

# Amateur RADIO

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**Build a simple ATU**



**The data protection  
racket**

**On test: Trio TM2550E  
2m FM mobile transceiver**

**YAESU FT770RH REVIEWED**

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PA4C	AC power unit for FRG9600	12.00
QTR24D	World zone clock	32.50
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SB1	Switch unit	15.00
SB2	Switch unit for YH1	13.50
SB3	Switch unit	14.25
SP55	External loudspeaker	14.50
YH1	H'set/boom MIC for SB1/2/3	14.50
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BP4	Empty battery box for cells 6X	8.50
BP5	High capacity q/charge 10.8V Nicad	
DC1	12V mobile regulator pk (2E)	13.25
EX243	Curtis keyer unit for IC735/ 745	49.50
EX257	FM unit for ICR71	53.00
EX310	Speech synth. unit for 271 etc	35.50
HP1	Mono headphones	39.00
HS10/H5	Headset and boom MIC assy + switch	28.50
IC-AH1	3.5-30 MHz mobile ant.	37.50
IC-AT10	100W auto ATU	189.00
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IC-PS30	Power supply unit 25A cont.	18.50
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IC271E	2 mtr all mode 25W b/stn	499.00
IC271H	High power 100W version of IC271E	699.00
		875.00

IC27E

IC290D  
IC290E  
IC2E  
IC2KL

IC3200E  
IC471E  
IC471H

IC4E  
IC505

IC735  
IC745E

IC751E

IC04E

ICR71

LC11/14

LC1/2/3

PS15  
PS20

PS25  
PS35  
PS55

SM6

ADONIS  
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AKD

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Hi-Q

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25W 2 mtr FM mobile 9  
memories

45W version of IC27E

25W version of IC290E

10W multimode 2 mtr mobile

2 mtr H/H thumbwheel 2W

1KW PEP linear auto band  
switching

Dual band 25W t'ceiver

UHF m/mod b/stn 32 mem

75W version of IC471E

70cm thumbwheel H/H 2W

3/10W 50MHz SSB(FM)

transceiver

New all mode all band t'ceiver

All band SSB/AM/CW gen cov

TX-RX 16 mem

All band all mode t'ceiver

32 mem

70cm LCD keyboard entry

handheld 2W

All band short wave t'ceiver

32 mem

Leatherette case assy for

IC02/4E

Leatherette case for IC2/4/E

External power supply 20A

External PUS for IC751E

IC751 int. switch mode PSU

Matching power supply unit

for IC735

Desk for microphone

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20-500MHz low noise wide  
band preamp

2 mtr low noise RF switched  
preamp

Optimised preamplifier for  
for FT290R

High performance 2M-6M  
transverter

7.1 MHz traps. c/w  
instructions

PA valve

Nest of dipoles w/band ant

26-500 MHz

Wide band disccone ant

30-500MHz

70cm 2E directional beam  
antenna

# Amateur RADIO



## Editor:

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## Advertisement Manager:

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## Subscriptions:

01-760 0409

## Accounts:

Clare Brinkman

## Publisher:

Peter Williams

## On sale: Last

Thursday of the  
month preceding  
cover date

**Next issue:** Cover  
date August 1986 on  
sale 31 July 1986

## Published by:

Amateur Radio  
Magazines,  
Sovereign House,  
Brentwood, Essex  
CM14 4SE, England  
(0277) 219876

**Printed:** In England

**ISSN:** 0264-2557

## News Trade Sales by:

Argus Press Sales &  
Distribution Ltd, 12-18  
Paul Street, London  
EC2A 4JS.  
01-247 8233

**Front cover:** Trio TM2550E (p23)  
Photo by Jay Moss-Powell  
G6XIB

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Amateur Radio Magazines

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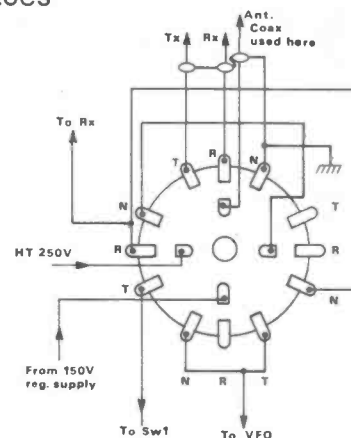
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# TWO FOR THE ROAD.

## The very latest IC-28E 2m. FM mini-mobile from ICOM.

This new 2 metre band transceiver is just 140mm (W) x 50mm (H) x 133mm (D) and will fit nearly anywhere in your vehicle or shack. Power output is 25 watts or 5 watts low power and is supplied complete with an internal loudspeaker.

The large front panel LCD readout is designed for wide angle viewing with an automatic dimmer circuit to control the back lighting of the display for day or night operation.

The front layout is very simple, all the controls are easy to select making mobile operation safe. The IC-28E contains 21 memory channels with duplex and memory skip functions. All memories and frequencies can be scanned by using the HM-15 microphone provided. Also available is the IC-28H with the same features but with a 45 watt output power.

Options include IC-PS45 13.8v 8A power supply, SP8 and SP10 external speakers, HS15 flexible mobile microphone and PTT switchbox.



## IC-290D/490E Mobiles

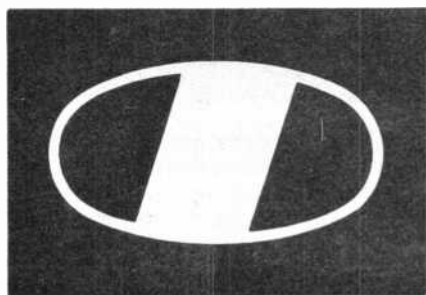
These SSB, CW, FM transceivers are ideal for mobile or base station operation. The IC-290D for 2 metres produces 25 watts/5 watts low power. The IC-490E for 70 centimetres produces 10 watts/1 watt low power. Both transceivers have a range of operating features, these include 5 memory channels, dual V.F.O.'s and a priority channel to automatically check your most used frequency. Squelch on FM and SSB to allow silent scanning whilst searching for signals, slow or fast AGC for SSB and CW and a noise blanker to suppress pulse type QRM. Sidetone is provided on CW.

Memory and full or programmable band scan with internal switches to stop on busy or empty channels. Programmable offsets are included for odd frequency splits.

Options include: IC-PS45 13.8v 8A power supply, IC-BU1 memory back up battery unit, IC-SP8 and SP10 mobile speakers.



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# ICOM

## Total coverage.. 100Khz to 2Ghz!



### IC-R7000.

**The R71E now has a team-mate – the IC-R7000.**  
**With these matching receivers it is now possible to tune from 100KHz-2GHz.**

The IC-R7000 covers Aircraft, Marine, FM Broadcast, Amateur Radio, Television and weather satellite bands. The IC-R7000 incorporates FM wide/FM narrow, AM, USB and LSB modes of operation with six tuning speeds:- 0.1, 1.0, 5, 10, 12.5, and 25KHz. Frequency coverage 25-1000MHz and 1025-2000MHz (25-1000MHz and 1260-1300MHz guaranteed specification). With the IC-R7000 you have normal tuning capability with the front panel tuning knob or for quick tuning of a desired frequency by using the front panel key-pad. A total of 99 memory channels are available for storage of received frequencies and operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob or by direct keyboard entry.

**These receivers are available seperately but together would make a superb listening station for the shortwave listener or licensed amateur.**

A sophisticated scanning system provides instant access to specific frequency ranges. By depressing the Auto M switch, the IC-R7000 automatically memorises frequencies that are in use whilst in the scan mode and can be recalled later. The scanning speed is adjustable and the scanning system includes memory selected frequency ranges or priority channels. All functions including memory channel readout are clearly shown on a dual-colour fluorescent display with dimmer switch. Other features include dial-lock, noise blanker, S-meter and attenuator.

Options include: RC12 infra red controller, EX310 voice synthesizer, SP3 and SP7 external loudspeakers, HP1 headphones and the ICOM AH-7000 super wideband discone antenna.

The IC-R71E is a general coverage receiver 100KHz-30MHz featuring direct keyboard frequency entry and infra-red remote controller (optional). SSB, AM, CW, RTTY and FM (optional) modes of operation. With 32 programmable memory channels, twin VFO's scanning systems, selectable AGC, noise blanker, pass band tuning and a deep notch filter. Keyboard frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency is altered without changing the main tuning control. Options include: EX257 FM unit, RC11 infra-red controller, CK70 D.C. adaptor for 12 volt operation, CW filter options and a high stability crystal filter, SP3 and SP7 external loudspeakers, EX310 voice synthesizer, HP1 headphones.



