 pages long (I know, I printed it all out!). This however is also available as an 'on-line' help from the program, the required part being displayed on your screen, which will save you quite a bit of paper!

The program, which will run on mono or colour based IBM PC clones, is DOS based and so it'll run on virtually any PC, and can be installed either onto your hard disk if you have one, or onto 5.25in or 3.5in disks of either density. It also it comes with a PIF (Program Information File) and suitable icon for you to run it under Windows if you wish.

Like its predecessor, paKet 6 is

shareware, and the author Tony Lonsdale VK2DHU hasn't limited any of the program's features to non-registered users. He just asks that, if you like the program and use it, that you consider paying the nominal Aus\$25 (£16 in the UK) fee to promote future updates. If you're a registered user of this, or indeed a previous version, this is valid for life, which seems extremely reasonable! Tony says that he encourages people to give copies to other amateurs, and you should be able to find paKet 6 available from shareware libraries and BBSs. If you're reading this and you'd like a copy, free, then turn to this month's CQ de G8IYA Editorial, where you'll see where to send your disk and SAE to for a free copy. Can't say fairer than that, can I? You can try the software out to your heart's content, and if you like it, then the UK distributor and registration agent is Essex Packet Shareware, 89 Tyefields, Pitsea, Basildon, Essex SS13 1JA who you can send the registration form to (which comes 'on disk' ready for printing, with the software).

PacketPeT for Windows

This commercial offering from TNC manufacturers PacComm is a split-screen terminal program that takes advantage of the Microsoft Windows interface for the PC. It's been designed to work with most TNCs, but gives specific support for those from PacComm as well as the Kantronics KAM, AEA PK88/232, and TAPR TNC1 and TNC2 compatibles. You can have several copies of PeT

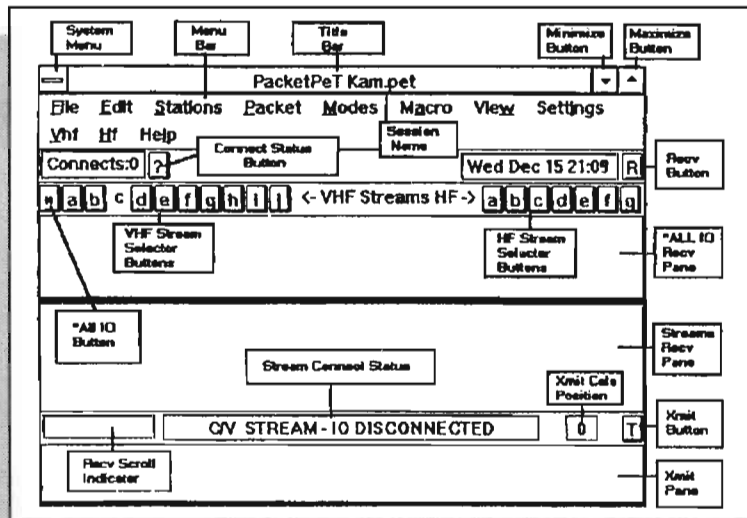
```
-- Buffers -- Windows -- paKet 6.0 -- Log File: AUTO
<---> 11:37:12 COM1: RTS DT
Window 1 - Stream A - Not Connected

-- REMOTE / PMS option
-- REMOTE Options --
Allow REMOTE access? Y
Issue REMOTE Menu on connection? Y
SEND files to REMOTE station? Y
RECV files from REMOTE station? Y
REMOTE trigger (decimal value) 29
-- PMS / Mail Forwarding Options --
BBS Callsign (eg XY4BBS-1)
Allow third party messages in PMS? N
Delete message after Forwarding? N
Call hourly? (Mail, Always, No) N
When? (minutes past the hour)
Call BBS once per day? (M, A, N) N
What time of day to call? (hh:mm)
Use Script to make BBS connection?
Connect path/Script File for BBS

paKet can issue a REMOTE
Menu to other stations
so they can perform a
number of operations on
your system while you
are not here. These
operations include
access to your PMS to
send and receive mail
messages; file transfers
to and from your disk;
etc.

Most users would set
this option to Y to
allow REMOTE operations,
but if you prefer, you
can disallow REMOTE
access by specifying N.
```

paKet 6



PacketPet for Windows

running, each in their own window, or indeed even run it in the 'background' if you wish - the program lets you know the instant someone connects to you.

