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LETTERS

Letter of the Month

Since becoming a licensed amateur in July 1983 I have followed the debates on whether Morse code should remain the criterion for the HF licence and the Novice Licence.

Personally, I know from my own experience as a radio operator in the Army, that Morse code is, for about 20-30% of the embryonic radio operators, completely impossible to pass. By that, I mean that some 10% cannot grasp the conversion of letter to symbol, and some 10 to 20%, while able to learn the code, cannot under any circumstances develop their ear to hand coordination to the requirements of the 12 wpm test. All fail on or between 6 to 8 wpm. This in my opinion does not in any way mark them as bad operators, far from it.

What we need is some means of ascertaining genuine lack of coordination and finding an alternative way on to the HF bands.

If we are to believe that standards of operating have dropped as low as some say, then it behoves us to support the implementation of the Novice Licence, if only to insure the reinstatement of higher standards. It is better for amateur radio as a whole to insist that all future amateurs must first pass the Novice Licence.

Ps I am very well aware of the problem of airband reception, particularly in relation to offset frequencies. In my previous industrial career, I had a strict upbringing in product and sales law ("Trade Description Act" etc.) and I try very hard to be responsible in my dealings with customers now that I run my own business.

Occasionally we have had customers report that they "can hear the aircraft but not the ground station"; I have never told anyone that "they must be out of range of the ground station" or any such remark and have been at great pains to explain the offset frequency system and to point out that the general coverage scanners which we sell are not totally compatible with airband standards. I normally suggest that the user can program the offsets. For example: use adjacent memories for the main and the offset.

One thing that should be made clear to users is that they should either buy a dedicated airband receiver like the Signal series, which have the correct IF bandwidth (~30kHz) or they accept this particular limitation on a general coverage set, which has a narrow bandwidth to suit normal landmobile standards.

We are probably the largest scanner dealer in the UK, and I do not recall ever parting bad company with a customer over this airband, issue. It would be interesting to know how many people really feel that they have been mis-led by a dealer.

I think there is a fine line between sets which "cover the airband" and those which are specifically promoted as being "Airband receivers". Presumably you would expect something called an "AIR 7" to fall into the second category, and to perform accordingly. I regard sets like the AOR as a general coverage receiver, and to have airband limitations, in deference to compatibility with landmobile standards.

I am sending a copy of this letter to "HRT" and look forward to a lively discussion.

— Peter Longhurst, Garex Electronics, Tring, Herts.

PS There was an error in the Warlingham frequency: surely not 127.725MHz and Davidstone Moor, 128.600MHz ± 7.5kHz.

Is This Economy?

Your September issue carried a letter of 12 column inches on the need for second hand gear. Sadly, your Readers Ads column, which fulfills this need, did not appear that month.

An editorial footnote to this letter mentioned the 'economy model' transceiver, the 747. For £695 you can purchase the transceiver, but all you can do is look at it unless you also buy a power supply (£195) a microphone (£21) and, say a SRY antenna (£20). The real cost to get on the air is £931. Is this economy?

To add FM, a £40 add on unit plus a larger power supply costing £280 is needed, bringing the total cost to well over £1000. A further £1600 will purchase a linear amplifier, which will quadruple the power output and add 1 "S" point but is this economy?

— G2BAM

One does instinctively expect a transceiver to come with a power supply (unless it is intended for mobile) and a microphone, but I would scarcely expect an antenna and a linear amplifier to be included in the price. The really keen constructor could build a power supply, and could perhaps

We regret that Ham Radio Today cannot reply to queries individually. Every month we publish a section of the most interesting. We will endeavour to answer straightforward questions about the back issues index if readers enclose an SAE and much patience. It helps if letters and back issue enquiries arrive on separate sheets of paper, although the same envelope can be used.

Subject Aired

I am very well aware of the problem of airband reception, particularly in relation to offset frequencies. In my previous industrial career, I had a strict upbringing in product and sales law ("Trade Description Act" etc.) and I try very hard to be responsible in my dealings with customers now that I run my own business.

Occasionally we have had customers report that they "can hear the aircraft but not the ground station"; I have never told anyone that "they must be out of range of the ground station" or any such remark and have been at great pains to explain the offset frequency system and to point out that the general coverage scanners which we sell are not totally compatible with airband standards. I normally suggest that the user can stage prior to taking the RAE, Morse test et al, to ensure (a) that interest is sustained (b) procedures are learned (c) higher standards are maintained (d) those who are slower to learn get the chance to pass on to higher achievements (e) a powerful lobby of dedicated enthusiasts to resist the money grabbers from taking away amateur frequencies for commercial use.

We only have to look at CB to see how ready they are to appropriate bands used by minority groups. 934MHz went that way in 1988 — what next? Whether you agree or disagree with me or the RSGB, we should be willing to stand together as licensed amateurs to resist the stealing of amateur bands to fill the coffers of any government.

— J. D. Bolton G4XPP, Timperley, Cheshire.

I am surprised at the figure of 20-30% unable to learn morse to 12wpm. I imagined myself one of them for the year or so it took me to increase from 5wpm to 12wpm. Let us know if you have spent a lot of time on morse practice with absolutely no result.

As regards the novice license, one justification for it might indeed be to permit the raising of the standard required in the RAE. Any comments?

— G2BAM

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Please mention HRT when replying to advertisements.
make a microphone using an insert costing less than £21, and this is perhaps in the spirit of amateur radio, but it would be better if one were clearly warned if something normally required is not included. Add on extras are fair game though. After all, not everyone wants them. — G3YZW

** Silent Spectrum **

After reading your article on Packet Radio and obtaining a PK88 tnc, I have it up and running on my old 48K Spectrum with the Interface 1, but can’t get the thing to talk to the RS232 port on my 128K Spectrum. The reason I want to use the 128K is that I am using an Epson FX80 printer and a Plus D disk interface, so I cannot use the Interface 1 on this machine. My 48K Spectrum software will not run using the RS232 port built into the 128K Spectrum. There must be a lot of other people who would like to use the 128K Spectrum on packet, but like myself are having difficulties. Could you print my letter in your magazine to find out if anyone has managed to get this up and running? I would welcome any advice. — Paul Sargent G4ONF, Costessey, Norwich. Tel. 0603 747782.

** Q And Take Your Turn **

Ref. your query regarding G4ISB’s point:

*Why?*

Quite apart from the fact that not all of us have the benefit of the RN’s code, the Q code already exists and — more importantly — is internationally known and understood. Thus “QTH” is “location” in any language and, with the rudiments of a foreign language, and the knowledge of its phonetic pronunciation, it is surprising what can be worked.

— J. W. Barker G3WAL, Rugby.

** Defeat Feet **

It is utterly pathetic to read your article in February describing a program for calculating aerial dimensions. We are now in the 20th Century. Why on earth are you still printing feet and inches? The world is becoming increasingly smaller and standardisation is the key to make compatibility feasible. The world has decided to use the metre to describe dimensions — so in future let us see no other feet than the editor’s — please.

— Ragnar Otterstad OZ8RO, Holte, Copenhagen.

20th Century? 20th Century? The metre was invented by Napoleon Bonaparte in the 19th Century to get his own back on the Duke of Wellington. The story goes that the Emperor ordered his astronomers to calculate 1/10,000,000 of the meridian through Paris and devise a scientific system of measurement based on this divinely ordained distance. Unfortunately, this turned out to be almost exactly the distance from the tip of King Alfred the Great’s nose to that of his thumb, which is, of course, the English Yard, or passus, as the Ancient Romans liked to call their version. Napoleon added about three inches to the metre to make it different. This dubious derived measurement has been defined with ever greater precision, but never corrected.

He always gets things wrong who does them in a hurry or a temper or, like Napoleon, both. So put not all your eggs in one bushel. Stand up for new standards, but don’t forget the last lot — they may come in useful. For instance, have you ever tried selling one third of a ten-pack of eggs? Ask the French. Having to calculate in two lots of lengths is nature’s way of paying back the Brits for not learning foreign languages. (Apart from King Alfred, who learned Danish, but flunked cookery.)

Now, we must drop off our perch and foot a few furlongs to pick up a peck of pickled peppers.

** £10 FOR THE LETTER OF THE MONTH **

You’ve got a gripe about the bandplans, or you’re sick of being wiped out by next door’s microwave. Or maybe you’ve been bowled over by the excellent service from your local radio shop. Whatever you’ve got to say about amateur radio say it here in the letters column and you could win yourself £10 for writing the letter of the month.

Send your epistles to: Letters Column, Ham Radio Today, ASP Ltd, 1 Golden Square, London W1R 3AB.

** Bought And Old **

Finally, a reply to Alan Gibson G1EUU. October?? Good grief — how did that get in there? We are going to start setting the Free Reader Ads in a smaller size to combat the tendency to fall behind with them. We can’t just chuck out the ones that look superannuated, because some people send ads on old forms — they don’t want to cut up current issues. It might help if advertisers were to put a date alongside their addresses.
**Radio Frequency Allocations**

HMSO (price £2.50).

The DTI Radio Communications Chart — has been prepared by called the United Kingdom bands allocated to commercial and industrial uses in the UK — showing all the radio frequency needing comfort, you're toughener than me. Fists has set up an index of morse operators who can be contacted by pre-first-timers and other novices and who will give them a bit of help, advice and coaching to see them through that first chilly dip. The list has over 50 names on it, and is free on receipt of an SAE to G3ZQS, Fists CW Club, 119 Cemetery Road, Darwen, Lancs BB3 2LZ.

**Bands in Colour**

A colour-coded chart showing all the radio frequency bands allocated to commercial and industrial uses in the UK — called the United Kingdom Radio Frequency Allocations Chart — has been prepared by the DTI Radio Communications Division and published by HMSO (price £2.50).

**Radio TODAY MAY 1989**

**Dipole for HF Pair**

Waters and Stanton are marketing a pair of choke traps which allow construction of a loaded two band dipole in a small space. Instructions are included for a two-band dipole 80 feet long (around 60 feet if the ends are dropped vertically) for 80 and 40 metres. Half size G5RV users can use the traps to add 80 metres to the existing aerial with only a small increase in size.

The traps are sold as a pair with instructions, rated to 500W min, for £16.95 plus £1.50 post and packing. Ask for the appropriate instructions if stretching the G5RV.

Waters and Stanton, 18-20 Main Road, Hockley, Essex SS5 4QS. Tel. 0702 206835.

**CW Club Answers Newcomers' Maydays**

Fist CW Club is making a kind and generous offer to "all those nervous brass-pounders who stand shivering on the edge of the pool, dipping a tentative toe into the water." — and if that description doesn't make you feel chilled through and needing comfort, you're tougher than me. Fists has set up an index of morse operators who can be contacted by pre-first-timers and other novices and who will give them a bit of help, advice and coaching to see them through that first chilly dip. The list has over 50 names on it, and is free on receipt of an SAE to G3ZQS, Fists CW Club, 119 Cemetery Road, Darwen, Lancs BB3 2LZ.

**Frequencies from 1 kHz to 60 GHz are divided on the chart into primary and secondary uses. The main uses shown are broadcasting, fixed services, amateur, meteorological, radio location, navigation, astronomy, space and the maritime, aeronautical and satellite bands. Call 01 215 4751 for more information.**

**France: VHF News Wanted**

News from France: Pierre Redon FCIADT operating from near Bordeaux in France is looking for a very experienced VHF/UHF operator to exchange information on the bands between the UK and France.

The French REF is moving to new premises in Tours and the QSL bureau is expected to be much faster following the move. There is also to be a bureau of 18 correspondents representing the areas of France to speed up the exchange of VHF information.

The bureau, active on 1296, 432, 2320 and 144, ssb and cw, make it their business among other things to activate rare squares in France. But, says British contact Clyde Hinton GITCH, they and their Spanish counterparts feel "isolated from VHF developments in Northern Europe". There will be a meeting between EA and F at St. Sebastian from April 30 to May 1 to discuss activities.

In June '89 EA2AWD/MM should be in the Gulf of Gascony (IN74-84-85) on 23 and 70cm. In 1990 a DXpedition is going to work Portugal 1N61 and Spain IN93-83-73-63-53-52, which contacts should reach G. The French want to hear the opinions of UK operators on the likelihood of contact between EA and G.

Pierre says that the ultimate aim is to form an "International Team" of active VHF/UHF expeditioners.

Pierre's address is Casseuil 33190, La Reole, France. He would like people to get in touch with him directly. Alternatively, Clyde Hinton GITCH, c/o 17 The Dewpond, Peacehaven, E. Sussex BN10 8EE has more directly.

**Marconi Day**

The Cornwall Amateur Radio Club is holding its worldwide International Marconi Day for 1989 on Saturday April 22, following the success of the 1988 event.

Stations with Marconi connections working this year include KIVV/IMD Cape Cod, VE1IMD Nova Scotia, VO1IMD St. Johns, Newfoundland, EIIIMD Ireland, IY4FGM Marconi Club Station, Italy, GNO1IMD Isle of Wight, G841IMD Poldhu Cove, Cornwall.

**At Last, A Good Reason To Go To Watford**

Good news: another trader shopfront. Andrews Computer Services' packet radio and computer shop, the first of its kind in the UK, opened in early February at 35A Chalk Hill, Watford, Herts, just under Bushy Arches near to Bushy BR station, the A41, M1 and M25. (Tel. 0923 229222, Fax 0923 242101).

MD Paul Andrews G6MNJ says that visitors are welcome for a chat or demonstration, 9am-5.30pm Monday to Saturday, and there is a live packet station running for the demonstration of TNCs. ACS also stocks computers, printers and peripherals, as well as a wide range of public domain amateur radio software.
Handbook Awards

The World Radio TV Handbook, a long-established source of radio receiving and software information, has branched out further by establishing a new annual award scheme. Details of the scheme are in the WRTH 1989, mostly in the December issue. Continuous updates can also be obtained from the WRTH’s quarterly Downlink bulletin, available by separate subscription.

Here is a summary of the results of the 1989 WRTH industry awards: Best Communications Receiver, the Kenwood R-5000. "In the semi-professional receiver group, this set is clearly a winner. It combines all the functions needed for effortless listening with good quality audio. Best Portable Receiver: Sony ICF-7601. "The analogue portable offers crisp reception, good performance for the price, and is ready for shortwave broadcast band expansions taking place this year. We feel that there are not enough budget analogue portables with good performance, hence the choice of this receiver." Most Innovative Software: Shortwave Navigator. "This is a Macintosh program developed by Jim Frimmel. It is a computer card index which gives access to the schedules of many international broadcasters and programmes. His idea of recording some of the sound heard on air into a computer program deserves recognition. This approach dispels the "old fashioned wireless" image that some members of the public still hold about international broadcasting." Best Computer Accessory: Shortwave Database. "Tom Sunstrom of New Jersey deserves credit for his active promotion of the international radio listening field. His database of monitored schedules, and the Pinelads bulletin board confirm his dedication to the medium."

Nominations from readers for next year’s awards are now being invited. These awards are not restricted to any country or language. Formal presentation of this year’s awards takes place during International Radio Days in Berlin (May 26-28 1989) for the best receivers, and the Association of North American Radio Clubs convention in Florida on 20-23 July 1989 for the computer software awards.

The WRTH is published by Billboard Publications Inc., 1515 Broadway, New York NY 10026, USA. The editorial offices are at PO Box 50558, 1007 DB Amsterdam, The Netherlands.

Russian To Join

The Club of Friendship between radio amateurs of the USSR and UK, "open to all UK radio enthusiasts (licensed or not) who are interested in the language and culture of the Russian people and who would like to further their interest by direct radio, correspondence or personal contacts", has been launched by operators in the two territories.

Proposed by Andy UA3PI and founded by Ken Norval G3JFN and Serge Chikutov UZ3AYT with fellow enthusiasts, the club is now ready to publish a regular newsletter and provide lists of correspondents in the USSR who are seeking friends in the UK.

Membership is £3 a year, and further information can be had by sending an SAE to Ken Norvall G3JFN, 24 Ryedene, Vange, Basildon, Essex. Thanks to PRO Ken Strellis G3JDJ for the information.

Package Radio

Technical Software now have a multimode receive system for the BBC computer. The RX-8 system offers auto fix with saving and tuning, VHF and HF packet operation with auto fine tune, SSTV, including colour display of line sequential and robot signals, save and printout, RTTY "virtually any station using Baudot", morse with auto speed tracking and speed lock, AMTOR/SITOR including NAVTEX receive, UoSAT 1 and 2 receive, and ASCII.

The hardware has four-pole filtering and is isolated for low noise. The software lives in a 16K eprom, and full instructions are provided for installing the eprom. Ease of use and wide compatibility have been a priority, according to Technical, and all modes except SSTV can be printed/printed by computer. SSTV can be dumped to printer.

The full package including interface, eprom, manual, all connecting leads and demo cassette costs £269; existing RX-4 users can return the demo for a £15 discount.

A detailed list of the system's capabilities is available from Technical Software at From, Upper Llanrhydd, Caernarfon, GWynedd LL54 7RF, Tel. 0286 881886.

New Sussex Repeater

A new 70cm repeater, BG3HY, is scheduled at time of writing to open on channel RBS in the mid-Sussex area, filling the 70cm gap between Crawley and Brighton, Horsham and Lewes.