### IC-R71E.

**Computer Control** These receivers can be connected to a computer terminal via a suitable interface.  
 JT602 Serial Interface for IC-R7000  
 JT603 Parallel Interface for IC-R71E (IC-R7000)  
 The ICOM IC-R71E requires the IC-EX309 interface connector

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# L·E·T·T·E·R·S

## SELF-PERPETUATION

In his letter published in the April issue of *Amateur Radio*, Mr Crosland has once again invented a number of facts and then gone on to draw conclusions on his fabricated information.

**G6JNS 'fact':** *The RSGB planned to change the Society's constitution to increase the President's term of office to three years. This was shelved because a number of members protested.*

**Reality:** In a much needed update of the Society's constitution, or more precisely Memorandum and Articles of Association, it is intended to examine every aspect involved in the Society's operation. One, and just one, of the hundred or so topics that need consideration is the duration of the presidential term of office. I have to report that this item has not even been discussed, let alone any decisions made. Any proposed change would, of course, have to be approved by the Society at large at an EGM.

May I remind readers that the RSGB appears exceptional amongst national amateur radio societies in

limiting the term of office to one year at a time? This alone should justify investigating the pros and cons of a change from the present system. **G6JNS 'fact':** *Council members have to stand for election every three years, but if they are elected president they stay on Council for the presidential and subsequent year.*

**Reality:** If a Council member serves as president during either the first or second year of his/her term on Council, then his/her term of office remains unchanged at three years. However, if he/she serves as president during their third year, then the term as immediate past president will carry into the fourth year. And so on. If this occurs during a term of office after a second election, then the Member has to stand down for at least one year: so the appointment only delays the period out of office, it does not by-pass it.

**G6JNS 'fact':** *G3FKM was elected president in recognition of the outstanding service he had rendered the Society.*

**Reality:** I feel few past presidents would regard their term of office as being a reward for loyal service. It is a

crucial, very difficult and arduous job that can take up literally several hours a day, every day of the year. G3FKM was not elected in recognition of his services, although no-one would deny them, but simply because he was the best person to do the job.

**G6JNS 'fact':** *Joan Heathershaw was elected president in January 1986 even though the Society's rules specify that the election shall be in June or July.*

**Reality:** There is no Society rule which specifies that the election of the president shall take place in June or July. The Articles of Association dictate that the Society must publish the name of the next president in the October issue of the Society's journal. To meet printing deadlines, this means that the decision usually has to be made no later than the June or July Council meeting: Council does not normally meet in August because many members are on holiday that month. There is no reason whatsoever why Council should not decide, as it did unanimously, to elect the next year's president at the first Council meeting of the year.

The reason for electing the president early this year is that 1988 represents the 75th anniversary of the Society. The Society will obviously be taking the celebrations seriously and much of the responsibility for its planning during 1986 and 1987, and for the implementation of these plans in 1988, will fall on the 1987 president. It is called forward planning.

I would note that the Articles require the EVP to be elected at the first Council meeting of the year.

**G6JNS 'fact':** *Council has manipulated the rules to prevent new members being elected.*

**Reality:** Council has acted responsibly and elected the right person to do the job. For G6JNS to suggest that everyone on council has conspired to keep a person off Council tells us much about his thinking.

May I make one other point. Only four out of the 18 making up the 1986 Council have more than six years experience on Council. The remaining fourteen have on average less than two years, with five with no previous experience.

**David A Evans G3OUF, RSGB General Manager/Secretary**

## PAST EXPERIENCE

I wonder if any of my experiences in designing and building equipment in the 1920/30s will be of interest to younger members of the DIY fraternity?

In 1929 I was assigned by Marconi International to their Calcutta depot as a marine radio operator. One memory I cherish from this time concerns the S.S. Talma, a British India Steam Navigation Co passenger ship that sailed between Calcutta and Japan. I joined this ship as No 2 Radio Operator in 1930 when a Mr Donald Bailey was the Senior Radio Operator. We became great friends with many common interests, including building MW and SW receivers, and listening to the Philips experimental SW transmitters at Hilversum, Holland and to a French station in Saigon.

Another of our interests

was the construction of audio amplifiers to use with a Marconiphone pick-up which was sent out to us from home. Our favourite amplifier used two American type 45 valves in a push-pull output stage. HT came from the ship's 100V dc mains, to which we added about 120V dc from sundry accumulators. We made a moving coil LS with the help of one of the ship's engineers. This was energised from the ships mains and mounted on a large baffle board. Passengers were invited to many of our musical sessions on deck during off-duty periods and when in port.

I have often wondered whether we were the first to entertain passengers in this way.

The amplifier was installed in the wireless room, so called in those days, which was just forward of the first funnel. When used on deck, we ran about fifty feet of flex

from the pick-up to the amplifier and seventy feet from the loudspeaker. Note that there was no 50Hz mains from which these long leads could pick up 'hum'. The first time we switched on the amplifier there was a very loud howl from the LS. This was eventually stopped by reversing the leads to the LS. The significance of this is that the quality of reproduction was noticeably better than when the LS and PU were placed close to the amplifier using short leads. This was because we had discovered and applied over all negative feed-back when using longer leads.

It would not be too much of an exaggeration to say that my hobby has provided me with many accidental, interesting and useful discoveries during the last sixty years and I am sure it will continue to do so.

**W Titmuss, Bristol**

## CHEAT PROOF

Further to the ongoing saga of the Morse code program for the Amstrad CP464 computer, initiated by G0BRN in the January 1986 issue and modified in the June issue by G4TQB.

Although the improvement by G4TQB is an excellent addition to the original program, it is open to a little cheating as the screen characters are printed out either before, or while the sound is heard.

However, to cheat at learning Morse is a pointless exercise anyway!

I found that when the program is RUN, the Morse created is the same every time, exactly as the print-out by G4TQB. So, to anyone interested, just delete lines 250 and 260, which will result in a more random output, being a different program every time.

**A Sheldon, Nottingham**

# L·E·T·T·E·R·S

## VISITS TO ENGLAND

I have been a radio amateur since 1984, and I have also visited England annually for the last six years. In 1985 I acquired a visitor's licence and worked on 2 metres from Taunton in Somerset.

I was very surprised at the number of OMs that I worked on SSB, and as a result I decided to try taking 2 metres and 70 centimetres along with me this year.

Following my stay in England I intend to write an article for the *German Amateur Radio Club Magazine* about my experiences in your country.

I am going to be QRV on 2m and 70cm from Taunton, and I would like to work as many radio amateurs as possible between 12 July and 11 August.

I am planning to operate in CW, SSB, FM, RTTY and Oscar modes, and will use only 15 watts (100 ERP) on 70cm and 28 watts (150ERP) on

2m. I hope to speak to many of you on the band.

**Thomas Pohl DH3 AAE,  
Salzgitter-Bad.**

## CALL OUT

About twelve months ago, when the 1985 *RSGB Callbook and Members Handbook* became available, I was most surprised to learn that I had become 'ex-directory'.

I soon learned that I was not the only one. 1985 was the first year that the callbook had been prepared from the RALU's computer records, and to say that these were somewhat inaccurate is putting it mildly.

Comparing the 1985 Callbook with the previous year's it became obvious that the number of 'ex-directory' amateurs had increased dramatically.

In most cases, it appeared that the amateurs who had had their particulars withheld were those whose

station location differed from their correspondence address (as does mine).

Telephone conversations and correspondence with both the RALU and the RSGB confirmed that this was indeed the case and was due to an omission in the RALU's software. In practise this meant that in these cases the RALU had simply transferred a blank record to the RSGB who printed this as 'particulars withheld at licensee's request'.

In view of this, the RSGB promised to set up a system where you could inform them directly of the address which you wanted to appear in the Callbook. Consequently, I wrote to them giving this information, confidently expecting everything to be correct in the 1986 Callbook. What did I find in the 1986 Callbook? 'Particulars withheld at licensee's request'.

I wonder how many other

readers have had similar problems?

