

HRT

**Incorporating
SCANNERS**

HAM RADIO TODAY

JANUARY 1994 £1.70

CHRISTMAS REVIEW SPECIAL

**Icom IC-707
Budget Transceiver**

**Ten-Tec 'Scout'
Mobile HF Rig**

**Accessories for
your station**



**'Young Amateur of the Year'
presentation to Tim Munn G7OTO**

**BEST VALUE
Argus
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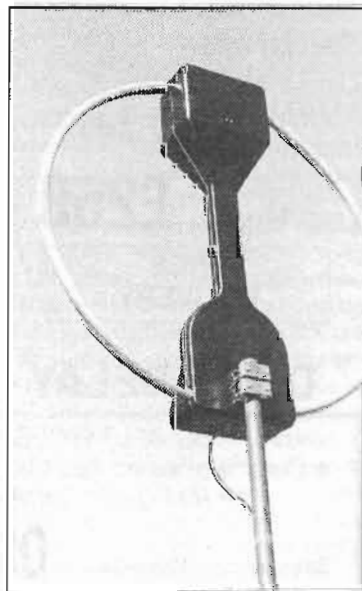
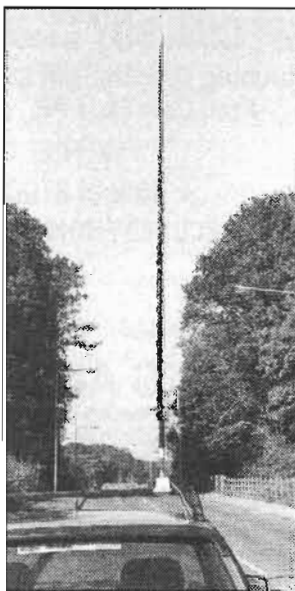
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MFJ HF Loop Aerial Reviewed
Ten-Tec Scout Reviewed (left)
Icom IC-707 Reviewed (left)

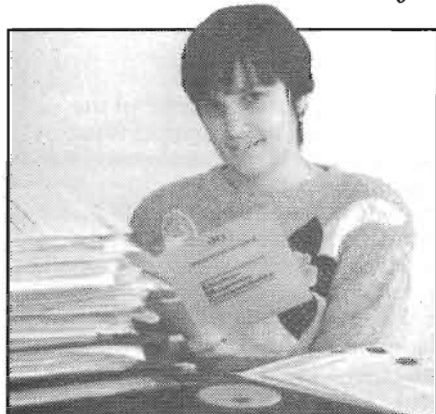


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CQ de G8IYA

Editorial

Will we need planning permission for towers in the future?



This month, you'll find our traditional 'Christmas Review Special' in HRT, with a few amateur radio goodies away from 'top of the range' base station rigs and the like. We're fortunate in being able to review two of the latest 'budget' HF rigs, including *complete technical* results, even a couple of aeri-als to go with them, for base and mobile operation. Next month we've some more interesting review goodies lined up, watch this space!

Problems

Getting a new rig to 'play with' can be nice. However it's unfortunate that many amateurs coming on the air for the first time suffer from EMC problems. With signals getting into the electrical equipment of neighbouring houses, running high power in a built-up environment is often 'out' for many amateurs, although careful aerial location can get over much of this. Using a ground-mounted HF vertical immediately adjacent to next door's TV feeder downlead isn't a good idea, but amateurs often can't get the same aerial 'up high' on their chimney or whatever, either due to planning/deed limitations or simply because of 'what the neighbours would think'.

Is Low Power The Answer?

Are these problems the reason why some amateurs with low aeri-als find themselves limited to low power operation? 'Real' QRP (low power) devotees of course find operating with such power levels is a fascinating and challenging aspect of amateur radio. They also know that a good aerial system is

vital in getting out. But not everyone's fortunate enough to be able to achieve this goal.

Wanting to keep *our* house looking reasonably neat and not like an 'aerial farm' (as well as technically not being allowed to have *any* outdoor aeri-als, despite the roof-mounted rotatable 6m/4m/2m/70cm/23cm beam system, 2m/70cm vertical, and Strumech Versa-tower complete with planning permission!) G4HCL's 160m/80m/40m trap dipole was strung at a low height, so that the house 'shadowed' it from the road. But this meant the aerial's apex, i.e., the balun feedpoint and the area of maximum RF, was that much nearer to neighbouring equipment. Running 400W when needed, did, as expected, cause the odd problem!

A word with the neighbours followed, and the aerial went up considerably higher. The result, neighbours happy with no more RFI, G4HCL happy with a better signal. But the 'real' point made, to our neighbours at least, was that we amateurs need to get our aeri-als up high.

What, No Planning Permission Needed for Towers?

September 19th 1985 was a significant day for radio amateurs in the USA. This was when their Federal Communications Commission passed a declaration saying "...state and local regulations that operate to preclude amateur communications in their communities are in direct conflict with federal objectives and must be preempted." A revision on May 31st 1989 added "...State or local regulations of amateur antennas may not preclude, but must reasonably accommodate, such communications....". Which means that planning restrictions *cannot* be enforced there to limit 'reasonable' amateur radio aeri-als and towers.

Over here in Europe, I'm told (thanks Armin, if you're reading this in HB land) that a Swiss amateur some time ago successfully exercised his 'human right' to freely communicate, with a court order for his prominent aerial system to be taken down being overruled by a higher court. I wonder when there's going to be a 'test case' of

this in the UK?

Reverse RFI

Coming back to the present, you may soon be switching on your rig over the Christmas break, all ready to join in one of the many 'festive nets' on the air, maybe even have a few chats during the G-QRP Club 'Winter Sports'. All of a sudden, your receiver gets wiped out with noise - yes, the youngster next door's just switched on his brand new plastic cased QRN-spewing video game. The ball's on the other foot now. What can you do? Nothing, probably. If it's affecting your broadcast TV or radio reception, you can fill in an interference form, write out a £30-odd cheque to the RIS, and wait in hope. But if it's just the amateur bands affected, you'll have to work out how to overcome it yourself.

There's been a much talk about the European EMC regulations that will become mandatory soon. These are a 'two-edged' sword as far as many users of the hobby radio spectrum are concerned. On one hand, all the commercially-available gear you'll buy for your shack *must* be EMC 'compliant', i.e., shown and *certified* not to put out unwanted emissions above given levels. On the other hand, all other electrical and electronic equipment on sale (including your neighbours' computers, lawnmowers, electric drills, electronic games, and the like), must also be compliant, and maybe more importantly, not be *susceptible* to 'interference' from given levels of radio transmissions.

Right now, manufacturers, or at least responsible manufacturers, are starting to 'design in' EMC protective measures in their new gear. Because if they want to sell it after 1995, it'll need to meet the requirements, otherwise it'll be an expensive 'white elephant' on their European warehouse shelves.

I wonder what the major amateur radio manufacturers are doing about getting their gear 'certified'? I know one UK HF receiver manufacturer has already got their receiver 'done', a different UK amateur radio equipment manufacturer is considering giving up. UK radio kit manufacturers are actively doing something, this time to try and get the EMC certification requirements adapted (i.e., reduced) for their specialised (i.e., limited, maybe classed as 'experimental') market. But you can be sure that if manufacturers don't do anything soon, you'll find a sudden lack of their gear to buy, at least at the sort of price you'd think sensible.

May I wish all - readers, throughout the world, a peaceful and happy Christmas, with hopes of a better New Year, whatever it may bring us.

LETTERS

Letter of the month

I have been registered as disabled, with a 50% disability, since I left the army in 1972. Since I became an amateur in 1983 and for a few years before, I have always enjoyed attending rallies, if as and or when I could make the trip.

As I am disabled I have always been grateful to the rally organisers, who kindly open the doors some thirty minutes early for disabled people. But I have been subjected, by a small minority of idiots, to abusive and snide remarks such as; "Some people will do anything to get in early", or "Why's he getting in with the disabled, he's not disabled", or "That chaps only blind, he's not disabled and neither's the person with him". They also reckon that after we disabled people have been in for our early half hour, all the bargains (?) have been bought. What these remarks, spoken loudly enough for disabled people passing by to hear, boil down to is envy, a gross indecent envy by one or two people with their brains in neutral and their mouths in overdrive.

There is no advantage in being disabled. I for one, and friends, who like myself are also disabled, would gladly give up our early half hour entrance advantage to be as fit, physically, as these people. The only advantage for us is that for a short time we can get around the rally site quite freely without someone's handheld poking in our faces or other parts of our anatomy, or fags and fag ash all over us. We can get close to the stalls, as there are no rubber neckers standing and ogling items they've little or no intention of buying, nor are the areas between the stalls blocked by groups of 'rag chewing pals'.

The worst stall for 'rubber neckers' and oglers is the bring and buy. I often wonder why they are there, they don't appear to have an item on sale, nor do they do anything more than give the stall minders the run-around, as they ask to see one item after another, which they never buy. If I have an item for sale it goes in and I leg it, coming back only once or twice to try to see if there's an item that I want and have the money to

buy, or if some nice person has bought my gear.

I'm not nasty or vindictive (except to cabbage headed clowns), but I would dearly love to have the power, for just a week, to swap bodies, me and a dozen or so other disabled and blind people, with the small minority who resent the half hour advantage we are kindly given. I wonder how they would handle the pain, the frustration, the anger, the self doubt and the many, many more real problems. Even after 21 years as disabled I still struggle and get angry, frustrated, despondent and I have lost good friends who've succumbed to their disablement or have taken their own life.

If you have ever broken your leg, imagine that instead of it healing and the plaster being removed in a matter of weeks or months, it gets worse and year by year it worsens slowly, on top of which the doctors and specialists all say "we can do nothing more for you surgically speaking, all we can offer you is some relief from pain". Take it from me the relief is small and the side effects of these drugs, are often more of a problem than the constant pain, they prevent you from driving and you feel constantly disorientated and spaced out.
J. D. Bolton, G4XPP

Editorial comment;

Although I am not disabled, I sympathise with you when you tell us about how some thoughtless people act at rallies. When my children were small and in a pushchair, they were constantly having lighted cigarettes and aerials from handhelds pushed in their faces. It was terrible trying to manoeuvre the pushchair around all those people standing around in the middle of the isles chatting. I avoided rallies as much as possible then, only going to those I really had to, as I just got very angry with people. Comments I got were "Why are you bringing that thing in here?" Maybe they just don't want women with children (who grow up to be our amateurs of the future) showing an interest in the hobby. Maybe they don't want the disabled in our hobby either.

Dear HRT,

Having read the 'letter of the month' in the November 93 issue of HRT, I have a few simple words to say on this subject.

There is nothing to beat competition, this alone will stabilise amateur radio equipment prices, the more amateur radio shops there are in this country, the better it will be for the punter. It has been said many times, one must shop around for the best deal. I am not complaining, far from it. If I find that I cannot afford to purchase new, then I look at the second hand market, at least there are savings to be made, i.e., no import charge, no 17.5% VAT. So, you pays your money and takes your pick, it's as simple as that.
M. Marsden, G7NDP

Editorial Reply;

Competition has always been with us, and the growing trend that's appearing now is for the amateur radio equipment manufacturers themselves to 'go away' from having just one controlled outlet each in country for their products, but instead to 'open the market' for dealers to sell their equipment on a competitive basis. But some dealers in the past, maybe even some who'd tried to offer good service and helpful advice, unfortunately didn't manage to compete against the 'big boys', and the required price cutting to keep their turnover up eventually forces them to give up. Some of course just went bust through other reasons! Maybe soon we'll just have the 'box shifters' to buy our gear from, where we'll need to know what we want first because the dealer hasn't the resources to offer advice and demonstration facilities, because all this cuts into his overheads. Like one London electronics shop with the 'half knowledgeable' member of staff who tries to sell members of the general public 2m rigs with a "Range of 100 miles". Yes, it happens already.

Dear HRT,

"Hello" I said, "I'd like to buy a 70cm hand held please. I don't know much about radio so I'd be very

"TONE" BURST



PRESENTS: How to "Launch" an aerial #3



THOCK!

OW!



©GEMEN

grateful if you would show me which one is best for me". The eyes of the rally dealer lit up and he strolled off to the part of his stand full of 'good quality' second hand radios of various descriptions.

"Well", he said, "this FT-708R here is a really good buy". He switched on the radio and called into the local box. This was just what I, as a newly licenced Novice, was looking for. I pleaded with my mum to lend me what I needed to make up the £120 that I needed to pay for this 'deal', all under the happy gaze of the salesman. In the end, I persuaded my mum to lend me what I needed and handed over the money. Great, I walked out of the rally, confident that this time I had not been ripped off. After all, it was a fellow radio amateur, a G8 that was selling it to me.

A few weeks later the 'idiot fuse' blew. After chasing around various dealers, I found one that would fix the rig for the not-so-small sum of £31.50. Okay, this was fine, the rig worked as well as it did when I bought it, that is until the fuse blew again a few weeks later. A local G8 helped me to re-solder the fuse, which should not have gone again after the other dealer repaired it. It has now blown again. The moral of this story: Novices under eighteen take someone with you who knows what he is doing, or you will end up losing out. Enough said.
Ed, 2E1BZK

Editorial reply:

You're quite correct in recommending newcomers to take someone experienced along when spending a relatively large amount of money on a piece of secondhand equipment. An obvious example is the same well-known precaution when buying a secondhand car. However, in the case of a piece of solid-state radio equipment, which

doesn't normally 'wear out', who can say what could happen to it in the future when it may have been, to all intents and purposes, a perfectly working set when sold? 'Cover ups' are very difficult here, the set often works properly or it doesn't, although older mechanically tuned valve gear can and often does deteriorate with age and use. An 'idiot fuse' blowing in a relatively modern rig seems a little out of the norm - the HRT Tech Ed used an FT-708R on his daily commuting journeys to and from work for several years with no such problems. Maybe a better plan of action could have been for the repairer to find out why the fuse blew in the first place, as if the set didn't draw excessive current through the fuse in normal use then maybe something else, somewhere, (like overvoltage, high external aerial SWR, or whatever) could have be the cause?

Dear HRT,

Another good hour in the shack reading HRT, so I decided to try my newly acquired typewriter (£5) and write to you about something that caught my eye and caused me to cast my mind back a bit. Any mistakes in the typing are caused by the lack of breakfast this morning and the fact that the carousel releases itself on the occasions my finger gets jammed in between keys... Now what was I going to say? H R T there it slipped again...October issue. The trials of G3ZZD. Trying to get an aerial over a tree. Grey cells Sir I said to myself. Many years ago as a SWL I had the same thing happen to me. Whereupon I took to the woods and acquired a nice bendy pliable length of tree branch (I may get used to this thing) and made a bow. A nice straight length of 3/8ths dowling was used as an arrow, weighted at the end with a screw and some length of

solder, I then acquired a ball of light strong string, looped it up and down the garden path and attached it to the end of the arrow. This was fired over the roof of the house, the end fixed to the aerial wire and hoisted up, the other end, like me, went up the pole.. Another 'good idea'. At the local corporation dump I found a line support for washing, this looked interesting. I took it home and removed the line from it and stared at it for a while then the little grey cells started to work once more. I turned it upside down and there I had three legs for it to stand on. I then inserted a length of tube over the end and bolted a 3 element two meter beam onto the top and there was my portable mast, I was so pleased.... Why do the 'O's chop holes in the paper?...
Perce Robins, G8BSK

Editorial comment:

Thank you for your letter, I had a good laugh to myself thinking about you typing away there. All the bits of paper from the 'O's fell out of the envelope when I opened it! Our Tech Ed went to the local dump, but when he was putting someone's old vintage receiver in the boot an "Oi, you can't take rubbish away from here" voice suddenly made itself known. Ah well...

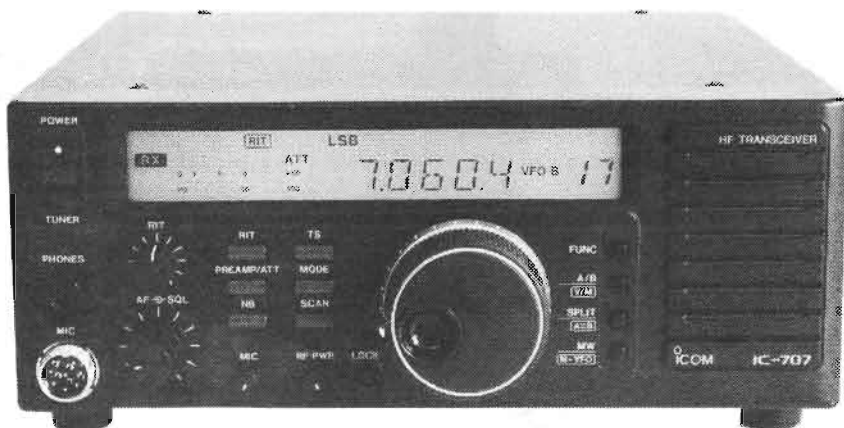
Please note that all letters to be published in these pages, as well as having to bear the name and address of the sender on the original correspondence (we totally ignore all anonymous letters!), will now always be published with the name, and callsign if held, of the writer. Replies will normally be published through these pages, and if needed will be forwarded onto the original writer if addressed to them c/o the HRT Editor.

£10 for the Letter of the Month

Do you have something constructive to say on the state of amateur radio today? Perhaps you'd like to put your viewpoint to the readers, get some discussion going, or give an answer to one of the issues raised? We'll pay £10 for the best letter we publish each month. So write in with your views, to 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. Reader's views published here may not necessarily be those of the magazine.

Icom IC-707 Review

Chris Lorek tests Icom's new HF 'Baby'



Currently priced at £895, the IC-707 is cheaper, a lot cheaper, than virtually any other 100W 160m-10m band transceiver on the market. A very prime candidate for a pre-Christmas HRT review we thought!

Features

The set covers all the HF amateur bands on transmit, with continuous coverage over 500kHz-30MHz on receive. CW, SSB and AM modes are fitted as standard, an extra £55 gets you the UI-9 module to add FM to the lineup. You get a 100W maximum transmitter output (25W on AM), with a front panel variable control to vary this down to 5W to suit whatever your operating needs are. A front mounted internal speaker is fitted alongside the various operating controls, and a large and very easily-read multi-function backlit LCD shows you what the rig's doing at any time.

All the usual tuning features of a synthesized HF set are provided, such as twin VFOs with split operation possible for DX chasing, 25 memory channels, memory channel 'scan' and frequency range 'search' facilities, and twin 'band stacking registers' which take you to the last-used frequency and mode on each VFO as you cycle through the amateur bands.