The local repeater group would like to encourage amateurs both to use the repeater, and to send reports and (whether you are a regular user or not) comments to Mr. Gordon King, G3XTH, 73 Grand Avenue, Hassocks, W. Sussex.

5 Watts for Morse

Tony Smith of the European CW Association writes to say that the G-QRP Club has announced a rise in power levels for awards to 5W RF output from the beginning of the year. This, of course, affects the EUCW/G-QRP CW Novice Award.

More information, send an SAE to Tony Smith G4PAI, 1 Tash Place, London N11 1PA, England.

Just In Case

West Hyde Developments' latest offering is an easy-access 19 inch instrument case system, Series C75.

All the cases are extruded with steel panels and no external screws. Panels are easily removable for maintenance. The 3U cases have optional carry handles. For more information, contact West Hyde, 9-10 Park Street Industrial Estate, Aylesbury, Bucks HP20 1ET. Tel. 0296 20441.
Angelika GOCCI would like to point out that the news item on CEPT in HRT was in fact by Nigel G4IJE.

College Knowledge?
The former Wireless College in Colwyn Bay threatens to go increasingly QSB into the rising QRM of history.

GW4ZWG is asking readers, and ex-staff and ex-students of the College, to key into recall mode and spare the time to drop him a line with any details about the College.

“Everything would be grist to the mill for this research project,” says Alan, GW4ZWG.

He is looking for historical, descriptive, illustrative, anecdotal and nostalgic material, and would be delighted to hear from anyone with facts and figures, pictures, recollections and reminiscences.

Apparently the Wireless College, overlooking the sea which played so prominent a role in the lives of many graduates, displayed an amateur callsign — a ‘2 plus two’ GW4ZWG believes — and boasted its own theatre.

“All assistance given will be acknowledged and indefatigably followed up,” promises GW4ZWG, who is QTHR.

Knobs
Bulgin’s range of Multi knobs and twiddles has been expanded and now offers four basic colours, push- or collet-fittings, wing, arrow and low-profile options, caps in a wide variety of shapes and colours, and accessories including dials, stators and nut covers. DIL and MIL standard fittings, temperature stability from —20°C to +70°C. A full catalogue is available from A. F. Bulgin & Co., Bypass Road, Barking, Essex IG11 0AZ.

Yo Ho — You’re Nicked
Do you ever wonder what the Radio Investigation Service of the DTI gets up to when they aren’t investigating sources of interference? They are busing pirate radios, an activity which has become an official priority following the burgeoning of unlicensed music stations and complaints from industry and the emergency services.

The RIS clocked up 444 raids and over 100 prosecutions in 1988, an increase of 50 per cent over 1987.

The prosecutions are being backed up with a 5-year ban on application for one of the coveted community radio licenses on anyone with a piracy conviction, on top of a £200 fine and up to three months in prison. Wider powers against pirates and their suppliers are being sought.

Kanga’s Cat Leaps Out
The new catalogue from Kanga Products includes a transmitter to match their dual band receiver, a morse code practice oscillator, and a T/R central board.

An innovation is the supply of bare PCBs with instructions for people who wish to use their own components. They also have a newly modified phone number: 0303 276171.

CQ and Destroyer
Members of the Royal Naval Amateur Radio Society have formed an HMS Plymouth Group to operate from the Falklands veteran Type 12 frigate HMS Plymouth of that ilk. HMS Plymouth, saved from its likely fate as a missile target by the Warship Preservation Society and volunteers, will be open to the public (there is an admission charge) from March 29 to October.

The intention is to set up a replica W/T office and carry on contacting on the usual HF and VHF bands. The group hopes to re-obtain the old Devonport signal letters, giving the callsign GB3GUZ.

RNARS members can join the Group for £2 sent to the Treasurer or Secretary, Mr. Chris and Mrs. Bobby Harper, 24 Cunningham Road, Tamerton Foliot, Plymouth, Devon PL5 4PS.

Not Just Any Old Iron
Antex Electronics, well known for their soldering irons to suit all shacks, have produced a colour brochure which introduces the company, describes its selection of irons, soldering stations, bits and accessorises, and covers a number of topics of interest, including the benefits of temperature controlled soldering and safety. Available from Antex at 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE. Tel. 0822 613565.

Highland Fling
The Scottish Tourist Board (Radio Amateur) Group continues its year’s events with station GB2DWR at the Blair Athol Distillery, Pitlochry, Perthshire on 29/30 April, and GB2RB at the Burns House Museum, Mauchline, Ayrshire on May 27/28. SWLs welcome, two awards available. Contact John “Paddy” McGill GM3MTH, PO Box 59, Hamilton, Scotland ML3 6QB or QTHR with an SAE for further information.
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6 TUTOR.
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Garex are proud to announce that they have been appointed sole UK dealer for this incredible new Timestep product. Following on from Timestep's phenomenal success in the education market a special low cost Atari ST version of their terrestrial system is now available. Simply plug in your existing receiver to view amazing pictures. For the ultimate, add a Meteosat receiver for unbelievably smooth 15 frame animation that is completely automated once set up. Just watch the clouds roll by! New pictures are added twice an hour if required, the oldest being discarded automatically. This sophisticated package will run on any Atari ST-1040 and compatible colour monitor, comes complete with all software and
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£249.95
For those who would like a one-stop-shop, we offer the complete package of a ready-to-run system: Meteosat dish and receiver, Atari interface unit,
grey scale adaptor, 14pin colour monitor, Atari ST-1040 computer, software
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AND, OF COURSE, ALL PLUGS AND CABLES. On your doorstep £1,695.00

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The basic MICROWAVE METEOSAT system, no complications, a
complete plug in and go package requires no computer, no software, and can be up and running, including dish alignment within ten minutes. Nothing more to buy, just plug, dish, microwave receiver, frame store, 12in bw
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137MHz VHF SATELLITE ACCESSORIES
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SAE for full details and prices of other 'separates'

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The celebrated Timothy Edwards designs now owned and manufactured by
Garex:
- A simple but versatile design capable of covering spot frequencies
- In the range 25-200MHz
- Excellent sensitivity (typically 0.4µV for 12dB SINAD)
- Double superhet (10.7MHz and 455kHz IFs)
- Choice of IF bandwidths from "W-SAT" to "12kHz" FM standards.
- The basic receiver is single channel crystal controlled.
- Multichannel option.
- 2 watt audio output stage having a low quiescent current.
- Size: 153x33x13mm
- Requires 10–14V DC supply.

PRICES:
Stock Versions: (fully assembled), aligned and tested boards) 6m, 4m, 2m and Weather Sat: £49.95
Complete cased version and special options: details and prices on request.

Crystals can be supplied if required; most popular 2-metre
frequencies and the currently active weather satellites are readily
available. Crystal prices on request.

- Main power supply module: £15.50

GAREX VHF PREAMPLIFIERS
- Compactly designed: size: 34x9x15cm
- Up to 26dB gain
- Can be made for any frequency in the range 40–200MHz
- 2dB bandwidth ±3MHz (at 15MHz
- Uses BF981 (0.7dB NF at 200MHz)
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- 1dB compression: +10dBm
- Saturated output: +15dBm
- Supply voltage 8–17v DC at 5–10mA

Stock Versions: (fully assembled, aligned and tested boards) 6m, 4m, 2m and Weather Sat:

- £11.45
- Other versions: prices and details on request.

- HIGH PERFORMANCE 2 METRE PRE–AMPLIFIER
- 3 Band–pass stages for improved selectivity
- 26dB gain with 15dB NF
- Switches 35 watts
- RF switched (fail-safe action): gas–filled relays

Assembled, tested pcb £42.50
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Since many amateurs don't wish their car to look like a 'mobile porcupine', more and more amateurs are becoming interested in less conspicuous mobile aerials for 2m and 70cm. Due to the ever increasing performance of mobile transceivers, with better receiver sensitivity and higher transmit power, the need for monster aerials such as ⅓ wave 2m whips has decreased. The aerial is a very important part of the overall system, but unfortunately town planners do not take this into account with multi-storey car parks and the like! A long, shiny aerial may also attract the less desirable elements of our population when left on a car, with resultant damage to aerial, car, and possibly the loss of a valuable mobile transceiver.

Car manufacturers are responding; my own Ford Escort uses the rear windscreen heater element in combination with a preamp for broadcast radio reception, and I have for many years been working in an attempt to reduce the visual aspect of my amateur aerials (veteran readers may refer to HRT Jan 85 for examples).

**Dual Band Aerials**

By using one of the many dual band aerials with a suitable diplexer, the amateur active on both 2m and 70cm may gain reasonable performance with a single whip. If the aerial is mounted on the car roof rather than on a rear wing, an improvement in performance may often be gained in comparison to a wing mounted ⅓ wave whip while keeping the same overall maximum aerial height. The still, short versions of mobile whip keep the radiation at the horizon, where it is normally needed, rather than a long whip bending back at speed with the resultant ERP going either up into the sky or into the ground!

**Create car class — use an aerial that hardly anyone will notice, recommends Chris Lorek**

**Performance**

The aerial model number is the Comet CHL-21J, I used it for over a year operating into my local and, so local repeaters. Readers of my past equipment reviews will note that I have often referred to its use, regular QSOs through 50km distant repeaters on 70cm were normal practice. When gutter mounted and compared to my previous 1m long dual-band whip mounted on the rear wing, I found the average performance on 70cm to be very similar indeed, but with a slight loss in the order of a couple of dB on 2m. This I felt I could tolerate due to the advantage of its tiny size, and it became virtually a permanent fixture. A very large number of amateurs have since asked me about it, and several more are now in use.

**Miniature Dual Banders**

At the 1987 Leicester show, I saw a tiny 'Comet' dual band whip offered for sale on one of the exhibitor's stands. Measuring 29.5cm in length (the whip portion in fact was only 23cm long, the PL259 base taking up the remainder) I initially thought it was either a joke or would be very inefficient. Nevertheless, I surprised the HRT editor by digging into my wallet for one, for curiosity's sake if nothing else. On leaving the exhibition that evening with the editor in the passenger seat, heading to the hotel for the usual late night chin-wags with the traders, I replaced my usual dual-band aerial with the tiny Comet affair, and we were both astounded to find it performed very well indeed. "This calls for a write-up" he said, and eventually after much reminding, here it is!

**Less Conspicuous, Greater Gain**

The accompanying photograph shows the aerial in use, but I thought...
that the small coil in the middle made it look a little more conspicuous than I would have liked. Following this, I found that the same manufacturer made a slightly longer dual bander but without any coil, the CHL-23J with an overall length of 44.5cm. This has a built-in capacitor at its mid-point, providing a more slender appearance, the whole arrangement being just shorter than a 2m ¼ wave whip. A loan of a CHL-23J for a few days was quickly arranged, just to see how it performed!

The technical specification of this claimed 2.15dBi gain on 2m, and 3.8dBi on 70cm which seemed reasonable, both figures being 1½-2dB greater than the CHL-21J. In use, this difference was just noticeable when driving around my usual routes, although in practice I feel I would have noticed very little change if I were not performing a critical comparison.

Due to multi-path propagation effects and the individual effects of aerial location on the car, I felt any ERP measurements in a static environment would be subject to inaccuracies, but for the interest of readers I took a plot of the SWR and presented impedance of the whips, when mounted on the ‘Comet’ hatchback mount fitted to the rear of my car. For this I used a network analyser with the connecting coax length normalised out, hence effectively measuring the aerial rather than the coax loss and phase effect.

From these we see that the SWR as supplied was perfectly adequate in all cases, each square indicating an increase of 1 in SWR, and markers 1, 2, and 3 representing the bottom, middle, and top of the 2m and 70cm bands. I found a worse match was presented when using my previous gutter mount, the aerial being resonant on VHF at a higher frequency. I couldn’t re-adjust the resonant frequency of the whips by more than a few MHz by altering their length. Even so, the on-air performance was very good, and surprised many an amateur!

**On-Glass Aerials**

These have been used by cellular phone users for several years, but few amateurs have ever considered their use for amateur frequencies. The aerials operate on a given frequency range by using two plates fixed on opposite surfaces of a glass windscreen as a ‘capacitor’, a small coax connection box on the inside having a tuning network to normalise out the effect of this capacitance and provide a good 50ohm resistive match.

Recently, commercial versions have started to appear for PMR bands on VHF and UHF, and I managed to ‘twist the arm’ of a UK aerial manufacturer to supply one for evaluation on 2m. The aerial acts as a quarter wave, the actual length being around 4cm longer than my standard PL-259 mounted quarter wave due to the differing impedance presented. The finish is entirely matt black, the completed fitment on the top of the rear windscreen on my black car being very inconspicuous indeed, in fact people often have to look twice before noticing any aerial has been
fitted. The whip portion is screwed into place, and may be quickly removed with a twist of the hand for car washes and the like.

The whip took me less than 5 minutes to fit, following which a small capacitor in the inner box needed to be adjusted to provide the best SWR. This took me just a few minutes to perform, with a resultant SWR of less than 1.3:1. To check whether any adverse performance resulted, I drove around for some time using it together with my gutter mounted quarter wave, both aerials fed to a coax switch for a rapid comparison on the move. In use, I noticed no difference whatsoever, certainly less than 1dB. A 'static' test would of course provide inaccurate results in ERP again due to multipath effects and the like, because of the different mounting position, but I again took an SWR and impedance plot which confirmed an excellent match over the 2m band.

Conclusions
The 2m on-glass aerial is now permanently fitted to my car, although not available on the general amateur market at the time of writing. I feel it is only a matter of a few months before these types appear for 2m and 70cm through the usual retailers. The cost of the aerial is similar to that of a gutter or mag-mounted ¾th whip plus mount and connecting coax, rather than the high prices often banded about for professional products such as this. As such, I feel it is only a matter of time until amateurs realise the advantages, especially drivers of leased vehicles or those who wish to sell their cars in the future in "as new" condition, as the aerial is very easily removed without leaving a trace. My amateur friend G4P0K/M quickly relieved me of the small Comet aerial for use on his car in place of his ¾th whip!!

For amateurs who prefer to change aerials around, or who already have a PL259 type mount but would prefer a less conspicuous aerial, the tiny dual-banders have much to offer. Their short length enables their fitment on a higher part of the car such as a hatchback lid, and they may of course be easily unscrewed and removed when leaving the car, the smaller version can even fit into an inner pocket. I have never been troubled with attempted theft from my car since I have not advertised the fact of valuable radios being housed within. This unfortunately was not the case several years ago when my previous car with multiple aerials was a regular target. Luckily, due to anti-theft precautions I never lost any radios and two offenders were even caught and locked away by the police (QRZ 2m FM ... this is Cambridge Panda 276 calling G4HCL/M ... yes it happened), but that's another story...!

Long Comet (CHL-23J7) — hatchback RS-17 mount.

Short Comet (CHL-21J) — hatchback RS-17 mount.

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Large numbers of redundant Pye Westminster PMR transceivers have appeared on the surplus market. Many, suitably modified, have been between a standard Westminster and an export model, which I owned, already on 51MHz, I was able to make a list of the necessary modifications.

John Whetstone G40UB converts the PYE Westminster PMR for 51MHz FM

tweaked for the 70MHz band. It is possible to modify this model to operate in the FM 51MHz section of the 6-metre band, helping to promote much needed F3E activity there.

Since the time when a large number of surplus Low Band Pye Westminster PMR transceivers started to appear, a fellow amateur, G1DNZ, asked me if it was possible to convert one of these to the 51MHz band. He, like many others was keen to use FM on the six metre band, recognising the potential of the band to take some of the weight off 2 metres. After a lot of thought and checking the various differences that would be required to the standard 68MHz model. Basically, these are as follows.

In the receiver section I left the receiver multiplier as a times two device and ran the local oscillator at 10.7MHz above the receive frequency. No modification would be needed to the local oscillator board, so that the only board in the receiver section to need modification was the rf amplifier mixer board.

The transmitter multiplier board as it stands is × 24. This would have to be modified to × 12 and the PA and harmonic filter appropriately modified.

Receiver front-end

Locate L1, lift off the screening can and note there are two capacitors across this coil, one a 47pF and the other a 12pF. Remove the 12pF and put in its place a 39pF. Next, locate L3, lift off the screening can and note a 1000pF capacitor (1n) and an 8.2pF capacitor. Remove the 8.2pF capacitor and fit in its place a 22pF capacitor. Then, locate T1, lift off the screening can, note a 1000pF capacitor (1n) and a 10pF capacitor. Remove the 10pF capacitor and put a 22pF capacitor in its place. Locate L4, lift off the screening can and note a 100pF capacitor and an 8.2pF capacitor. Remove the 8.2pF capacitor and put a 22pF capacitor in its place. Next, locate T2, lift off the screening can and note a 1n capacitor and a 10pF capacitor. Remove the 10pF capacitor and replace with a 22pF capacitor. See Fig.1 for layout.

Finally, replace all the screening cans. This completes the modification to the rf amplifier and first

Fig.1 The circuit and layout of the receiver front end.