**Nigel Roberts G4IJF, Essex.**

## HOLIDAY-MAKERS BEWARE

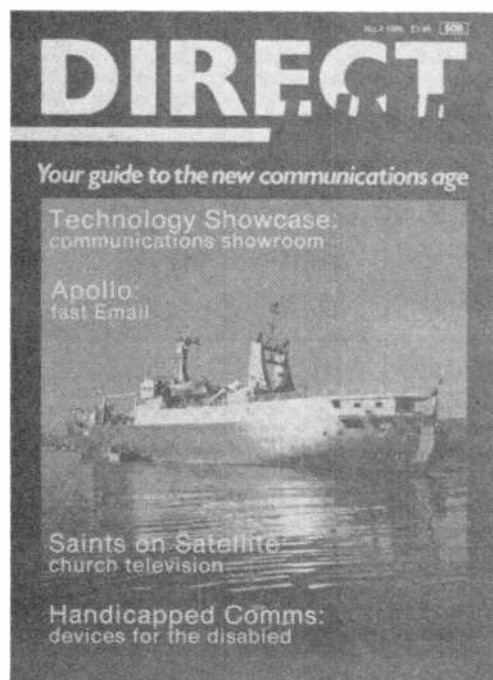
A holiday in Jersey was nearly spoilt by my purchasing a secondhand amateur radio transmitter for £149, which proved faulty in use and then was promptly rejected by the shop keeper, who would not have it back at any price. According to this shop Jersey laws protect shop keepers only.

In fact, on my threatening to write to the manufacturers and any other outlet for complaints, I was told he would have me put off the island!

In contrast to this dictatorial attitude, my faith was restored by the warmth of the welcome given me when I was invited to the Jersey Amateur Radio Society club meeting.

**Steve Venus, Middel**

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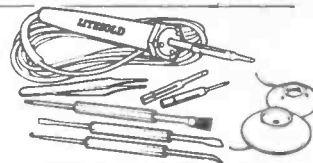


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model, 12w, 2.4mm bit. LC 18 Model, 18w, 3.2mm bit. 240v Std - 12v available. Presentation wallet.

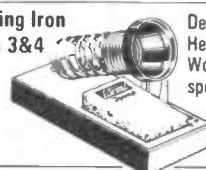
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EC50	-	£1.64
Adamin 12 and		
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£1.04 per Reel

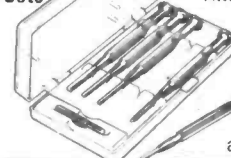
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227 set 5 socket spanners 3 to 5mm £2.82

305 set 2 crosspoint and 3 hex wrenches

1.5 to 2.5mm £2.70

228 set 20 piece combination:

5 open, 5 skt spanners, 2 crosspoint, 3 hex and 3 plain drivers, scriber, handle/holder £6.10

**Microcutters.** £4.82 Light weight hardened and precision ground. Flush cutting. Screw joint, return spring, cushion-grip handles. Safety wire-retaining clip.



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#### NEW FROM ICOM

Thanet Electronics Ltd of Herne Bay have announced the launch of the IC751A HF base station transceiver, which is designed for the ham operator who demands high performance. The 100 watt IC751A incorporates the best features of its predecessor, the IC751.

For the CW enthusiast, the new IC751A includes an electronic keyer unit, QSK rated at up to 40wpm, standard FL32A 9MHz/500Hz CW filter and CW sidetone to monitor your code in Rx or Tx modes.

Amateur band coverage includes general coverage reception from 100kHz to 30MHz, and may be easily modified for MARS operation.

The IC751A features a newly designed tuning control for smooth tuning, an added LED annunciator for easy identification if you're using the tuning speed, dial or band switching functions, and 32 memories.

In the receive mode, the IC751A has a sophisticated thermal sensor to monitor the internal temperature, which automatically activates the cooling fan to give maximum stability.

The IC751A boasts a number of newly designed features: a new 9MHz notch filter that drastically reduces QRM; a new AGC system; a new compressor for better audio clarity; and a new AF gain control system that improves control of the CW sidetone volume.

The IC751A costs £1,399 inclusive of P&P.

Another newcomer to the Icom stable is the IC28E. Smaller than many conventional compact mobile transceivers, the IC28E provides 25 watts of output power on any frequency in the 2 metre band, and also allows you to operate using a selectable 5 watt low output power feature. In the receive mode the rig covers the frequencies from 138 – 174 MHz.

The front panel LCD readout is designed with wide angle viewing capability, making transceiver operation safe and easy while you are at the wheel. Variations in ambient light conditions pose no problem when using the rig, as the built-in light sensor automatically adjusts an internal dimmer control circuit to control backlighting of the display at anytime day or night.

Light and compact at just 140mm(W)×50mm(H)×133mm (D), the IC28E will fit nearly anywhere in your vehicle, making it ideal for travel in all environments.

The rig contains a total of 21 fully-programmable memories and all memory channels and frequencies can be continuously scanned and checked by using the provided HM15 microphone. The IC28E costs £325 inclusive of P&P, and further information on both rigs can be obtained from: *Thanet Electronics Ltd, Sea Street, Herne Bay, Kent CT6 8LD. Tel: (0227) 363859.*

#### CARBON FIBRE MASTS

Antenna Technologies can now supply communications antenna masts of up to 30 metres (100 feet) manufactured from an ultra light and strong carbon/glass fibre composite material. This new range of masts is particularly suitable for portable professional and tactical defence requirements where light weight and high durability are very important, enabling the masts to be quickly and easily transported and deployed.

As well as being typically less than half the weight of traditional metal masts, this new range is less susceptible to corrosion and icing, and a 15 metre mast can be deployed by two people in less than half an hour.

They are also radio transparent, which can prevent degradation of radiation patterns and loss of efficiency for many HF antennas. Applications include radiating masts for MF and HF communications and support structures for wire, yagi and dish antennas.

Antenna Technologies use computer programs to analyse users' requirements in terms of static loading, wind loading, deflection and safety factors to ensure that the recommended mast optimises performance and cost.

For further information contact: *Antenna Technologies, Horace Road, Kingston-upon-Thames, Surrey KT1 2SN. Tel: (01) 546 7808.*

# All the latest news, views, comment and developments on the amateur radio scene

## BNC CONNECTORS

A commercial-quality BNC connector from Amphenol is designed to be cost-effective without sacrificing the RF electrical performance typical of BNC receptacles. Application areas include computer and business equipment, television broadcast and other communications equipment.

Series 31 connectors are ruggedly constructed, with a zinc diecast body finished in durable Astroplate, moulded insulators, and stamped and formed tin-lead contacts with

solder-cup termination. They are designed to accommodate 0.125 and 0.25in panel thicknesses, both types being front-mounted for easy installation. The BNC two-stud bayonet mechanism enables quick connection.

Connector impedance is nominally 50 ohms, rated working voltage 500V rms. The connector is designed for a frequency range of 0 to 4GHz. Ground lugs are available as options.

To mate with Series 31 receptacles, Amphenol manufactures low-cost BNC Suretwist plugs for RG-59 and 62/U cables. They will, however, mate with any male BNC plug.

For further information contact: *Amphenol Ltd, Thanet Way, Whitstable, Kent CT5 3JF. Tel: (0227) 264411.*

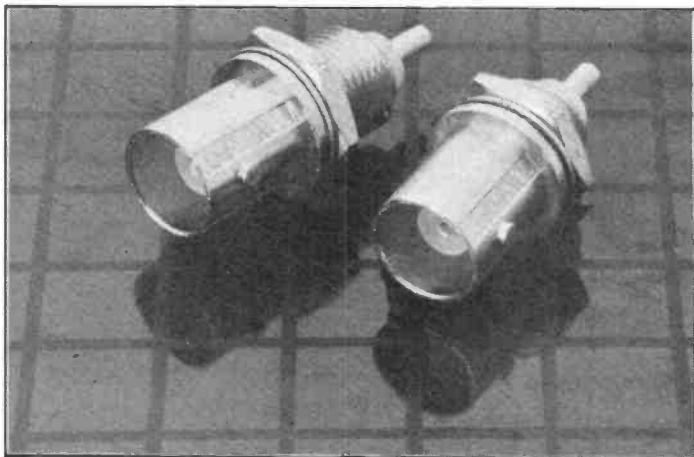
## IN LINE CONNECTORS

Complete versatility for the Masterplug mains connector system comes with the introduction of the new in line connector. Now, any appliance fitted with a Masterplug miniature plug can be used anywhere around the home, office or workshop.

This low cost addition to the range is a single socket designed to be cable mounted and to accept a Masterplug miniature plug. Rated at 6 amps, the socket is fully shuttered and complies with the requirements of the appropriate British standard specification. It may be connected to a standard 13 amp plug either by a long length of 6 amp cable – making a useful extension adaptor, or by a short length of cable – making it into a simple adaptor from a 13 amp socket to a Masterplug socket. A length of cable fitted with a miniature plug and an in line connector makes a versatile Masterplug extension cable.