The set measures 240mm x 95mm x 239mm, weighs 4.1kg, and uses an external 20A 13.8V DC supply for operation. It comes supplied with a fused DC power lead, fist microphone and operating manual, optional accessories include a carrying handle, mobile mount, 250Hz and 500Hz CW filters, a high-stability oscillator, and automatic aerial tuning units. The supplied manual

is written very much with beginners as well as 'old hands' in mind, with the *purpose* of many functions (such as the RIT, preamp, attenuator, noise blanker and so on) explained as well as details of how to use these.

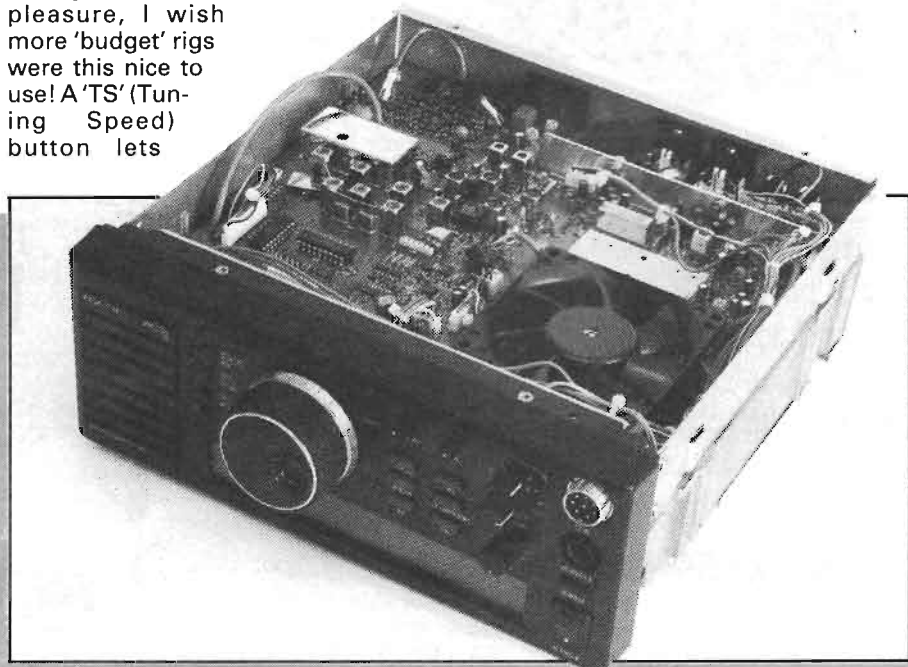
Controls

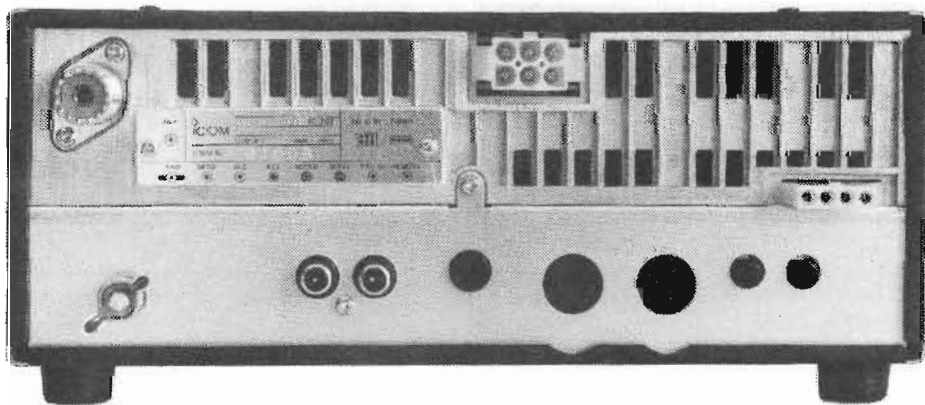
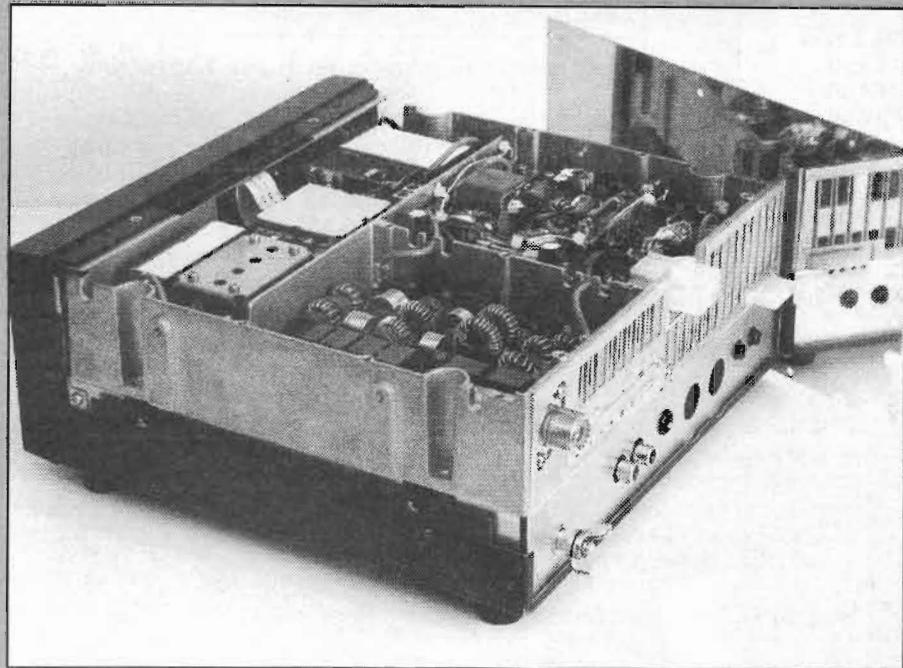
After coupling the set up to my aerial system and shack 13.8V power supply, I looked for the lift-up 'bail' to angle the set up for comfortable viewing on my shack table. Unfortunately, I didn't find one – one of the prices to pay for economy – but never mind!

After using a book instead for this purpose, on a much better note I found tuning around using the very smooth tuning knob was a pleasure. I wish more 'budget' rigs were this nice to use! A 'TS' (Tuning Speed) button lets

you change the tuning steps to 1kHz or 1MHz for fast frequency changes, another press providing an amateur band change function (there isn't a 'band change' or 'band up/down' button as such). It took me just a minute or so to become an 'expert' at using this function very quickly, the Up/Down buttons on the supplied microphone also coming in useful here. Changing modes however involved repeated presses of the 'Mode' button, this cycling upwards through LSB, USB, CW, CW-N (narrow filter), AM, FM, and FM-T (sub-tone). This was a bit of a 'long winded' approach, although I found I could inhibit the unused positions (such as CW-N and the two FM positions) using the transceiver's 'set' (configuration) mode which made it much less of an evil.

A switchable preamp and attenuator plus a switchable noise blanker are fitted for receive use, and a front panel button can be used to control an optional externally-mounted Icom AH-3 or AH-160 automatic aerial tuning unit. Around the back, sockets are provided for the usual power, aerial, ground, CW key, and external speaker, a couple of accessory sockets (for data terminal connection and the like), two sockets for ALC and TX control of an external linear, and a CI-V socket for computer control of the transceiver using an optional interface.





On The Air

The front-mounted speaker gave very good audio, and listening around the broadcast bands was an added pleasure - the AM filter having enough bandwidth to make listening a bit better than the 'stuffed through a woolly sock' audio I sometimes hear! Although the set is specified as tuning down to 500kHz, I found the actual tuning range right went down to 30kHz, although I didn't hear very much down there!

The S-meter is limited to five LCD segments between nothing and S9 (S1, 3, 5, 7 and 9) plus three segments above S9, although on the amateur bands I found this usually indicated S9 and rarely anything above or below - I suppose this reflects the usual '59' (or '599' for CW ops) report! Seriously though, it seemed a bit too sensitive below S9, and rather hard to raise above this except on the broadcast bands with the 'monster' signals found on these bands.

Audio reports on my transmitted

SSB signal with the supplied mic were quite favourable, and plugging in my 'usual' shack microphone, the Icom SM-10, gave me reports of my 'usual' quality - nothing amiss here showing the set was putting out a reasonably clean signal. I must say that I did miss the facility of switching in narrower filtering on receive or having a 'shift control', for use in crowded band conditions. Although optional CW filters are available, these are a rather high £129 each - you *do* get very a good 455kHz filter for your money but it's quite a 'chunk' out of your pocket!

Noise Blanker

Noise blankers on many sets I've tried are often 'much of a muchness'. In other words, rarely very effective. However, I found the one fitted to the IC-707 particularly good in getting rid of ignition noise. So much so, that one Sunday morning, when I was out mobile on 80m listening into the AMSAT-UK 80m net with the set (I never like to

miss it), the difference between the noise blanker 'in' and 'out' made the difference between complete readability of the weaker stations or just a chainsaw noise from the car's electronic ignition and engine management/fuel injection systems. A quick call into the net with the set's 100W and my 80m G-whip even allowed an exchange of reports with net control G0AUK (it was nice to work you, Ron, whilst I was mobile), which I otherwise wouldn't have thought possible due to the QRN.

Laboratory Tests

These showed the transmitter put out plenty of power, with quite good suppression of harmonics - the copious internal screening I found that was used in the set no doubt contributed to this 'cleanliness' (maybe is this in preparation for the forthcoming European EMC requirements?). On receive, the strong signal handling performance was reasonable overall, although the measured filter bandwidth 'skirts' reflected the set's economic price. The high first IF gave good 'roof filtering', although the relatively large jump to 455kHz as a second IF showed up in the 2nd IF rejection. This may cause limitations in some cases although I found no problems whatsoever on air.

Conclusions

The IC-707, in my opinion, is a very desirable 'first rig' for HF use. It looks like Kenwood and Yaesu have a very serious competitor in the 'budget' HF field. 'Nuff said! *My thanks go to Icom (UK) for the loan of the review transmitter.*

LABORATORY RESULTS:

RECEIVER;

All measurements carried out in standard SSB mode, with attenuator/preamp off, unless stated.

S-Meter S9 Level;

Freq. MHz	Sig. Level
1.8	24.2µV pd
3.5	25.5µV pd
7.0	22.1µV pd
10.1	20.9µV pd
14.0	20.3µV pd
18.1	20.1µV pd
21.0	20.5µV pd
24.9	22.8µV pd
28.5	22.8µV pd
29.5	25.0µV pd

S-Meter Linearity

Measured at 14.25MHz;

Indication	Sig. Level	Rel. Level
S1	2.76μV pd	-16.2dB
S3	3.54μV pd	-14.1dB
S5	4.52μV pd	-12.0dB
S7	7.15μV pd	-8.0dB
S9	18.1μV pd	0dB ref
S9+	256μV pd	+23.10dB
S9++	1.70mV pd	+39.5dB
S9+60dB	13.3mV pd	+57.4dB

Preamp/Attenuator

Gain difference, tested at 14.25MHz

Preamp;	+10.8dB
Attenuator;	-19.3dB

Selectivity;

Measured on 21.4MHz;

	SSB/CW	AM
-3dB	2.11kHz	6.41kHz
-6dB	2.54kHz	8.15kHz
-20dB	3.22kHz	9.53kHz
-40dB	3.58kHz	11.68kHz
-60dB	3.90kHz	14.19kHz
-80dB	4.48kHz	18.30kHz

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;

	Preamp Off	Preamp On
10/20kHz spacing;	76.5dB	75.7dB
20/40kHz spacing;	83.2dB	83.5dB
50/100kHz spacing;	92.1dB	90.0dB
100/200kHz spacing;	94.2dB	91.6dB

Sensitivity;

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

Freq. MHz	SSB/CW	AM
1.8	0.41	1.04
3.5	0.45	1.08
7.0	0.36	0.83
10.1	0.32	0.79
14.0	0.31	0.74
18.1	0.33	0.76
21.0	0.33	0.74
24.9	0.35	0.77
28.5	0.37	0.82
29.5	0.38	0.83

Image Rejection;

Increase in level of signal at the first and second IF image frequencies, and at the IF itself (64.455MHz), over level of on-channel signal, each giving identical 12dB SINAD signals;

Freq. MHz	1st Image Rej.	2nd Image Rej.	IF rej.
1.8	<110dB	69.4dB	90.7dB
3.5	<110dB	67.1dB	90.5dB
7.0	<110dB	67.7dB	93.3dB
10.1	<110dB	68.3dB	93.5dB
14.0	<110dB	67.8dB	95.0dB
18.1	<110dB	67.7dB	96.1dB
21.0	<110dB	67.9dB	93.4dB
24.9	<110dB	67.3dB	86.2dB
28.5	<110dB	67.3dB	86.1dB
29.5	<110dB	68.1dB	84.9dB

Blocking;

Measured on 21.4MHz as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation of 12dB SINAD on-channel signal;

	Preamp Off	Preamp On
+/-50kHz;	103.8dB	104.5dB
+/-100kHz;	106.4dB	106.4dB
+/-200kHz;	107.3dB	106.9dB

TRANSMITTER;

TX Power/Current Consumption;

Connected to stabilised 13.8V DC using supplied DC lead;

Freq MHz	Power/Current
1.8	117W (17.2A)
3.5	121W (16.0A)
7.0	123W (15.6A)
10.1	123W (15.1A)
14.0	123W (16.5A)
18.1	123W (20.4A)
21.0	124W (17.9A)
24.9	124W (15.0A)
28.5	119W (16.9A)
29.5	116W (17.8A)

Harmonics;

Freq. MHz	2nd	3rd	4th	5th	6th
1.8	-83dBc	-72dBc	<-80dBc	<-80dBc	<-80dBc
3.5	-77dBc	-69dBc	<-80dBc	-55dBc	<-80dBc
7.0	<-80dBc	-75dBc	<-80dBc	-64dBc	<-80dBc
10.1	-73dBc	-65dBc	<-80dBc	-73dBc	<-80dBc
14.0	<-80dBc	-61dBc	<-80dBc	<-80dBc	<-80dBc
18.1	-80dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
21.0	<-80dBc	-78dBc	<-80dBc	<-80dBc	<-80dBc
24.9	<-80dBc	<-80dBc	<-80dBc	<-80dBc	<-80dBc
28.5	<-80dBc	-77dBc	<-80dBc	<-80dBc	<-80dBc
29.5	<-80dBc	-80dBc	<-80dBc	<-80dBc	<-80dBc

SSB IMD Performance;

Measured on 14.25MHz with a two-tone AF signal, results given as dB below PEP level;

	3rd Order	5th Order	7th Order	9th Order	11th Order
ALC Onset	-33dB/ -28dB	-36dB/ -34dB	-42dB/ -41dB	-50dB/ -50dB	-58dB/ -62dB
Mid ALC	-32dB/ -28dB	-34dB/ -33dB	-42dB/ -40dB	-49dB/ -47dB	-55dB/ -56dB



iambic keyer. This has a fixed weighting of 15%, and the speed can be changed from the 'power-on' default of 25 WPM to between 5 WPM and 50 WPM using the key paddle itself. Full break-in operation is used at all times in CW mode.

A unique feature of the set is the variable bandwidth 'Jones' crystal filter, which can be varied between around 500Hz bandwidth in the 'narrow' position, continuously through to around

Ten-Tec Scout Review

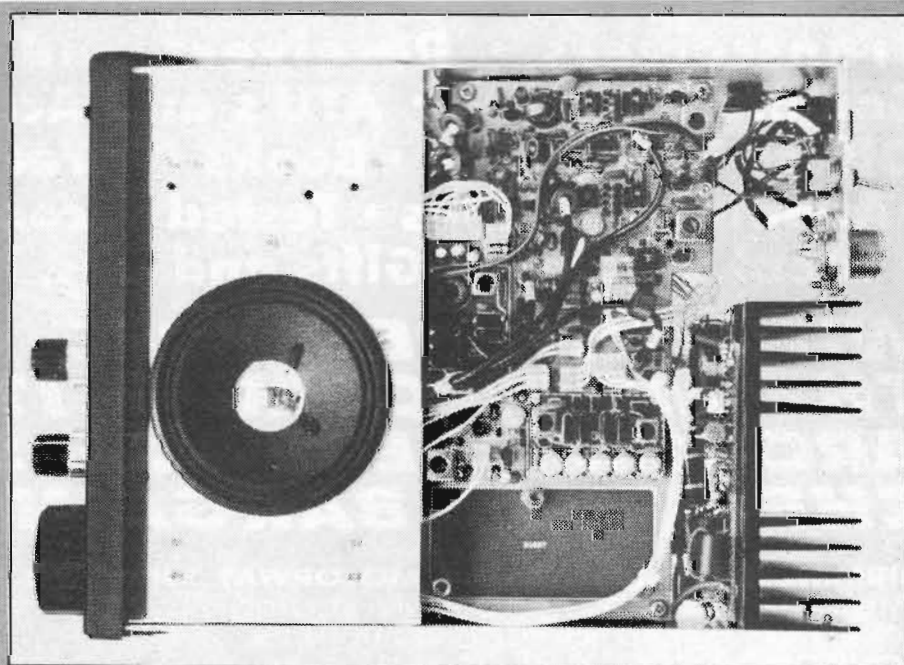
G4HCL passes a technical eye over Tec-Tec's 50W rig

There's been quite a lot of eager talk, both on air and in print, about the Ten-Tec *Scout* (see the last few 'QRP Corners' for example). When the 'Man from Nevada' came along personally to deliver me a sample for review, complete with five plug-band modules, I couldn't wait to try it on air!

Easy To Use

The *Scout* is a compact, lightweight rig, and is designed for 'simple' operation whether at home, out portable, or mobile, being powered from your external 12V DC supply. It comes supplied as a 'single band' 40m set, however you can buy additional modules at £39.95 each which plug into the front panel, one at a time, to let you use the set on other bands from 160-10m including the WARC bands. The 160m, 80m, 40m, 20m, and 15m modules were supplied with the review set. An optional noise blanker unit is also available, this fitting internally. The transceiver operates on SSB and CW, and has a preset transmitter power output which can be varied between QRP power levels and 50W.

In use on SSB, you just plug in your microphone, preset the front panel mic gain control until the ALC LED lights on voice peaks, and chat away, the rig selects the correct sideband for you depending on the band in use. For CW use, as well as a socket for an external keyer or 'straight' key, a paddle key may also be used with the set's built-in



2.5kHz bandwidth in the 'wide' position.