Warning: When replacing any one of these transistors, the appropriate source resistor must be selected to produce a source current. TR3 (R5) and TR8 (R9) 2 to 3 mA TR6 (R14)

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Ham Radio Today May 1989
Transmitter modulator driver

Remove the transmitter modulator driver (Fig.2) board completely. It is most important that all the coils are numbered L1-L12 on the formers, to remind the experimenter which goes where. Take C2 and C9 out completely. It is most important that all the coils are numbered L1-L12 on the formers, to remind the experimenter which goes where. Take C2 and C9 out completely. If a grid dip oscillator is available tune L1 and L2 to approximately 4.3MHz. Note that L3 has two capacitors on it (150pF and 120pF); take 120pF off leaving the 150pF capacitor on, but, if a GDO is available, peak it at about 8.6MHz. Remove L4 and note it has two capacitors on it (150pF and 120pF); take the 120pF capacitor out leaving the 150pF capacitor on. (Sometimes one of these capacitors is mounted on the underside of the board.) Put this coil in place of L6, remove L5 and put this coil in place of L7, removing the resistor R32 from the coil (L5); also take the 39pF capacitor off the coil and replace it with a 22pF capacitor. Put strap in to link the missing stages. This will link C13 to L4 which is in its new position (see Fig.3).

Take the old L6 coil and put this in place of L8, altering the capacitor from 39pF to 22pF at the same time. Then put the coil that was in L7 in place of L9, changing the capacitor on L7 at the same time from 47pF to 27pF.

Remove L10 and fit the coil that was L8 into L10 position and change the capacitor on it from 47pF to 27pF. Discard the original L9 and L10 (these will not be needed). On L11 leave the 2.7k resistor in place but change the capacitor value to 56pF. On L12 take the coil out, discard the capacitor and fit a 56pF to the coil; replace the coil.

Now replace the thin feeder cable which goes from the output of the board, (pin 3 and pin 4) with a longer piece of RG174 feeder cable. This new cable must be long enough to reach board 2 of the power amplifier unit instead of board 1. Now replace the modulator drive board in position, and re-connect all cables.

The PA board

The PA board is made up of four separate boards on one heatsink. Disconnect the wire strap which goes from the first PA board to the second one (pin 2 to pin 1). This will completely isolate the first board (which we do not need in this version). Discard the old RG174 feeder cable. Connect the now longer cable to the second board of the PA unit, pin 3 for the braid, pin 1 for the centre conductor. Next, remove board 2 from the heatsink after first unsoldering the transistor base (Q2) plus resistor and choke from the board. Add a 100pF silver mica capacitor to the underside of each trimmer capacitor, put back the board and solder back the components, and then squeeze the four-turn coil to bring the turns nearer together. Next, remove board 3 and add a 100pF capacitor beneath each trimmer. Then put back the board and solder back and components. Next, remove board 4, remove coil L10 from the board and wind another one of a similar diameter but with enamel wire (18 standard wire gauge), so that the

Components for modification to 51MHz

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Value</th>
<th>Type of component</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>100pF</td>
<td>Silver mica (350V)</td>
</tr>
<tr>
<td>3</td>
<td>68pF</td>
<td>Silver mica (350V)</td>
</tr>
<tr>
<td>6</td>
<td>22pF</td>
<td>Ceramic or silver mica</td>
</tr>
<tr>
<td>2</td>
<td>56pF</td>
<td>Ceramic or silver mica</td>
</tr>
<tr>
<td>2*</td>
<td>27pF</td>
<td>Ceramic or silver mica</td>
</tr>
<tr>
<td>1*</td>
<td>39pF</td>
<td>Ceramic or silver mica</td>
</tr>
<tr>
<td>Reel</td>
<td>18SWG</td>
<td>Enamelled copper wire</td>
</tr>
</tbody>
</table>

*Not needed if old components are used
Fig. 3 Coil and test point positions before and after conversion.

turns do NOT short to each other. This coil should have six turns on it rather than four. Now solder it in position; reposition the board and then solder back the components.

To remove board 4 you may have to take out the complete PA assembly, because the power standoff holding down one corner of board 4 is secured by a nut underneath. The PA assembly is removed by unscrewing the four pillar supports, one on each corner.

This completes the PA modification.

Harmonic filter

Take out the harmonic filter (Fig. 5) (four screws) and remove the coax cable from each of the filters.

Now remove all the coils and all the capacitors. Using 18 swg enamelled wire wind the coils (see Fig. 5) on a ¾ in drill bit. As with the old harmonic filter there will be three double coils. Each leg of these three coils will have 7.5 turns closely wound on it. When the three double coils are mounted on the board, solder a 68pF capacitor to the middle of each double coil, taking the other end of the capacitor to earth. Now screw the board back in and solder the coaxial cable back on.

This completes the 51MHz modifications to the transceiver.

Receiver Alignment

Fit the crystals to the transceiver and locate the receiver local oscillator multiplier board (Fig. 6). This is a fairly small board with three coils on it. Put the test meter on the 2.5 volt range and then put the negative lead of the meter on a negative supply point. Put the positive lead of the meter on test point 1 on the multiplier board (Fig. 6). Tune L1 for maximum. Remaining on test point 1, tune L3 for a minimum dip. Now move the positive lead of the meter to test point 2 and tune L4 for maximum. Remaining on test point 2, tune L1 for maximum and then L3 for maximum. Finally, tune L1 for maximum. This completes the alignment of the × 2 local oscillator multiplier board. See Table 1 for a list of crystal frequencies.

Next, locate test point 1 on the 455kHz IF board and feed a signal source into the receiver; tune L1, L3, T1, L4, T2 and L6 on the RF board for
maximum signal reading on the meter, taking care to keep the signal source fairly weak. This completes the alignment of the receiver.

If a 10.7 or 455kHz IF generator is available use it as follows: transfer the positive lead of the meter to test point 3 on the 455kHz board to locate the discriminator coil (in the largest screen can on the board), and with a reasonable noise-quietened signal from the IF generator, tune the discriminator coil for OV. Now the discriminator is balanced and should almost eliminate ignition interference.

**Multiplier Board**

Connect a SWR power meter and dummy load on to the transmitter antenna socket. Put the meter on the 10 volt range with negative lead on a negative point. Put the positive lead on test point 1 (Fig. 3). Key transmitter and at once note the voltage on test point 1 before any tuning has been done. Tune L1 and L2 in sequence for maximum reading. Staying on test point 1, tune L3 for a dip in the reading. Next transfer test lead to test point 3 (test point 2 is not used) and change meter range to 2.5 volts. Tune L4 for maximum reading and then L3 for maximum reading. Remaining on test point 3 tune L5 for minimum. Transfer test lead to test point 4 and tune L6 for maximum, and then turn L5 and L6 in sequence for maximum reading. Next, keeping on test point 4 tune L7 for minimum. Now, transfer test lead to test point 5 and tune L8 for maximum. Then tune L7 and L8 in sequence for maximum, now tune L11 for a dip on test point 5. Move test lead to test point 2 of the PA board and tune L12 for maximum, then L11 and L12 in sequence for maximum reading.

**Table 1**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Spec. of Xtal</th>
<th>Frequency of Xtal</th>
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<tbody>
<tr>
<td>51.41TX</td>
<td>T18</td>
<td>4.281667 MHz</td>
</tr>
<tr>
<td>51.41RX</td>
<td>T29C</td>
<td>31.055 MHz</td>
</tr>
<tr>
<td>51.43TX</td>
<td>T18</td>
<td>4.2858333 MHz</td>
</tr>
<tr>
<td>51.43RX</td>
<td>T29C</td>
<td>31.065 MHz</td>
</tr>
<tr>
<td>51.45TX</td>
<td>T18</td>
<td>4.2875 MHz</td>
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<tr>
<td>51.45RX</td>
<td>T29C</td>
<td>31.075 MHz</td>
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<td>T18</td>
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<td>T29C</td>
<td>31.085 MHz</td>
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<td>T18</td>
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</tr>
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<td>*T18</td>
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<tr>
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<tr>
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<tr>
<td>51.59RX</td>
<td>T29C</td>
<td>31.145 MHz</td>
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</table>

*Calling frequency
sequence for maximum. Now move the meter lead back to test point 5 of the multiplier board and re-peak L7 and L8. Now put test lead back on test point 2 of the PA board and re-peak L11 and L12. This completes the tuning up of the transmitter multiplier board.

**PA Board**

Capacitors C1 and C2 are not used, so connect the negative lead of the meter to a suitable negative point, and the positive lead of the meter on to test point 2 of the PA. Press to transmit. Tune C6 and C7 in sequence until maximum reading is obtained.

Now move the red meter lead to test point 3. Press to transmit and tune C11 and C12 in sequence for maximum power. This completes the tuning up of the PA.

At the time of writing the maximum power allowed for FM on six is 25 watts ERP. Therefore, if an aerial of more than about 3dB gain is employed, it would be possible to exceed the power limit for the band with the 12-15 watt output of the transmitter. A modification was needed to reduce the output power to about 5 watts. This is simply done by disconnecting the base of the driver transistor and inserting a 47ohm, 0.5 watt resistor between where the base went and the base of the transistor, and re-tuning the PA board.

Now the reader has successfully got the transceiver on the 51MHz, I would urge him or her to invest in a good commercial low pass filter to insert between the transceiver and the aerial as it is most important to reduce the second harmonic to a minimum, since it falls in the local radio section of the band.

It may be of interest to readers in the East Midlands to know that on Friday nights at 7.30pm local time, there is a net on 51.41MHz.

Wishing you all success.

The author is grateful to Philips Telecom (formerly Pye Telecom) for permission to reproduce several diagrams from the Westminster instruction book and to his many friends for their advice, especially Jack G5UM.
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BUILD A RECEIVER!

Building your own receiver is one of the most satisfying aspects of amateur radio. Nothing quite beats the thrill of hearing stations from far away on a set you constructed yourself. The first contact on a homebrew transmitter comes a close second though! Fortunately we offer kits for both, but it's the receivers' turn to be featured this month:

**DcRx DIRECT CONVERSION COMMUNICATIONS RECEIVER**

The HOWES DcRx series of receiver kits offer amazingly good performance for simple, easy to build equipment. These receiver kits have made an excellent introduction to amateur radio for many newcomers, as well as providing the basis of a QRP station for thousands of licenced operators around the World. These are single band receivers, and as such avoid complexity and expenses, whilst offering very pleasing results for both SSB and CW reception. Versions are available to cover the 20, 30, 40, 80 and 160m amateur bands, plus a 5.4MHz airband variant. A case and a couple of tuning capacitors are the only major parts you need to add. We can supply suitable capacitors at £1.50 each for all but the 160M version.

**Prices**

- DcRx Kit: £1.50
- Assembled PCB: £21.50

**MBRX H.F. MARINE BAND COMMUNICATIONS RECEIVER**

This little set is designed principally for AM Broadcast reception, but SSB and CW signals can also be resolved with a little careful tuning. Frequency coverage is 5.7 to 12.8MHz in three switched bands. The set features a switchable input stage that enables very short antennas to be used as well as full size ones. This kit will enable you to build an SSB and CW receiver with good facilities and performance at a sensible price.

**Prices**

- MBRX Kit: £25.90
- Assembled PCB: £44.90

**TRF3 SHORTWAVE BROADCAST RECEIVER**

This kit is designed specifically for AM Broadcast reception, but SSB and CW signals can also be resolved with a little careful tuning. Frequency coverage is 5.7 to 12.8MHz in three switched bands. The set features a switchable input stage that enables very short antennas to be used as well as full size ones. This kit will enable you to build an SSB and CW receiver with good facilities and performance at a sensible price.

**Prices**

- MBRX Kit: £25.90
- Assembled PCB: £44.90

**NEW! — ACTIVE ANTENNA**

If you would like more information on any item, or the rest of our range, simply drop us a line enclosing an SAE. We have an information sheet on each kit, plus a catalogue showing the full range.

**AA2 ACTIVE ANTENNA KIT**

Surprising as it may seem, there is no need for large receiving antennas at frequencies below 30MHz. Good results can be obtained by using the new HOWES AA2 active antenna kit and just a few feet of wire or metal rod. The AA2 can be used with a single wire or a miniature dipole, indoors or out, and covers 100kHz to 30MHz applications. Direct or coax powering can be used, and there are two selectable gain settings. Ideal for use with a 'black box' general coverage receiver or one of our kits!

**Prices**

- AA2 Kit: £7.50
- Assembled PCB: £11.50

If you would like more information on any item, or the rest of our range, simply drop us a line enclosing an SAE. We have an information sheet on each kit, plus a catalogue showing the full range.

**TRF3 KITS**

- TRF3 Kit: £14.80
- Assembled PCB: £20.20

73 from Dave G4KQH, Technical Manager.

Please mention HRT when replying to advertisements
I always find it encouraging when I listen down at the bottom end of the bands and hear a comparatively high proportion of new GO callsigns pounding away amid the rest. One obviously expects to hear the older hands there, but with all the other modes available to the new licensee it can often be easier to stick to phone or one of the many new data modes which are available. I can still remember my first contact. Being a penniless schoolboy at the time I could only stretch to a very QRP transmitter and when the first station came back to one of my CQ calls I was so surprised and excited I could hardly read him!

As time went on I obviously progressed to a more powerful transmitter, but as I could work DX only on CW I used it virtually all the time. Looking back it was a very good training, and one I value far more than power if I had been let loose on a high SSB transmitter.

Enough reminiscing, but just a word to those who are new to CW — keep it up, and to those who have not tried it on the air — give it a go, you may well find it very worthwhile.

**Shop Window**

Samson is a name which has long been associated with electronic keys for the amateur as well as the professional market. Originally they were marketed by Spacemark, but after the owner's retirement they were handled by G5BM.

The range of Samson keyers now includes three models: ETM-1C, ETM-5C and ETM-8C.

The ETM-1C is a basic electronic keyer module without a paddle. It is neatly packaged in a case measuring 36 x 65 x 108 mm and has a single knob on the front for the speed adjustment from 8 to 40 words per minute. It also includes dot dash memories, self completing dots and dashes, a built in sidetone generator and a iambic mode for squeeze keying. The unit is battery powered, but as it uses CMOS logic the idling current is below 1 microamp.

The next unit in the range is the ETM-5C. This keyer incorporates all the features of the ETM-1C but has its own integral dual paddles. The case is virtually the same as the ETM-5C shown and measures 45.5 x 113 x 160 mm. In addition it incorporates either transistor or relay keying which can easily be altered via an internal link. There is also an external adjustment for the dot dash ratio. This is very useful because a slight adjustment of this can make the CW sound more "musical" and easier to read.

At the top of the range there is the ETM-8C. This keyer has all the functions of the ETM-5C but it also includes eight 512 bit memories for stored messages such as CQ calls or the like. Although the keyer normally operates between 5 and 40 words...
per minute, I am told that a simple resistor change on the board enables it to operate up to 200 words per minute. This makes it ideal for meteor scatter operation.

The overall finish on the keys is good, and I have been more than satisfied with my ETM-5C which I have used without trouble for the last five years. The paddle is nice, having adjustment for both spacing and tension. Also the use of CMOS circuitry means that the current consumption is very low. Personally I never turn mine off and I have only replaced the batteries after two or three years in case they started leaking. Using internal batteries and being self-contained saves the necessity for a psu which means yet another cable across the operating table.

Another advantage of having a completely self-contained keyer is the lack of RF pickup. If a separate paddle, keyer and possible power supply are used external leads have to be used which can increase the risk of RF pickup and lead to some unexpected results or erratic operation.

Prices for the units are:
ETM-1C £34.00 plus £1.25 p&p.
ETM-5C £85.00 plus £2.55 p&p.
ETM-8C £139.00 plus £2.55 p&p.

Further details or the units themselves are obtainable from Frank Watts GS5BM, Woodland View, Birches Lane, Newent, Glos. GL18 1DN. Tel: 0531 820960.

Correspondence

A number of people wrote in asking about the RNARS (G38ZU) QRM runs. Unfortunately the time seemed to drop out of the system somewhere. My apologies. So just to put the record straight, it is transmitted on the first Tuesday of the month on 3520 kHz at 2000 local time, ie BST or GMT, whichever is being used. Speeds range from 15 to 40 words per minute.

Peter Fox GOGQL was another correspondent. He put in a word for the original "bug" key. He mentioned that he first came across one in Egypt during the war when one of his radio mechanics made one using a piece of clock spring and an assortment of junk. Apparently it worked well, so it goes to show what can be done.

Peter went on to say that he uses a Vibroplex key (very nice) and that bugs retain a degree of individuality which is absent with today's electronic keyers. This is very true, but it sometimes has the advantage that it makes people's morse easier to read.

News and Events

For those who do not know, an EUCW net is run every Tuesday at 1900 GMT. The frequency is nominally 3.655MHz plus or minus a few kilohertz for the QRM. The net is normally directed by SM7GWF with OZ6O and DL2ZAV giving assistance.

The net is normally intended for EUCW representatives to meet and get to know each other. Even so all CW operators are welcome to check in and have a chat. In fact many people will QSY off frequency after they have checked in to chat to someone in particular.

Many EUCW member clubs are re-naming their events as EUCW ones. One club which has done this is the Scandinavian CW Activity Group (SCAG) whose midsummer straight key day is now called the EUCW Straight Key Day. It is to be held on Saturday 24th of June and it is open to all amateur CW operators who enjoy using hand keys. There is also an incentive that anyone receiving at least two votes for best fist will receive a Straight Key Award free of charge.

The CW Flits Club (which is also a member of EUCW) is continuing to grow. At the last count membership had risen to over 400 and was still rising. They are also issuing attractive membership certificates now, and members can obtain discounts on amateur products with some dealers. Further details from Geo Longden G3ZQS.