The Masterplug in line connector is expected to retail at around £2.00, complete.

For specification details, please contact: Masterpiece Products, Annscroft, Shrewsbury. Tel: (0743) 860512.



## dc POWER SUPPLY

New from Global Specialties is the model 1300, a low cost bench power supply which has been specifically designed for use by designers, technicians, educational institutions and electronics enthusiasts.

The instrument has a fixed output of 5V dc ( $\pm 0.25V$ ) at 1A maximum, with a line regulation of 0.2%, a load regulation of 1.0%, and a maximum ripple of 10mV peak-to-peak. Variable outputs are 0-20V dc at 0.25A maximum, with a line regulation of 0.05%, and a maximum ripple of 10mV peak-to-peak.

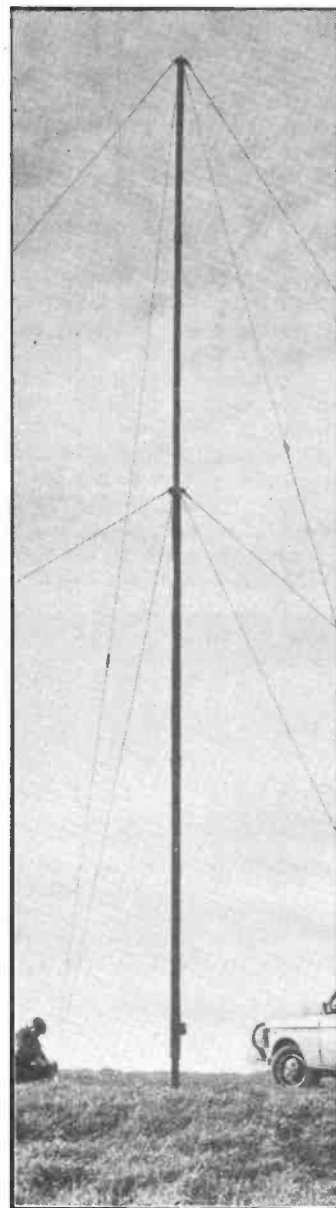
The outputs can be used independently or interconnected to accommodate different voltage and current requirements. Current limiting guards against damage

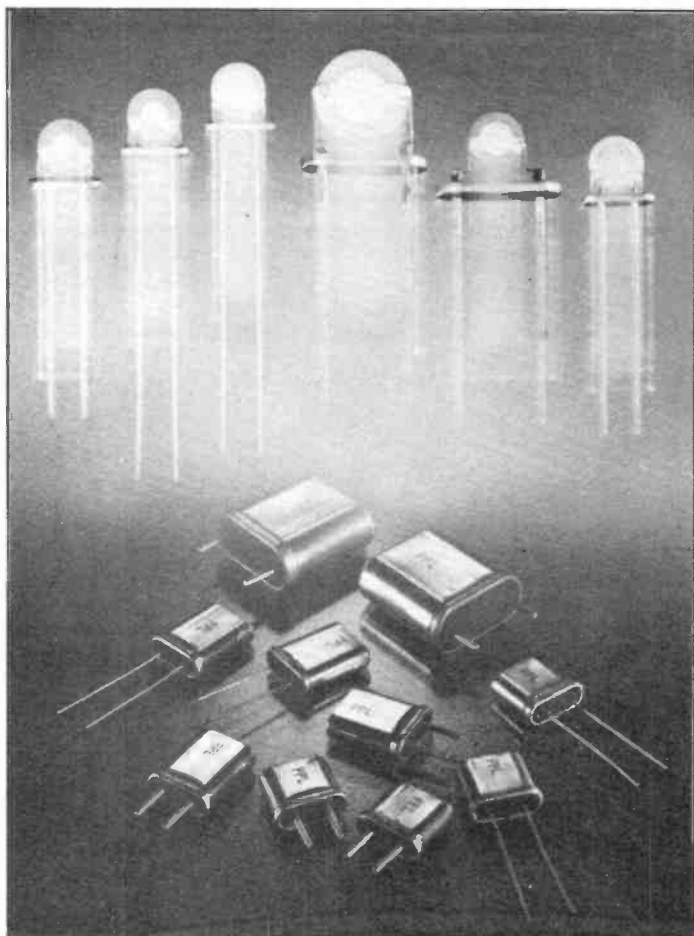
due to short circuits.

The instrument's front-panel voltage and current meter has an accuracy of  $\pm 5\%$  of full scale, and a light-emitting diode (LED) indicates overload on the 5V supply.

Weighing only 2.7kg and with dimensions of 76x254x178mm, the model 1300 power supply is easily portable. It is supplied with an illustrated manual which provides specifications, operation instructions, maintenance and calibration information, a circuit description, and a schematic diagram.

For further information contact: *Global Specialties Corporation, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3QA. Tel: (0799) 21682.*





## QUARTZ CRYSTAL FILTERS

A new range of quartz crystal filters from Piezo Products includes a large variety of standard designs for use in HF, VHF and UHF communications, spanning the 100kHz to 100MHz frequency range.

Made by the specialist firm CR Snelgrove of Canada, the filters come with a wide range of selectable attributes including sharp selectivity, low insertion loss, high stop-band rejection and excellent intermodulation characteristics. Linear phase filters and filters with precise group delay characteristics are also offered.

The HF range includes types for many standard frequencies including 99.8, 250, 455, 1400, 1500, 1748, 1750, 1751 and 4400kHz, plus 35.4, 40, 45, 68.6, 75 and 100.2MHz types for roofing filter applications. The VHF/UHF range covers 9.9 to 31MHz in a variety of standard frequency selections.

This range of standard quartz crystal filters also includes 200, 500 and 700kHz versions for miscellaneous applications.

For further information

contact: *Piezo Products Ltd, Millstream Trading Estate, Christchurch Road, Ringwood, Hants BH24 3SD. Tel: (0425) 479337.*

## SCOPE COVERS

Electronic and Computer Workshop Ltd (ECW) has announced the introduction of optional rigid covers for oscilloscopes in the popular Crotech range. These are ideal for protecting the instruments during storage or transit.

The covers are supplied with a retrofit kit and include a handy pocket for carrying probes and accessories.

ECW can supply these covers for the Crotech 3132 (dual channel 20MHz), the 3337 (dual channel, 30MHz) and the 3339 - a VDU scope offering the same performance as the 3337 but with a video input.

The price for all models is £10.93 including VAT, post and packing.

For further information contact: *Electronic and Computer Workshop Ltd, 171 Broomfield Road, Chelmsford, Essex CM1 1RY. Tel: (0245) 262149.*

## BENCH POWER SUPPLY

The new Thurlby LB-15 bench power supply is a low cost general purpose unit designed for versatility and ease of use. It provides up to 15V at currents up to 2A.

An output range switch allows the user to select a higher maximum output current when using lower output voltages. Voltages up to 7.5V are available at currents up to 4A.

Voltage and current levels are set using rotary switches which provide a rapid and accurate means of setting the output. Calibrated vernier controls provide infinite adjustment of voltage and current between each switch setting.

The units operate in constant-voltage or constant-current mode with automatic crossover. LED indicators show the mode of operation and provide a convenient means for measuring the load current. Adjustment of the current controls until the CV and CI indicators are illuminated simultaneously gives an accurate reading of the load current flowing.

Line regulation and load regulation figures are exceptionally good, as is the transient performance. Ripple and noise levels are very low.

The design is totally protected against overload conditions and incorporates a sophisticated 'power fold-back' protection system. The mechanical construction is equally robust.

The Thurlby LB-15 is designed and built in Britain and costs £89+VAT.

For further information contact: *Thurlby Electronics Ltd, New Road, St Ives, Huntingdon, Cambs PE17 4BG. Tel: (0799) 26699.*

## DATA BUS CABLE

Amphenol has introduced a data bus cable with enhanced performance for use in applications where extra protection against interference is required, such as aircraft control systems and ground and marine-based communication systems.