Frequency Control

The set uses manual 'permeability' (inductive) tuning, as opposed to variable capacitor or synthesizer control, and a unique (and rather complicated) method of frequency locking is employed to provide drift correction. Here, the set's microprocessor compares each frequency reading against time, automatically correcting this to an accuracy of +/-10Hz with a varicap diode when tuning control change or RIT control movement isn't detected.

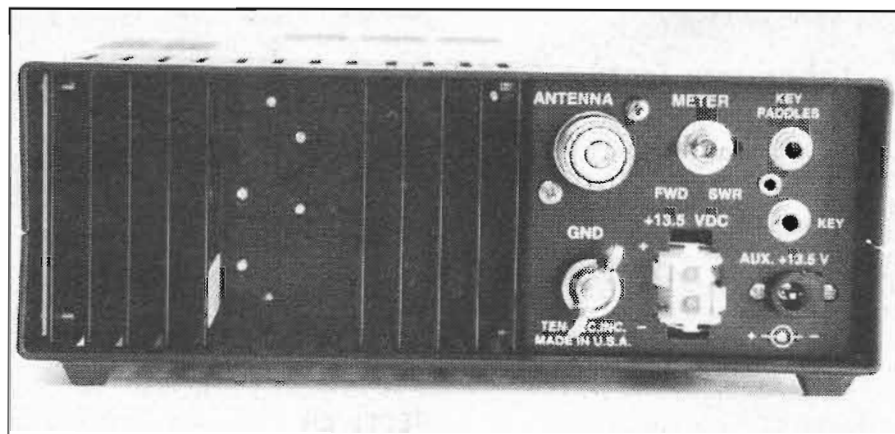
However, as the microprocessor is kept 'busy' on CW when the keyer is being used, this takes preference and the correction 'window' is opened up to 100Hz on receive, with no correction on transmit. The operating frequency is shown by a combination of the plug-in module (indicating the MHz digits) and a large four digit LED readout on the rig itself giving a readout to 100Hz resolution.

The supplied manual is very comprehensive, as well as giving good operating instructions it also provides circuit and layout diagrams for the set, including technical circuit descriptions and alignment instructions should you need to 'dive inside' yourself.

In Use

Getting on the air was simplicity in itself - you shouldn't need to read the instruction manual with *this* rig to sort out how to use it!

Although all accessory plugs are



supplied, a microphone doesn't come with the rig (although a pre-wired one was supplied with the review set). The manual says that any type of low impedance microphone can be used, although it warns that the cable should provide screening for *all* leads to prevent RF feedback problems. A headphone jack may be used either for 600Ω headphones or a low-impedance external speaker. I found I needed to turn the volume right down when plugging in my 8Ω headphones, but here I found the microprocessor background 'whine' very distracting. On CW, the sidetone level preset could be easily adjusted from the bottom panel for headphone use, but again for speaker use this caused a 'low volume' problem. Surely a rear panel external speaker jack, with a 'proper' headphone jack instead, wouldn't have been too expensive? Maybe this will be one of the 'standard mods' done by Ten-Tec Scout

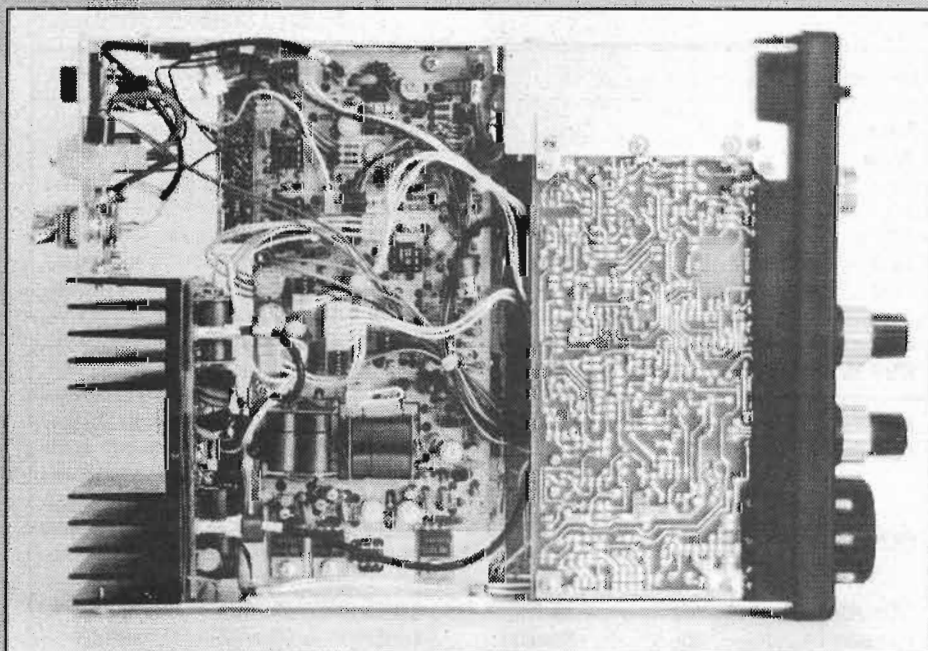
users! Another slight 'annoyance' was that the CW keyer resets itself to 25 WPM every time the set was switched off and switched back on again, this being normal, and thus requiring a quick speed reset each time before using the keyer on air.

Anyway, after having my little 'moan', I sat down and started to use the set (with the built-in speaker!) 'in anger'. I found the variable filter absolutely superb, an unexpected but very welcome feature on a 'budget' rig such as this, I felt a loss when comparing this with my 'normal' switchable bandwidth receiver! Operation on the LF bands at night showed the filter 'skirt' selectivity wasn't all that good though, and I often felt the need to switch an attenuator in (which wasn't fitted) to overcome the occasional strong-signal problems I found on 40m.

On The Move

With the set's small dimensions of 64mm x 184mm x 248mm (it'll easily fit in a briefcase), and light weight of just 2.4kg, it can make a useful mobile and portable rig, where of course the problems of 'monster signals' from the use of large aerials aren't normally present! So, the 'Outbacker' aerial went on the car, and the 'Scout' went into the passenger compartment! This is where I believe the set found its 'true home', that of a splendid mobile rig. Operation on the move was very easy, the slightly stiff tuning knob being well-suited to tuning around on a bumpy road, and the large display being easy to read with just a quick glance.

The set worked very well on the move, and I often used 40m out and about in the area of my home as an 'alternative' to 2m and 70cm. I wish I'd had the optional noise blanker though! I found that, with the engine off (i.e. lower battery voltage) I often couldn't drive the rig into ALC on speech peaks, a reasonably healthy supply voltage



thus being necessary.

Laboratory Tests

These confirm the transmitter was putting out a clean signal on SSB, all tests being done with the transmitter adjusted to give exactly 50W output (the power output measurements being those with the set 'as supplied'). The receiver measurements confirmed the limitations noted on air, the significant one being the 6.144MHz IF rejection (of 500kW ERP international broadcast band stations!) with the 40m unit plugged in.

Conclusions

The Ten-Tec Scout makes an ideal portable and mobile rig, I found it very easy to use on air in these circumstances. With its capability of easily being set to QRP levels combined with the very useful variable bandwidth QRM-cutting 'Jones' filter, it could also find a 'niche' market amongst QRP

devotees, maybe even 'taking over' from the Heath HW7/8/9 series of transceiver which is now no longer commercially available.

Our thanks go to Nevada Communications for the timely supply of the review sample, from whom it's available at a current price of £585 with additional band modules priced at £39.95

LABORATORY RESULTS:

RECEIVER:

All measurements carried out on 7.05MHz in standard SSB mode with widest filter setting, unless stated.

Sensitivity:

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

Freq. MHz	Level
1.8	0.68
3.5	0.42
7.0	0.41
14.0	0.42
21.0	0.35

S-Meter Linearity

Indication	Sig. Level	Rel. Level
S1	0.57 μ V pd	-53.6dB
S3	1.37 μ V pd	-45.9dB
S5	4.43 μ V pd	-35.7dB
S7	38.8 μ V pd	-16.9dB
S9	273 μ V pd	0dB ref
S9+	12.5mV pd	+33.2dB

Selectivity:

Level	Min. Bandwidth	Max. Bandwidth
-3dB	0.56kHz	2.12kHz
-6dB	0.75kHz	2.48kHz
-20dB	1.21kHz	3.42kHz
-40dB	1.95kHz	4.27kHz
-60dB	3.10kHz	5.34kHz
-80dB	4.31kHz	6.63kHz

Image Rejection;

Increase in level of signal at the first IF image frequency, and at the IF (6.144MHz) over level of on-channel signal, giving identical 12dB SINAD signal;

Freq. MHz	Image Rej.	IF Rej.
1.8	60.5dB	73.4dB
3.5	48.1dB	76.0dB
7.0	60.1dB	53.0dB
14.0	74.8dB	77.6dB
21.0	56.8dB	

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;

10/20kHz spacing;	77.6dB
20/40kHz spacing;	77.8dB
50/100kHz spacing;	80.3dB
100/200kHz spacing;	85.7dB

Blocking;

Measured on 21.4Mhz as increase over 12dB SINAD level of interfering signal, unmodulated carrier, causing 6dB degradation in 12dB SINAD on-channel signal;

+/-50kHz;	101.5dB
+/-100kHz;	102.4dB
+/-200kHz;	103.1dB

TRANSMITTER:

TX Power/Current Consumption;

Connected to stabilised 13.8V DC using supplied DC lead, measured 'as supplied' (see text);

Freq MHz;	Power;
1.8	43.6W (9.6A)
3.5	47.6W (9.7A)
7.0	46.4W (10.3A)
14.0	44.8W (10.2A)
21.0	42.9W (10.4A)

S-Meter S9 Level;

Freq. MHz	Sig. Level
1.8	502 μ V pd
3.5	333 μ V pd
7.0	273 μ V pd
14.0	411 μ V pd
21.0	267 μ V pd

Harmonics;

Freq. MHz	2nd	3rd	4th	5th	6th
1.8	-58dBc	-55dBc	<-80dBc	-75dBc	<-80dBc
3.5	-62dBc	-68dBc	<-80dBc	-67dBc	-79dBc
7.0	-63dBc	-60dBc	-69dBc	-53dBc	-72dBc
14.0	-57dBc	-50dBc	-72dBc	<-80dBc	<-80dBc
21.0	-61dBc	-57dBc	<-80dBc	-78dBc	<-80dBc

SSB IMD Performance;

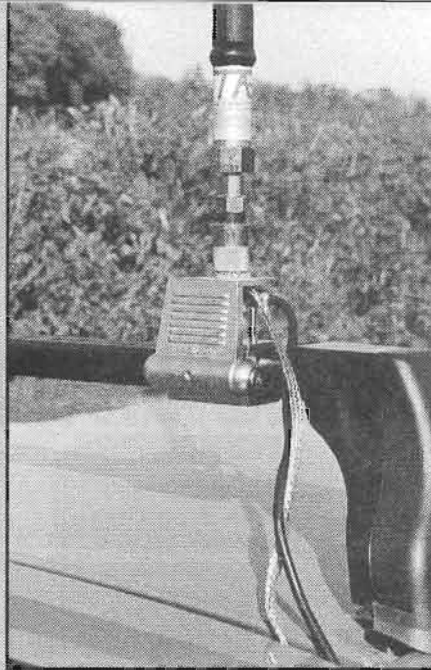
Measured on 14.25MHz with a two-tone AF signal, results given as dB below PEP level;

	3rd Order	5th Order	7th Order	9th Order	11th Order
ALC Onset	-32dB/ -32dB	-40dB/ -41dB	-45dB/ -49dB	-53dB/ -54dB	-57dB/ -59dB
Mid ALC	-30dB/ -30dB	-38dB/ -38dB	-43dB/ -48dB	-52dB/ -51dB	-54dB/ -60dB

Over the last few years, I've been fortunate in being able to receive a couple of Australian amateur radio magazines each month, and reading through these often shows the difference in the 'physical' operating conditions experienced, especially in the Northern Territories. Many families in the 'outback' rely on HF radio communications as a link to the 'outside world', the Australian 'Flying Doctor' being a well-known example. It was from this, that the 'Outbacker' was chosen as an export name for the amateur range versions of the multiband HF aerials manufactured by the Australian firm of Terlin Aerials.

Band Switching

The *Outbacker* is a range of aerials; the standard 'Outbacker' is 1.8m long and covers 80-10m with a power rating



The Outbacker in use Close-up of the earthing arrangements

On The Air

A friend of mine uses an Outbacker on an 'off the shelf' hatchback mount designed for larger aerials. As it's the XYL's car I use, I wondered what would happen to the car's rear bodywork after a few hundred miles worth of travelling along leafy lanes using the same arrangement, so I decided to 'play safe' with a slightly more substantial mount fitted to a roof rack! I added a short, heavy copper earth strap to the car body and rear hatchback door (a good earth is very important for HF mobile use), and went on the air, the Ten-Tec 'Scout' transceiver being used as a mobile rig.

I found the aerial was indeed broadband, even on 80m, this was quite useful 'on the move'. The top adjuster allowed almost a 1:1 VSWR on all bands,

'Outbacker' Mobile HF Aerial Review

Chris Lorek reviews a multiband HF mobile aerial from the land of 'Oz'

of 300W PEP, with a 'T' model adding 160m; the 'Outbacker Jnr' is 1.2m long and covers 80m-10m with 150W PEP handling power; and the 'Outbacker Perth' is 1.2m with a 1m steel whip extension covering 80-10m with 150W PEP handling, again with a 'T' model adding 160m. The aerial chosen for review was the standard Outbacker, currently priced at £189.95.

It uses a helically wound element on a fibreglass rod, with 'taps' along its length for each amateur band, a socket being provided at each tap. A 'wander lead' is used to short out the unused length at the bottom of the whip, the excess lead length being coiled round the aerial when in use. A short metal 'adjuster whip' is fitted at the top, to allow the aerial to be set for minimum SWR on the band segment in use, although a marked position on this whip indicates a 'default' setting to give reasonable coverage of most bands.

The overall aerial is epoxy covered and black polyurethane coated, and certainly looks like it could take a lot of rough treatment! Indeed, the US distributor of this range is rumoured to have been seen at rallies trashing it against the floor, bending it double, and even offering a hammer to passers by to try and break the aerial with!

The base of the aerial is fitted with a 3/8th UNF stud for fitting to a mobile mount, and a (large!) heavy duty spring base is available as an option to save damage (to your car I'd imagine, rather than to the aerial) should the Outbacker hit a tree or whatever.

HRT Editor Sheila G8IYA thinks 'he'd better use a good mount for this aerial on my car'

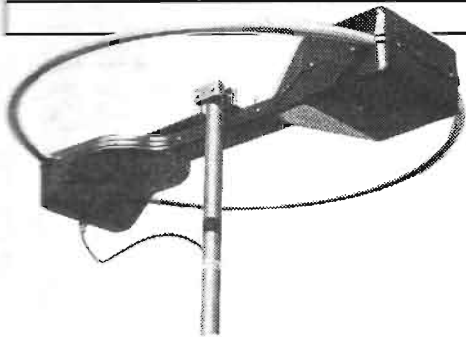


with less than 2.5:1 VSWR across all bands except 80m, where around 150kHz bandwidth was achieved. Compare this to the typically 20kHz bandwidth I get with my 'usual' 80m G-Whip! The Outbacker put a good signal out on all bands too, and I consistently received signal reports as good as I gave, indicating low losses. Comparing the Outbacker on 80m with my G-whip showed it was within half an S point or so on both transmit and receive on inter-G working. The G-whip just about had a slight 'edge', although to be fair this was a monoband whip I compared it with.

Conclusions

The Outbacker is a very rugged aerial, which looks like it should last a lifetime of use. Provided you don't mind stopping the car to change bands, in normal use you shouldn't need to also stop each time you alter frequency on your mobile rig! It worked well on air, I had many hours of pleasant listening and several on-air QSOs as a result, although I made sure it had a rugged mount to match the rugged aerial!

My thanks go to Nevada Communications Ltd. for the loan of the review aerial.



Horizontal mounting give omnidirectional coverage if mounted sufficiently high above ground

Not everyone can get a large rotary HF beam up in the air. Some amateurs are restricted in space in getting *any* sort of full-sized HF aerial erected, even a wire dipole. One answer to this, and an effective one at that, is a high-Q loop.

Enter The Loop

MFJ's 'Super Hi-Q Loop' covers all frequencies between 10-30MHz with a power handling of up to 150W, all in a loop of just 91cm diameter (which will fit through a standard loft entrance in your house). You mount the loop wherever you can, with a single coax feed down to the shack-mounted control box which handles the required tuning for you.

The first thing that should be realized is that, as the physical size of an aerial gets smaller in relation to wavelength, any resistive losses become *very* important, so the loop arrangement must have a *very* low resistive loss. This in turn leads to a high 'Q', which means very narrow bandwidth. If you have a small loop that's broadband, it probably isn't going to work very well! MFJ use thick tubular aluminium for their loop, with welded connections to a butterfly tuning capacitor thus overcoming the problems of rotating (i.e., resistive) contacts.

Directivity

With a small loop, a sharp 'null' occurs broadside to the loop itself – indeed this was taken advantage of in early commercial direction-finding systems using loops. For us amateurs, this means we can nicely 'null out' unwanted interference. For example by mounting the loop horizontally above the house roof you get a lovely 'null' towards your TV, hi-fi, kid's QRN-generating video games and the like! Alternatively, mounting the loop vertically you can aim the null at, say, the neighbour's house, or go the 'whole hog' by using a rotator and nulling out unwanted on-air interference, be this local or DX.

MFJ HF Loop Aerial Review

No room for a full size HF aerial? Try an MFJ loop, as reviewed here by Chris Lorek

Bandwidth

Narrow bandwidth can of course be a very good thing. It adds additional selectivity to your overall system, on transmit and receive, very useful if your receiver gets problems from out-of-band signals. But this can mean an aerial system re-tune each time you change frequency, and I remember the awkward and long-winded manual tuning I used with some loops in the past. MFJ have gone quite a way towards overcoming this with their 'intelligent' controller. Just press the 'Auto Band Select' *Up* or *Down* button whilst transmitting a low-power but steady carrier, and the unit searches for a dip in SWR, halting the tuning at that point and sounding a beeper to let you know you're 'almost there'. You then use the 'Fine Tune' *Up* and *Down* buttons to get to the loop tuning spot on, a built-in 'cross-needle' SWR meter lets you see when you've reached the optimum tuning.