The advantage of this program is that, if you're familiar with Windows, you should be 'quite at home'. The program does however in most cases require you to enter commands to the TNC as you would do normally - like 'C G7XYZ' to connect to G7XYZ, there's no 'one touch connect' keys and the like. You can however program 'Macro' commands, and the built-in macro recorder can even save your keystrokes into a file for automatic play later on. Also, one-touch multiple connect support is built in to make 'stream switching' very easy. The program also shows you which streams have had activity present that you haven't yet seen, and a click on your mouse button quickly switches you between streams.

If you have a sound card fitted to your PC, the program will even talk to you! When I issued a command to connect to my local BBS, GB7XJZ, upon connection a pleasant sounding American female voice came through my PC's stereo speakers telling me that I was "Connected to, Gee, Bee, Seven, Exe, Jay, Zee". A similar voice saying "Disconnected" came though on disconnection, even a bright

"Seventy Three!" on quitting the program! Although this could be termed a 'gimmick', it can be very useful if you're using your computer for, say, logging or rig control in the 'foreground' with PeT running but hidden away in the background. You can indeed get PeT to play any PC '.WAV' sound files on command and connect status change. A small collection of these come with the program and you can, of course, record your own in your own voice if you wish using your sound card. As well as the 83 page manual, an on-line 'help' facility using the Windows environment is available if you get stuck.

In use, about the only limitation I found was the lack of binary YAPP file transfer facilities. PeT instead uses its own derivation of Xmodem for this, and you'll need another PeT user to make any use of this. But to be fair, many BBSs have a '7+' convert facility which can get you over this limitation for many file downloading or transfer needs.

The program comes on two 3.5in HD disks and expands to around 3Mb on your hard disk, you'll also need to have Windows 3.1 installed of course. It should be available by the time you read this, at around £49.95 plus p/p. It's stocked in the UK by Siskin Electronics in Hythe, to whom my thanks go for the provision of the program for test.

Node Lockouts?

A *Packet Radio Roundup* reader dropped me a line asking what the situation is regarding packet node SysOps being able to choose which station connect to their node? Ethics aside, as far as I can see, if a node operator provides equipment for a given purpose, and pays for site facilities and the running costs, then he or she can indeed pick and choose what it's used for, including who can and cannot connect to it. For example, if someone decide to leave their packet station running in their shack, then surely it's up to them who they choose to let use it remotely!

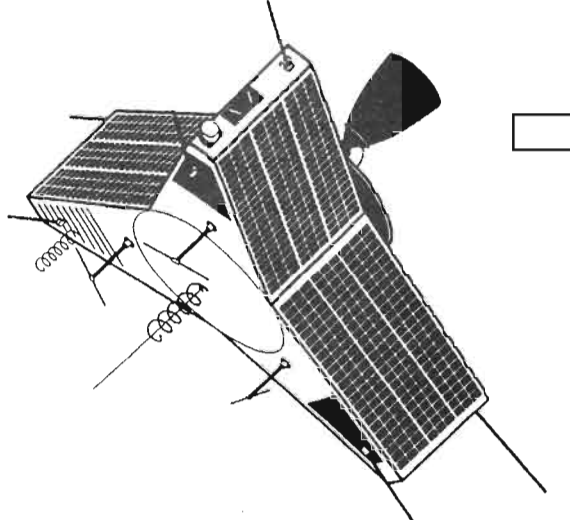
If a node is provided as a 'network node' specifically for linking purposes, then it would be quite reasonable to 'lock in' only the callsigns of the other network link nodes which the links are planned with, thus excluding non-planned nodes which could appear and thus easily disrupt careful network planning. If however a node has a 'general user access' port, on 2m say, then would it be feasible to 'lock out' individual users or 'lock in' just a few selected user callsigns to the exclusion of others? This is reportedly what's been happening by my correspondent in his area. What do other packet operators think? Let me know your views, I'll be pleased to publicise 'pros' and 'cons' through these pages.

CTRL-Z, End of Message

That's it for this month. Please do keep your messages and mail coming, either to G4HCL @GB7XJZ.#48.GBR.EU or to the HRT editorial address in Hemel Hempstead. I reply to every packet message I receive, although business commitments do sometimes mean it can take me a few days. For example, tomorrow I'm off to an island off the coast of 3V8 for a few days, and yes I will have HF (and possibly also VHF) amateur band gear there with me!