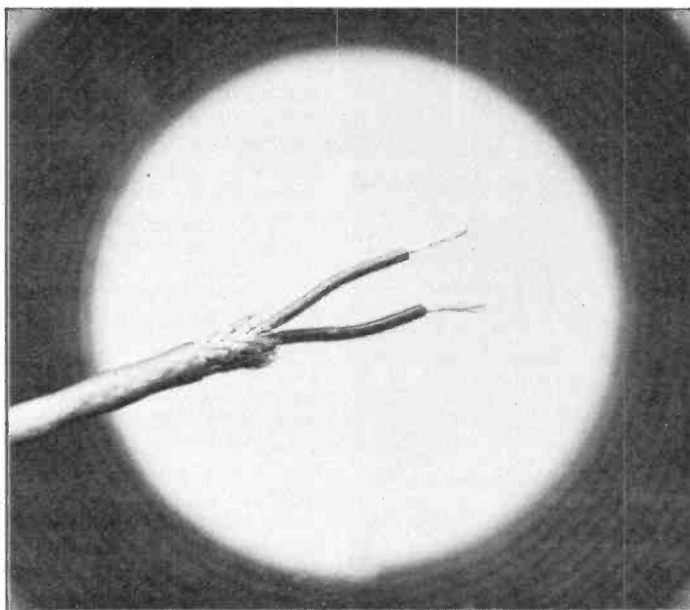
Type 711-Pan 6421 is a 77 ohm, twin 24awg multiplex data bus cable approved to MIL-STD-1553B and DEF 00/18 (part 2), and meeting the requirements of Panavia specification.

The construction features dual screens of silver-plated copper strands, giving 85% minimum optical coverage for each screen. Silver-plated copper alloy cores are insulated with red and blue Kapton/FEP tape plus dispersion. The outer sheath is blue extruded FEP of 0.2mm minimum thickness.

Characteristic impedance is 77 ohms  $\pm$  3 ohms, mutual capacitance 98.4pF/m max, and attenuation is 4.92dB/100m max at 1MHz. Maximum core-to-screen working voltage is 600V rms.

Nominal diameter over outer sheath is 3.5mm, and mass is 28kg/km max. The cable is supplied in multiples of 1m length, minimum 5m.

For further information contact: *Amphenol Ltd, Thanet Way, Whitstable, Kent CT5 3JF. Tel: (0227) 264411.*





## STRAIGHT & LEVEL



### COMMS RECEIVERS

Grundig have just introduced two new models in their Satellit range of communications receivers (not to be confused with their new, and rather good, satellite TV receiver).

The 400 and 650 models both feature a PLL synthesizer and an LCD display for time (the clock covers two time zones) and frequency display.

The 24-memory Satellit 400 covers VHF (88-108MHz), SW (1.6-30MHz), MW (513-1611kHz) and LW (148-353kHz), and has a scanning facility for the selected waveband.

Sensitivity is quoted as  $2\mu\text{V}$  for 6dB signal to noise, with a -6dB bandwidth of 2.3kHz (-50dB : 3.6kHz).

The larger Satellit 650 has

60 memories (because of the microprocessor control, all are fully independent of mode and waveband). VHF and SW coverage are the same as the 400, with MW coverage from 510-1620kHz and LW from 148-420kHz. A BFO is provided, and short wave bandwidth is selectable between 2.2kHz and 3.5kHz. Sensitivity is  $0.7\mu\text{V}$ - $4.5\mu\text{V}$ .

Both receivers will accept either 120V or 240V mains input in addition to the internal batteries.

Prices will be approximately £180 for the Satellit 400 and £400 for the Satellit 650.

For further information contact: *Grundig International Ltd, Mill Road, Rugby, Warwickshire. Tel: (0788) 77155.*

### SONY ICF2001D AVAILABILITY

In the May issue of *Amateur Radio* we published a review of the Sony ICF2001D receiver, from which we received a number of enquiries regarding availability.

The problem seemed to be that agents handling the model didn't carry samples incorporating the air band reception facility.

We have now established that Sony initially manufactured a batch of receivers without the air band facility, because they were unsure about the reaction it would receive from the DTI. However, since December all receivers in production

have incorporated the air band facility and the model should now be available from main Sony agents.

Geoff Horn, the MD of Horns of Oxford, identified the problem and now has the receiver with the air band facility in stock.

The company is retailing the rig at £366, but offers a 10% discount to all RSGB members. This marvelous offer includes a complete after sales service.

For further information contact: *Horns of Oxford Ltd, 6 South Parade, Summer-town, Oxford OX2 7JR. Tel: (0865 511241)*

### MOBILE AERIALS

A new UHF mobile aerial is now available from On-Glass Aerials Ltd of Cannock, Staffs, which will mount directly onto a windscreen without the need to drill fixing holes.

Although primarily developed for the PMR market, with models covering 420-540MHz, a 70cm amateur band model, the OW432, has now also been produced. This will retail at around £35 + VAT.

Specifications include a 200W maximum power rating and nominal 50 ohm impedance, and connection is via a miniature UHF connector. The radiator can be removed from the ABS plastic base for security.

The company hopes to produce a VHF version for 144MHz in the near future.

For further information contact: *B D Price G4DVB, 93 Highview, Vigo Village, Kent DA13 0TG.*

### RF CO-AX CONNECTORS

A new range of low cost, high quality RF coaxial connectors is now available from Sussex based Electrostatic Ltd. The range consists basically of 5 single pin connectors and one cable coupler.

Designed for rapid and accurate connection of coaxial cables without soldering, all that is necessary is to cut and square off the cable, push it into the main body of the connector and tighten the single screw.

The connector length ranges between 27mm and 34mm with a main body diameter of 11mm.

Manufactured from the highest recommended materials, this rugged range has many applications in the electronic/electrical, telecommunication, radio, TV, hi-fi, video and manufacturing industries.

For further information please contact: *Electrostatic Ltd, Hayward House, North-chapel, Petworth, West Sussex. Tel: (042878) 611.*





## OP-AMPS

*Op-Amps* by J Brian Dance is a complete guide to 'getting going' with op-amps.

Although intended for the home constructor and the technician, it is essentially a beginner's guide to the subject, giving the reader a basic grounding, with examples, without having to make a thorough study of the subject and plough through reams of data sheets.

The text is in a non-mathematical, easy-to-read style with many illustrations. Subjects covered include recently introduced devices and well established old friends such as the 741. A special section on high power integrated audio amplifiers has been included to cater for the growing interest in home made in-car discos, with modifications for increasing the power output still further.

The author is well established as a technical author, and despite a grammatical error on the back cover summary, has produced a well presented book.

*Op-Amps* is an essential book for the op-amp beginner, particularly with its extensive glossary of terms at the back. Published by Newnes Technical Books it is available from normal outlets for a meagre £4.95 (ISBN 0-600-33372-8).

## 16 BIT MICROPROCESSOR HANDBOOK

This handbook, written by Trevor Raven, is intended for the experienced technician who wants to move from 8-bit to 16-bit microprocessors, and covers the four most popular 16-bit families available today: the 8086, 8000, 68000 and 99000.

The text discusses the different facilities and special features of each family, together with examples of computers using these devices and operating systems available. A knowledge of CPUs is necessary to fully appreciate this very informative book, although a lot of referring to the appendices would explain most of the

terms and theories used.

Illustrations, timing diagrams and memory maps are not over abundant, but do appear when clarification of a point is absolutely necessary, emphasising that a prior knowledge of the subject is necessary.

The book is published by Newnes Technical Books and available from normal outlets at a price of £9.95 (ISBN 0-408-01318-4).

## OSCILLOSCOPES

The most essential piece of test equipment on most test-benches is an oscilloscope, and is often the single most expensive test instrument most hobbyists will buy. The array of 'scopes available varies from the most simple single trace 'scope through to multi-trace digital or screen storage 'scopes, with prices not necessarily directly proportional to usefulness.

This book is not intended as a buyer's guide, but does contain a large section on which features are important

## CLUB NEWS

### Wythall award

A Worked All Midlands Club Award (WAMC) has been organised by the Wythall Radio Club in conjunction with Eddystone Radio Ltd.

The award is open to radio amateurs and listeners operating on the 6m, 4m and 70cm bands and in any simplex mode. The aim of the award is to promote the existence of amateur radio clubs and societies. The award is operated on a points system, with 1 point scored for working/hearing a member of a club or society in the midlands region using a personal callsign; 2 points for a member using a club callsign; and 5 points for a member of Wythall Radio Club using the club callsign G4WAC (all claimants must work G4WAC).

The Midlands area is defined as the counties of Hereford, Worcester, Shropshire, Staffordshire, Leicestershire, Northamptonshire, Warwickshire and the West Midlands.

The Bronze award requires 20 points, whilst Silver, Gold and Platinum require 35, 50 or 65 points respectively: only one contact per club can be

claimed for the award.

Claimants are required to send in log extracts signed by two other amateurs. Summary logs are acceptable. Details on the log should include date, time, callsign, band, mode, name, QTH and the club name (that's important).

The award commences on 1 July and has no time limit.