On The Air

The loop comes with mounting brackets for both vertical and horizontal mounting. Vertical lets you use it as a directional aerial, and also lets you mount near the ground if you can live with the adverse effects of nearby buildings etc. If you can get the loop up high (at least 6m above ground) then horizontal mounting gives you omnidirectional coverage, with 'nulls' above and below the loop.

The control box needs an *isolated* (i.e., unearthed) 12V DC supply, which is provided by a supplied plug-in mains

adapter, the manual gives dire warnings of severe damage if you use anything else! So, I plugged it all in, mounted the loop vertically initially at the same height as my 20m dipole, and started having a listen around.

As I expected, the tuning was sharp, very sharp. Indeed, even using 'fine tune' buttons, if I blinked I could easily miss the SWR dip! However, after a while I got used to the tuning, and consistently achieved better than 1.5:1 SWR by quickly 'tapping' the up/down fine tune buttons – although I'd have preferred a slower tuning rate though the 'auto tune' had done its stuff.

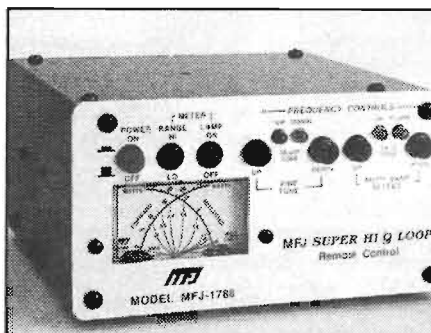
Comparing the loop with reference dipoles on 20m, 15m and 10m,, each at the same height and in the same plane, in general and after many hours of on-air testing I found no real difference in signal strengths on air between the two. So there we are, get the loop up high, and it *should* work about as well. I then tried mounting the loop in the back garden near my shack, the loop mounted vertically on a 3m hand-rotatable pole. Here, the QRN from my shack computer was very noticeable, but I found I could null this out very effectively with a quick twist of the wrist! Signals were, naturally, affected by the proximity of the building, but I still achieved very reasonable results with plenty of on-air contacts.

Conclusions

The MFJ loop worked well, radiating a virtually equivalent signal in comparison with a 'full size' aerial when mounted in a similar position. At a size of less than 1m diameter, it can prove to be the much-needed solution of many amateurs who don't have a garden, or roof, to mount aerials. Remember though that the ERP is still there, and the RF will get into surrounding objects (including you and your transceiver) quite well when mounted in proximity to these, but if it can be mounted in the clear it should work very well.

The MFJ 'Super Hi-Q Loop' aerial is currently priced at £299.95 including the controller and power supply, and my thanks go to Waters and Stanton Electronics for the loan of the system.

The indoor control unit



Revex Power Checker Review

A handy accessory to check your handheld transmitter is working as it should be, reviewed by the HRT Editorial team



When a sample of the Revex PC 705 power checker arrived in the post, we thought 'what a handy little unit!' It's a compact (106mm long) power checker, fitting to the BNC connection of your handheld or QRP rig in place of the aerial. It can test power levels of up to 5W over the frequency range of HF up to 23cm (2 MHz - 1300 MHz), although the instructions recommend that 5W power input should not last more than 2 seconds, with a level of 3W maximum recommended for longer use.

The unit is self-powered, using rectified RF to light up the LEDs to show the power level. Seven LEDs are fitted, these indicating levels of 0.3W, 0.6W, 1W, 2W, 3W, 5W, and 10W. In giving an indication of your transmit power, it can thus also be used as a quick 'battery check' for your handheld - despite what

your rig manual says the 'bargraph' indication on handheld transmitters is often simply an indication of transmit mode, and bears no relationship whatsoever to the actual power transmitted (as we've seen in past HRT reviews)!

The manufacturers say the unit can be used for short distance communication as well, this possibly being handy for 'remote operation' of your main station from your handheld, for example under the current UK licence regulations which allow this from within your home.

Our opinion; a handy pocket-sized accessory which can find a wide range of uses. The Revex PC 705 is currently priced at £34.95 and is available from Waters and Stanton Electronics, to whom our thanks go for the provision of the review sample.



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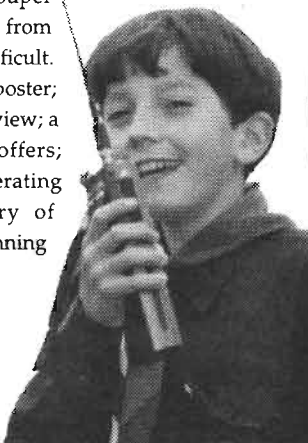
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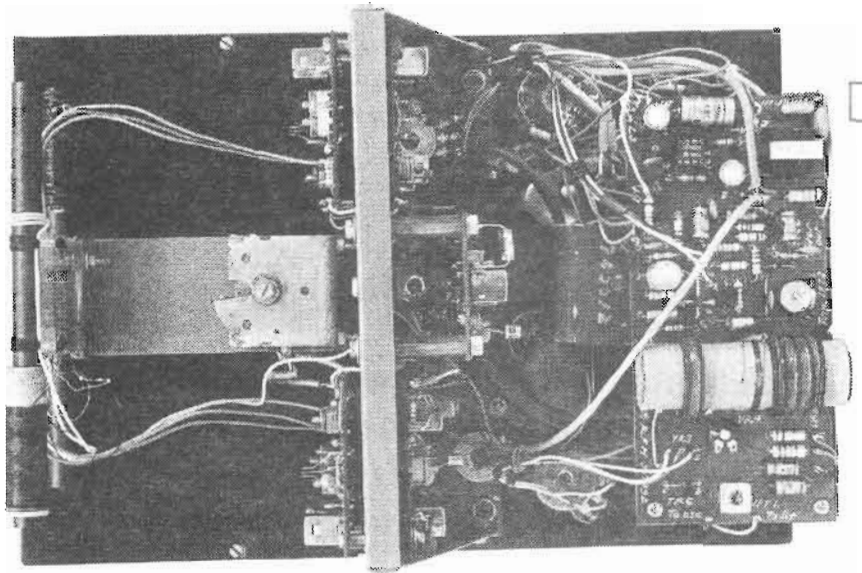
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Long, Medium and Short Wave Superhet Receiver (part 2)

Raymond Haigh continues his AM/SSB/CW receiver project with the construction stages

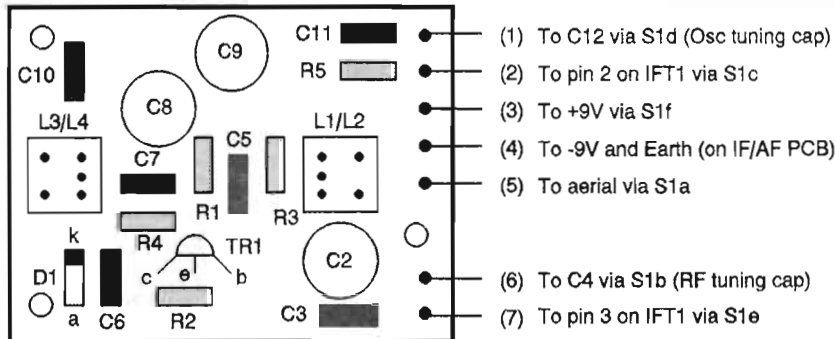


Fig. 2 RF and Oscillator Stage PCB
(PCB shown full size)

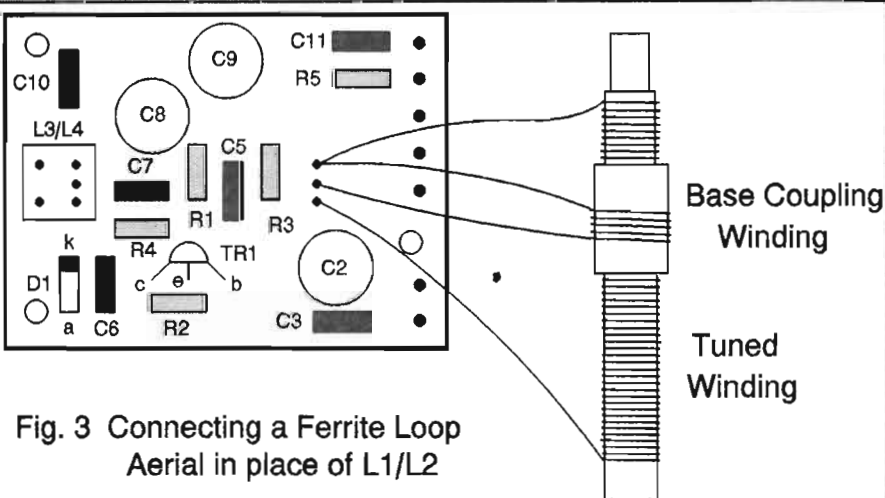
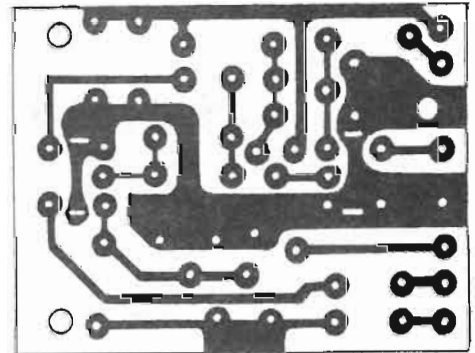
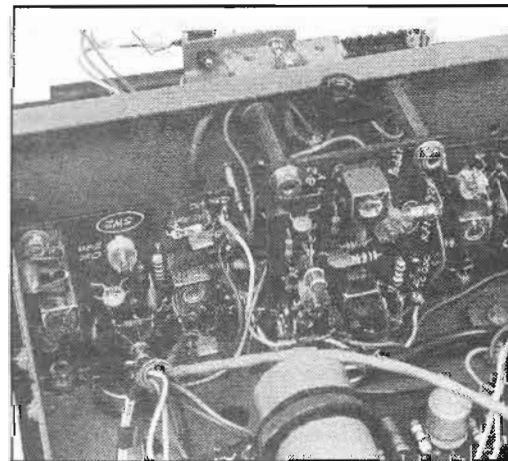
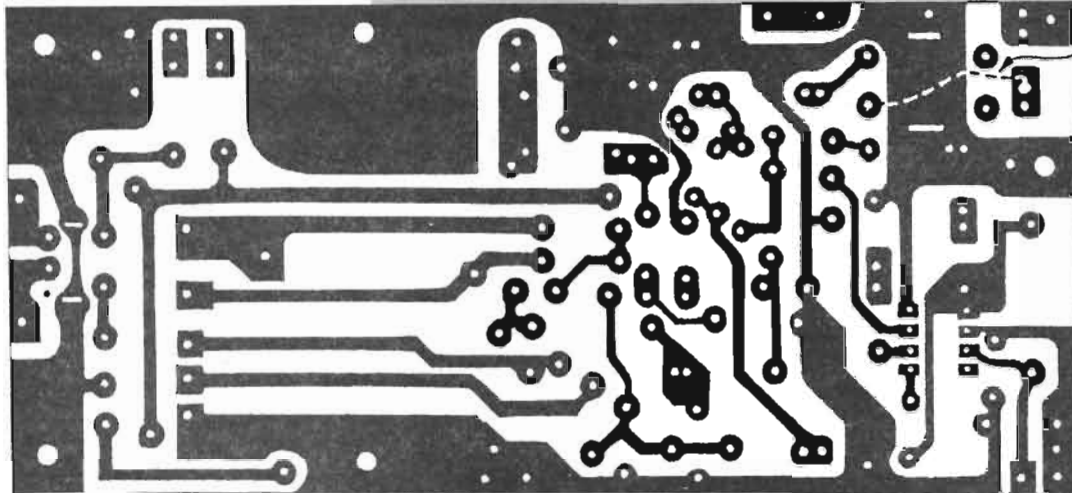


Fig. 3 Connecting a Ferrite Loop Aerial in place of L1/L2



him. The same front end PCB layout is used for all ranges, but frequency adjusters (C9) are only fitted on long and medium wave bands. When tuning capacitor swing reducers C3 and C11 are



WIRED CONNECTION ON
UNDERSIDE
OF PCB.
SEE TEXT

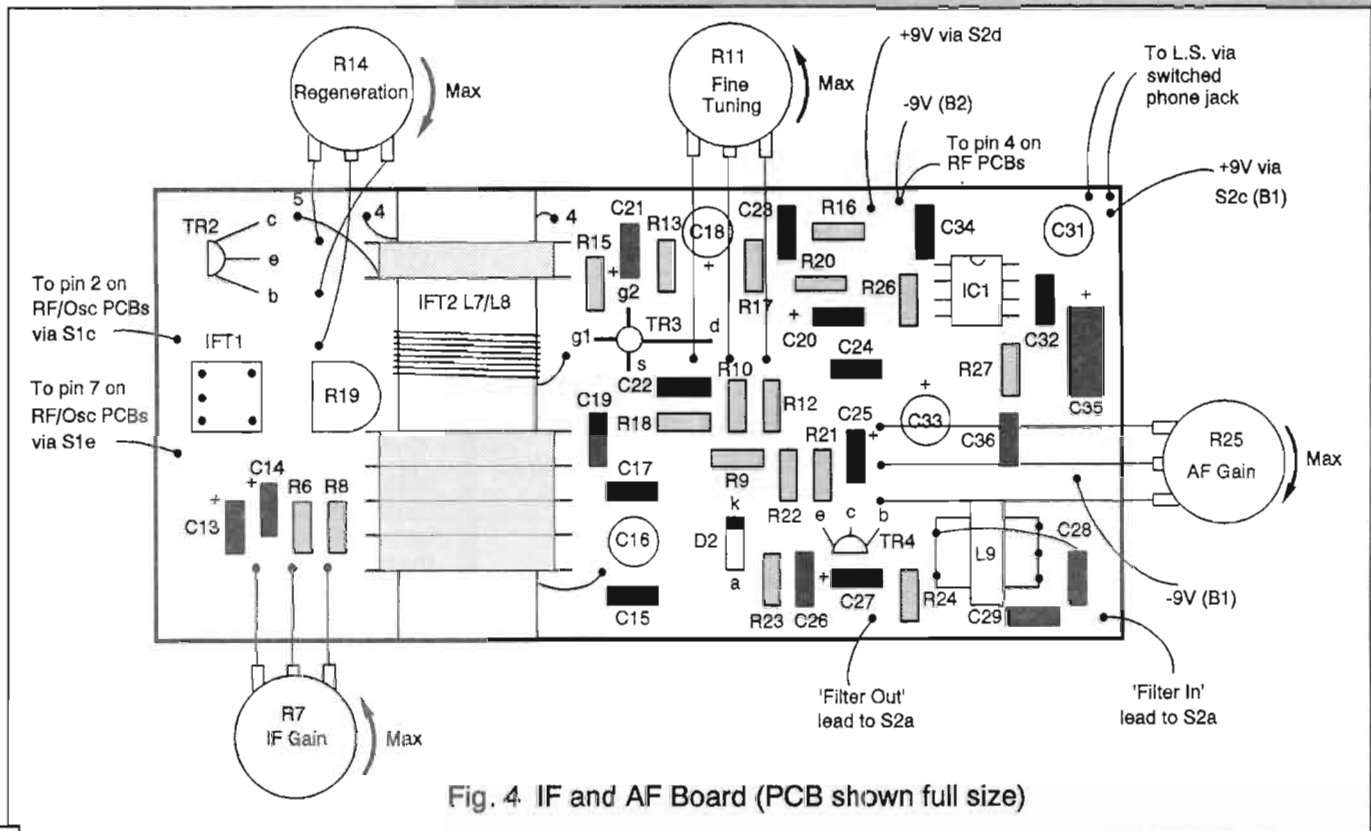
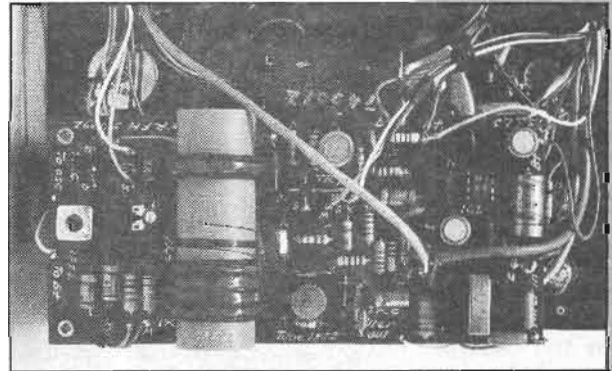


Fig. 4 IF and AF Board (PCB shown full size)



not used, wire links must be inserted to connect the tuning capacitor into circuit. If ferrite loop aerials are substituted for the RF transformers L1/L2, they should be connected to the printed

circuit board as shown. The simple wave change switching makes no provision for shorting out the long wave loop when the medium wave aerial is in circuit, and separate rods must be used or absorption effects will seriously degrade performance. The rods should be fixed at least 50mm apart. Ferrite loops provide a stronger signal on these bands than a short wire aerial, and the directional effect can be used to null out interference. They are to be preferred for this simple receiver.