Satellite Rendezvous

Richard Limebear G3RWL with this month's AMSAT-UK news, including details of the new UNAMSAT-1 satellite



They are starting the launch campaign of the UNAMSAT-1 MicroSat. The launch had been set for 15th June, but there was a possibility that it might be delayed about one week. The launch has been planned to be on a refurbished Soviet SS-18 ICBM designed to carry satellites. The final keplerian elements of the intended orbit are not known, but the known parameters are as follows;
Orbital Inclination; 73 degrees
Altitude; 730km
Orbital Eccentricity; 0.00000000

The satellite will separate from the rocket with no spin. All transmitters will be silent at separation and for a period of at least 1 hour. The VHF receive aerial and the two halves of the canted dipole for 40.997MHz will be collapsed and then they will be deployed three minutes after separation.

The following information was first published in mid-1992, it may have changed since;

As with the earlier Microsats it has five modules, each about 20cm on a side. Four of the five modules are updated clones of existing MicroSat hardware-software carrying dual 70cm PSK transmitters; a computer and power system; a 5-channel 2M FSK receiver and running similar software to the other Microsats. The main differences from the earlier MicroSat configuration are that the computer will have 4Mb of RAM instead of 8Mb, and UNAMSAT-1 will be equipped with Gallium Arsenide solar panels.

The innovative new addition is a brand new on-board experiment in the 5th "TSFR" ("This Space For Rent") module:

UNAMSAT-1's primary mission is

to act as meteor sounder. It will contain a 40.097MHz transmitter with 60W output, pulses from which can be varied from 1 to 10 msec in duration with a pulse repetition rate of 1 to 10 seconds, as controlled by a computer subsystem. The meteor echoes will be detected on a receiver at the same frequency designed to detect the returned echo and measure its doppler shift. The use of the meteor sounder is to obtain research data on the full-sky spatial and velocity distribution of meteors, with the focus on a search for high-velocity meteors originating outside our solar system.

The 40MHz frequency for this transmitter is in accordance with the ITU frequency allocations table for scientific research and both the 40MHz and amateur frequencies have been licensed by Mexican authorities.

The meteor receiver is an SSB 'zero-IF' design and the return echoes are digitized and stored in the normal computer's RAM. After each pulse, the spectrum of the received signal will be determined using the on-board computer as a DSP Fourier Transform spectrum analyzer. If a meteor echo is detected, the echo will be saved for later transmission as a special telemetry frame.

The 1-10 second repetition rate for the meteor transmitter will be adjusted depending on the state of charge of the batteries and other spacecraft power requirements, and also on the time domain requirements of the echoes.

When UNAMSAT-1 is not involved in meteor research, it can be turned into a standard PACSAT message store-and-forward satellite and data

will be sent using standard amateur AX.25 packet, but the actual frequencies haven't been determined yet.

MicroSats

On 25th May, DOVE controllers ran test software to check the operation of the voice module after several months of non-use. It generated only garbled voice, so it was turned off. They are investigating possible causes, and at this

point believe it is a software problem, not hardware. You may hear DOVE in various modes as controllers continue testing and/or loading new software. The S-band transmitter will remain off. Telemetry reports are not needed at this time.

WEBERSAT (WO-18) is broadcasting new pictures and light spectrometer data weekly. Monday UTC continues to be the day for the broadcast of the most recent spectrum, along with the week's WOD. WeberWare 1.0, 1.2, 1.3, or a similar program is required for picture extraction, decoding, and display. WeberWare 1.3 is the current software version, and is available from AMSAT-UK.

AO-27's FM transponder is in operation at weekends when the spacecraft is in sunlight. The transponder uplink frequency is 145.850MHz, and the downlink is on 436.800MHz. As yet, no official operating schedule has been announced, but that hasn't stopped amateurs from communicating with others through the satellite. The control station, N4TPY, reports that the satellite has an output power of between 2 and 3 watts at the present time, so don't expect too much from