To claim the award, claimants should send their logs together with a cheque or postal order for £1.50 made payable to the Wythall Radio Club, stating the class claimed and how the points total is arrived at, to the Awards Manager, from whom details and a list of applicable clubs can be obtained if a large SAE is enclosed.

Contact: *Mick Pugh G4VPD, 37 Forest Way, Hollywood, Birmingham B47 5JS. Telephone enquiries to Chris G0EYO/G1RHG on (021 430) 7267.*

### Top of the class

We've just received the results of BYLARA's YL-OM Midwinter Contest for 1986. Top of the YL Class SSB was G4YLO who scored 348 QSOs with 47 multipliers to achieve 53,298 points.

In the OM CW Class, the winner, SM6FPC, notched up

14 QSOs with 6 multipliers to finish with 420 points. As for the SWL Class, NL8818 came first with 47 QSOs, 16 multipliers and 3,768 points.

For further information contact: *Alison Soars G0ALI, 84 Kidge Road, Kingswinford, West Midlands DY6 9RG.*

### Scottish convention

This year Glenrothes and District Amateur Radio Club host the Scottish Amateur Radio Convention. The event will be known as 'Scotam 86' and is to be held on Saturday 13 September at the Lomond Centre in Glenrothes, Fife.

Five years ago, 'Scotam 81', was held at this venue and at that time visitors from all over the UK attended the convention.

This year, however, vastly improved and extended facilities at the Centre offer the opportunity to make this the most successful amateur radio event in Scotland to date.

Full catering facilities, including lounge bar, will be available throughout the day and, for those travelling from a distance, there are many reasonably priced hotels and guest houses in the area.

For further information contact: *Ken Riddoch*

*GM3ZSP, Garland Cottage, South Road, Cupar, Fife KY15 5JG. Tel: (0334) 53336.*

### IERE Conference

The Institute of Electronic and Radio Engineers (IERE) will be holding their fifth international conference on electromagnetic compatibility (EMC) from 30 September to 3 October this year at the University of York.

The latest trends in this field will be pinpointed, including both immunity of interference and suppression at source.

An innovation in this year's conference is that a complete session has been devoted to the consideration of papers dealing with methods of improving immunity to interference arising within printed circuit boards as a result of EMC.

Also, as two universities in the UK are now offering EMC as a degree subject or as part of a postgraduate course, a special session will be devoted to the subject of EMC education. Included in the programme will be consideration of courses, and the use of demonstrations and computer graphics in electro-magnetics education.

Another area to be covered

and which are not so important, depending upon the particular application. Mr Hickman advises not only on how to choose 'scopes, but on techniques of operation that will get the best out of the instrument.

Finally, to give readers a better understanding of the principles behind oscilloscope operation and use, basic 'scope circuitry and the cathode ray tube are explained. This comprehensive book also covers accessories available, such as cameras and the different types of probes, and seems only to miss out on beam-splitters.

This second edition book will appeal to everyone who uses or intends to purchase an oscilloscope, from the hobbyist to the technician.

*Oscilloscopes* is well illustrated with both diagrams and photographs, published by Newnes Technical Books, and is available from normal outlets at the reasonable price of £5.50 (ISBN 0-600-33373-6).

## SCANNERS

If you visited the RSGB's annual show at the NEC this year you may well have seen Peter Rouse's new book, *Scanners - A VHF/UHF Listener's Guide*, on display at the Argus stand.

Peter (GU1DKD) regularly writes articles for amateur radio related magazines, and is doubtless familiar to many as a writer who 'knows his onions'.

This book is written to his usual standard, and is intended as a beginner's guide to scanners and what can be heard using them. This said, much of the information it contains will be useful to many more experienced radio users.

It begins, of course, with basic radio theory, covering this in an elementary, non-technical manner in just sufficient depth to allow a beginner to understand what's going on.

Scanner hardware, operation, aerials and accessories are covered, with details of RT procedure so that what

is heard can be understood, and a brief overview of equipment available in the United Kingdom.

The most interesting section for many people will undoubtedly be the chapter outlining UK frequency allocations. The basic list is similar to the one published in *Radio and Electronics World*, our sister publication, some time ago, but in addition to this there are details of the air bands (including frequencies used at different airports, Volmet, etc), marine and amateur bands, PMR and radiophone frequencies, and so on.

All in all it's a rather good book, and I look forward to the promised *Scanners 2*, in which Peter will cover modifications, DIY accessories and international allocations as well as offering greater detail about some of the *Scanners 1* topics.

*Scanners* (ISBN 0 85242 880 4) is published by Argus Books Ltd, 1 Golden Square, London W1R 3AB, and it costs £7.95.



is that of safety. A session on 'hazards' will include papers from various institutions who have been working on the evaluation of RF ignition and detonation hazards.

'Aerials and EM Fields' and 'Test Methods and Specifications' are the titles of two more sessions which are becoming increasingly more important.

On the first day of the conference tutorial papers on such subjects as spectrum analysis, screening, suppression components and filters, EMP, measuring techniques, and instrumentation will be studied. These tutorials have been designed to appeal in particular to the newcomer to the subject of EMC.

Also of particular interest to newcomers will be the exhibition that is being organised to support the conference. More than 30 stands will be present and the latest developments from leading EMC specialists will be on show.

Attendance at the conference is open to both members and non-members of the Institution.

For further information and registration forms contact: *The Conference Secretariat, Institution of Electronic and*

*Radio Engineers, 99 Gower Street, London WC1E 6AZ. Tel: 01-388 3071.*

## Date for your diary

The Bury Radio Society Hamfeast 1987 will be held on Sunday 8 February 1987 at the Mosses Youth and Community Centre, Cecil Street, Bury, Lancs. This is only minutes from the M66.

Further details from: *C J Ashworth G1PKO. Tel: 061-764 5018.*

## Amateurs on course

The North East Hants Adult Education Institute is running the following courses for 1986:

The radio amateur C&G 765 course starts on Thursday 25 September at the Wavell School, Lynchford Road, Farnborough, Hants.

The Morse - Beginners course starts Monday 22 September, also at the Wavell School.

The Morse - Advanced, 10 to 20 wpm, also starts Thursday 25th at the Wavell School.

Please contact the school for further information. *Tel: (0252) 540084 or (0252) 518305.*

## IRTS AGM

The 54th Annual General Meeting of the Irish Radio

Transmitters Society was held at the Cill Dara Hotel, Kill, Co Kildare on 4 May.

A dinner dance was held on the Saturday evening and a large attendance visited the trade show, Amtor and computer demonstrations prior to the meeting on Sunday afternoon.

The event attracted radio amateurs from all over EI land and a large contingent of GI visitors were also present.

For further information on the club's activities and its membership, please contact: *The Secretary, PO Box 462, Dublin 9.*

## Marconi's Flat Holm

The Barry College of Further Education are mounting an expedition to Flat Holm Island to take place between 22 and 26 September 1986.

The station GB2FI celebrates the 89th anniversary of Marconi's pioneering tests from the island and will be active on all the HF bands, 6m as GW3VKL, 4m, 2m, 70cm, 23cm and 3cm wideband FM. Sked frequencies will be 50.12MHz, 70.22MHz, 144.27MHz, 432.27MHz and 1296.27MHz. For skeds on VHF, UHF and HF contact GW8NVN, GW1JCB or

GW8CMU, all QTHR.

This station is one of the few required for the Marconi Award and is a rare square for the WAB award (ST26).

For further details please contact (enclosing an SAE): *S Lloyd Hughes GW8NVN, 4 Blenheim Close, Highknight Park, Barry, S Glam CF6 5AN.*

## Telford mobile

The Telford Amateur Radio Rally Group are holding a mobile rally at the Telford Raquet and Fitness Centre, Telford, Shropshire on 31 August from 11am. This new site, which is alongside the previous venue, can be reached from junction 5 of the M54 or via the A442. Talk-in via GB4TRG on S22 and SU8.

For further details: *Tel: G8UGL (Telford 584173) or G3UKV (Telford 55416).*

## Moving right along

Wigan-Douglas Valley's ARS have moved house. Meetings are now held on the first and third Thursdays of each month at the Standish Conservative Club, School Lane, Standish near Wigan. They begin at 8pm and new blood is very welcome.

For further details contact: *Dave Snape G4GWG who is QTHR.*

## Natter night

Forthcoming events on the Sutton and Cheam Radio Society calendar include a natter night on 7 July and a talk on films and video by Pat G6MKC on 18 July.