Fig. 4 shows the layout of the IF and AF printed circuit board. All but one of the lead-outs from inductor L9 are soldered to isolated copper lands, and the component is finally connected into circuit by a wire link. By this means, the primary and secondary can be arranged in series, if desired. Correct phasing will be evident from the reduced HF audio response. Fig. 4 also details the connections to the potentiometers. With the fine tuning control wired as shown, clockwise rotation of the spindle increases the capacitance of the diode. Vero pins inserted at the lead-out points ease the task of wiring between the boards. Transistors, padding capacitors and swing reducing capacitors were also connected into circuit via Vero pins, and a holder was used for

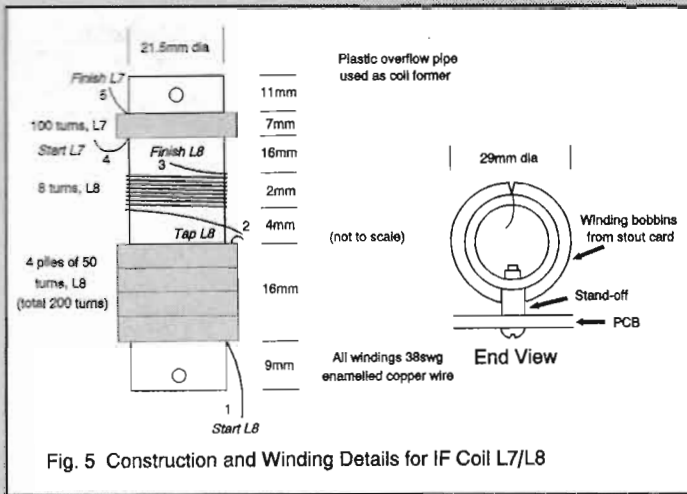


Fig. 5 Construction and Winding Details for IF Coil L7/L8

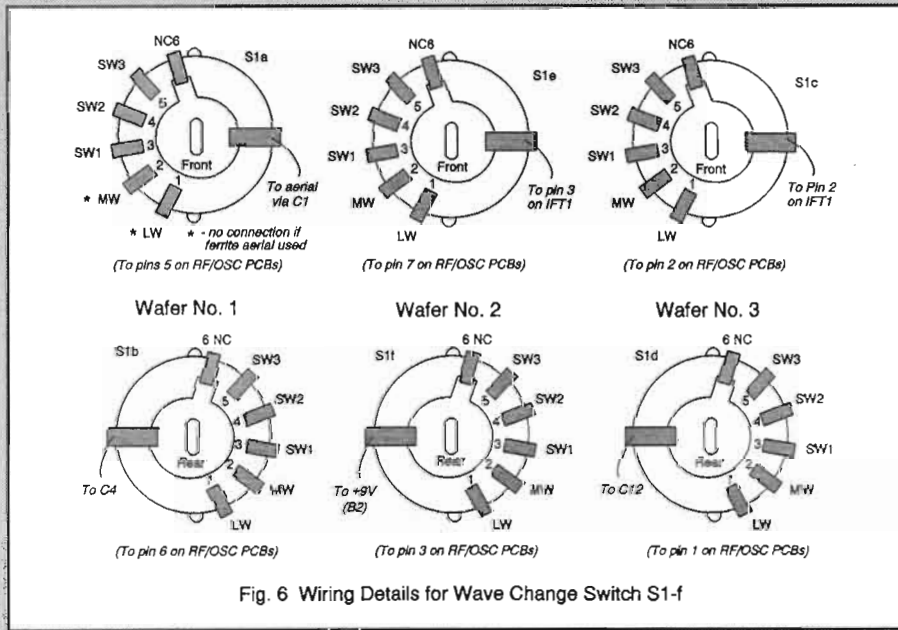
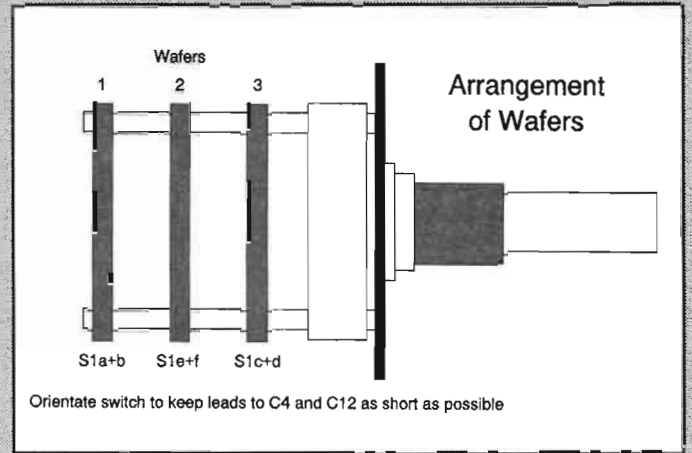


Fig. 6 Wiring Details for Wave Change Switch S1-f

IC1. This made it easy to carry out minor modifications, and to check components by substitution. The printed circuit tracks suit BF241 and BF494 RF transistors. When connecting the BC108C transistors onto the SW1 and SW2 front end boards, insulate the emitter leads with a length of sleeving to prevent shorting.

Winding IFT2

The construction of IFT2 is fully detailed in Fig. 5. The rings of stout card which hold the windings in place are glued with balsa cement to strips of card wound around the former, the strips being the same width as the individual winding piles. The coil is mounted above the printed circuit board on short stand-offs and the lead out wires are soldered directly into circuit. Adhere to the winding recommendations, or C15 and C16 may not tune the coil to the intermediate frequency.

Wavechange Switch Wiring

Details of the wiring and wafer

positioning are given in Fig. 6. It was not found necessary to fix a screen between the sections, but the wafer carrying S1e and S1f should be located centrally (these functions are 'earthed' to signal frequencies).

The wafer-turning shaft in the Maka-switch assembly I used for the prototype receiver made intermittent contact with the mechanism and the switch was electrically noisy when touched or operated. I eliminated this problem by fixing a springy brass strip to the switch frame and arranging it to press on the shaft. Constructors who use this type of switch may also wish to take this precaution.

Wiring between the tuning capacitor, wave change switch and front end boards must be as short and direct as possible. Use solid core hook-up wire, as rigid leads stay in position better than flexible ones and receiver alignment is less likely to be disturbed. A different insulation colour for each switch function makes wiring up easier, and short lengths of coloured sleeving, slid over the leads, can be used to identify the connections to individual front end boards.

Power and Filter Switching

On/off and filter switching can be combined in a four pole, four way wafer switch. The additional filter capacitor C30 is wired on the switch wafers, no provision is made for it on the printed circuit board. If this capacitor is wired permanently into circuit, a less expensive three pole three way switch would suffice.

Mechanical Construction

The receiver is not prone to instability, and provided earlier observations regarding short wiring are followed, layout is not critical. Photographs of the prototype show the method of construction I adopted, with all components and controls mounted behind a plywood front panel and tuning capacitors, wave change switch and front end boards arranged above and below a shallow aluminium chassis. The IF/AF board is located behind the speaker along with two 9V battery packs, each built up from AA cells.

As you can see, I made no attempt to miniaturize the receiver, as the need to provide a clear dial and accommodate the controls and loudspeaker impose limits on what can be done in this direction. Constructors who are mainly interested in receiving amateur SSB transmissions should consider a heavier, all-metal type of assembly. Mechanical rigidity and good screening are so important in achieving the rock-steady tuning necessary for processing these signals.

In next month's HRT, Raymond High completes the project with the alignment and calibration plus operating hints.



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Problem Page

Got a question relating to amateur radio? – write in, we'll try to answer it here!

Q: After using my 2m multimode for several years I've just got my Class A licence. Which HF rig is the best to get?

A: That's quite a wide-ranging question of course! If you've been listening around the HF bands for a while, using a general coverage receiver for example, you may already have an idea of the type of operation you want to go in for. A CW-only rig for example could be sufficient if you're not interested other modes, or a QRP rig if this aspect interests you. But if you're just 'starting out' and want to have a wide range of choices, say ragchewing on 80m as well as DX chasing on 20m, and don't want to start off with the challenge of getting contacts on QRP, then a 50-100W multimode multi-band rig is

probably the answer.

But the first thing you should budget for is a good aerial, as spending a vast amount of cash on an all-singing all-dancing HF rig can be wasted when it's just put into a random length of wire strung along the garden at a low height. An aerial such as a G5RV with an aerial tuning unit can be a useful starter if you have the room for this, as long as it's mounted well up and in the clear. Remember that a multiband quarter wave vertical aerial also needs to be mounted high up, and be accompanied by a good wire radial system unless it's a 'half wave' type. Tower-mounted rotatable beams can come later, unless of course you can manage to get one of these up at the beginning!

After that, you can start looking at a

rig! If economy is important, then if you already have a multimode VHF rig, a HF transverter such as a HX-240 (reviewed HRT May 1990) can be an economic solution as a 'starter'. Remember the performance of this will be limited by that of your VHF rig, and receiver filtering etc. won't be up to that of a purpose-made HF transceiver. For a 'stand alone' HF set, take a look in the HRT free readers ads for a secondhand set - something like an FT-101 can be a better choice than a new but limited feature, low power, possibly even single band, set.

If price isn't a major consideration, I would advise against buying a 'top of the range' set to start with, get something a little more modest and put the money saved towards a better aerial system, or even multiple aerials for different band ranges. You can always 'trade up' later, or use that rig as a second receiver or 'standby' set. Here, something like the Icom IC-707 or IC-735, the Kenwood TS-140 or TS-450, or the new FT-840 (review planned) or FT-890, could be worthwhile looking at depending upon your budget.

SCANNERS

New Products

The 'Scanmaster' range of accessories has been launched by Nevada in Portsmouth, here's a couple which handheld scanner users may find interesting:

Scanmaster QS300 Adjustable Desk Stand

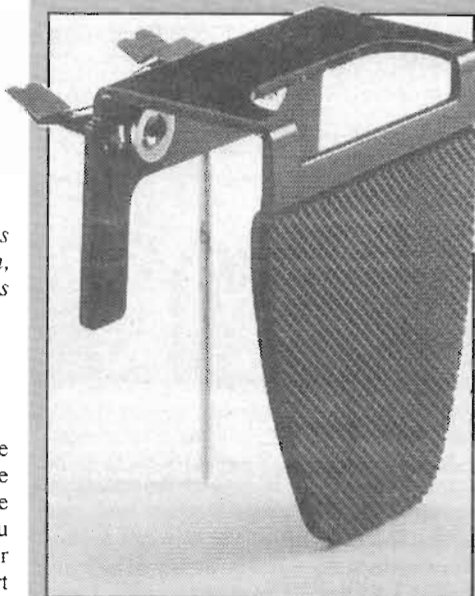
If you like to use your handheld in the house, an angled stand can be very useful. The Scanmaster QS300 stand is fully adjustable both vertically and horizontally, to give you the best viewing and operation angle for your scanner. It also comes complete with a short BNC to SO-239 socket lead, in those cases where you'd like to use your external aerial for your scanner. The QS300 is priced at £19.95 plus p/p.



The Scanmaster Desk Stand

Scanmaster Mobile Mount

Many of us have struggled with using a handheld scanner, or even a handheld transmitter, in the car. Holders which clip onto a door often don't let you see the display and keypad too well - here's a new type which clips onto the air vent grille on your dashboard! As such, the controls and display can be positioned directly in front of you. It's priced at a very reasonable £9.95 plus p/p.



The Scanmaster Mobile Mount fits onto your air vent grille

These Scanmaster products are now available from Nevada Communications in Portsmouth and their dealers around the UK

AOR AR3030 General Coverage Receiver Preview

Due to have been revealed 'in the flesh' for the first time in the UK at this year's Leicester Show is the new AR3030 HF receiver. This is quite a departure from AOR's traditional products, and from its specifications it looks set to find a firm place in the stations of many 'serious' short wave broadcast, utility, and amateur band listeners.

The receiver offers a frequency coverage

of 30kHz-30MHz, tuning in selectable tuning steps down to 10Hz, with reception modes of AM, Synchronous AM, Narrow Band FM, USB, LSB, CW and FAX. Many HF listeners know that good filtering is all-important on the crowded HF spectrum, with this in mind the AR3030 comes fitted with a high quality Collins 8 resonator 6kHz mechanical filter for good AM reception, plus an additional 2.4kHz filter for SSB/FAX/CW and a 15kHz filter for NFM reception modes. For higher performance, you can also fit an optional Collins 7 resonator mechanical 500kHz filter for CW and a Collins 8 resonator mechanical filter for better SSB selectivity.

A direct Digital Synthesizer is used for tuning, controlled by the set's microprocessor which offers 'user friendly' control of the set, with 100 memory channels which retain frequency, mode, bandwidth, AGC, attenuator and tone. Switching between bands is easy, the set, for example, again retaining the last-used settings and frequency for the various broadcast bands. A large analogue S-meter together with a backlit LCD shows you what's going on. Plugs and sockets a-plenty are fitted on the rear panel for your accessories, including a low level audio output and tape recorder remote switching, IF output and AGC, and an RS-232 port for remote control from your computer. A BNC aerial socket is used, together with terminals for high or low impedance wire aerials and an external earth. An optional VHF converter is planned, which will fit inside the receiver to extend its horizons somewhat. The set operates from an external 13.8VDC supply to allow use out and about as well as from home.

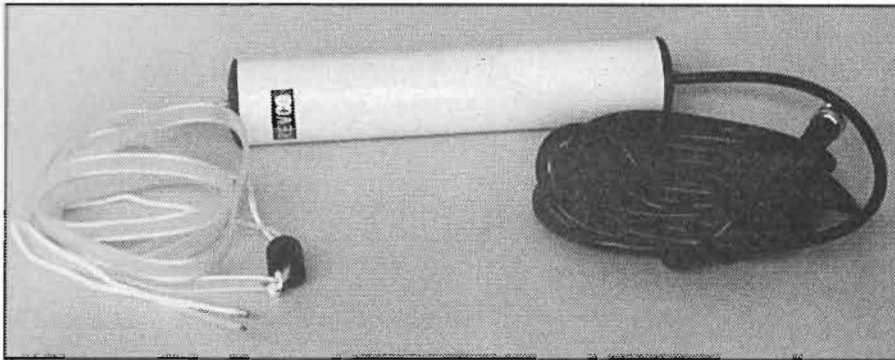
We've a review model already 'lined up', you'll see it in these pages soon!

The new AR3030 HF receiver



Review - Scanner Accessories

Chris Lorek reviews a couple of handy low cost accessories from Garex to help your listening



The Garex Portable Scanner aerial

Garex Portable Scanner Aerial

Many of us like to take our scanners with us when going away for a short while, whether this be an overnight business trip, or to visit relations (like over the Christmas and New Year break), or of course away on holiday. Alternatively, many scanner users still 'make do' with the set-top aerial originally provided with the receiver, as an outdoor aerial sometimes isn't practical. In all these cases, when the scanner's short whip aerial is pressed into use, it's often OK for listening to very strong, local, signals but you'll be missing out on a lot of the action.

When a sample of the Garex Portable Scanner Aerial came to the office on loan, it looked the perfect answer to many scanner owners problems! It's a 'J' type aerial made up from flexible ribbon cable, with the matching and termination unit on printed circuit board fitted within a short tube at the bottom. There's even a length of cord at the top so that you can hang the aerial wherever's best in your particular location, and to complete the 'self contained' aspect, the aerial comes complete with a 4m length of good quality RG-58/U coax, ready-fitted with a BNC plug to fit your scanner's aerial socket. I found the lightweight aerial managed to coil up to a very small size, and a 'suitcase' and 'briefcase' test showed it could fit in any odd 'nook and cranny', very handy for trips away.

I tested the aerial on-air over a period of several weeks, with the top of the aerial tied to the curtain rail of my bedroom window, the coax going to my handheld Bearcat scanner on the bedside table. Compared with the scanner's helical whip, which I'd always used for such 'occasional' listening away from my 'radio shack', I was literally amazed at all the new signals coming through - I even found I needed more memory channels in the scanner! As an example of the improvement gained, the GB3SC 2m repeater in Dorset, which I couldn't

hear anywhere in the house with the scanner's set-top whip, now came through loud and clear. The price of the Garex aerial is also remarkable in my opinion, at just £15.95 including VAT and UK post and packing. I was due to send it back this week. I didn't. I bought it instead.

Garex Tuneable Aerial Filter

I'm sure many readers have come across the problem of unwanted signals, particularly IF (Intermediate Frequency) 'images', being received on their scanner. Adding a rooftop aerial, particularly one with a built-in preamp, can bring in a lot more signals, but sometimes in unwanted ways! I have two very local, and thus very strong, fire brigade transmitters in the 147MHz band. These literally cause me havoc when trying to listen around the civil aircraft band, which happens to be at the receiver's 'image' of twice 10.7MHz away. Likewise, the Bembridge tower frequency is the exact image of my local 2m packet stations on 144.650MHz! I also know several other users who suffer from strong Broadcast Band II (88-108MHz) signals, thus overloading their receivers, and even my amateur band handheld suffers from paging reception interference on 2m. To get over these problems, rather than

place a fixed attenuator in your receive line, which attenuates the *wanted* signals by just as much as the *unwanted* signals, a 'notch' filter may be used as a much better solution.

The Garex Tuneable Aerial Filter comes ready-fitted with BNC connectors and a short BNC-BNC connecting lead, and simply fits in series with your scanner's aerial connection. It provides a sharp, tuneable notch over the range 88-175MHz, using the tuning knob on the front of the small (79mm x 61mm x 41mm) box. Inside, a high quality Jackson variable capacitor is used, and internal screening together with good earthing lets you use the unit within 5MHz or so of the frequency you've 'notched', without considerably reducing the wanted signal. Further away, there's virtually no difference in the strength of the wanted signal. A 'calibration chart' is provided, which gives a graph of the front panel reading in relation to the unit's notch frequency, to help you get started. In addition to the notch circuitry, a 25MHz high-pass filter is also contained within the small box, to help problems from strong HF/medium wave/long wave signals.

I tested the unit both on air, and connected to my signal generator and spectrum analyzer. Here, I found the unit gave very deep notch of 40dB across 87-174MHz. On air, the filter worked superbly when used with my rooftop VHF/UHF aerial system, no more fire brigade interference on airband, no more paging interference on 2m. Even an expensive high-Q 'cavity' filter around the size of a 1.5 litre lemonade bottle only gives around 30-40dB attenuation, and the Garex filter was certainly much easier to use for such receive-only applications! The Garex filter is priced at £26.80 including VAT and UK post and packing.

Further details on both these products, which are available from Garex and Revco dealers, may be obtained from Garex Electronics in South Brent, Devon, to whom my thanks go for the loan of the units for evaluation.

The Garex Tuneable Notch Filter





The Top Band Net

Our Traditional Christmas Chiller

Bill's favourite activity in amateur radio was taking part in ragchews on the 'LF' bands, in particular the 'Gentleman's Band, that of course being 'Top Band' or 160m.

Every Sunday morning, the local club net would take place. The net used AM for this rather than SSB, with participants using either homebrew rigs or by the 'AM' mode on their commercial transceivers. This way, Short Wave Listeners could 'listen in' using simple HF receivers, and lately even with the types of scanner receivers with HF AM coverage that seemed to be on sale everywhere. The club even gained a few new members this way, some of who've become amateurs themselves.

At precisely eleven o'clock each week, right down to the second, Jim the 'net controller' would put out a 'CQ' to the club members (Bill was convinced Jim listened to the 'speaking clock' pips to get his timing 'dead on'). But even before this, many of the members would already be waiting in anticipation, sometime even preempting the start of the net by asking whether such-and-such an amateur was on frequency, to see if their friends were there. The net became a social occasion, an extension to the club meetings. This was very useful for Bill, because his arthritis meant that he couldn't get out as much as he liked to any more. Keeping in touch with the 'chaps' this way was something he looked forward to each week, as he got lonely on his own in the house, especially living in the rural part of his area which Bill loved so much.

Each week, a different topic of amateur radio would be discussed as the 'net subject'. Sometimes this would be the theme of the last club lecture, or sometimes a subject related to whatever was the 'talking point' and the bands that week. But it was always interesting, it acted as a 'focal point' for club members, and they knew they had many other listeners who couldn't 'join in' either because they didn't have a licence, or just that they didn't have Top Band AM fitted on their time-wary transmitter!