Band Reports

There has been quite a lot of activity over the months under review. Band conditions could have been better, but with ten metres now open and a number of contests, there has been plenty on offer for those who enjoy contests of DXing.

Unfortunately I had few equipment problems over this period. My ten metre dipole needed some attention and a power supply I was borrowing for the rig had to be returned. This reduced operation to QRP only. Even so it was still possible to work a few stations. On ten the best of the bunch was TA2/G3UIN and on twenty contacts were made with EA2EA, KP2A, PJ1B, P40V and SV1RP/2 amongst others.

Richard Everitt, G4ZFE, had a much better haul over this period with an FT101ZD and either a vertical or a GM3HAT dipole he managed contacts with the following: 28MHz — P40Z0, XE3ARB, CE3DXT, CW5A — 9J2AL, YX5A, HC2G, NP4CC, LT8WW, LR1V and FR/DL4BBO. 21MHz only produced P40V, FR/DL4BBO, KP2A and D44BC while 14MHz gave contacts with P40V, VQ9QM, FY5YE, PJ1B, VP2MW, PZ/N3JT, FR/DL4BBO, HC5M and ZS6BCR. 7MHz also produced some good DX in the form of PJ1B, YX5A, P40V, P40R, KP2A, Su1ER, HD8EX, VP2MW, ALG7G and HC5M. Not a bad list at all!

Sign Off

So that's about all for now. Please remember to send in any news, views or band reports you may have. My address is in the call book, or if you do not have one to hand it is 144-Worple Road, Staines, Middlesex TW18 1EQ. Till next time 73s es BCNU de Ian.
## Semiconductors

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When HRT first published our exclusive review of the tiny Yaesu FT23R portable, we marvelled at its small size. The latest from the Yaesu stable, described in our exclusive Leicester exhibition report, is the FT411, exactly the same size as the FT23R but offering a whole host of operating features. We promised you the write-up, so in line with the HRT tradition of 'first ever reviews' here we go . . .

**Fully Featured**
The basic features of the FT411 are very similar to the FT23R, both sets covering 144-146MHz in selectable tuning steps, with top mounted volume on/off/volume and squelch controls and a rotary click-step VFO/Memory channel knob. Depending on the voltage of the battery pack chosen, the transmitter output power varies between 2.5W (FNB-9/FNB10/FNB14 7.2V packs) and 5.0W (FNB-11/FNB12 12V packs), the set itself being capable of operation at any supply voltage between 5.5V and 15.0V DC. All the usual FT23R accessories may be used, such as dry battery cell cases, speaker microphones and the like.

**Remote Battery Pack**
One such accessory that could prove useful is the PA-7 battery cable, where the tiny set complete with helicopter but minus the battery may be clipped onto your lapel, with the heavier battery pack fitted to your belt or whatever, linked to the set with the curly DC supply cable. This would allow more comfortable all-day operation using a large battery pack and the helical positioned up in the clear; alternatively the tiny FNB-9 200m Ah pack could enable the entire set to be clipped onto your lapel or into a shirt pocket.

With the FNB-10 pack, the set measures 139mm (H) x 55mm (W) x 32mm (D), and weighs 430g. Compared with its FT23R cousin, the control features of the FT411 are significantly more comprehensive, a real case of 'microprocessors with everything' to give operating flexibility such as automatic repeater shifts. This does not suit everyone's taste, which is why the FT411 complements rather than replaces the FT23R, however, being a committed 'gadget freak', I quickly started with the instruction book to see exactly what the set was capable of.

**VFOs**
Two digital VFOs are provided, tuning in independently selectable steps of 6kHz, 10kHz, 12.5kHz, 20Hz or 25kHz. Frequency change is performed with either the rotary click-step tuning knob on the top panel, or by the keypad mounted up/down buttons. For a rapid QSY, 1MHz steps are selected by a press of the keypad 'F' button, or direct frequency entry is possible using the numeric keypad buttons. An 'Automatic Repeater Shift' function may be enabled, so that whenever the set is tuned to the 145.600-145.800MHz segment a minus 600kHz TX shift is automatically selected.

**Memories**
A total of 46 memory channels are provided for storage of operating frequencies, TX offset, sub-tone information and scanning status. Any +/- transmit/receive split may be programmed and stored. An 'instant access' call channel may also be programmed, for rapid switching to your favourite local repeater or natter channel, selected by the large button on top of the case.

Memory channels are accessed by the 'MR' button on the keypad, switching between channels by using the rotary tuning knob at the top of the set or the keypad up/down buttons and direct channel access by entering the memory channel number on the keypad. One can QSY up or down from the memory by pressing the 'MR' button again. You can QSY away from the memory channel as required, a bar appearing under the

---

**Chris Lorek G4HCL finds more and more functions stuffed into a small space.**

---

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HAM RADIO TODAY MAY 1989
memory channel number. A further press of the 'MR' button returns you to the original memory.

**Scanning**

Either the whole band or any desired portion, may be scanned in the selected tuning steps. For the programmed band scan where a section of the frequency range is sampled, two further memory channel’s ‘L’ and ‘U’ are used to store the lower and upper limits. Scanning of memory channels is initiated in the same way, and any of the memory channels may be skipped as required to prevent the set locking up on busy channels. In each case, the scan is initiated by keeping one of the up/down buttons pressed for more than half a second, halting as soon as a signal strong enough to raise the squelch is received. Two modes of scan resume are provided, the first continuing when the received signal disappears, the second continuing after a pause of 5 seconds after the scan halts regardless of the squelch status.

A priority channel watch is also available, where the set checks any memory channel every five seconds, locking onto this channel for the duration of any received signals. Any number of memory channels may be sequentially checked. This function can be used with any other receive or transmit function, so you can be monitoring a repeater while keeping a watch on the local simplex channels.

**Sub-Tone**

When fitted with an optional FTS-17 CTCSS board, sub-audible tone squelch operation may be selected for busy channel monitoring, or for operational control with a repeater having this facility. Any of the standard CTCSS tones may be programmed for encode or decode/decode operation; in the latter case the set remains silent unless it receives a signal with the correct sub-tone frequency.

As well as this silent monitor facility, a pager mode can activate a tone sounder on the set when the correct sub-tone is received, flashing a bell symbol on the LCD if you have been called in your absence.

Individual sub-tone frequencies may be stored in the memories on a channel by channel basis for automatic selection. With other selective call applications (such as digital voice message storage in the remote transceiver) the keypad acts as a DTMF Touch Tone pad in transmit mode. A 10 sequence DTMF memory stories up 15 characters per sequence for single-key activation.

**Battery Saver**

A refinement to the usual type of battery economiser enables the user to select one of nine receiver on/off

[Additional text and diagram details]
ratios to allow the average receiver battery drain to be reduced. The receiver is switched ‘on’ for 30mS and ‘off’ for a pre-set time of between 30mS (1:1 ratio) and 1 sec (1:33 ratio). This can be disabled for packet radio and the like. An auto power off facility may be selected to prevent you flattening your batteries by forgetting to switch the set off. The set goes into a power-down mode after a user pre-set time of 10, 20 or 30 minutes following no PT1 or manual channel change, sounding a short warning melody from the speaker a minute before hand.

On The Air

I started by programming memory channel numbers 9-23 with simplex channels S9-S23 for logical selection, followed by my local repeater channels, the 46 available memories being more than adequate. At first, I found the small keypad a little tricky to use, however, after the initial programming operations I found I rarely needed to use it, relying mainly on memory channel switching by using the rotary tuning knob.

Over the review period of several weeks, I used the set as a portable with the supplied stubby helical, as a mobile using my glass-mounted whip, and as a base station with a rooftop colinear. I was very pleased to get good audio reports on transmit; through my semi-local repeaters in Cambridgeshire and Herts my usual QSO partners were unaware that I was using anything different than my normal ex-professional tranceiver. Wandering around the city centre, the short helical whip allowed me to carry the set in my inside pocket without the helical jabbing me each time I turned around, although not surprisingly I found it slightly less effective than one of the usual 20cm long affairs.

On receive, the set was adequately sensitive so that I could always hear stations who could hear me, although in noisy surroundings I found I did sometimes have to hold the tiny speaker up to my face to prevent distortion caused by turning the volume up too high. I found the maximum audio level just enough for use when driving around, although plugging in my external dashboard-mounted speaker brought a useful increase in volume.

When used from home with the rooftop colinear, I found the rejection of signals spaced by 12.5kHz very good indeed. I could easily operate using these spacings on the lower portion of the band at busy periods in the presence of other stations on adjacent channels. This however also meant that the odd station who was running over the top deviation, in the order of 6-7kHz, or was off frequency like the chap I received who was 3kHz, did come through rather distorted.

Pressing the portion of the PTT bar just above the PTT button itself transmitted a 1750Hz tone for repeater access, which I found very easy to use. Above this was a button which backlit both the LCD and all the operating keys, again this was easily located especially when in the dark! With the sensible positioning of these controls, I found I could operate the portable totally one-handed with just my thumb and forefinger.

Throughout the review period, the supplied FNB-10 battery never went flat I could happily monitor for much of the day as well as have the odd QSO or two just by giving the set an overnight charge. Although not supplied, I felt the optional battery cable together with a higher-capacity, higher voltage pack giving higher transmit power) would have been very useful indeed. I could then have walked round looking just like one of the 'professional' radio users with the speaker and mic right where it was needed, up near my face with the set clipped to my lapel.

Insides

The set is built on a die-cast metal chassis with the RF circuitry housed on a mother board on the main chassis, with several daughter boards on it. The digital circuitry is on a further board, this time mounted on the front panel, linked to the RF section with a multi-way plug and socket combination. For system use, all programmed memory information may be cloned from one FT411 to another through a wire link between the external microphone connectors.

On receive, a double conversion superheterodyne arrangement is used, with a switched wideband front end. A first IF of 17.3MHz is used, with a pair of monolithic dual crystal filters providing adjacent channel selectivity, the 455kHz second IF employing a further ceramic filter giving additional selectivity. On transmit, a directly modulated final frequency VCO is
Laboratory Results

As found on-air, the receiver sensitivity was reasonable, but adjacent channel rejection measured was very good, especially that of 12.5kHz spaced signals. This should ensure compatibility if this channel spacing is formally adopted in the future, as well as being suitable for current use in heavily congested areas. The intermodulation rejection was quite reasonable although not up to the performance of purpose-designed mobiles and base stations. The blocking performance was quite good, especially the out-of-band rejection.

On transmit, an adequate power output was measured with the harmonics well suppressed, the low power level being a constant level regardless of battery voltage showing good regulation. The battery current reduction on lower power however, in common with many other portables, does not match the transmitter output power reduction, showing that battery life in low power mode would not be extended by much.

Conclusions

The FT411 lives up to the tradition of being a simple-to-use portable, by using just the top-mounted knobs in conjunction with the memories, but having the versatility, if required, of a fully featured rig by the use of the multi-function keypad. It certainly is very small, fitting easily into a shirt pocket. Having a large number of common accessories to its cousin the FT23R (readily available both new and secondhand) extends its versatility. The provision for extended receive coverage, while keeping its transmission capability limited to the 2m range and not running foul of the law, may be of interest to the scanner enthusiasts amongst us.

My thanks go to South Midlands Communications Ltd. for the loan of the review transceiver.

### Laboratory Results

#### Receiver

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Input level required to give 12dB SINAD:</th>
</tr>
</thead>
<tbody>
<tr>
<td>144MHz</td>
<td>0.172μV pd</td>
</tr>
<tr>
<td>145MHz</td>
<td>0.160μV pd</td>
</tr>
<tr>
<td>146MHz</td>
<td>0.158μV pd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Squelch Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold 0.07μV pd (5dB SINAD)</td>
</tr>
<tr>
<td>Maximum 0.35μV pd (10dB SINAD)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjacent Channel Selectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured as increase in level of interfering signal, modulated with 400Hz at 1.5kHz deviation, above 12dB SINAD ref. level to cause 6dB degradation in 12dB on-channel signal</td>
</tr>
<tr>
<td>+ 12.5kHz 55.5dB</td>
</tr>
<tr>
<td>- 12.5kHz 64.5dB</td>
</tr>
<tr>
<td>+ 25kHz 70.5dB</td>
</tr>
<tr>
<td>- 25kHz 72.5dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermodulation Rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase over 12dB SINAD level of two interfering signals giving identical 12dB SINAD on-channel 3rd order intermodulation product</td>
</tr>
<tr>
<td>20/50kHz spacing 60.5dB</td>
</tr>
<tr>
<td>50/100kHz spacing 61.5dB</td>
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</tbody>
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<table>
<thead>
<tr>
<th>S-Meter Linearity</th>
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</thead>
<tbody>
<tr>
<td>Indication</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<tr>
<td>6</td>
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<td>8</td>
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<tr>
<td>10</td>
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<tr>
<td>12</td>
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</tbody>
</table>

| Transmitter |

#### TX Power and Current Consumption

<table>
<thead>
<tr>
<th>Freq MHz</th>
<th>Power 7.2V Supply</th>
<th>9.6V Supply</th>
<th>13.8V Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>High 2.05W/910mA</td>
<td>3.95W/1.24A</td>
<td>6.00W/1.41A</td>
</tr>
<tr>
<td></td>
<td>Low 610mW/535mA</td>
<td>610mW/535mA</td>
<td>610mW/535mA</td>
</tr>
<tr>
<td>145</td>
<td>High 2.20W/915mA</td>
<td>3.85W/1.23A</td>
<td>6.05W/1.42A</td>
</tr>
<tr>
<td></td>
<td>Low 615mW/535mA</td>
<td>615mW/535mA</td>
<td>615mW/535mA</td>
</tr>
<tr>
<td>146</td>
<td>High 2.15W/915mA</td>
<td>3.95W/1.23A</td>
<td>6.00W/1.41A</td>
</tr>
<tr>
<td></td>
<td>Low 615mW/535mA</td>
<td>615mW/535mA</td>
<td>615mW/535mA</td>
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<table>
<thead>
<tr>
<th>Harmonics/Spurii</th>
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</thead>
<tbody>
<tr>
<td>2nd Harmonic</td>
</tr>
<tr>
<td>3rd Harmonic</td>
</tr>
<tr>
<td>4th Harmonic</td>
</tr>
<tr>
<td>5th Harmonic</td>
</tr>
<tr>
<td>6th Harmonic</td>
</tr>
<tr>
<td>7th Harmonic</td>
</tr>
<tr>
<td>Spurii</td>
</tr>
</tbody>
</table>

| Peak Deviation   | 4.9kHz |
| Toneburst Deviation | 3.8kHz |
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**TS-940S** £1,995
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The TR-751E is one of those transceivers which actually has no competition at all, combining as it does the all mode performance of a 2 metre base station with the convenience of mobile use as well. Whether you want to operate on FM, SSB, or CW, the TR-751E will do the trick. Real ease of use (in the Kenwood tradition), and sensible facilities, have made the TR-751E a firm favourite all over the world. Call in to any of our branches and see for yourself.

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HAM RADIO TODAY MAY 1989
Random Ramblings.

Joseph Addison wrote, sometime around 1690—"Unhurt among the war of elements, The wrecks of matter, and the crash of worlds". In other words, he had chosen an aerial rotator which wouldn’t hold his beam in a high wind.

It is foolish to economise on your aerial rotator, because if you do, and install it on top of a pole or mast, you will be extremely sorry when it breaks and you have to take the whole thing down again. When it comes to top quality aerial rotators, it’s hard to beat those from DAIWA. The MR-750 series rotators are capable of holding the aerial still and rotating the house, but one has inevitably to pay for such performance.

We have just started selling two rotators from the EMOTO company, which was founded by a respected mechanical engineer, and has built a substantial reputation in Japan for high quality mechanical design. These rotators complement the DAIWA MR-750, and give you a real choice for your rotator requirements. They all use a safe 24 volt ac supply to feed the motors, and the controllers are easy to use and easy to read.

I can only give the briefest of details in this small space, but when you need further advice, give us a call or drop a line, and we will explain in great detail why these rotators are the best, and tailor the right one for your needs. As I started with a quotation, I may as well end with one equally appropriate—"Down, thou climbing sorrow, thine elements below", which comes from King Lear, so even poor Shakespeare had his beam fall down.

**DAIWA MR-750PE...£290**
Turning torque...700kg/cm to 2800kg/cm (depending upon number of motors)
Braking torque...6000kg/cm to 21000kg/cm (depending upon number of motors)
The MR-750PE is unique in that the rotator is supplied with one drive motor fitted, but up to three additional motors can be fitted, each one multiplying the turning and braking torque. With all four motors, the MR-750 could almost be used for powering a railway engine turntable, such is its turning power. Must also mention that the additional motors can be fitted without dismounting the rotator from the aerial system.

**EMOTO 105SX...£159.69**
Turning torque...520kg/cm
Braking torque...3000kg/cm

**EMOTO 747SRX...£347.24**
Turning torque...700kg/cm
Braking torque...7000kg/cm

Both EMOTO rotators are extremely well made and weatherproofed, with hard epoxy based paints and stainless steel hardware. The controller scales are particularly easy to see and interpret.

For more details, just ask for the rotator leaflets from us.