The club also meets on the third Friday of the month at 7.30 for an 8pm start in the Downs Lawn Tennis Club, Holland Avenue, Cheam. Club nets are held on Monday at 2030 hours on SSB 144.390MHz, and on Tuesday at 1030 hours on SSB 3.70MHz,

and the Society monthly newsletter is full of club activity reviews and news.

If you would like more information about the club contact: *Alan Keech G4BOX, 26 St Alban's Road, Cheam.*

## North Brizzol meets

The North Bristol Amateur Radio Club meets every Friday at the Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol.

Activities for the month of July include a natter night on

the 4th, a talk by John G4TRN on the 11th about 27MHz to 28MHz, and a HF activity night on the 18th.

For further information please contact: *Alan Booth G4YQQ, 656 Southmead Road, Filton Park, Bristol BS12 7RD.*

## Verulam ARC

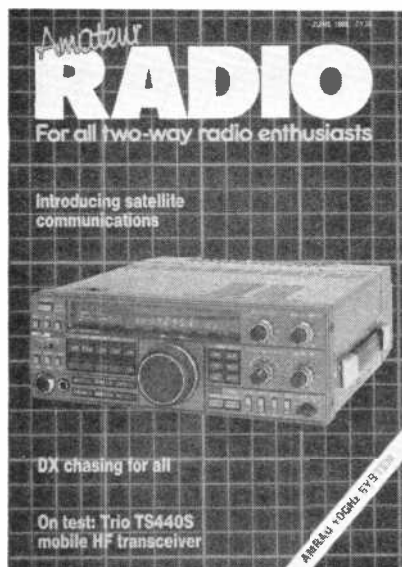
The Verulam Amateur Radio Club meets at the RAF Association Headquarters, New Kent Road, off Marlborough Road, St Albans, on

the second and fourth Tuesday in each month.

On Tuesday 5 July there will be an activity evening, and on Tuesday 22 July, at 7.30 for 8pm there will be a talk entitled 'Running Hot and Cold DXpeditions' presented by Neville Bethune G3RFS and Gerry Wimpenny G4OBH. All visitors are welcome at club meetings.

For further details contact: *Gerry Wimpenny G4OBH, 30 Faircross Way, St Albans. Tel: 52003.*

# LOOK WHAT YOU GET EVERY MONTH IN



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# DX DIARY

News for HF operators compiled by Don Field G3XTT

I am writing this on my return from a family holiday in Majorca. No, I didn't take the rig, but it was interesting to see a number of amateur antennas on the island, usually atop tower blocks. Most were tribanders, although in one case I spotted a tribander stacked above a 2 element 40 metre beam. These were on a tower, which must have been about 40ft high, on top of a block of flats of about 12 storeys. Contrast this with the lot of flat dwellers in this country who usually have no opportunity at all to put up an outdoor antenna. No wonder there are so many loud EA6 stations on the bands!

## Clipperton Island

Before I went away I was able to listen to this year's FO0XX expedition from Clipperton Island (see May's *DX Diary*). Despite the avowed intention to give precedence to Europe and always to work split frequency, the USA once again seemed to get the most attention, and when the expedition did stand by for Europe it was often co-channel, with the inevitable chaos. The prize must, however, go to the expedition operator on 3795kHz who stood by for Europe on 3803kHz (ie outside the European allocation) and, when he got no European callers (surprise, surprise!), went back to working the Americans.

Despite the above, many UK stations who missed out last year were eventually able to work the expedition on 40 or 20m, and I believe a couple may have made it on 80m CW.

QSLs go to the YASME Foundation

Incidentally, it is just possible that Clipperton Island may become commonplace on the bands in the future. According to the Pacific Islands Monthly, there is a move afoot by the French government to fit the island out as a stopover and shelter for the tuna fishing boats and for sailing boats in that part of the Pacific. Presumably this is to reinforce France's claim to the island and its territorial waters. The work involved would essentially be to reinstate facilities on the island that were set up during WWII and then abandoned.

## DL7FT

In my May column I mentioned Frank DL7FT's operation as DL7FT/SV/A, supposedly from Mt Athos; the saga continues. Frank operated subsequently from SV5, on several occasions having heated exchanges over the air with Greek amateurs who claimed he was operating illegally.

It now seems that an official letter was sent to Frank *after* his Mt Athos operation, revoking his Greek licence because of the way he had abused his operating privileges. The letter took some time to find him, so he was busy operating from the island of Kos in the meantime.

At the same time, the ARRL has copies of his Mt Athos documentation and, so rumour has it, is on the verge of approving that operation for DXCC credit.

The outcome is awaited with interest. The one thing

which is certain, however, is that the whole affair can have done nothing to show up amateur radio in a good light with the authorities. Unfortunately, there have been too many episodes like this in various parts of the world in recent years.

## Marion Island

Some bad news for those still wanting a contact with ZS2MI, the one and only callsign on Marion Island. The new crew, which took over in April for a 14 month tour of duty does not include an amateur.

So unless one of them gets lonely and decides to take up amateur radio while out in that remote and inhospitable spot, it looks as though we could be in for a long wait for a contact.

## DX news

Richard G3CWI didn't get to Nigeria after all. Instead he turned up as JY8NT from Jordan and may still be active when you read this. QSL to Box 146, Cambridge.

K1RH and W1CCN will be operational from St Pierre & Miquelon from 11 to 22 July. On previous trips there they have always been easy to work on or around the usual DXpedition frequencies. Look particularly on 20m CW in the evenings.

HF0POL is now active from the South Shetland Islands and will be there until October. He is busy on 20 metres and should also be on 80 and 40 metres by now. QSL to SP5PWK. CE9AM has also been reported from South Shetland.

ON7IP/ST2 returned to the Sudan on 19 May and should continue to be active until the end of July.

## IOTA enthusiasts

For the IOTA enthusiasts, F6BNQ and F6FWW expect to operate from L'Ile aux Chevaux (EU48) from 28 to 31 July. TF1PS hopes to operate from the Westman Islands (EU71) during the last week of July, and VO1QF will operate from Grand Manan Island (NA14) for the last two weeks of July.

While on the subject of Islands on the Air, *DX News Sheet* reports that, for a trial period, certain frequencies will be designated 'preferred frequencies' for IOTA expeditions. These are (plus/minus QRM): SSB-14160, 14260, 21160, 21260, 21360; CW-14010, 14060, 21010 and 21060kHz. The IOTA net meets on Saturdays from 0700GMT on 7095kHz and from 1300GMT on 14260kHz.

NH6FU/KH9 is now operational from Wake Island and will be there for a year. He hopes to operate on LF as well as HF.

QSL to Box 86, Wake Is, 96898, USA. KB6DAW also hopes to be operational from KH9 during October.

## Laos

The Japanese *DX Family News Lette* reports that JA1UT was due to visit Laos (XW8) in late April to discuss the resumption of amateur radio in that country. Yoshi can already lay claim to fame with his success in getting the XU1SS operation off the ground in Cambodia. In the early '70s there were several

amateurs active from Laos, particularly Feng XW8BP, who now lives in Taiwan and operates as BV2DA. However, apart from a brief operation by SM0AGD, there has been no activity from there for over ten years. If JA1UT's efforts are successful we may be able to look forward to some operation by mid-August. We can only wish him well.

## Encourage Cambodia

Meanwhile, the DX Family Foundation have donated a 40/80 metre antenna system to XU1SS to encourage some operation from Cambodia on the LF bands. This is particularly desirable for Worked All Zone enthusiasts, because Thailand and Burma are the only other countries currently active from Zone 26, and even HS activity is rather sparse at present.

As for Burma, although the 1Z9A/XZ9A operations have been accepted by *CQ Magazine* for credit for its awards, they are not acceptable to the ARRL. Indeed, the IARU Region III office has recently received a communication from Burma to the effect that amateur radio has been suspended in Burma since 10 January 1964. Despite this, the Burma Amateur Radio Transmitting Society remains in existence.

## Log keeping

In recent years the licence requirements for log keeping have become less stringent. When I was first licensed, for instance, it was necessary to record the actual frequency of any transmission, nowadays the licence only requires the frequency band to be logged. I believe that in the USA it is no longer even necessary to log individual callsigns of stations called and worked (I'm not even sure that you still need to keep a log at all).

All of this may ease the burden of paperwork for the casual ragchewer, but should be no excuse for the DXer to lower his log keeping standards. It can be invaluable to know, for instance, on exactly what frequency you worked that D68 station on 20 metres—the information may help a fellow DXer who wants to snag him. It may also help you when you hear that he is now active on 40 and want to catch him on 20 to make a sked.