Of course, as the years went by, topics began to repeat themselves. Subjects such as 'Is a linear needed?', or 'Should amateur radio be a black box hobby or confined to purely homebrew equipment?' resurfaced, normally on a random sort of basis. Even so, Bill loved to join in, happy in

the knowledge that he always received a warm welcome to the net.

As more and more new amateurs became licensed, the net slowly gained a 'different' sort of image, and topics such as computers, digital communication, and so on, often became the 'talking point'. Much of this was above Bill's head, but he knew that we must encourage progress in the hobby. However, the 'old guard' was still there, and often after the 'formal net' had finished, they'd get together for their 'own' net to reminisce on the 'good old days'. It was here that Bill would always find his old friends, including some that would be happy to just listen to the technical goings-on by the 'new breed' in the club net, but without joining in the discussions as such.

As time went by, Bill found himself in sheltered accommodation, and fortunately the Warden, Clive, was an amateur himself, indeed he'd been introduced to the hobby by overhearing the weekly net! Clive was a sprightly young chap, although he was only active on 2m FM with his Class B licence. However, with this 'common bond' he made sure Bill was able to get on the HF bands whenever he wanted, and erected a 40m long wire aerial for him, which ran along to the top of a large tree at the bottom of the grounds, to keep him on 160m. He even spent many hours adding ferrite beads and soldering bypass capacitors here, there, and everywhere in the Warden 'call' intercom system, which picked HF signals up very nicely! Bill only found this out when some of his neighbours were convinced that he was rambling on about himself, 'broadcasting' over the intercom, when it was of course the rectified Top Band AM that was doing it!

He was sad when Clive left for a similar position but at a residential home across town, but Clive said he'd try to keep in touch to make sure all was well. Eventually, the Club's net gained a new 'net controller', but Jim found a 'new lease of life' in being the self-appointed controller of the expanding 'Old-Timer's Net'.

One morning, Bill was surprised to hear a new callsign but with a familiar

voice call into the 'Old Timer's Net'. Clive had just passed his CW test, and told the net that the remote auto-ATU coupled to his new all-singing all-dancing transceiver, loaded the 80m G5RV he was using, with the feeders strapped together, fine for 160m. Every few weeks, Clive would again call into the net, just to see if Bill was OK, and whether he needed any help, as he knew Bill's health was deteriorating. He made sure that, someone at least (often one of the younger members of the club), would come along to see him when needed, whether this was to maintain the aerial system, or just to give him a lift along to the club when Bill felt well enough to visit. Unfortunately, Clive himself was never able to go along because of the attendance requirements of his job clashed with club nights. But Bill secretly knew that Clive had also made sure that one or two of the other 'old timers' were also well looked after in this way.

As Clive had been acting as a remote 'Guardian Angel', for about a year now, Bill made a couple of phone calls. He arranged for him and a few club members to pay Clive a surprise visit, just before the next club meeting that December, on what he knew would be Clive's birthday. Although he wasn't in the callbook yet, Bill knew the name of the residential home he worked in, and thus managed to find the address. They turned up at the door that evening, complete with a birthday cake and a few bottles of suitable liquid refreshment, asking for Clive. The Head Warden greeted them and showed them in, but the 'Clive' who came to see them wasn't the Clive they knew. He did remember his namesake though, and said that, unfortunately, he was no longer with them. "But where does he live now?" they asked. Clive sadly replied that his namesake, just after starting to work there last December, had been out in his spare time putting a better aerial up for one of the residents, who liked listening on his radio each week to something called the 'Old Timer's Net'. But he'd slipped on an icy patch on the roof, and fell to his death. A pity, as he'd been over the moon the day before. This was because he'd been so pleased that he'd passed something called a 'CW Test' whatever that was, which he told us meant he'd be able to get himself a better radio to talk to his friends with.

QRP Corner

Dick Pascoe G0PBS looks forward to the G-QRP Club Winter Sports

Readers may remember that during my visit to the giant Hamfest in Dayton last April, I had a chance to take a brief look at the new rig from Ten-Tec. Called the *Scout*, this single band transceiver is now available in the UK. Reports from users in the USA have been quite favourable with especial mention of the new technology incorporated in the Jones Filter. Operators will have to spend some time with this filter, as it does take some getting used to. I have been reliably informed though

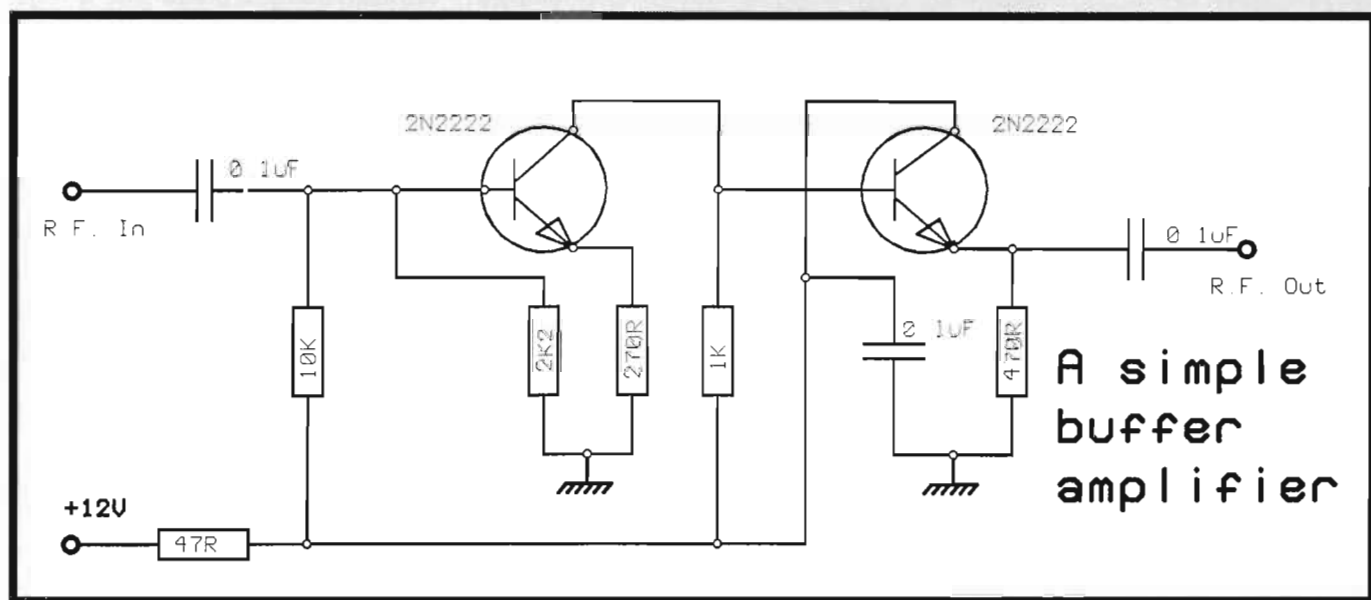
band module, other band units are available at £39 each. Readers should check to confirm prices and availability, and it is rumoured that the QRP version will retail at about £500, but this has not been confirmed.

A chat with Jeff from W & S brought forth a promise of a set on loan (we've now sent this to Dick but unfortunately their's arrived too late to feature as this month's review, however Dick will give you his impression of it in next month's column - Ed).

There are many times that the computer will be of great benefit to operators. I often use mine to check out various aerial configurations, the programs from Roy Lewellen W7EL being well known to many amateurs. Chris G4BUE regularly uses Roy's programs to check out his new aerial ideas, it is much easier to do this on the computer than in 'real time' in the garden!

Computers also have a great use in checking circuits. There are several programs available to the home constructor, one that I have tried is 'Electronic Workbench'. This program enables the experimenter to check out his ideas, before blowing up transistors in a real circuit. Varying voltages may be applied to circuits, different resistors, capacitors and transistors of varying types.

I also use my PC to design printed circuit boards. All of the circuits that appear in this column have been drawn using 'Easy PC', which is a very simple-



A simple buffer amplifier

that once it has been mastered, it is very good.

The present model available has facilities for up to 50W out and cannot be reduced much below the QRP maximum of 5W. A QRP version of this radio is promised, and we have been told that it will be available in the USA this winter and here in the UK sometime in the spring.

With a single band module, the Scout is priced at £589 from Waters and Stanton. Changing bands is very easy, the module in use is removed from the front panel by undoing a clip and sliding it out. The model on offer at the Harlow rally was supplied with the 40m

Computers and Radio

Any amateur who has not been to a mobile rally for several years would be very surprised if they popped into one today. The overwhelming amount of computers and associated equipment will amaze those not expecting this.

The personal computer explosion has hit the amateur as well as the small businessman. Who would have thought that almost every shack would have a computer on the bench? The PC has taken over from the Morse reader, and packet radio is now used to keep track of band conditions, levels of activity, and of what DX is popping up.

to-use program but extremely versatile, permitting printing of both PCB layouts in several layers and also of the circuit diagrams for that board. Gone are the days of using paper, with the pads supplied on strips, a much neater job can be done too, with tracks running much closer thus enabling smaller boards to be made. Other programs are available which do autotracking. I have not tried any of these but have been warned off them unless a very powerful computer is used.

Winter Sports

The annual G-QRP Club's Winter

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Sports takes place again this year. After missing last year's event because of the house move, I'm really looking forward to meeting many old friends once again on the air. This event has become an established part of the low power activity during the year and one of the most popular, enabling operators to get away from the Christmas turkey leftovers and spend a few hours on the air.

This is *not* a contest, and operators should not operate in contest mode. The aim is to get on the bands and chat to other enthusiasts, there are no exchanges required except for those needed by the log. Realistic reports are required, as most low power operators use this information to quantify how their aerial systems are working.

The event runs from 26th December until 1st January inclusive. There are no requirements of times spent on the bands, no upper or lower limits at all. No bands or frequencies are specified, but the usual centres of activity which are 1.843, 3.560, 7.030, 10.106, 18.080, 14.060, 21.060 and 28.060MHz will be very busy. Most operators will be using the higher bands when they are open, but many operators will still be down at the bottom. Don't forget

that 50MHz and the VHF bands can also be used, QRP is not restricted to HF CW. Spend the time you want to. Some I know will be there glued to the radio's looking for that elusive member that they haven't worked yet. One of these, Bob G4JFN, will be hunting for members, he's worked over 300 members so far, which is not that many considering we have about 3000 active members worldwide.

When operating, call *CQ QRP* or tail-end other QSOs. To qualify, both stations must be running 5W output (or less of course) in CW mode or 10W output or less using SSB.

As I have stressed, this is not a contest but members can send copies of their logs to the club's communications manager Gus G8PG at Mr. A Taylor, 37 Pickerill Road, Greasby Merseyside, L49 3ND. The G4DQP trophy will be awarded to the entry that has made the best overall contribution the event.

For those who are not yet members of the G-QRP club, and who would like to take part in the Winter Sports, membership for UK amateurs costs £5.00 and details are available from Mr. J. Leak, Flat 7, 56 Heath Crescent, Free School Lane, Halifax, West Yorkshire.

Buffers

Many people have asked me about using a crystal controlled transmitter with a DC receiver to make a simple transceiver. The addition of a change-over unit will enable the switching from receive to transmit, but if some form of tuning is required then the transmitter will have to track the receiver. One way of achieving this is to use the VFO on the receiver to drive the transmitter. In most cases this will not have enough output to drive the transmitter as well, so some form of amplification is required.

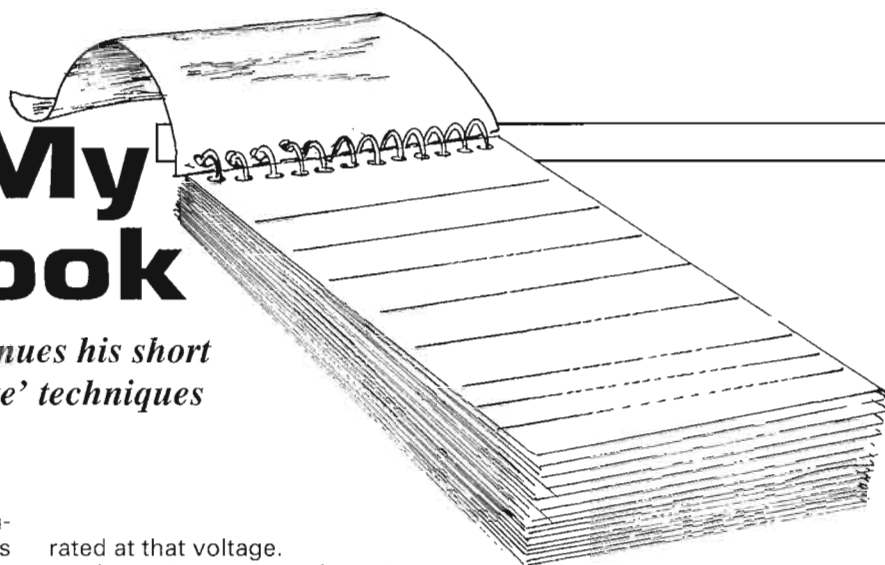
In a simple receiver such as the *Sudden*, designed by Rev. George Dobbs for the G-QRP Club, the NE602 which is used as the mixer for the VFO has a 'spare' output on pin 6. If a buffer amplifier is connected to this pin, the transmitter can be driven by this same VFO.

Virtually any NPN transistor can be used in this configuration providing the gain is high enough, and this handful of components will enable the transmitter to work well. Try it, you will be surprised.

That's it for this month. News and views to me either via HRT, packet via GB7RMS, or direct to Seaview House, Crete Road East, Folkestone CT18 7EG.

From My Notebook

Geoff Arnold G3GSR continues his short introduction to 'hollow-state' techniques



For a transistorised radio circuit, a single DC power supply is often all that is required, but a valve requires a minimum of three different supplies. These are: (1) A low tension supply (either AC or DC) to warm the filaments or heaters; (2) A high tension supply (DC) to draw a standing flow of electrons through the valve from cathode to anode; and (3) Grid bias (DC), to provide a means of restricting that flow of electrons to a suitable and safe value.

Like most things in radio and electronics, these supplies, or the batteries which provide them, are usually known by abbreviations. In British practice these are LT, HT and GB. On equipment and circuits which originated from the other side of the Atlantic, you'll find them referred to respectively as 'A', 'B' and 'C' batteries.

In mains-powered valved equipment, all three supplies are derived from the single mains supply, sometimes stepped up or down by means of transformers, or reduced by resistive droppers, and rectified and smoothed where necessary.

Filament & Heater Supplies (LT)

As I have mentioned before, the filaments in directly-heated valves require far less power to raise them to a temperature where they will emit electrons than do the heater-cathode assemblies in indirectly-heated valves. For that reason, they were especially favourite for equipment run from batteries.

In the early days of radio, 2 volts (the output of a single-cell lead-acid accumulator) soon became the norm for filament supplies in battery-powered equipment. Many's the old-timer who will regale you with tales of how he used to carry accumulators back and forth to the local radio shop for their regular recharging.

Later, new valves with 1.4-volt filaments were developed, and the so-called 'all-dry' portable (meaning that both LT and HT batteries were made up of dry cells) was born. Although the nominal voltage of a dry cell is 1.5V, its average over the useful discharge life is nearer 1.4V, hence the valves being

rated at that voltage.

In mains-operated equipment, where more power is available from the supply, you will usually find indirectly-heated valves being used. The heaters of these valves may be connected in parallel, or in series, or (especially in military or professional equipment, where operation from 12V, 24V or even 48V DC supplies is sometimes required) in a series-parallel network. Ratings of 6.3V or 12.6V are the norm for valves intended for parallel connection. The reasons for this choice are not entirely clear, but probably stem from the nominal 6V or 12V vehicle electrical systems. In any case, they are multiples of 2V (back to that lead-acid cell again).

Valves used in circuits handling significant power (audio output stages, for example), have heavier anode currents, therefore the cathode must produce more electrons than one used in a low-power stage. The bigger cathode requires more heating power, and if the voltage on the heater is fixed, the only solution is for it to draw a larger current.

Producing 6.3V to drive a group of valves in an AC mains-powered set involves the use of a step-down transformer. This has several disadvantages, as far as the equipment designer is concerned. A power transformer is expensive, it is heavy, it produces a strong alternating magnetic field, and it only works on AC.

In the days when the mains electricity supply in large parts of the UK was still DC, this last factor was important for domestic receiver manufacturers, for it meant that sets using mains transformers were unsaleable in those areas. The solution was to drive the valve heaters direct from the mains supply via a resistive dropper, producing a set which could work equally well on AC or DC.

A little maths will soon reveal a problem, however. A typical low-power valve requires a heater power of 300mA at 6.3V, that's just under 2 watts. A typical audio output stage valve requires rather more, in the range 500mA to 1A at 6.3V, that's 3 to 6 watts. For an average 5-valve domestic receiver, the power required for the valve heaters

would therefore be around 2 amps at 6.3 volts.

If the set is to run on 240V mains, with parallel-connected valve heaters, getting rid of the surplus 234 volts (240V - 6V in round figures) at 2 amps requires a series dropper resistance which will have to dissipate $234 \times 2 = 468$ watts. Yes, that's almost half a kilowatt, all wasted. Apart from the problem of the physical size of the dropper, and where to put it to ensure the safe dissipation of all that heat, every hour you listen to the radio will add another half a Unit to your electricity bill!

The obvious solution would be to connect the valve heaters in series instead of parallel; that way there is less surplus voltage to get rid of, and the total heater current drawn from the mains is less. The snag is that not all the valves draw the same current. Remember, they were all designed to work on 6.3V, with the differing heater power requirements taken care of by different currents. But perhaps the valve manufacturers might have been persuaded to produce another range of valves having heaters that provide the required power when passing a standard current, rather than when fed with a standard voltage. And that's just what they did.

One of the standard 'current-rated' ranges of valves for series heater connection was designed to work at 100mA. Our typical low-power valve requiring around 2W of heater power would have a voltage drop of 20V at that current, and the output amplifier valve requiring 6W would drop 60V. Adding up four lots of 20V and one of 60V gives a total of 140V. That leaves just 100V surplus (240-140V) to get rid of, and at a current of only 100mA, so the power dissipation in the dropper resistor is now only 10 watts – rather different from half a kilowatt!