---

**Keys by Bencher**

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**Packet TNC from Kantronics**

**The best scanners in the world — from AOR.**

And for all that’s good in amateur radio — go to LOWE.
In the last "QRZ", I reported on the ARRL's decision to accept Malyj Vysotskij Island as a new DXCC "country". Since writing that, I have received my 4J1FS QSL card from MV Island for my QSO on 9th July last year. The QSL, which is a four-side folder rather than a card, has two sides in full colour and also gives the full story of the expedition, which makes quite interesting reading.

The front of the card shows a map giving the location of Malyj Vysotskij in the colours of the Finnish and Soviet flags, while on the back is a colour photo of the operators taken on the island with their gear. The QSL gives the following information about the expedition: "Malyj Vysotskij — M-V Island — is situated at 28° 34' E and 60° 38' N within Soviet territory in the Baltic Sea. The island is about a mile long — lush but desolate and uninhabited. Its dilapidated houses and alleys green with thick vegetation suggest that the island was left alone decades ago. It was on September 27, 1962 that Finland leased M-V Island from the Soviet Union along with the Siamaa Canal which serves as a gateway for shipping from the Finnish lake district to the seven seas. A total of 14,765 contacts were logged in 96 hours of operating (that's over 2V2 QSOs every minute for the entire period of operation — G4JVG) ..."

4J1FS ops, OH2RF, OH2BH, UZ3AU, UW3AX, UR2AR and OH5NZ, with their gear, a Kenwood TS940S and TL922 linear, on Malyj Vysotskij Island.
THE SIGNAL OUT OF
OH2BH
FINLAND

OH2BH’s antenna system, with 6 ele KLM beams on 10, 15 and 20 metres. The whole tower, which is 43m (140 ft) high, is rotated by a heavy duty rotator at the base.

in evidence in the photo. I would be interested in receiving pictures of your shack, or examples of your QSLs, for inclusion in future “QRZ”s.

Talking of Coco Keeling, if you missed my AX9YG/VK9YG operation in October last year, you may be interested to hear that probably the next operation from there will be in October this year, when Cris Hendersen plans to visit Cocos Keeling. Callsign is not known at time of writing, but will almost certainly be in the series VK9Y followed by a further single letter. Knowing Cris, operation will be on both CW and SSB.

Despite the 100,000 or so QSOs made by the Hungarian group who operated from Vietnam in October and November last year, there is still a lot of interest in contacting that country. This is proved by the fact that, at the time of writing, 3W0A is active on 14195 and generating a large pile-up of European callers. This operation, which is using the call 3W0A on SSB and CW and 3W1A on RTTY, is by a group of four Soviet amateurs from the RL8PYL club station in Kazakhstan. There are rumours, unconfirmed at the time of writing, that one or two of the group will be permitted to operate from one of the Vietnamese-occupied islands in the Spratly Islands group, some of which are also claimed by Taiwan, China and the Philippines.

In the past, attempts to activate the Spratly Islands without the permission of the Vietnamese authorities which occupied the island ended in disaster when a German boat was fired on, causing loss of life. The South China Sea, where the Spratly Islands are located, is also known as one of the most notorious areas of the world for pirates (sea pirates rather than radio pirates), so it is not particularly welcoming. While it is good to see that glasnost and perestroika are now permitting Soviet amateurs to go on DXpeditions to countries outside the USSR, has anyone else been annoyed by Russian amateurs now virtually demanding QSLs direct with IRCs, instead of via P.O. Box 88 Moscow? I have also received many QSLs direct from Russian amateurs for my VK9YG operation, all expecting replies direct, but without their enclosing either an sae or any IRCs. A few have said that it is impossible to get IRCs in the USSR (although some have sent them, so it cannot be!) but as the USSR is a member of the Postal Union that is a problem of distribution in their country.

It is not reasonable to expect DX stations to QSL to you by mail unless you send them a self-addressed envelope and some form of return postage; if not you can expect your reply via the bureau. (My postage bill was over £200 to answer the QSLs sent direct to me for VK9YG QSOs: I would not expect to have to pay that myself.) On the other hand, some amateurs send their replies to all QSLs via the bureau, even when they have received self-addressed envelopes and IRCs or even sometimes dollar bills. To me, this is even less acceptable, although I suppose it is slightly better than the stations who do not reply at all: I am still waiting for my FR5DX QSL card.

Albania Efforts

Earlier, I mentioned the Hungarian group who activated Vietnam as 3W8DX and 3W8CW for the first time since the American pull-out of Saigon during the Vietnam war. Now there are very strong rumours that they will return to South East Asia very shortly and operate from Laos, which has also been inactive for many a long year. Callsigns are reportedly XW8DX and XW8CW, although if the operation does come off it will probably be history by the time this is read. While on the subject of rumours, there are always rumours flying around the

QSL from PU0FZ on Fernando de Noronha, operated by Fred, PY7ZZ.
bands of upcoming activity from Albania, which figures in most DXers' top three most wanted countries list. The latest rumour has it that G3FNJ is organising a group of Greek amateurs to operate from an uninhabited Albanian island off the coast of Corfu. Certainly Norman, G3FNJ, is presently in Greece and speaks fluent Greek, but he once told me that, despite this ability and attempts for over 20 years, he was unable to even get a Greek licence, as there is no reciprocal licensing agreement between the UK and Greece. Hopefully this will change in the near future, with the advent of the CEPT licence, a soon as Greece ratifies it, but presumably this means that previous operations by other British amateurs from Greek islands have been illegal? We wish Norman luck with his attempts to activate Albania, and if it comes off he will be much in demand.

As an amateur who enjoys travelling, especially with a transceiver, I welcome the CEPT licence, but my initial euphoria wore off somewhat when I studied the details. It apparently only permits you to operate your own station when abroad as a mobile or portable set-up, so theoretically you will not be able to set up a station in an hotel room, or hire a self-catering apartment or villa for your DXpedition to Liechtenstein or wherever. Another big disadvantage is that, according to the February Radio Communicaton, if you visit Sweden, for example, you must operate your station in accordance with that country's "T" licence, even if you hold a British class "A" licence. The Swedish "T" licence is very similar to our "B" — fine if you want to operate 2 metre FM mobile, but not much good if you want to talk to your mates back home. Presumably the advent of the CEPT licence will not negate the proper reciprocal licensing agreements, where they already exist, which give the same authority as residents rather than the very restricted operating possibilities of the CEPT licence? Or will it?

Ten metres has continued to be a very good band recently, with excellent openings to the States and South America almost every afternoon. One station has been very active, almost always around 28520-28525 kHz, is HK0HEU from San Andres Island, a Colombian island in the Caribbean Sea. If you hear or work him, QSLs go via HK0FBB. He has been on the air almost daily around 1300-1400 GMT. Two Japanese DXers have recently been on a DXpedition to Dominica, also in the Caribbean, and have been very active as J79ROJ and J790UT. I heard J79ROJ on 28550 with very strong signals around 1500, when he announced that he was going to move to 28025 CW, but both stations have been reported on 80, 40 and 20 metres as well. What is interesting is that they are giving RA4HA as their QSL manager; I have certainly never heard of non-Soviet operations from countries outside the Eastern bloc using a QSL manager in the USSR before, and indeed even the 3WOA Soviet DXpedition to Vietnam is using an American QSL manager, W4FRU.

Finally, another station which has been very active recently is HV3SJ from the Vatican City, one of only three stations from that mini-State. They have been worked on 40 metres SSB and also, when I worked them, at about 1730 on 14195. I don't think I remember ever hearing this station with less than a 59+10 dB signal: their full-size 2 element quad high above the Vatican's buildings probably has something to do with it. QSLs for HV3SJ go via I0DUD. Please send any news for "QRZ" or pictures of your shack or antenna or examples of your QSLs to Steve Telenius-Lowe, "Penworth", Tikers Green, Reading RG4 9EB.
PHOTO ACOUSTICS LTD announce a NEW RANGE OF
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★ Swivel joint for 180° angle adjustment
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★ Ideal for the radio amateur who cannot fix anything to the 'company car'
The four New Models are as follows:–

** Please Note: Maximum power handling of these antennas is 25 watts.

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PRICE £247.25 Carriage £10
FREE 2 METRE 3/4 WAVE ANTENNA INCLUDED AS INTRODUCTORY OFFER.

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How much improvement may be achieved by fitting a pre-amp? And at what cost to the receiver parameters?

The answers to these questions will be different for individual cases. One adds a pre-amp in order to hear weaker signals or work dx further.

The noise figure is in itself a rather subtle subject which cannot be dealt with in depth in an article of this nature. However, some introduction is necessary as noise figure (NF) is generally accepted as the most important single characteristic of any receiving system.

Not all these characteristics are easily or clearly specified and definitions often vary from vendor to vendor (and purchaser!).

As this subject is not covered in the RAE, I am attempting to provide some understanding of the total effect a pre-amp has on a receiving system. The noise figure is in itself a rather subtle subject which cannot be dealt with in depth in an article of this nature. However, some introduction is necessary as noise figure (NF) is generally accepted as the most important single characteristic of any receiving system.

At this stage it seems appropriate to simply and loosely define the terms used.

Definitions

Dynamic range is the difference in magnitude (in dB) between the smallest and the largest signals that may be intelligibly resolved (without alteration of the attenuator or RF gain controls, usually).

If a small signal and a large signal are present simultaneously then the closer they are together, the more difficult the task of the receiver. See fig. 1.

Intermodulation products (IMPs). When two or more signals simultaneously impinge on a mixer (or other non-linear stage) other signals are produced. These signals do not exist outside the receiver and are therefore unreal, but nonetheless may be really troublesome. Suffice to say that these are known as "orders" of intermodulation products, e.g. third order imp. The number of the order is determined by the signal and harmonic relationships. The higher the order of imp, the greater will be the interference to real signals. See fig. 2.

Noise figure. This is sometimes called noise factor. Perhaps the least understood, and yet believed by most engineers to be the most important characteristic of all when assessing a receiver's performance, noise figure (NF) is a figure of merit expressed in dB or degrees kelvin (K) that tells us how much worse a receiver is than the unachievable perfect noiseless receiver. Therefore the lower the NF the more sensitive the receiver.

The signal to noise ratio at the input to the receiver will be degraded by the noise of the receiver itself. This results in a smaller signal to noise ratio at the output — the end to which we wish to listen! A signal only just above the noise at the input may disappear completely into the receiver's noise floor. See the small signal in fig. 1.

Gain. This is simply the ratio of the magnitudes (expressed in dB) of input to output signals across any device, stage or system. The definition applies to loss as well. It may seem curious that, when adding a pre-amp, it is not necessary to consider the gain of the receiver. However, as will be seen further on, the gain of the pre-amp is very significant indeed, but not as important as the NF.

The signal with noise already on it will arrive at the antenna which is being bombarded with noise from many sources as near and as far as...
the limits of our imagination and perhaps beyond! The signal and noise is then passed to the noisy pre-amp (and noisy receiver) via a noisy feeder. The signal, especially a small one, has a great deal of competition before it eventually reaches our (noisy?) ears. See fig. 3.

Before moving on, let's summarise the situation so far:

1. When the receiver is switched on it will produce noise, even without any input connection whatsoever. In fact, even with an impossible noise-less termination at the antenna input socket, the receiver will still produce noise.

2. Any signal received must, in order to be resolved, be of greater amplitude than all the combined noises with which it competes. In modern times computer enhancement helps to achieve this in difficult cases (at processing stage).

3. If strong signals cause the receiver to produce IMPS, the wanted signal may be masked or unreadable. This is one form of "overload".

4. The dynamic range of the receiver stretches from its "noise floor" to its overload or "ceiling". A pre-amplifier can improve dx capability by improving sensitivity (noise figure) but only at some cost to other parameters.

Sensitivity. This is the lowest level at which a weak signal may be received and utilised. A receiver with good sensitivity will receive weak signals and will have a low noise floor or low NF. Receivers have different sensitivities according to band, mode, age, alignment, state of the art at time of design, price, manufacturer and many other variables.

The main reason for adding a pre-amp is to effectively reduce the NF of the receiving system. In fact, as will soon become apparent, the noise figure of the receiver plus pre-amp is very little higher than the NF of the pre-amp only. Therefore, the poorer the sensitivity of the receiver, the greater could be the improvement of dx capability by adding a pre-amp.

Consider the following three cases:

1. Operator one, who has an ageing two metre rig with a 10dB NF. She only has local QSOs.

Operator two, who has a two metre rig with a 6dB NF. He only has local QSOs but works further afield than operator one. Works some dx occasionally too.

Operator three, who owns a super new all-singing, all-dancing multimode two metre rig fully equipped with bells, buzzers, flashing lights and a NF of only 3dB. Works lots of dx.

All three operators run similar antenna systems, feeders, cable lengths and share the same QTH (very hypothetical). Only the rigs differ as above.

Each operator now tries the same pre-amp to see whether it improves their system performance.

Let us assume the pre-amp has typical characteristics, eg gain = 20dB (ratio 100) and NF = 1.5dB.

It now becomes necessary to introduce a formula in order to calculate the effect that the pre-amp will have on each rig.

\[ \text{Ft} = \text{Fa} + \text{Fr} - \frac{1}{\text{Ga}} \]

when:

- \( \text{Ft} \) = total NF (Rx plus pre-amp)
- \( \text{Fa} \) = pre-amp NF
- \( \text{Ga} \) = pre-amp gain
- \( \text{Fr} \) = Rx NF

There is no need to consider the receiver gain \( \text{Ga} \), which does not appear in the formula. No account has been made of the antenna and feeder NF, although it is very significant to the station performance. The measurement would be a little more complex and probably not contribute very much to the point of this particular article which is concerned with the pre-amp. All the dB ratios must be converted to numerical ratios when making the calculation, the result then being converted back to dB NF. See fig. 4. Inter connection losses have not been considered here though very signifi-
cant. Operator One’s receiver plus pre-amp will now have a NF of:

\[ \frac{1.5 + 10 - 1}{20} = 0.09 \]

Converting to numerical ratios:

\[ \frac{1.413 + 10 - 1}{100} = 1.503 \]

Converting back to dBs = 1.769 dB

Operator One’s NF has fallen from 10dB to 1.769 dB.

Operator Two’s receiver plus pre-amp will now have a NF of:

\[ \frac{1.413 + 4 - 1}{100} = 0.03 \]

NF = 1.600dB

Operator Two’s NF has fallen from 6dB to 1.600dB

Operator Three’s receiver plus pre-amp will now have a NF of:

\[ \frac{1.413 + 2 - 1}{100} = 0.02 \]

NF = 1.532dB

Operator Three’s NF has fallen from 3dB to 1.532dB

While all three stations have benefitted, clearly Operator One’s has seen the largest improvement, but, perhaps surprisingly, all three stations finish up with very similar noise figures, and therefore similar dx capability.

It may now be shown that the gain of the pre-amp is very significant.

If a similar experiment is carried out with a pre-amp of 1.5dB NF and 10dB gain (ratio 10) the result would be as follows:

Operator One:

\[ \frac{1.413 + 10 - 1}{1000} = 0.01 \]

NF = 1.529dB

Operator Two:

\[ \frac{1.413 + 4 - 1}{1000} = 0.02 \]

NF = 1.511dB

Operator Three:

\[ \frac{1.413 + 2 - 1}{1000} = 0.02 \]

NF = 1.504dB

Two significant points emerge from the high gain example: all three noise figures are virtually the same (or differ insignificantly), and all three noise figures are only fractionally higher than the noise figure of the pre-amp alone.

It may seem surprising to some that an old ‘noisy’ receiver with a pre-amp can be just as sensitive as a new “quiet” receiver with pre-amp. However it is so.

Another surprise may be that the RF gain of the receiver may be backed off almost completely without any loss of sensitivity but considerable reduction of Rx noise. Remember, the receiver gain Gr does not appear in the formula

\[ Ft = Fa + Fr - \frac{1}{Ga} \]

How often one hears an operator give a signal report “You’re an S8 on my meter but I’ve fitted a pre-amp and have a permanent noise level of S5.” By reducing the RF gain control of the receiver the S-meter may possibly be set to read zero (or very low) under no incoming signal conditions. The calibrations will almost certainly not follow the original AGC law, but at least it will have some relative use (which is still an S-meter has anyway!). And the background noise in the loudspeaker will not appear abnormally high. It is possible to put attenuation between the pre-amp and receiver to minimise or eliminate receiver overload. It is even possible to control the pre-amp with a form of AGC. One could also calibrate the S-meter, but all these things are beyond the scope of this article. However, it may be seen that the action of the pre-amp is to deliver to the receiver a signal which is sufficiently above the receiver’s noise level to be suitably detected and processed.

Such a system produces excellent results when the station is in a ‘quiet’ radio environment, free of other relatively close or relatively strong transmissions. That proviso is the major disadvantage of a pre-amp. Although it is very good at small signal handling, it can suffer considerably from the effects of strong signals which either overload the pre-amp or cause the pre-amp to overload the front end of the receiver.

If the receiver has a dynamic range of say 90dB (1,000,000,000 to 1) with a noise floor of -110dBm, then the maximum signal it can...
handle will be -20dBm. Adding a pre-amp which drops the noise floor by say 10dB to -120dBm will also drop the ceiling by 10dB to -30dBm (assuming sufficient dynamic range of the pre-amp). If signals larger than -50dBm are presented to a pre-amp with 20dB gain, the receiver will overload, producing IMPs and other unwanted effects. See fig. 2.