KEPLERS

SAT: OSCAR 10	UoSat 2	AOj13	PACSAT
EPOC: 94142.44873866	94143.03061883	94144.40940288	94144.20928715
INCL: 27.1282	97.7875	57.8423	98.5965
RAAN: 326.3729	158.9341	251.0411	230.5154
ECCN: 0.6021350	0.0012137	0.7206867	0.0010403
ARGP: 180.2426	356.6640	342.2489	264.3951
MA: 179.1822	3.4484	1.9918	95.6036
MM: 2.05879809	14.69211582	2.09725094	14.29897339
DECY: f5.5Ef07	2.76Ef06	f4.61Ef06	2.1Ef07
REVN: 5428	54661	1401	22617
SAT: DOj17	WOj18	LOj19	FOj20
EPOC: 94144.16596132	94144.21082933	94144.19061234	94144.43473962
INCL: 98.5981	98.5971	98.5977	99.0329
RAAN: 230.7887	230.8353	231.0663	300.7480
ECCN: 0.0010560	0.0011035	0.0011451	0.0541340
ARGP: 263.4989	263.3967	263.1040	33.2966
MA: 96.4992	96.5956	96.8842	330.0992
MM: 14.30037037	14.30011373	14.30107216	12.83225622
DECY: 4.5Ef07	3.3Ef07	4.1Ef07	f3.5Ef07
REVN: 22618	22619	22620	20108
SAT: AOj21	UOj22	KOj23	KOj25
EPOC: 94143.50227818	94144.18192998	94144.52572252	94144.19534348
INCL: 82.9413	98.4364	66.0839	98.5540
RAAN: 160.9779	219.1638	329.5255	217.7814
ECCN: 0.0035976	0.0008301	0.0013803	0.0010495
ARGP: 150.2606	8.5029	293.2557	247.7152
MA: 210.0599	351.6298	66.7013	112.2919
MM: 13.74539547	14.36915556	12.86286047	14.28053943
DECY: 9.4Ef07	6.5Ef07	f3.7Ef07	4.5Ef07
REVN: 16619	14963	8374	3427
SAT: IOj26	AOj27	RSj10/11	RSj12/13
EPOC: 94144.24944208	94144.19661163	94143.06202902	94144.13470258
INCL: 98.6505	98.6515	82.9244	82.9224
RAAN: 220.3266	220.2413	347.4186	29.2888
ECCN: 0.0008712	0.0008078	0.0013145	0.0029039
ARGP: 287.1330	284.8036	90.9237	172.4887
MA: 72.8895	75.2246	269.3425	187.6707
MM: 14.27727519	14.27623773	13.72337109	13.74040914
DECY: 2.3Ef07	2.8Ef07	3.3Ef07	3.7Ef07
REVN: 3427	3426	34646	16534
SAT: Mir			
EPOC: 94146.81506251			
INCL: 51.6479			
RAAN: 293.2401			
ECCN: 0.0001511			
ARGP: 331.0610			
MA: 29.0280			
MM: 15.56204750			
DECY: 4.553Ef05			
REVN: 47271			

a hand-held with a rubber duck.

Several spacecraft have been in trouble during the past month. *KO-25* had a software problem with the 145.980MHz receiver, so the 145.870MHz receiver was turned on for a while; it's back on 145.980MHz now after a software reload.

In the middle of May there was a strong solar storm with a coronal hole which blasted some heavy particles out; these caused SEU's (single event upsets) in computer memories and also, possibly, upset other electronic components. Observers of the EDAC (error detection and correction) counters on all amateur satellites saw the

counts much increased; the EDAC circuitry can handle single bit errors but when an error occurs affecting more than one bit then all hell usually breaks loose. Non-amateur satellites were probably affected just as badly.

KO-23 crashed a couple of times but was speedily reloaded each time. *LO-19* also went down after 950 days of continuous operation; it is sending telemetry and its digipeater is turned on but the BBS is unavailable for use since the full BBS software is not loaded. They expect it to be out of action for about three more weeks, as this is being written, so by the time you're reading this it may be

available again.

IO-26 also went down, they think it was from the same problem and are working to bring it back. The 435.867MHz transmitter has been heard occasionally, but the (normal) 435.822MHz transmitter should be back soon.

Amsat-UK News

AMSAT-UK has recently donated \$100,000 (£68,500) to the Phase 3D builders. This will be used to purchase a high capacity battery which should have a life span of between 10 and 12 years.

As you read this, we should just about have come back from the ninth Annual AMSAT-UK Colloquium, hopefully you'll see a write-up with photos in the pages of HRT soon. This is the largest international gathering of amateur satellite enthusiasts and experts in the world and has established a high standard of quality presentations on topics relevant to the amateur satellite community. Rumour has it that even the HRT Editor was planning to accompany the HRT Tech Ed (a regular attendee) for at least one or two of this year's Colloquium events.

Remember that Amsat-UK can usually supply the very latest versions of computer software for use on amateur satellites, as well as the latest editions of a wide range of ARRL and RSGB publications devoted to aspects of satellite operation, send an SAE to Ron G3AAJ for a publications price list. For further information about Amsat-UK contact: AMSAT-UK, c-o Ron Broadbent, G3AAJ, 94 Herongate Rd., London, E12 5EQ. A large SAE gets membership info, and SWLs as well as licensed amateurs are welcome. All new joiners get the USAT-P tracking program on 5.25in disk. Members of Amsat-UK receive a copy of the bi-monthly Oscar News, and of course all proceeds from Amsat go towards funding the future of the amateur satellite movement.