Other standard ranges of valves for series heater operation had current ratings of 150mA and 200mA. The 150mA range were popular in the USA, giving a typical 4-valve or 5-valve set which could have its series heater string connected directly across the US

standard 117V AC mains supply, without the need for any dropping resistor at all. When imported into the UK, some of these sets were fitted with the infamous 'line-cord' droppers to drop the surplus 120V or so.

Line-cord looked just like a standard, fabric-covered mains lead, but actually had one core made from resistance-wire. It got warm in operation, of course, which didn't do the rubber insulation around the cores a lot of good. Its biggest problem was that when it became frayed or damaged near the mains plug, unwary owners would often cut off the damaged section and refit the plug, thereby reducing the overall resistance and applying excessive voltage to the receiver, not a very desirable situation!

Any valves used in a series-connected heater chain must be of a type having an adequate heater-cathode insulation rating, as there will be a considerable difference in potential between the (earthy) cathode and the heater of any valve which is placed near the top (live mains) end of the chain. The valves in those stages which are most susceptible to hum – usually the detector and frequency changer – are placed nearest the bottom (neutral mains) end of the chain.

Anode & Screen Supplies (HT)

As I explained a couple of months ago, a valve is a one-way street, with a flow of electrons passing from cathode to anode. Electrons have a negative charge, so the anode needs to be given a positive potential to attract them. No anode current flows – not even a leakage current – when the anode is negative with respect to the cathode.

In descriptions of valve circuits, you will encounter the terms anode current and cathode current – what is the difference? In a triode, the two are identical, for all the electrons leaving the cathode are collected by the anode. In tetrodes and pentodes, a proportion of the electrons are taken by the screen grid, and the anode current is therefore less than the cathode current. No current flows in the control grid circuit, except in certain oscillator and hard-driven amplifier circuits, of which more later.

Except in a valve being used as a rectifier, the anode is maintained positive with respect to the cathode at all times. Therefore, the anode supply must be DC, and if noise or hum is not to be added to the output signal that the valve is amplifying, it must be a smooth (constant) DC.

For equipment operating from AC mains supplies, the arrangement of the

HT supply circuit – transformer, rectifier, and reservoir capacitors – will not be basically different from that for a simple, unregulated supply for transistorised equipment. The voltages will be very different, of course, with HT supply rails even in domestic radio receivers being anything from 90V to 350V and occasionally more. The value of the reservoir capacitors will be lower, typically in the range $8\mu\text{F}$ to $32\mu\text{F}$ for radio receivers, rising to $100\mu\text{F}$ and more in TV sets.

The rectifiers used were traditionally either valves – generally double-diodes in a full-wave configuration, occasionally single diodes in a half-wave circuit – or else metal rectifiers of the copper-oxide or selenium variety. Towards the end of the valve era, when reliable silicon rectifier diodes became freely available, these devices began to be widely used. If substituting one or two silicon diodes for a valve or metal rectifier in a set under repair, it is essential to incorporate a series resistor to compensate for the lower series impedance of the silicon devices. The large current surge at switch-on can otherwise kill the reservoir capacitor or even the mains transformer.

In transformerless sets, whether intended for AC-only mains supplies or for 'Universal' AC/DC operation, half-wave rectification of HT is the norm, using a single diode.

Where stabilised HT supplies are required, there are unfortunately no equivalents in the valve world to the common 3-terminal regulators which have revolutionised power supplies in solid-state equipment. Instead, we have to rely on shunt regulators using gas-filled stabiliser tubes, similar in application to the Zener diode, or on series regulators using valves (usually beam-tetrode types), in a circuit configuration

very much like that of simple series-transistor regulators.

Grid Bias Supplies (GB)

In the days of receivers operating from a 2V accumulator plus HT battery, the Grid Bias battery, usually a 9-volt dry battery with tapping points every 1.5V, was an essential part of the power supplies. As already mentioned, the current drain was essentially zero, so the GB battery usually lasted for several years. Indeed, until it reached the 'corrosion-oozing' stage, it tended to be forgotten except by enthusiasts who would try to achieve optimum reception on their TRF receivers by changing the bias tapplings feeding the various valves.

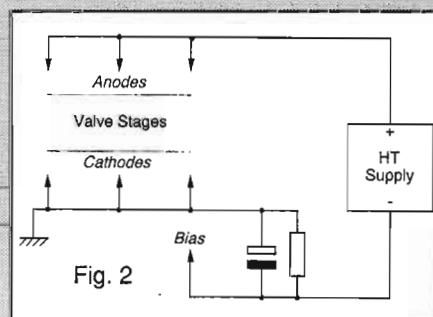
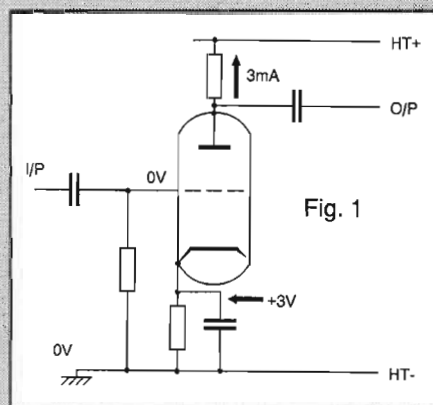
In later valved equipment, apart from transmitters and similar large amplifiers requiring a 'stiff' (stable) bias voltage, the separate GB supply was abandoned – after all, why shell out good money for a supply which was not called upon to provide any current? Instead, the required bias potentials were generated as voltage-drops across resistors inserted in the bottom ends of the HT circuits.

This could be done on a stage-by-stage basis, where each valve has a resistor inserted between its cathode and the HT-negative (chassis and probably earth too) rail. The voltage drop across this resistor makes the cathode positive with respect to the chassis, to which the grid circuit will be returned, which is the same as making the grid negative with respect to cathode (Fig. 1).

Alternatively, bias can be generated on a whole-set basis, where a resistor is inserted in the HT-negative line between the power supply and chassis (Fig. 2). The voltage drop across this resistor, due to the combined cathode currents of all the stages, means that HT-negative is negative with respect to the chassis, and can also be used as the GB-negative line. This particular circuit arrangement is known as 'automatic bias'.

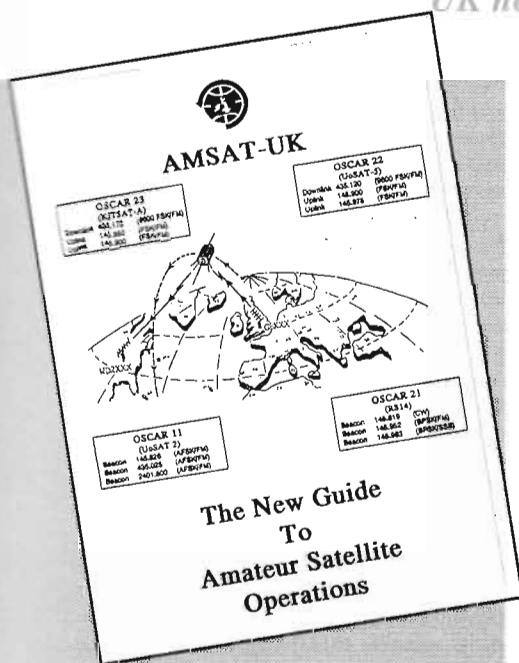
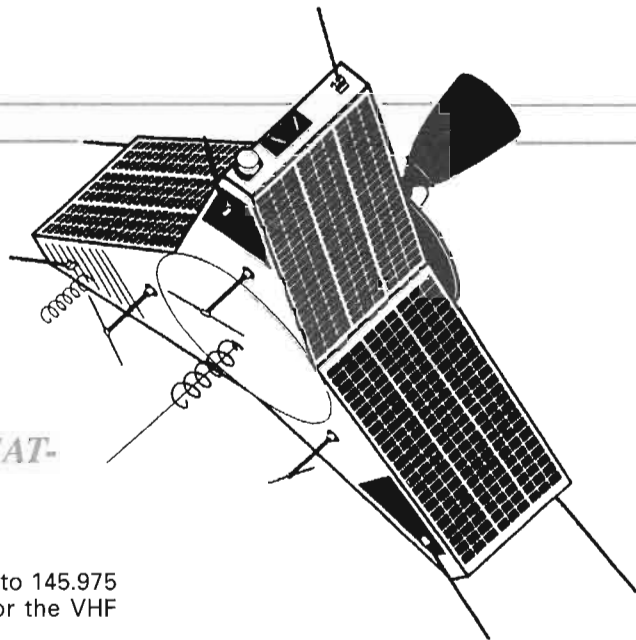
With either of these methods of generating bias supplies, it is usual to bypass the resistor with a capacitor to prevent unwanted negative feedback or coupling between stages. Unless, of course, negative feedback is actually required in a particular stage.

Next month, I hope to round off this short introduction to 'hollow-state' techniques (so-called to distinguish them from 'solid-state') with a few notes on some unusual circuit features you may encounter, plus a brief run-down on valve numbering codes, which can be a great help in finding your way around an unfamiliar piece of equipment.



Satellite Rendezvous

Richard Limebear G3RWL with this month's AMSAT-UK news



The new 'Guide' is now available

The *New Guide to Amateur Satellite Operations* is now available. There are now more pages than its predecessor, and it's now gone to A4 size pages instead of the old A5 size. It's available from AMSAT-UK at £4.50 inc. UK p/p, send your order to Ron G3AAJ, see below for address. (This is an excellent book, written by Richard G3RWL, which I heartily recommend—it's an up to date guide to all the satellites operational as of Aug 93, with future technical data sheets being made available to keep it up to date—HRT Tech Ed).

Arsene

ARSENE seems to have disappeared and is no longer responding to telecommands. The transmission stopped on 9th Sept at the time ARSENE was coming out of a one hour eclipse period. All telemetry collected before the failure is being carefully investigated by ARSENE experts.

One of the tricks the command station is trying is to re-activate the 2m transmitter with 15W of output. Apparently this power mode was never switched on before. Interested parties

are recommended to listen to 145.975 MHz downlink frequency for the VHF beacon.

Satellites Recently Launched

Here's some information on the satellites which have just come into operation;

KITSAT-B: Digital store and forward communication experiment plus CCD earth imaging system and a DSP experiment. Standard PacSat protocols. Uplink: 145.87/145.98MHz Downlink: 435.175/436.50MHz 2/2.2/5W output power. 436.500 seems primary Speed: 9600bps Power: solar cell (GaAs) Nicad battery (14V/6A) Computer: primary 80c186, secondary Z80, 12MByte RAMDISK KAIST say they will soon distribute a KITSAT-2 DTLM parameter file on KO-23.

POSAT:

Uplink: 145.925/975 MHz Downlink: 435.250/275 MHz (250 primary) Speed: 9600bps with 38.4 kbps capability which is *very probable* (understood to use PacSat protocols).

This comes from the Portuguese organisation LNETI with the purpose of giving experience in spacecraft construction/operations to Portuguese nationals. The spacecraft carries both amateur and commercial components; the extent of amateur radio operations is not known.

Additionally POSAT carries two cameras (1 km and 200 m resolution); DSP, cosmic ray, and star sensor experiments; and will navigate autonomously using an onboard GPS receiver.

Healthsat will use commercial frequencies to continue to support voluntary workers associated with VITA, Satelife etc. Its purpose is to be a test platform for minimal ground-stations and it will operate at 9.6 and 38.4 Kbps.

Eyesat: not planned for 'routine' services. It has modem capability for 1200 and 9600 bps but is said to *not* be PacSat software compatible. FM

talkthrough mode too. Amateur component is called Amrad. Commercial payload has priority. The spacecraft is understood to incorporate both 9600 baud up/downlink and a 19.2 kilobaud experimental downlink.

Uplink: 145.850 MHz Downlink: 436.800 MHz Speed: 300 - 19200bps Power: 0.25 to 4 watts Computer: primary 80c186, secondary Z80, 12MByte RAMDISK

Itamsat: Digital store and forward communication experiment compatible with PacSat protocol telemetry and communications software.

Callsign: IY2SAT Downlink: 435.867 MHz (primary) PSK 1200 baud, 435.822 MHz (secondary) PSK 1200 baud, AFSK 1200 baud (FM), 9600 baud (G3RUH compatible) Analogue transponder (FM) Uplink: 145.875 MHz 1200 baud Manchester / 4800 baud, 145.900 MHz 1200 baud Manchester / 4800 baud, 145.925 MHz 1200 baud Manchester / 9600 baud / exper, 145.950 MHz 1200 baud Manchester / 9600 baud.

ITAMSAT will start out with a callsign of ITAMSAT, and change to IY2SAT when BBS operations are initiated. I have a file for the telemetry parameters of ITAMSAT available on request. Writers of telemetry decoders will want to note that this file may not be precisely in the 'standard' MICROSAT format and their programs will need to recognize both callsigns.

Amsat-Italy have also released their version of TLMDC for their satellite; it's been on Kitsat but if anyone wants it then send me a disk.

38.4 kbit downlinks (with 9600 uplink) are very likely on several of these satellites. I have no technical info on the modulation type; whether QPSK (fits the bandwidth of amateur receivers) or fsk (separate RX technique needed). FSK seems probable.

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CESAR-1

Some clarifying information on the Chilean satellite CESAR-1. This is a 100% amateur radio satellite project being constructed by AMSAT-CE. Contrary to other reports, the Chilean Air Force has no participation in it. The MICROSAT type satellite is being built under an agreement between AMSAT-NA and AMSAT-CE under which AMSAT-NA is providing AMSAT-CE with basic information regarding the MICROSAT design, and rendering any possible assistance when needed. AMSAT-CE estimates the total cost of completing its first satellite project at around \$1M US dollars! This amount includes more than merely the cost of building CESAR-1 but represents the total outlay needed

to establish the necessary infrastructure to accomplish the task.

CESAR-1 will be a standard MICROSAT to which the builders expect to add a GPS receiver and digital voice transponder experiments. The latter will receive an L-Band uplink and transmit an S-Band downlink. Among other applications, this experiment will allow terrestrial repeaters to be linked via the satellite. The present plan calls for completion of a flight unit by January 1996.

Amsat-UK News

A phone call by the HRT Editor to Amsat-UK's Hon. Sec. Ron G3AAJ brought forth the following news; The

Sat-Sked program by Wayne WA2N can be downloaded from PacSats, and is for use with the Trakbox auto tracking device. On downloading the program, satellite users have 7 days usage before obtaining an ident number, which will open the program for future use. This ID is obtainable from AMSAT for £20 if a member, or £30 for non-members, all monies received go to the AMSAT Phase-3D fund, and is the way that Wayne is subscribing to this exciting new satellite.

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

KEPLERS

SAT: OSCAR 10	UoSat 2	AO-13	PACSAT	DO-17	WO-18	LO-19	FO-20
EPOC: 93261.37176135	93266.58557116	93263.37003204	93266.18221471	93266.23231091	93266.20321397	93266.75863415	93262.12161713
INCL: 27.1985	97.8054	57.8512	98.6174	98.6178	98.6176	98.6182	99.0281
RAAN: 5.5050	288.6093	293.7059	350.3244	350.6125	350.6033	351.3494	100.4732
ECCN: 0.6025636	0.0013031	0.7210437	0.0010459	0.0010553	0.0011285	0.0011457	0.0540198
ARGP: 115.1006	44.3925	324.5886	256.7891	255.7561	257.3247	254.5061	233.7673
MA: 317.3712	315.8324	4.2495	103.2140	104.2451	102.6691	105.4856	121.2342
MM: 2.05882714	14.69056049	2.09718161	14.29850520	14.29987128	14.29965946	14.30057190	12.8322116
DECY: -9.9E-07	1.57E-06	1.21E-06	3.4E-07	3.9E-07	3.4E-07	4.1E-07	-1.1E-07
REVN: 4921	51116	885	19144	19146	19146	19155	16936
SAT: INFORMTR-1	UO-22	KITSAT-A	ARSENE	RS-10/11	Cosmos 2123	Mir	
EPOC: 93266.75660614	93265.11055625	93263.67655469	93241.80475365	93265.78298818	93265.77234864	93266.82873996	
INCL: 82.9460	98.4659	66.0792	1.3018	82.9282	82.9210	51.6187	
RAAN: 339.8817	339.6293	124.2611	119.8566	166.4889	209.7390	83.8687	
ECCN: 0.0036869	0.0008256	0.0001255	0.2933615	0.0013289	0.0029281	0.0004427	
ARGP: 106.0838	16.3205	353.3278	152.1382	49.2382	130.1855	121.5263	
MA: 254.4375	343.8248	6.7724	232.4293	310.9897	230.1875	238.6130	
MM: 13.74525023	14.36851117	12.86279630	1.42202460	13.72323480	13.74026602	15.59836341	
DECY: 8.4E-07	5.3E-07	1E-08	-4.9E-07	8.8E-07	1.6E-07	7.872E-05	
REVN: 13298	11458	5212	162	31323	13192	43452	

Packet Radio

Roundup



Chris Lorek G4HCL tells you how to get a free high-density PC disk packed full of packet software

I'm always asked "What software do I need for packet, and where can I get it from?". To get you started, all you need is a simple 'dumb terminal emulator' for your computer, but there's also a very wide range of 'all-singing, all dancing' software available. But the best person to decide what's best for your needs is you! To this end, much software is available on a 'try-before-you-buy' Shareware basis, from sources such as Venus Electronics (26 Pevensey Way, Frimley Green, Camberley, Surrey, GU165YJ, Tel. 0252 837860) and the Public Domain and Shareware Library (Winscombe House, Beacon Road, Crowborough, Sussex, TN6 1UL, Tel. 0892 663298). I'm busy trying out the latest APLINK (AMTOR<->Packet 'link' software) from the PDSL, and at this year's HF Convention Roland G3VIR manned the Venus Electronics stand with the latest versions of Lan-Link V2.20, Supermorse V4.06, Geoclock V5.0, APLINK V7.00, BPQNode V4.06K, TPK V1.81, Baycomm Mailbox, and 7Plus V2.02 as well as plenty more!

Shareware distributors such as these only charge a nominal 'copying fee' for the software and disk, which, if you like the software, you then register by sending the author your payment. My personal favourite is the G7JJF packet driver, which has a very reasonable £10 registration to 'open up' the features. Commercially available software is also often available as a limited feature 'demo' from packet dealers, see below.

Free High Density Disk!

Now then, would you like a free 1.44Mb PC disk full of packet programs? Just send a suitably sized SAE to Siskin Electronics (PC House, 2 South St., Hythe, Southampton, SO4 6EB. Mark your envelope 'HRT Disk' so they'll know what you want, and you'll soon be play-

ing with PD software such as WINPAK (software for Windows), ROYSCW (a CW trainer), working demos of TURBOLOG, PkGOLD, KaGOLD and the like. Naturally, the offer is limited to one disk per person, but if you send them an A5 sized envelope they'll probably pop a catalogue in for you as well.