So, a pre-amp would not be a lot of use to a station well located atop an exposed hill, surrounded by hall stations, radio taxi bases, fire, police and ambulance stations, a local broadcast repeater, microwave food processing factory, and for good measure, an international airport thrown in! The solution here would be to have a switchable pre-amp (if at all).

The task of the receiver designer is to offer optimum performance, suitable for most users, uses and situations likely to be encountered, and maximum sales! Fitting a pre-amp becomes more of a special application, for better dx hunting or improving a station in a ‘black hole’ location.

The state of the art at present is not such as to permit the design of receivers with very low noise floors and wide dynamic ranges and superb IMP performance, all at an affordable price.

The motor industry has an analogous problem. It can build a car that will travel at 200mph or achieve 90mpg but not both at the same time. Receivers can be produced to operate very well indeed under certain conditions, but only at the sacrifice of performance in other conditions. Like most things, they are a compromise. That is why a pre-amp can be a very useful addition to a station in the appropriate situation.

Hang 'em High

The pre-amp is more effective at the mast head because it can present a good signal to noise ratio to the feeder which is itself lossy and noisy. The signal the antenna offers to the feeder is therefore the larger the signal to noise ratio at the antenna end of the feeder, the less work the receiver has to do.

I believe that I previously operated from a “black hole” location: 200 feet below the top on an ironstone hill surrounding the QTH on three sides. The fitting of a cheap but good pre-amp (costing just a few pounds) inside the receiver transformed the station. However, it must be stated that this particular ‘black hole’ is very free of interfering signals.

Pre-amps seem to be most useful above frequencies of about 28MHz. Ambient noise below this frequency limits the usefulness of pre-amps. HF rigs seem perfectly satisfactory without pre-amps and meet all dx conditions if a good antenna is used, of course.

It is worthy of mention that many years ago professional communicators learned that money spent on improving their station was much more effectively put into the receiver than the transmitter. Massive increases in transmit power are necessary to achieve small increases in range. Small improvements to a receiver front end can extend range considerably. While serving in the RAF as a member of a trials team operating UHF, I worked an aircraft to a range of 240 miles at 20,000 feet with 10 watts of power. Experimentally increasing to 150 watts only extended the range to 250 miles. A 4% increase in range for a 1,500% increase in power! The range limit in this case was, of course, line of sight — 120 miles at 10,000 ft.

Constructors should line up their pre-amps for minimum noise figure rather than maximum gain, the former being more important. Manufacturers optimise noise performance and then just measure the gain to ensure that it meets specification.

For in depth understanding of noise figure I recommend Noise Performance Factors in Communication Systems by W W Mumford and E H Scheibe. Published by Horizon House — Microwave Inc. Dedham, Massachusetts, and RadCom, Sept ’84, page 778 How’s your front end?
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Rgards
Derek Shute

HUNTINGTON
circa 1980

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All prices include VAT
First of all, welcome to all our readers who are either currently active on packet radio, or just ‘thinking about’ it. Our pioneering series in HRT has certainly stirred up a great deal of interest, and I must thank the very large number of amateurs who sent me packet messages through the national BBS system.

As packet radio is clearly heralding itself as ‘tomorrow’s mode today’, with amateurs pioneering this communication technology in the traditional manner, this column is the start of a regular ‘Packet Page’ in HRT. I’ll be describing current and future trends, the latest software, new TNC hardware, club news, events, and the rapidly evolving UK and international packet network.

Licensing

With the revised licence the use of packet radio has at last become legal! Before this, it was generally accepted as ‘custom and practice’, with unattended digipeaters, mailboxes, and the like being ‘ignored’ as far as licence conditions went. The current licence now formalises what is, and what is not, allowed on packet. For instance, it is perfectly OK to sit back in your shack while Joe down the road on 2m connects into your VHF/HF gateway and uses your 20m 100W transceiver to have a QSO with a foreign amateur. It is also legal to leave your 25W ERP 2m rig running as a digipeater and a personal ‘message store’ while you go shopping.

There is, however, one practice that was previously accepted but has apparently been firmly stamped upon by the DTI RIS, which is the facility available on many PBBSs of storing third party messages. Several amateurs throughout the country have received letters instructing them to remove this facility, which meant switching their personal message store facility completely off.

Some software from suppliers such as Siskin Electronics in the form of a plug-in Eprom inside the TNC already had the facility of third party on/off switching; others were less fortunate. Kantronics also have been quick to respond to the new UK needs with a special 2.85(UK) version upgrade, with periodic CW ident and third party on/off PBBS facility, as well as several other useful features on the built in KA-Node. I understand this upgrade is now available ex-stocks from UK Kantronics dealers such as Lowe Electronics. Yours truly is now again legal!

Packet Radio Guides

A common moan is that of little information being available for the beginner. For the owner of a shiny new TNC, the first few days of operation can be very daunting as well as possibly confusing. If you missed the HRT Beginners’ Guide series, there are a few publications that could help you on your way. One of these is the Packet Starter Pack by the East Suffolk Data Group, produced by G7ANH and GOJUV. Unlike other publications which rapidly become out of date, this information pack is regularly updated and reprinted as required to reflect the rapidly changing face of packet radio. Copies are available for a nominal donation to club funds (currently £1 plus large SAE) simply to cover their expenses, with annual membership standing at £5 at the time of writing. Their secretary is Dave Archer G4GKE, 121 Parliament Rd, Ipswich, Suffolk IP4 5EP.

Data Groups

Throughout the country, network ‘nodes’ relay packets day and night, bulletin board stations run to disseminate information providing a service to all amateurs, but many users take these purely for granted. The day to day running expenses of these are certainly not funded by organisations. They are run by local groups of amateurs, and sometimes by individuals. A quick word of thanks never goes amiss, and if your area is served by a Packet Radio group, then do consider joining. One such society is Maxpak, and their quarterly journal Digicom is well worth a read. Their Membership Secretary is Richard Nicol G1NZZ, 37 Thicknall Drive, Stourbridge, West Midlands DY9 0YH.

New Hardware

The latest news is that the well-known industry ‘standard’ TNC-220 has now been updated with the introduction of the TNC-225, provisionally priced at £179. New additions are a PMS (personal message system) with enabled/busy/pending indicators, the facility for Amtor and RTTY modes with a replacementEPROM, and a built-in HF multicolour bargraph tuning indicator. It uses the Texas TCM3105 modem on VHF, with EXAR 2206 and 2211 ICs together with a six-pole active filter on the HF port.

For 9600 baud FSK usage, either for satellites or for high speed linking between groups, I am informed the G3RUH modem is now available in chip form to enable it to be fitted inside a standard TNC.

End of Message — CTRL-Z

This regular feature must of course be a two-way affair for it to reflect what is happening, so please get in touch to let me know what the latest is in your corner of the world. I can be reached via packet with a message routed to G4HCL @ G87XJZ-2, or via Prestal Mailbox 011138098. If you prefer pen and ink, letters addressed to Chris Lorek, c/o Ham Radio Today, Argus Specialist Publications, 1 Golden Square, London W1R 3AB will also get to me.
operation on the band. Unfortunately this came after the peak of sunspot cycle 21 when propagation conditions had started to decline; however some remarkable results were achieved, giving an indication of what to expect in the future.

The 50MHz band is not a Region 1 allocation in Europe due to the extensive use of TV on Band 1. At the last IARU conference a strong case put up by the RSGB was defeated by three votes, but despite opposition put up by neighbouring countries the DTI agreed to grant restricted operation to Class A and later Class B UK operators on a 'Non interference basis'.

Early History
We have to go back over 40 years to trace the start of activity in the band by UK operators, some still alive and active. The peak years of cycle 19-1946/47 are of historical interest, during the run up to cycle 19 a considerable number of TV and commercial stations had been heard over the north/south path in both Europe-South Africa and North-South America by what is now known as Transequatorial Propagation (TBP). ZS1P in Cape Town had been regularly receiving the Alexandria Palace TV and MD5KW had been receiving All India Radio and commercial stations from Africa and Europe, so in 1946 he installed a beacon on 50.01O beaming alternatively north south and active. The peak years of cycle 21 when propagation conditions had started to decline; however some remarkable results were achieved, giving an indication of what to expect in the future.

Due to successful negotiations by the ARRL with the FCC, US amateurs did not have the same TV problems as Region 1. From March 1 1946 the 6 metre band (50-54MHz) became generally available. The early pioneers utilised CW, AM and even NBFM. Antennas included rhombics, corner reflectors, folded dipoles, to name a few. The first 2-way QSO involving "skip" was reported to have taken place on April 23, 1946 when W1LSW new Hampshire worked W9DWU of Minneapolis distance 1,100 miles. By August 1946 6 metre operators were popping up all over the country in all but 18 of the US. By this time about 30 Canadians were on the band. In the Pacific, Australia and New Zealand had their share of experimenters also. Some of the early VKs included VK2WJ, VK2BZ, VK2IS, VK2LZ and VK2NO. Some phenomenal low-power DX contacts were made around this era; on November 29th W1MUX raised G5BY with an input of three watts. Numerous W6s with converted M5Ks running 3.5 watts worked the East coast. The miles per watt must go to W2RRG NJ who worked W7ERA Oregon with an input of 0.3 watt!

Geophysical Year (IGY) 1957
The IGY — an international co-operative research program concerning the geophysics of the earth, included major studies of the ionosphere. To further these studies many countries not normally operational on six metres granted temporary permits. This authorisation included Azores CT2, Madeira CT3, Sweden, Norway, Poland, Switzerland, UK and Ireland. Probably one of the most successful European operators during the IGY was the late Harry Wilson EI2W. During the four months from October 27th 1957 Harry worked 190 stations in 35 US states and 2 Canadian Provinces. Four QSOs were
made with California, XF1PFE for the first Europe-Mexico contact on this band. In England Gordon Spencer G4LK in Newcastle who had been granted a 50MHz permit for a few months, carried out test with South African stations, and had QSOs with WVE stations.

**Solar Data**

Although the accurate forecasting in advance of periods of good propagation is difficult, there are certain aids and guidelines to consider. It is necessary to appreciate the significance of information about solar and geophysical events which either have affected or may effect radio propagation, together with forecasts of likely conditions. Every Sunday the RSGB GB2RS news bulletin includes information prepared by Charlie Newton G2FKZ of events which have affected, or may affect radio propagation. Bulletins include both factual data and propagation forecasts. The factual data usually refers to the week up to the Tuesday preceding the transmission. This is as up-to-date as can be arranged, because the information is received from many sources. Each 27 day rotation has its Carrington Rotation number (a solar rotation base map is prepared each year by R. G. Flavel G3LTP, Chairman of the RSGB Propagation Studies Committee. We understand that a copy of the current map will appear in the 1989 RSGB Callbook). Interesting activity centres, such as major sunspot groups, flares, coronal holes etc., can be referred to in latitude north and south and heliographic longitude, which gives both position on the disc and the date of central meridian passage.

Frequently the radio effects of solar events are experienced around the time of central meridian passage, but this is not always the case. Large flares can have almost instant effect on the ionosphere regardless of their position on the disc, whereas auroral effects usually occur 30 to 50 hours after the event. The general background flares and sunspots, mostly small in size and short in lifetime, are what is known as ‘solar activity’. This varies depending on the number of active regions and the type of flare emissions that occur, both in the optical X-ray, and radio spectrum in general. The effects are classified as Solar Quiet — no active regions erupting; Solar Moderate — active regions erupting, but with low intensity; Solar Active – one or more active region erupting, but with high intensity bursts or new regions forming, or both.

**Solar Flares**

These are divided into three types: C, M and X. C type flares are very common and are of low intensity, about 80 to 100 per week at the present time, in effect they give the general background to the solar flux. M type are of increased intensity over C and can cause events such as magnetic storms and short wave fadeouts (SWF) of varying amounts. These are sub-classified in M1 to, say M4. The resulting magstorms of M3 M4 type flares usually give Scottish weak auroral events. X type are violent, big and accompanied by X-ray type emissions. They usually cause widespread blackouts of the spectrum.

**WWV Solar Data Reports**

Every three hours the geomagnetic field is measured in three dimensions: horizontal (H), declination (D), and vertical (Z). The one showing the greatest variation at any time is for computing the three hourly K index. Sometimes the bulletin will refer directly to this K index, but more often it will express magnetic activity in terms of the 24 hours A index. The A index is derived from the K data.

**WWV Geoalert Broadcasts**

The National Bureau of Standards (NBS) transmits information regarding solar activity via WWV on 2.5, 5.0, 10, 15 and 20.0 MHz, at 18 minutes past each hour. These messages are changed every six hours at 1800, 0000, 0600 and 1300 UTC. The first bit of information is solar flux; measured at 2800MHz in Ottawa, Canada. It is a measure of the solar electromagnetic radiation — hence it is related to sunspot and flare activity. Given next is the A index which is a measure of geomagnetic activity for 24 hours, ranging from C (very quiet) to 400 (very disturbed). It is measured at Virginia, USA.

Following this is the K index, which is a logarithmic index of geomagnetic activity ranging from 0-9 units. The K index is measured every three hours at Boulder, Colorado, USA. These measurements are then averaged to determine the A index for the next 24 hour period. The last piece of information by WWV is a forecast of terrestrial conditions for the next 24 hours as they correspond with solar activity such as flares and the geomagnetic field. By monitoring WWV on a regular basis and by paying special attention to the A and K indices given, it is possible to predict auroral conditions (see figure 1).
Six metre DX QSL Information

C02KK: QSL Mgr. W4COO, Gene Sykes, 8510 Carmabola Circle, W. Palm Beach, FL 33460
CT1DQ: Via KD3VR
CT5BK: Via H. Coen, Verda Bala Vista 3, P-9000 Funchal, Madeira Island.
CT4KQ: Serafin, Matao da Silva, Estrada da Azenha, 3500 Viseu, Portugal.
CX4HS: Alberto Symonds, PO Box 274, Montevideo, Uruguay.
CX8BE: Jorge De Castro Alves, Lieja 7184, Montevideo, Uruguay.
C6ANY: Daniel De Souza, Box N-1712, Nassau NR, Bahamas Islands.
OSL Mgr: W2GKH, Stuart F. Mayar, 2417, Newton St, Vienna, Virgina 22180.
D44CU: Julio Vera-Cruz, PO Box 36, Mindelo, Republic of Cape Verde.
E1AMO: Manual De La Torre, Pedro Claret 9, Valadolid, Spain.
E1AS: Albert Laitham, 226, Belgard Highands, Clondalkin Dublin, Eire.
E19Q: Dick Magid, 18 Manor St, Waterford, Eire.
FC1GTV: Daniel Lauseille, La Gran, Champcevini, 24750 France.
FM3AG: Jean Louis Bibas, Ecole d'Appassionement Maritime, Beause Jour, F-97720 Trinite, Martinique.
FY5AU: Leslie Thomas, PO Box 899, F-97300, Cayenne French Guiana.
FY5AB: Joe Vella Brincat, PO Box 10, Zabbar, Malta G.C.
HC1BI: HC5QF, PO Box DX, Cuenca, Equador.
HC2FG: PO Box DX, Cuenca, Equador.
HC6S: Vittorio Taddei, Via F. Gobet, 1, Torino, Italy.
HC8B: Diego Bucheli, 34-35 Miguel de Caro, Montevideo Uruguay.
HH2C: Serge Cuville, Box 1774, Port au Prince, Haiti.
HH2D: Mike Barry, c/o BBC, Ascension Island South Atlantic.
HH2ET: Yannick Desbois, 22, rue de la Place, Paris, France.
HH7VP: Patrick de Verteuil, Abricots, Jeremie, Haiti.
HH7XJ: Herbert Schoenbohm, Box 2570, Christiansted, Virgin Islands.
HV4CD: John Webster, 31 Atlantic Shores, Christ Church, Barbados.
HV4IK: Ted Ross, 16 Ifiynias St, Larnaca 309, Cyprus.
HV5AV: Mike Barry, c/o BBC, Ascension Island South Atlantic.
HV6BV: Diego Bucheli, San Cristobal Island, Galapagos Islands.
HV7V1: Donald Bl/Card, PO Box DX, Cuenca, Equador.
J56US: Dave, QSL via WA6JOC.
J56LV: Brian David Reid, Box 115, Castries St, St. Lucia, Windward Islands.
OSL Mgr: K2QIE, Ed Mason, 129 Cherry Hill Rd, Edgewood, MD 21040, U.S.A.
J6LB: Ehud Neoklis, Thomas, La Clery, Castries, St. Lucia.
J6LE: Stephen Thomas, La Clery, Castries, St. Lucia.
K6GDX: José Chalimins, 93 Gardenia Ave, Latte Heights, Guam 96913.
KP2A: John Ackley, Box 10245, Charlotte Amalie, Virgin Islands 00820.
QSL Mgr N5CW.
KV4AD: William B. Fageol, 19-A Solberg, Box 2126, St. Thomas, Virgin Islands 00801.
KV4FZ: Herbert Schoenbohm, Box 2570, Christianssted, Virgin Islands.
OSL Mgr: W2GKH, see C2ANY for address.
OX3LX: Bo Christensen, Box 187, DX-3920, Julianahab.
QSL Mgr: W2GKH, source OZ1DQ.
OX3RA: Heruf Rasmussen, Box 165, DX-3920, Julianahab, Greenland.
P1D: William de Wight, Box 3383, Willemstad, Curacao, Netherlands Antilles.
OSL Mgr: W2GKH, see C2ANY for address.
PJ2D: Roger Glommer, 24 Cole Bay Lagoon, St. Marten, Netherlands Antilles.
PZ1AP: Arnold J. Polbrook, PO Box 566, Paramaribo, Suriname.
P4AS: Juan Noguera, PO Box 2380, St. Noahelas, Aruba.
PV1D: Dr. C. Fimerelli, 21 Eleonore St, Athens 112 54, Greece.
PV3GFK: Francesco Capevano, 16 Ave 270, Zona 10, Guatemala City, Guatemala.
PV3NC: Carlos M. Fonseca Q, Box 4300, San Jose 1000, Costa Rica.
PV3E: Heinz Lazarsfeld, Box 8-4750, San Jose, Costa Rica.
PV3K: Carlos Diaz, Box 891, San Pedro, San Jose 2050, Costa Rica.
PV3NA: Erik Roy Jimenez, Box 661, San Jose 1000, Costa Rica.
PV7A: Via T77C; Antonio Cecccoli, Via Belle Carrera 67, 47031 Murata, S. Marino.
V2AR: Mickey Matthew, Box 550, Golden Grove, Antigua & Barbuda Leeward Is.
V2AYL: Hyacinth Matthews, Box 550, Golden Grove, Antigua & Barbuda Leeward Is.
V31AB: Wayne: QSL via W4WIP.
V31PC: Box 7, Punta Gorda, Belize, Central America.
VP2MJ: Monty Werry, Richardson Hill, Montserrat, Leeward Islands.
VP2MN: Joanna Mee Martin, Box 113, Plymouth, Montserrat, Leeward Islands.
OSL Mgr: W2LIC, Gene Egr Snr, PO Box 64, Gloucester, N.J. 08030-0064.
VP2MO: Errol "Bobbie" Martin, Box 113, Plymouth, Montserrat, Leeward Islands.
OSL Mgr: W2LIC (see above VP2MN).
VP5D: Robert B. Cooper Jr, Providenciales, Tuku & Calcos Islands.
V680: Heraic, PO Box DX, Cuenca, Equador.
V686WV: QSL via KOTLM.
V9321B: Jose Cespedes, Box 2871, Managua, Nicaragua.
V91BIEC: Edouardo Bruso, Calle los Sismoles, 3244, Miramonte, Box 05-43, San Salvador, El Salvador.
ZD7CW: QSL via N4CI.
ZD6GN: Mike Barry, c/o BBC, Ascension Island South Atlantic.
ZD6PV: QSL: Direct, via ZD8b buro or via his home call G4MAB.
Z1RC: Roger Corbin, Box 1549, George Town, Grand Cayman, Cayman Islands.
Z53AT: Thomas Friedrich, PO Box 21602, Windoek, Namibia, S.W. Africa.
Z53E: QSL: OSR K8EFS, Mr. M. D. Anderson, Box 54 R 4 S Cochran, Charlotte, MI 48813, U.S.A.
Z94UN: QSL Mgr: NA2K, Mr. Harry Westervelt, 72 Kuhthau Ave, Milltown, NJ 08851, U.S.A.
4S7EA: Ernest Armanarigna, 276 S Colombo Rd, Divulpiuta, Belize, Central America.
4XI1F: Ralph Rosenbeum, 17 Shalom St, Ra'anana 43561, Israel.
4XI6F: Danny Rosenbeum, 17 Shalom St, Ra'anana 43561, Israel.
SB4A2: Neoklis Kyriazis, PO Box 1662, Limassol, Cyprus.
SB4QG: Ted Ross, 18 Ifinias St, Larnaca 305, Cyprus.
G3QGJ4/8NO: Soqn Ldr Roy Hambly, 16 Ybran, Glen Conway, Colwyn Bay, Chwlyd LL28 6NJ, North Wales.
8YIC: Wenly Bethune, Hampshire House 12, 4 Rekadox Ave, Kingston 10, Jamaica.
8P6CX: Paul Burleigh, Wayne, Rockley, St. Michael, Barbados.
QL: Mgr: K2QIE, Ed Mason, 129 Cherry Hill Rd, New York, NY 10030, U.S.A.
8P6KY: Frank Freer (Barbados), QSL Mgr: K2QIE (see above).
8P6OW: John Webster, 31 Atlantic Shores, Christ Church, Barbados.
QSL Mgr: K2QIE (see above 8P6CQ).
8P6L9: Mike Barry, c/o BBC, Ascension Island South Atlantic.
8P6AY: David W. Pentille, Rockley Beach, Christ Church, Barbados.
8H1BY: Paul Guy, 93, Euston Crescent, Northfleet, Kent.
8H1OG: Joe Vella Brincat, PO Box 10, Zabbar, Malta G.C.
9S5NQW: Tom Gregory, QSL via A17EL. Samuel Harrell, Box 368, Stockbridge, GA 30281, U.S.A.

In order to exchange information between national and international operators two active nets are in operation: 28.885 for world-wide use, and 3.817 for European use. The 28.885 is open all day-most days during good conditions and many well-known DX operators exchange current information and arrange skeds for 50MHz operation. The European net is operating most mornings from 0800 GMT for arranging skeds and exchanging information.

6m Liaison Frequencies

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HAM RADIO TODAY MAY 1989
Argus Specialist Publications, Argus Books and Argus Specialist Exhibitions are moving from their existing offices to a new headquarters building at Easter.

FROM TUESDAY MARCH 28th THE NEW ADDRESS WILL BE:

ARGUS HOUSE
BOUNDARY WAY
HEMEL HEMPSTEAD
HP2 7ST

THE NEW TELEPHONE NUMBERS, FROM THE SAME DATE, WILL BE:

Central Switchboard Hemel (0442) 66551
Classified Tele-sales Hemel (0442) 66650
Fax Hemel (0442) 66998
Telex: 827797
On these club contacts and forward diary pages, dates are shown approximately from the week of publication to the end of the cover month, and further into the year where dates have been supplied. If we get a yearly schedule, we will incorporate half-yearly slabs, to save space and allow for alterations. We need dates at least three calendar months in advance to get them into the nearest issue. For example: the last possible issue for dates from mid-August to mid-September is the September issue. The September issue normally appears on the first Friday in August, and we need club dates by the second Friday in June. Club dates received well in advance will normally be run in more than one issue. Also, please write and let us know if your club has ceased, or changed its name or contact.

HAM RADIO TODAY MAY 1989

please mention HRT when replying to advertisements
THE MIDLANDS

Birmingham: Midland ARS. Contact: Paul O'Connor G1ZCY Tel. 021 443 5157. Meetings: Thursdays 7.30 at Unit 16, 60 Regent Place, Jewellery Quarter, Birmingham. Apr 12 Morse tuition 7pm Mar 8, 15, 22, 29; Apr 5, 12, 19, 26; May 3, 10, 17, 24, 31.

Coventry ARS. Contact: Johnathan Ward G4HHT Tel. 0203 610408. Meetings: Baden Powell House, 121 St. Nicholas St., Redford, Coventry. 8pm. Fridays.

Dudley ARC. Contact; J. Barry Clarke G4XMT Tel. 09073 5720. Kiddleminster DARS. Contact; Tony Tel. 0562 751584.

Mid Warwickshire ARS. Contact: G4TIL Tel. Southam 4765. Stourbridge, West Midlands DY9 0YH.

Rugby ATS. Contact; Kevin Marriott GW1BWH, 77 Lloyd Crescent, Stoke Hill, Coventry CV2 5NY. Meetings: Cricket Pavilion, BTI Radio Station, 8th entrance. A15 Trunk Rd., Hillmorton, Rugby. Tuesdays 7.30. Apr 18 AGM; May 2 Annual Construction Competition judging; May 16 DXpedition to Lundy by Lionel Parker G4LP; May 23 DF hunt under new rules; Jun 27 Top band D/Fing by Geoff Foster (provis).

Stratford on Avon DRC. Contact: David G0HWC Tel. 0789 750584. Meetings: 2 and 4 Mondays, 7.30pm. The Baptist Church, Payton St., Stratford on Avon. Apr 10 Visit RAF Radford, Coventry. 8pm. Fridays.

Telford DARS. Contact: Tom Crosbie Tel. 0952 597056. Welshland Valley ARS. Contact: J. Day Tel. 0858 32109.

West Bromwich Central RC. Contact: Bill Oakes G1YQY Tel. 021 430 7267. Meetings: Robin Woods Centre, Beauty Bank, Stourbridge, Worcestershire DY9 0YH.

Wolverhampton ARS. Contact: Keith Tel. 0902 24870. Worcester DARC. Contact: D. Batchelor Tel. 0905 64173. Wythall RC G4VWC. G4VAC. Contact: Chris Pettitt GOEYD. Tel. 021 430 7287.

SOUTH WEST ENGLAND

Bath DARC. Contact: G4UMN Tel. Frome 63939.

Bristol: North Bristol ARC. Contact: Alan Booth Tel. 0272 690404. South Bristol ARC. Contact: Len Baker G4RZV Tel. 0272 834282. Meetings: Whitchurch Folk House, East Bundy Rd., Whitchurch, Bristol BS14 0LN. Most Weddays. Apr 12 Activity evening; Apr 19 Practice morse tests under exam conditions; Apr 26 Activity evening; May 3 Video Travels in South Africa; May 10 HF Activity evening; May 17 Construction evening; May 24 Club station.

Conway Valley ARS. Contact: R A Hinton Tel. 0301 1864.

Delyn RC. Contact: Stephen Studdart GW7AAV Tel. 0244 128428. Meetings: At the Four Crosses, Pentraeth Rd., Menai Bridge. 7.30pm. 1 and 3 Mondays. May 1 Bank Holiday informal get together; May 15 Demonstration on morse test by Peter G3MGB. "Let us find out what that summer weather will be." Jun 5 Aerials for DX by Bert Hewit GW3YNM; Jun 19 Security in the home and shack by John Parry GW3VVC.

Evesham: Vale of Evesham DARS. Contact: John G3DEF Tel. Evesham 6407. Meetings: 1 Thursdays at 7.30pm at the MEB Club, Worcester Road, Evesham. (04094 on left entering town). May 4 Visit by Howes Communications.

Exeter ARS. Contact: Roger Tipper Tel. 0392 68095.

Ham Radio Today May 1989 please mention HRT when replying to advertisements

Newport ARS. Contact: G4WZUQ Tel. 0291 62887.

North Wales: Dragon Amateur Radio Club/Clwb Radio Amtatur Y ddraig GW4TTA. Contact: Tony Rees Tel. 0248 800563. Meetings: At the Four Crosses, Pentraeth Rd., Menai Bridge. 7.30pm. 1 and 3 Mondays. May 1 Bank Holiday informal get together; May 15 Demonstration on morse test by Peter G3MGB. "Let us find out what that summer weather will be." Jun 5 Aerials for DX by Bert Hewit GW3YNM; Jun 19 Security in the home and shack by John Parry GW3VVC.

Northern ARC. Contact: Steve G4GHL Tel. 09173 3720. Plymouth ARC. Contact: G4SCA Tel. 0752 337880 Plymouth Mobile Rally. Plymouth School, Church Road, Plymouth. May 28 from 10am. Large free car park, refreshments, raffles, usual trade stands, demonstrations and talk-in on 522. Full details from Joe G1RXR Tel. 0752 509865.

Poole ARS. Contact: G0EOV Tel. 0202 674802.

Southampton RES. Contact: Neil Tel. 0980 22803.

Thornbury DARC. Contact: Tom Cromack G0FGL. Rose Cottage, The Naite, Oldbury on Severn, Bristol. 1 and 3 Wednesdays. 8.30 United Reform Church, Chapel St., Thornbury, Evesham. Apr 19 Project evening; May 3 Raynet; May 17 HF activity.

Torbay ARB G3UNA, G8UNA. Contact: Bob McCreadie GOFOX Tel. 03864 233. Meetings: the ECC Club, Ringslade Rd., Nr. Highweek. Natter nights most Fridays. 7.30pm.

Trowbridge DARC. Contact: Ian Carter G0GGA. Tel. 0380 830383. Meetings: Usually 4 Wedsdays, 8pm, TA HQ, Bythesea Road, Trowbridge. Apr 26 Residual current devices by G0HFX; Jun 21 6.30am 2 metre fox hunt; Jul 19 6.30am Picnic.

Yeovil ARS. Contact: David Bailey G1MIMM. QTHR. Meetings: The Recreation Centre, Chilton Grove, Yeovil. 7.30pm, every Thursday. Apr 13 Multimeters by G3GC; Apr 20 AGM; May 4 Briefing for GRP Convention; May 7 QRP Convention, Preston School, Yeovil at 9am. Two lectures, plenty of traders and refreshments. Contact: J. W. Howard G1MIMM, 7 Thatcher Close, Yeovil, Somerset.

SOUTH EAST ENGLAND

Basingstoke ARC. Contact: D. Deane G3ZOI Tel. 0734 332777 (0734 787930 (wk)). Meetings: The Forest Ring Community Centre, Sycamore Way, Winkleybridge, Basingstoke. 7.30pm. 1 Mondays. Club net Sunday evenings on 144MHz.

Bedford DARC. Contact: Ray GOYEM Tel. 0234 244506. Special Event Stations G8B00 and G8B00B commemorating World War 2 during 1989. Locations include RAF and USAF bases in the Bedford area.

Biggin Hill ARC. Contact: Geoff Milne G3JUML, 142 Hayes Lane, Hayes.

Braintree DARS. Contact: N. Williscombe Tel. 0376 45056. Meetings: Braintree Community Association Centre, Victoria St. 7.30pm. 1 and 3 Mondays. Club net C6BRH or G4JXG, 2m and 4 Mondays, 8pm.

Broadhurst RTS G0BRC, G7BRC. Contact: Kevin Fay Tel. 0634 376991.

Brighton ARS. Contact: Peter Tel. 0273 607737. Meetings: 1 and 3 Wednesdays, Roast Beef Bar, Brighton Racecourse, Elm Grove, 8pm.

Bromley, Kent. Tel. 01 462 2689. Meetings: The Victory Social Club, Kehill Gardens, Hayes, Kent. 7.30pm. 3rd Tuesdays. Club net 145.350MHz FM 11am Sundays.

Burnham Beeches RC. Contact: G6EIL Tel. 0628 25720.

Cambridge DAR. Contact: D. Wilcox Tel. 0964 50957.

Cheshunt DARS. Contact: L. Gabin Tel. 09278 3911. Meetings: The Stable Lof, Bury Farm, Pednor Rd., Chesham, 8pm. Wednesdays.

Cheshunt DARC. Contact: Roger Friby G4OAA Tel. 0992 4864795. Meetings: Thursdays 8pm Church Room, Church Lane, Wormley, Herts.


Cornwall RAC. Contact: Mike G4QLQ Tel. PO Box 100, Truro, Cornwall. Apr 22 International Marconi Day on the air.

Coulston ATS. Contact: Alan Tel. 01 864 0610.

Crowley ARC. Contact: Jack Tel. 0294 28612.

Dover: South East Kent YMCA ARC. Contact: Des Edwards Tel. 0304 203073. Meetings: Dover YMCA, Godwynemouth, Leybourne Rd., Dover, Kent CT16 1SN. Tuesdays. Apr 12 AGM; Jun 24-25 Warren Memorial Weekend special event station GB2WW; Jul 19 Morse tests; Nov 15 Morse tests.

Dunstable Downes RC. Contact: Tony Kelsey-Stead Tel. 0582 508259. Meetings: Room 3, Chews House, 77 High St. South, Dunstable, Beds. Fridays. Apr 29 Wolfsburg Amateurs visit; May 1 DF/treasure hunt; May 6 Gerryman leaves; Jun 18
Rochford, Essex. 10am. Contact: Ted G4TGU Tel. 0702 202129.

Southgate ARC: Contact: Brian Shelton Tel. 01 360 2453. Meetings: Holy Trinity Church Hall, Winchmore Hill, London N21. 7.45pm. 2nd and 4th Thursdays. Apr 13 Grand Surplus Sale; Apr 27 Introducing Youth into Amateur Radio.

South Kent (YMCA) ARC. Contact: Des Edwards Tel. 0304 203073. Meetings: Dover YMCA, Godwynhurst, Lybourn Rd., Dover. Tuesdays. Apr 12 AGM; June 24-25 Wadershare Vintage Weekend special event station GB2ZWW; Jul 19 Morse tests: Nov 15-Morse tests.

Stevenage DARS. Contact: G6EDA Tel. 0438 724991.

Welwyn Hatfield ARC. Contact: Roger Curtis GOCYC Tel. 0707 324958. Meetings: Lemsford Village Hall, Brocket Rd., Welwyn Garden City, 1 Mondays, 8pm. 9th WGC Scout HQ, Knightsfield, WGC 3 Mondays. Regular nets. Apr 17 On-air chance to contact G3BYG and G4WVM; May 1 The black art of pile-up, vintage radio display, other stalls, play area, model aerial testing range, transceiver clinic, packet radio demo, cw pile-up, vintage radio display, other stalls, play area, model flying display, refreshments. £1. Members free, non-members 50p. Contact: G8CJS or G80ZP QTHR.