Southern 'Meet the SysOps'

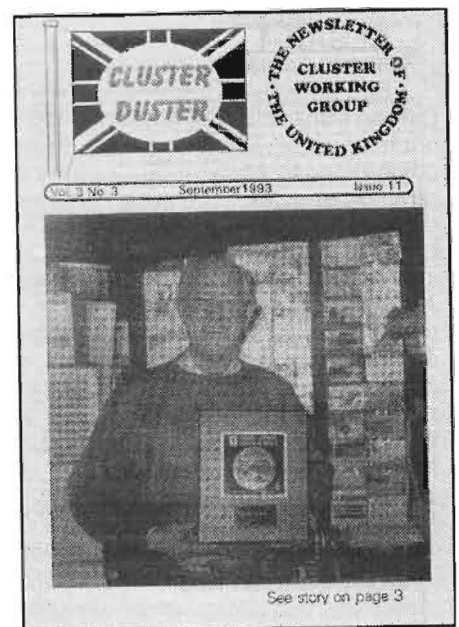
On Saturday, 9th October, the Southern Users Network Packet Group (SUNPAC) held their first 'Meet the SysOps' get-together. Around 70 visitors attended from around the south of the UK, including half a dozen who took a ferry journey from the Isle of Wight for the event. Three 'hands-on' demonstration stations were running, and in the adjoining purpose-designed training room, talks were given on subjects such as 'What Can Packet Do For Me?', 'The DX Cluster System', and 'How to get the best from your TNC'. Public Domain and Shareware software was on hand for distribution, and the free raffle for a pack of the latest commercial OS-2 software was won by an amateur who'd unfortunately left when the draw was made - he wasn't in the callbook and wasn't on packet, which presented the organisers with a slight problem! The group express their thanks to SMC Ltd. for the free provision of their conference venue facilities for the event, which dispensed with the need for the group to make any admission charge for visitors to cover costs.

Their next 'get together' is planned for spring 1994, so if you missed this one watch out here or indeed on the network for details.

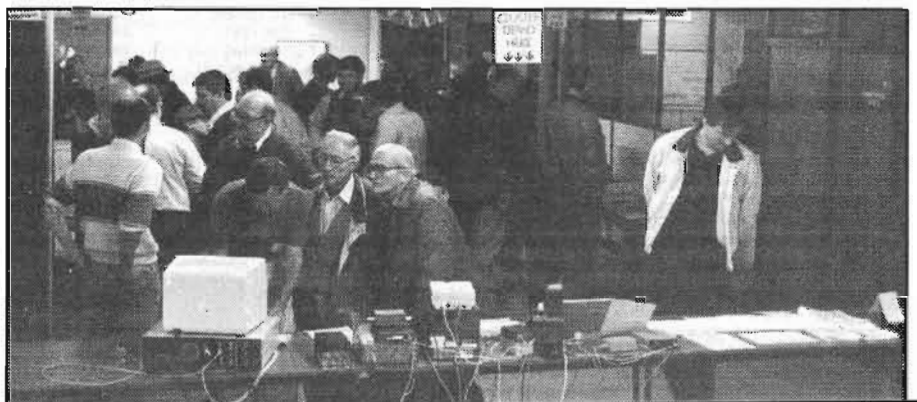
DX Cluster News

The EI DX Cluster system is growing, and links to the UK and thus European systems are well in hand. New cluster GB7BDX has recently appeared in the UK network, with the number of users building up. Regular news on

The 'Cluster Duster' is filled with DX Cluster News



The SUNPAC 'Meet the SysOps' get-together was a great success



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IC240	£125.00;	FT780R	£295.00;
FT290R	£295.00;	TH26E	£199.00;
TH27E	£229.00;	TH77E	£335.00;
DC10	£10.00;	RN Trans 2m/6m	£175.00;
TVHF230C	2m/Hf 9 bands	£195.00.	

these, together with general articles is carried in the quarterly 'Cluster Duster', edited by Maurice G3XKD (15 Glebe Road, Prestbury, Cheltenham, Glos. GL52 3DG, annual subscription £4.00 payable to 'UK Cluster Working Group'). The latest issue carries the usual 'network reports' together with an aerial survey, letters, the 'forgotten' Q codes, and even a page on component modifications to the Pye M202 Olympic for operation on the DX Cluster access frequency of 70.325MHz.



National EI Packet Coordinator Paul Healy EI9GL (left) chats to EI's first DX Cluster SysOp John Barry EI7DNB (photo courtesy IRTS)

From the Network

Dave G0DJA @ GB7WRG has been in touch to say that, following the November 93 *Packet Radio Roundup*, he's tried 6m packet and can hear several nodes, although he thinks his horizontally polarized beam is causing him problems. 6m is often very 'quiet' packet-wise compared with 2m and 70cm, and if you can get over the problems of computer noise on this band then it can be a real 'breath of fresh air' for getting into the network if user-access nodes are available in your region.

Mike VE3WZS in Ontario asks if a Ham Radio Call database and Packet BBS Call and Location database is available. I know of one or two 'Callbooks on CD ROM', but can any reader help with the latter? Mike wants to learn about ham radio in other parts of the globe, if you can help them drop him a message to VE3WZS @ VE3DAX.#SON.ON.CAN.NA Phillip G7DSZ @ GB7ZZZ tells me he's worked over 100 novices on packet and voice, plus a bit of 'LONNY' Packet Dxing! For an old-age pensioner it looks like he's certainly having fun with new technology!

Shaun 2E1BWN @ GB7BHM says

he's having a few problems in the parameter settings on his KPC-3 TNC in 'Term Mode', and asks if there's any good books out there to explain this. The best explanation on this particular TNC is really in the manual, however the best parameter settings are a law unto themselves! I've sent Shaun a copy of Dave G4WPT's lecture notes on 'TNC Parameter Settings', but if any other reader would like a copy of this just either drop me an SAE c/o the HRT Editor and I'll be pleased to oblige.

This year's 'Young Amateur of the Year', Tim G7OTO, is the Sysop of the new GB7IOW Isle of Wight BBS, which is in the proposal stage as I write this. Together with user access on 144.650MHz, this will forward via 70.3125MHz to the GB7IW 4m/2m/70cm/23cm node run by the IoW Packet Group at Chillerton Down. Anyone fancy 'long haul' linking on 4m or 23cm from there? Contact your's truly if you're interested!

CTRL-Z, End of Message

That's it for this month, I hope you find your Christmas stocking filled with plenty of radio goodies, maybe even that new TNC you're after. Until the New Year, 73 from Chris G4HCL @ GB7XJZ.

VHF/UHF Message

Geoff Brown GJ4ICD says "It's time to go fishing as the bands are too quiet!"



Dave OZ3SDL (G3SDL) with his new Head Antenna!

September started off nicely with a good 50MHz Sporadic 'E' opening on the 5th, stations reported were EH6VQ/JM19, EH9IB/IM85, IS0AGY, I8TUS and the 9H beacon. Later in the day EH7's came thundering into the UK, it really is amazing just how many openings we are now seeing on 6m due to more active countries on the band.

John, EI8HZ faxed a short note reporting a weak aurora on the 13th, he called CQ many times only to be answered by Jon OY9JD at 5/3 both ways, mind you it was late, like 0047z! Later that day, Neil G0JHC (Lancs) also reported an aurora in progress, he bagged a few SM's on 50MHz.

Sporadic 'E' Monitor

You may recall the article concerning the Uni-Ohm panoramic display unit a few months ago in this column. Well I really have had a problem trying to locate more of these units, however here's some good news. The UK service/sales agents are Advit Electronics at 30 Baker St., London W1M 2DS, or you may also try the Service Dept. at P. O. Box 9, Benfleet, Essex SS7 5DU, good luck.

50MHz News

Saudi Arabia is now QRV for the next few years. This is within UK reach via multi-hop 'ES', just like Kuwait was during the past two years. The operator to look for during next years ES season

is Alan KD4MAE and he hopes to be using the callsign of 7Z1AB from the US Embassy for around two years.

9M6SMC on 50.014MHz is now complete and left Jersey on the 26th September accompanied by your's truly for SMC Ltd., (c/o G4CVI) for it's onward journey to Malaysia. It's a pity I cannot accompany it to Malaysia!

Things livened up on the 3rd October with the W.A.B. contest. Activity seemed very good with most parts of the UK reporting good internal (UK) DX, large solar noise was also noticed during the morning.

Ela G6HKM wrote with information that she had just upgraded her 50MHz squares with the RSGB. Ela has been awarded #2 certificate for 325 50MHz squares confirmed, she was also awarded #4 certificate for 100 Countries on six metres (the first YL!), well done Ela.

70MHz Jersey DXpedition

I was a little surprised to read in another VHF journal that Colin G6MXL planned to come to Jersey in September, to operate mainly 70MHz from a rare square (IN99). This rare square (which up to now has never been activated on 70MHz) that Colin was going to activate contains a little land on the Southeast of Jersey that is very dangerous because of fast rising tides. However there is a large group of islands called 'Les Ecrehous', which are about five miles off shore to the Northeast of Jersey, that can be accessed by boat and are in the same square. As luck would have it I have a friend who just

happens to have the ideal boat to access these islands, but unfortunately Colin never got in touch with me! So if you're planning anything similar in the future, please contact me so I can make the necessary arrangements.

On 144MHz

The September contest wasn't very enthralling, a few GI's, GM's and EA2 was the best DX I heard. Some years ago there always seemed to be a large high pressure system covering mainland Europe during this contest, not so these days!

G4PIQ reports working more GM's than usual, others heard were ED2RCF/P in IN83, EA1BFZ/P, EA1DVY/P in IN82 and EA2LU/P in IN81. To the East a few HB9's were heard, no doubt perched on the tops of the mountains, but further than that there was just nothing.

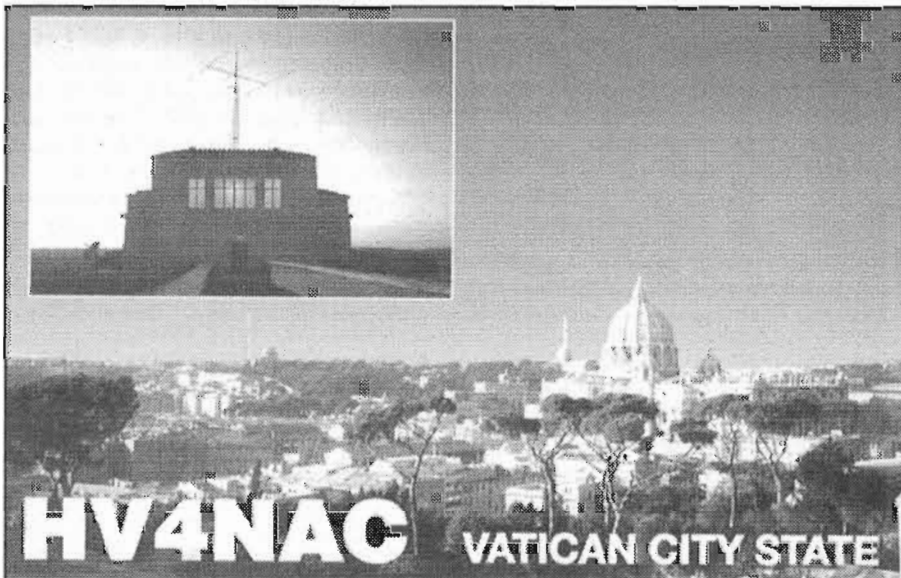
G6HKM reported poor conditions during the contest with only 363 QSOs and no special DX logged. In fact Ela said "My monthly report will fit on a postage stamp".



On 432MHz

The October IARU R1 432MHz and up contest took place on October 2nd/3rd, the usual poor conditions existed as it usually does during these events! Activity seemed low, but DX quality was good in GJ at least, as, PA (JO23) and G6PHJ/P (IO93) were worked on 23cm, others reported on 23cm were

HV4NAC on 50MHz



F6APE (IN97), F1ANH, and F6KEJ (IN97).
On 432MHz things were very quiet.

Fishing For DX?

I just couldn't resist this one. In the October copy of HRT, Don G3XTT featured contests in his *HF Happenings*. If you look very carefully, the call GJ6UW is printed on the certificate, which reminded me of a photograph I recently came across. Yes, it's me fishing for DX, as I was one of the operators during that contest. Black bream on 432 anybody?



Pan-European Reply

Many readers wrote to me reference the article in the recent June HRT called *Pan-European Operating*, readers did think that a few points were rather odd. I, as Chairman of the UKSMG, did send a letter to the Editor explaining that basic 50MHz operation is banned for visitors in other European countries, other than Malta (9H), Norway (LA), Portugal (CT), 4U1TU and HBO, however it looks as though the Editor was short of space as the letter has not been published, so here is a brief resumé.

Most European countries, as far as I am aware, only issue permits to their own residents and therefore do not allow any foreign visitors to operate on 50MHz (visitors still do operate, but illegally!). I know for fact it is not possible, or has it ever been possible, to obtain permits for 50MHz in France. But each year some 'smart Alec' goes and operates /P or mobile only to upset our French counterparts. Furthermore,

the French who have 50MHz permits are not allowed to operate /M or /P, so how come visitors do it?

The moral is don't take 50MHz equipment into countries that you are not permitted to operate it in, and that means over 80%. Your CEPT licence does not cover special permits, and 50MHz just happens to require one, customs officers are not stupid and you may well lose your equipment. By the way, there are no problems for the higher bands apart from Andorra, which now forbids foreign amateurs from operating on the VHF/UHF bands full stop due to previous bad operations. (As the original article said, you must first get written details from the country's licensing authority to find out what you can operate on, before you operate - Ed).

will be the new 'EEC' (European) Metricated 1995 VHF/UHF calendar, with all the new meteor scatter dates, and revised sporadic 'E' predictions, watch this space!

Eric, VK5LP sent his resume of VK happenings just recently, but even they are a little thin on the ground as VK goes into its sporadic 'E' season. One of his final comments I find very amusing is: "The younger generation isn't that bad, it's just that they have more critics than models".

Well, that's another year nearly over, may I on behalf of all at HRT wish you all a Merry Christmas and a healthy and prosperous new year, oh, and a good bit of dx on the VHF/UHF bands next year.

Please send any VHF/UHF reports, photos or news to: Geoff Brown, TV Shop, Belmont Rd., St. Helier, Jersey. C.I. or Phone/Fax 0534 77067 anytime.

Exclusive!

Coming soon in *VHF/UHF Message*

QSL Listing (with thanks to UKSMG)

- CR5CMP - Via CT1DZK. Rua Dalias 4 1, P-2040 Porto, Portugal
- D2EYE - Via OZ1ACB. A. Andersen, Kagsaavej 34, DK-2730 Herlev, Denmark
- EH1YV - Agustin Quintas, PO Box 148, 36200 Vigo, Spain
- EH2BUF - Alvaro Altuna, Box 105, E-20280 Fuenterrabta, Gipuzkoa, Spain
- EH4BG/6 - Via OZ3SDL. D. Court, Egebakken 18, Farum, DK-3520, Denmark
- EH5DY - S. Fernandez, Ave Valencia 38, 03700 Denia, Alicante, Spain
- EH9IB - Pedro Jerez Ruiz, PO Box 213, 29880 Melilla, Spain
- FP4EK - Via K1RH. R.Hirsch, 172 Newton Rd, Woodbridge, CT 06525, USA
- G4VXE/TF * G4ODA/TF * G0JLF/TF - QSL via home calls.
- KG4CB - Via WD9APE. F. Gabry, 23420 W Grand Ave, Lake Zurich, IL 60047
- LX2DX - J. Thibaut, Rue de Messancy 12, L 4962 Clemency, Luxembourg
- OJ0/OH1VR - Seppo Sisatto, Lansirinteenk 23, 33400 Tampere, Finland
- OH0/PA3DWD. Via PA3DWD. L. Hollander, Leane 2, NL-8807 PL Herbayum
- OY3JE - Jan Egholm, Box 3033, FR-110 Torshavn, Faroes, Via Denmark
- RA3VHF - PO BOX 73, 603000 Nizhny Novgorod, Russia
- SP2DDX - R. Palczynski, ul Ogrody 23 m 206, 85-570 Bydgoszcz, Poland
- SP6GWB - S.Ziemczonek, ul Stefana Okrzei 6 m 4, 57-300 Klodzko, Poland
- SP7JSG - C. Stepien, ul Tatrzanska 91-A m 48, 93-279 Lodz, Poland
- SP9SDF - A. Krypczyk, ul Karola, Swierczewskiego 18, 44-223 Knurow
- SV4AAQ - Dimitris Hiotis, Box 1232, GR-38110 Volos, Greece
- SV4AFY - Ekaterini Hiotis, Box 1232 GR-38110 Volos, Greece
- SV5TS - Vasilis Argyris, Box 7, GR-85106 Paradisi, Greece *NEW BOX*
- SV8CS - PO Box 148, 29100 Zakyithos, Greece
- SV8JE - Christos Plessas, G Doriza 3, GR-28100 Argostolion, Greece
- SV8YM - See SV8CS.
- SV8AXZ - See SV8CS.
- SV9ANJ - E. Nerantzulis, Box 1272, GR-71110 Iraklion, Crete, Greece
- SV9ANK - Nikos Vardaxis, Box 1272, GR-71110 Hrakleio, Crete, Greece
- S57CC - Branko Zemljak, Postna 7B, SL - 61360 Vrhnika, Slovenia
- T97M - Via DL8OBC. F. Riess, Postfach 1253, D-3007 Gehrden 1, Germany
- UA2/DK2ZF - R. Niefind, Rademacher Kamp 2, D-2117 Kakensdorf, Germany
- UO5OK - Dimitriy Slyusarenko, Box 300, 270000 Odessa, Ukraine, CIS
- Z31DX - Georgi Andonov, Janko Urdinov, 91480 Gevgelija, Macedonia
- Z32AM - See Z31DX.
- ZB2JI - Via G3VIE. 35 Brookside, Wokingham, Berks RG11 3ST, England
- ZC4DG - Dave Griffith, Uknda RAF Thatcham, Newbury, Berks RG13 4LY, UK
- 4U1ITU - (Aug 93). A. Guerra, Via S.Lorenzo 30, Lanuvio I-00040 Italy
- 9A2OB - Ivan Sarcevic, Porecka 7, 54000 Osijek, Croatia