West Kent ARC. Contact: B. Guiness Tel. 0892 32877.

West Sussex ARC. Contact: M. Mundy. 142 Junction Road, Burgess Hill.

Wimbledon DARS. Contact: Nick Lawlor G6AJY Tel. 01 330 2703. Meetings: 2 and 4 Fridays. St. Andrews Church Hall, Herbert Rd., Wimbledon, London SW19. 7.30pm. Apr 14 Surplus equipment sale; Apr 28 Desert Island Radio competition; May 26 Quiz with Coulsden Sco; Jun 9 Cellular Radio by Ian Lawlor G6KZ; Jun 30 HF antennas and feeder systems by Louis Varney G5RV.

IRELAND

Armagh and Dungannon DARC. Contact: J. Murphy Tel. 0661 522153.

Donegal ARC. Contact: EI3BOB Tel. 074 57155.

Mid Ulster ARC. Contact: Jim Lappin Tel. 0762 851179. Meetings: 2 Sundays (not July and Aug) 3pm Guide Hall, and buy, books, QSL bureau etc. Talk-in S22. £1. Proceeds to Stanley Eakins Memorial Fund.

NATIONAL AND INTERNATIONAL

AMRAC. Contact: Phil G5DLJ. Tel. 0703 847754.

British Amateur Television Club. Apr 30 convention/rally.

Founders Suite, Coventry Crest Hotel A46 near M6 junction 2. Traders, demonstrations, lectures. 10am, Members free, non-members 50p. Contact: G5CUS or G5OZP QTHR.

British Amateur Radio Teledata Group. Contact: Patrick Beedle G5IDM Tel. 0658 822286. Ffynnonas, Salem, Llandeilo, Dyfed SA19 7NP; SAE for more information. GB2ATG amateur radio news service transmits on 1 and 3 Sundays, on 2.390MHz, 14.090MHz and 144.600MHz. Operated by volunteers, GB2ATG welcomes amateur radio news for possible transmission, especially concerning radio data activity (RTTY, Amter, packet, fax, etc.).


UK FM Group. Northern. Contact: L. Laughton, Claremont, Main St., East Ardsley.
Ham Radio Today can supply ready-made, pre-drilled printed circuit boards for some of our published constructional projects. The first board to become available is the Morse Keyer, published in the January 1989 issue of HRT. The board reference number contains the essential information for identifying and ordering a board from our PCB Service. The first two digits give the year of publication, and second two the month. The extension number gives the number of projects available from that month’s issue.

Please send orders to: HRT PCB Service, ASP Readers Services, 9 Hall Road, Hemel Hempstead, Herts HP2 7BH. Please make cheques out to ASP Ltd. Payment can also be made through Access and Visa cards by telephone on (0422) 41221 during office hours.

HRT 8901-1 Electronic Morse Memory .......................................................... £5.50

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Access and Visa credit card orders can be taken by telephone on (0442) 41221 during normal office hours.

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VISA AND ACCESS WELCOME

Please mention HRT when replying to advertisements
FOR SALE

TRIO 930S Tx/Rx, mint condition, no mods, boxed and manual, £1000.00. Capco SPC-300 ATU. £250.00. Epson FX-80 printer, exl cond, all leads to fit BBC-B £130.00. Mon/Fri after 6:30pm: 01-761 5470, all Sat/Sun 0760 338416. Fred G4JUS.

SAISHO SW5000, virtually unused, £250.00. Tel. Brian G1UWV, New Milton, Hants. 0426 615860.

FOR SALE, race model 1771, fully synthesised, freq. range 15kHz-300MHz £350. Wanted: Racal 1912. – Phone 01-235 5422, ext. 1912.

PARAGON Ten-Tec transceiver, matching power supply power supply; all optional filters fitted; used only on receive, excellent £1,200, selling for £700. Ring (0772) 704009, after 6pm or Sundays.

HAULCRAFTER Receiver for sale, five band, S120, MW + 1.6MHz, converted to 240V AC with PSU, £40, MW & SW’s DX’rs £45, 240V AC, handles £60. G8BSK, 290 Priory Road, St Denys, Southampton 021 514 421.

FOR SALE, UBC 75XL desk top scanner, BV131 Zetagi linear amp, CTE International pre-amp, lots of other goodies for sale. Offers welcome. Phone Chris on 05205 231. Weekends only.

CM1-4 with disk drive, data cassette manuals, £85. Rule 12 volt Winch as new £250. FT780R 70cms Multimode £275. Yaesu MD850 HF module, 70cms and 6m modules for FT725R; px any above or phone price. G6WWM OTHR 01-302 6865.

FT480R all mode 2 metre Tx/Rx, mint condition, boxed with manual, £300.00. 0273 868455. Brighton OTHR.


PLESSEY PR155G communications receiver 0.6-30MHz with ISB adaptor £300. 0232 330891 or work 01-839 1949.

FOR SALE, Yaesu FT747GX with FM board and general coverage transceiver. Worked all over world with simple antennas, as new and boxed, £600.00. Contact Mike G0GIE on Leyland 424878, after 6pm, buyer collects and cash only. Genuine reason for sale.

COMPLETE 2 metre all mode station, FT480R, immaculate condition, never used mobile £285. MFJ-441/100W linear amp £110. 20A 13.8V DC PSU, twin meters, volts & amps £50. All three together £435. TR 2300 FM, 2 metre portable with nicads & charger, £110. All bargain £23. Tel. Paul G4XHF (0293) 515201.

YAESU FRG7700 HF receiver, 0 to 30MHz, all mode plus FRV 7700 converter, 120 to 170MHz, both as new; bargain £350. Tel. (0988) 745750.

EXCHANGE realistic DX440 digital receiver, AM & SSB, 150kHz to 30MHz, continuous & BBNMER to 10MHz scanner, must cover 2m-70cms ham bands. Phone Ken, Tyneside (091) 548761 or write. Ken, Bewfen Gardens, Roker, Sunderland, Tyne & Wear SR6 9BL.

MFT 28/144 transceiver, 2 metres; with 7db input attenuator, ideal for FT290, new, unused in box. £75. Ring 021 4688340.

SPECTRUM Analysr, FT5K1 cable, 9 x 9 x 14, 12 volts dryable changeable, 5 band widths, 1-25-100MHz, £50. QRP kit +100. £205.

DATON D70 morse tutor, Ring Adrian, office Southport 0704 46011; home Preston 0772 151.

FOR SALE, FRG-7 general coverage receiver, mint cond, £125; PDR 700-E 2M FM mobile with mount, 1-25 watts, £15; RN Electronics BM transmitter, 25 watt O/P with 4 ele beam and filter, £180. Contact Mark, G1PIZ, 0362 2319; weekends only.

For Sale Yaesu FT290R 70 cms module, boxed, £195; will swap for 8m module or other goodies for sale. Offers welcome. Phone Chris on 05205 231. Weekends only.

HAIVI RADIO TODAY MAY 1989

FREE READERS ADS!
service manual, spares, despatch by Securicor, £300. Tel. (0472) 356888, anytime.

TRIO 8305, 100-160m Tcv, mint condition, £850 ono. Buyer collects. Telephone 0287 38103 after 6pm Mon-Fri, anytime weekend.

TRIO 8305, as new, with CW Rxhf, £200. Tel. 0602 38002. FOR SALE new European power supply, type CPS 10; also Butternut HF6V, TRIO 830S, as new, with CW Rxhf, £425; Racal RA171 hardware £145; Yaesu 812A, KT88, QV05-25, TY2-125 offers. Want: back issues QST magazine.

TRIO R1000 with FM board, sensitive, good condition, £235. Other multimode transceiver with FM board, balance either way or sell. Full list, Lucking, 62 Elm Farm Way, East Molesey, Surrey KT8 0BL. 01-398 3602.

TRIO 700 for sale, Sommerkamp 860DXD (exactly same as FRG 9601), extended coverage 60-950MHz. Also 100MHz converter with TRIO 7000; 1K6 THUNDERBOLT. 10 element Yagi, £10. Leighton Smart, 33 Nant Gwyn, Telesys CF46 6DB. Ms. Small, 10 Cherry Tree Road, Chinnor, Oxon OX9 4QY.

TR170 2m, 70cm. HF and satellite modules, offers. Icom R70 comms Rcvr with FM, offers. Kenwood TS800H HF and 50MHz Tcvr £750. Money needed to start business. 0305 873570, Mike, G1XGM, 21 Marton Road, Toll Bar, Bentley, Doncaster, Yorkshire DN5 0RF.

COMPLETE HF base station. Yaesu FT100E CW/SSB/SAM, excellent condition with L.P.R., microphone and key, £210; Butternut six band vertical, virtually new, £125; complete station £320, includes co-axial, plugs, etc. Genuine reason for selling: Europe power supply takeover by Securicor on Sea View (Nofolk).

Yaesu FT480 and FT780, 2 metre and 70cm's 10 watt multi modes, plus clamshell RSGB/PSU/lock and base, scanning mic. G1LCN. Tel. 0274 782970.

SWANK 7000CX £350; HF vertical + radial kit £35; Oscar 2m x 70cm £20: No. 19 set, all accessories, working; offers; G4JWY. Tel. Eyke 480321 (Suffolk). FT2920 Mk1 with Buttkast front panel, new nicads, charger and soft case, £25. Tel. 0959 74275, after 7pm, weekends.

TWO-METRE Hand-held Trio 2500, mint condition, extra includes battery pack, leatherette case and new service manual, £140. Telephone 0240 370696 (Bucks).

Yaesu FT102D MkII, W.A.R.C. filter, F.M., mint condition, original packing, new 614B 50A fitted, full service manuals, £500; VF101DM remote digital, V.F.O. £200; Drake R4B T4X AC4 M5, recent complete service, new valves, GALW GTHR, Towbridge 0226 751636, anytime.

SCANNER for sale, AOR2002, covers 25-1300MHz, many features including: 20 memories, programmable tuning knob, AM / NFM / WFM modes, socket for RS232 Interface, non-destructive; boxed: only 6 months old; £370. Call 0273 (503) 5936.

11 METRE Crystals for sale, suitable for Yaesu FT101E, £3 each. Tel. Leighton Smart, 33 Nant Gwyn, Telesys CF46 6DB. Mild Glam, Wales. Sorry, no phone.

FOR SALE, going H.F., FT-280R KX2, £75; CIR, £50 for input, switching. 5MHz coverage, good condition with charger, flaxitant, soft case, 25w amp, 8 element Yagi, rotator, £325 the lot. Telephone Garth (G1LCN) 0532 788487 (Leeds).

FT-227R 2 mtr FM, mobile mount, v.g.c. and data for scan, £250; Maplin Matteline Electric Organ, professionally built, 2 x 49 key keyboards, 13 colour lights, 70 rhythms, circuit manual included. £325. G3XKA QTHR, Woking 73620.

TRIO 8305 HF Transceiver, excellent condition, complete with: ATU; AT230 and VFO, VFO 240. Reason for sale, going CRT, £800 ono. Forth 043 683912.

FREQUENCY meter, Thandar PFM200 handheld. 20Hz to 200Hz as new, complete with input adaptors, pickup antenna, mains unit, user manual, £40 including postage. Phone 0435 66317 (Guildford).

EXCHANGE Atari 520 St FM plus software (games, blank discs, etc). Wanted 3 filters £120, R80 £620, 51416. Health reason for selling.

FOR SALE, Yaesu FT101E HF transceiver, complete with CW filter, inverter etc. No mods, v.g.c. Genuine reason for sale. GAEW (Ian), 0270 428054, after 7pm or weekends.

EXCHANGE Antenna Sale. Shack Clearout, 1200 Valves...400 valves. All tested.
WANTED: Yaesu FT101 with digital readout, latex models preferred.

Also ATU and SW/PWR meter. Must be in excellent condition. Tel: of one 050 781 036.

WANTED for complete beginner, reasonable price communications receiver (full coverage), genuine advert, no junk or time waster please. Write Dave, 71 Kensington Road, Chorlton cum Hardy, Manchester 21 1WT.

WANTED: Wide spaced capacitor 28-160PF, Edystone 2 3/4 ceramic wave 2 pole ceramic band switch; Commodore 190L colour monitor. Phone 0375 378783, Toney.


J. Power, 43 Marwick Street, Glasgow G31 3NE (GNKOTO). Telephone 041 556 9895, after 5pm and weekends.

WANTED: Icom IC770; Sony CRT TV; Panasonic RF8000/9000; Grundig Satellit 3400 Professional, in fact any good quality shortwave receiver for cash or swap TV, video, stereo equipment.

Please telephone 0933 56087, Wymb顿, Midlands.

WANTED: Sony ICF 5900, Panasonic RF2900. Zenith trans-oceanic in 9000 working order, please Thanks, Carl, PO Box 942, Sally Oak, Birmingham B2 7DR.

WANTED: Philips D2899 radio or RA2100D. Cash paid.

Tel: 0422 412472.

WANTED: Cheap Datong D70 Morse Tutor in GWO. Will collect within 10 miles of Cardiff. Tel: (0222) 707395, after 5pm; ask for Mark.


WANTED: Band Three mobile radio receivers, Mobile, Tait, Storno, etc. Also Pyle Compact and Racial Syncom HF3000 mobile transceivers. Also any Pyle solid state HF transceivers. Contact Vic Tuff, 0670 355170.

WANTED: Recent R.A.E, Rapid Results Course. Tel:0222 751320 (evenings or weekends).


WANTED: Super Star 360 FM, must have complete UK legs 26MHz, 27MHz plus gow, but suitable for LO/LO/LOF/HIF/HIF/HF conversion. Tel: Felixstowe 288775.


WANTED: FT230R or TR7000 urgently, must be mint condition. Cash waiting for the right rig. Phone Mike G7BWM, 0203 958 2211.

WANTED: FRG 8600 60 to 950 MHz. Have AR4A £60. VC10 VHF converter £110. S. P. Martin, 24 Collingwood Close, Worle, W. M. Are, Avon BS22 5PO. Sorry no cash, must be collect.

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WANTED: Ham International Multimedia II or Concord, preferably converted to 10 metres. Tel: 01-891 2820, evs.

WANTED: YAESU ExVFO FV10 20M, must be good condition. Tel: 0222 416512, evenings.

SWAP DATAWRENCH terminal for IBM XT/AT and clones. The prices are negotiable. Phone Wayne, 01-561 1076.

WANTED: WS Mk 123 DC/DC converter hopac lead, handbook, hand generator kit, any ancillaries or spares. Also crystal set and horn speaker. Please ring Tim, GOAI, Haywards Heath 456380.

WANTED: Either YAESU, 1Com, or TR10 duobander (2metres/70cms) mobile transceiver, must be in good condition. Cash or swap high quality 35mm camera with ultra wide angle lens plus filters, electronic flash, etc. Tel: 0603 (Norwich) 867005, ask for GO84.

WANTED: QAOS solid state linear HF amplifier, FL110 or equivalent, suitable for use with YAESU FT7 as driver. Tel: 0328 600255.

WANTED: Kenwood MC-60A microphones and AT-230 ATU. Tel: 0315-587465.

WANTED: Trio 9R-50D manual or photo copy. All letters will be paid for. Your price paid. Please write Ron, 37 Lawnswood, Malinslee, Telford, Shropshire TF6 2HS.

WANTED: Panasonic RF2800LE/ DR28 multiband receiver users instruction manual and reviews required on short loan. All costs re-paid. Phone Wayne, 01-581 1076.

WANTED: Handi/Book/operator manuals for BBC computer. Also technical software RX, TXF, TX1 interface with cables and relevant information. Tel: 0703 222634.

WANTED: Grundig Satellite 2000 or similar plus manuals. Phone 522335 (South Yorkshire).

WANTED: FFET in exchange for Bearcat 175XL. Excellent order original receipt plus complete UHF/VHF frequency guide. Price reasonable. No transport. Tel: 0635 30018.

WANTED: HF transceiver, solid state with general CVX RTTY decoder, also cheap early TX/RX 1650, FT200, WW200, FT401. Anything considered, good quality. Contact H. Norr, 0420 349448.

WANTED: Mains transformer for EMF tape-recorder type RE301. The PSU mains transformer for this transformer would be even more welcome. Failing this will be looking for reel to reel two track slow speed recorder. Please contact Norman, G4YYX, evenings, 0863 32389.

WANTED: Stalker multimode or scanning receiver, must be good condition, exchange for Atari 130XE computer, or VHF remote control joystick, data recorder and loads of games. Please telephone Bill on Dover (0304) 212355.

WANTED: German WW2, ex-service equipment, working or not, for museum purposes. Parts why. Offer British gear or cash. Will collect. For sale: Collins radio SIUY with all mech filters. Siemens all-wave comm receiver c. 1935. Tel: 05321 778689. WANTED for YAGU 7700 9R-901 CW/RTTY reader, also 7700 converter and memory unit. H. Dickinson, 2 Caravan Ponty Fm, 24 Collingwood Close, Worle, W. M. Are.

WANTED: Kenwood MC-60A microphones and AT-230 ATU. Tel: 0328 600255.

WANTED: Manual for Spectrum 48K computer. The prices are negotiable. Phone Wayne, 01-561 1076.

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