Of course, not all DX sta-

tions keep to a regular pattern of operation, but by keeping an accurate log of stations worked (and heard) you can maintain a picture of who is on the bands, when band openings are occurring to particular parts of the world and the operating habits of any DXpeditions underway etc. This picture can help you day by day, season by season, and even sunspot cycle by cycle.

So, in my view, a log should include detailed information over and above that required by the licence. An accurate record of transmitting (and receiving) frequency, QSL information, snippets of information about operating habits or other information gleaned, and so on; anything you find helpful.

## Competent SWL

I deliberately suggested keeping a record of stations heard as well as those actually worked because the HF DXer should be one of the most competent SWLs on the bands. Probably 95% or more of his time in the shack will be spent listening as against transmitting. Otherwise he is likely to miss anything interesting which turns up. I have never fully understood the mentality of those who spend hour after hour calling CQ DX at the DX end, say, of 80m.

Occasionally they will snag a rare one which then disappears back into the noise before others can work it. Much more frequently though, while they are calling CQ they will be missing something rare a few kHz away, or down on CW, or on 40 or 160. When they do catch a rare one, the good 'listener' will usually be in there quickly enough to make sure it doesn't escape.

## Hand in hand

Good listening doesn't just help on a moment to moment basis—this is where efficient log keeping comes in. By keeping a log of what you hear, as well as of what you work, you can build up a picture of what is around. This way, the one that got away (and DXers have more tales than fishermen about this particular phenomenon) can be booked into the 'worked' log in a week or a month's time once his operating habits have been well and truly pegged.

## Sad reading

My own listening log makes sad reading in a way. If only I had worked all those I have heard (4W, YA, XW, KH5, A5 etc) I would be well and truly on honor roll by now and would have over 150 countries to my credit on Top Band. However, I at least have all this information and more in my listening log for posterity and for future reference. Who knows, if XW does indeed turn up on the bands again (see earlier paragraph) I might just be in there before you because I know when and where to look...

## Contests

The main event is the IARU HF Championship (previously known as the Radiosport Championship) on 12/13 July. This has been reduced from a 48 hour event to a 24 hour one, starting at 1200GMT on the Saturday. It covers 160 to 10 metres (but not the WARC bands), and both SSB and CW. Multi and single-operator entries are accepted, and there are single and mixed-mode categories.

Another change this year is that IARU member society headquarters stations count as additional multipliers (the basic multiplier is the number of ITU zones worked). The normal contest exchange is RS(T) plus ITU zone. The HQ stations will identify themselves by sending RS(T) plus a society identifier. This presumably means that the ARRL HQ station W1AW, for

instance, would send 59ARRL or whatever.

Scoring for the IARU contest is as follows: stations in same ITU zone and HQ stations — 1 pt; stations in different zone but same continent — 3 pts; stations in different continent — 5 pts.

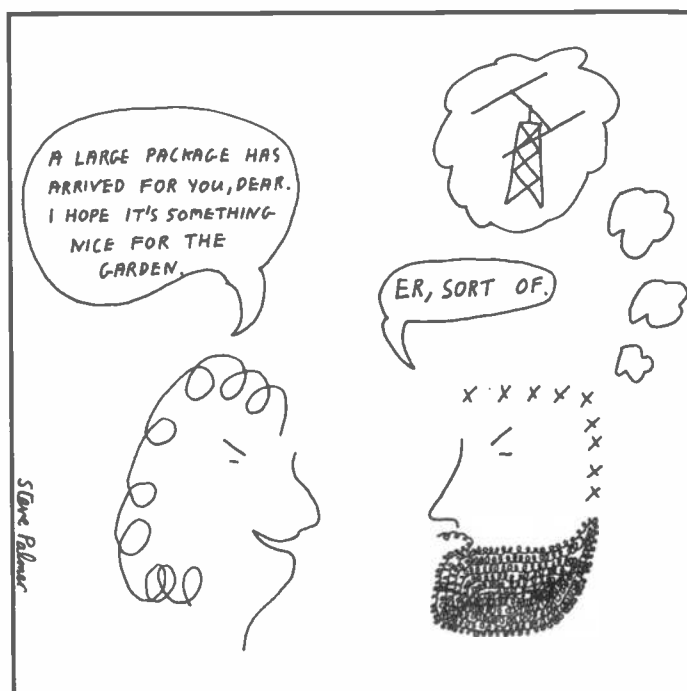
The multiplier, as I said, is the total number of zones and HQ stations on each band, added together. The same station can be worked once per band per mode, but all contacts must be in the designated sub-bands (ie you mustn't work a station on both CW and SSB on the same frequency). By the way, just in case you do not know, the UK is in ITU zone 27.

Official log sheets can be obtained from the ARRL by sending them IRCs for return postage (I can help with limited numbers of photocopied log sheets if required) and entries also go to the ARRL. As well as winners' plaques and trophies, all entrants making at least 250 contacts or working at least 50 multipliers will receive a certificate, so there is every incentive to have a go.

## Minor events

No other major HF contests take place in July, but there are several minor events including the Venezuelan SSB contest on 5/6 July and the CW contest on 26th/27th.

That ends it for another month. Don't let the summer weather keep you out of the shack. 73 and DX.



# The Protection racket

## The protection racket

'Right then, lads, Pete here has kindly agreed to act as secretary for the year, as we can't find any other sucker. . .er. . .volunteer to do the work. And his lad, Pete junior, will keep all our details on his home computer, so we shouldn't have any mistakes in future' (pause for hearty laughter). 'And so that nobody has any excuse for not sending in their subs on time, he's going to send everyone a computer printed reminder.

'Now we come to the election of Social Secretary – and Pete says that if the lucky winner wants to, he can keep his lists of addresses and events on Pete junior's computer as well. Are there any nominations. . .?'

And so it goes at many an AGM. We've all heard it before, haven't we? But does the innocent Pete know what he's letting himself in for by volunteering to keep the club records on a computer? Has anyone told him about the Data Protection Act, introduced in 1984? Does he know that as a 'data user' he is now legally obliged, either to register with the Data Protection Registrar, or to apply to him for a special exemption?

And worst of all, does he know that if he puts a foot wrong when treading the delicate maze of the new legislation on data protection, he could become personally liable for a fine of up to £1,000?

## Do they mean us?

They most certainly do! And this may come as quite a shock to any puzzled Pete amongst you. Most people, including quite a few of the popular computing magazines, dismissed the act when it first became law as applying only to big business and moneylenders.

'But I thought it was only meant to straighten out the finance companies', wails Pete. 'You know, the people who turn you down for credit and then refuse to tell you why when you've never let anyone down in your life.'

And he's partly right, but that must mean that he's partly wrong too. Without realising it, purely by keeping and working from a computerised list of members, their addresses, and the state of their subscriptions, Pete has become what is defined in the Data Protection Act as a data user, which means that he, not the club, is the one who has to comply with the new law.

The act came into effect on 11 May 1986, and it has been responsible for a great deal of confusion and misunderstanding over the last few months. *Amateur Radio* has received many telephone calls from worried club secretaries, asking whether the terms of the new act applied to them, and the RSGB has received so many requests for help and advice that the society has tried to obtain a blanket exemption for all affiliated clubs. Unfortunately, this was not possible because the onus for registration falls fairly and squarely on the data users themselves.

## What does Pete do?

There seem to be three possible courses open to him:

1. He can keep all his information on handwritten cards or sheets – a tedious and time wasting game that Pete junior's computer was supposed to make unnecessary.

2. He can send for a form from the Data Protection Registrar, and register as a data user. This saves any future worries, and the Registrar has promised to keep the form as simple as possible. It will cost him, or the club, £22, however.

3. He can inform every member of the club, including new members as they join, and preferably in writing, that their details will be held on a computer, and ask if they object. If they do, for whatever reason, then their details can only be held on a card index or similar system.

Alternatively he can kick out of the club all the awkward sods who do object, and then apply to the DPR for exemption.

The Data Registrar, Eric Howe, has publicly stated that he has no desire to make things awkward for the small computer user. His main concern is to protect us all from the unscrupulous companies who misuse the sensitive personal information held in medical or police security files, credit checking agencies and the like.

From now on we all have the right to be told what information is held on computer about us, and to demand that it be set right if it is inaccurate. And a very good thing too!

## The sting

However, in spreading its net wide enough to catch all the big boys, the act has caught all of us small users in its toils, so it's as well to be aware of both our rights and our legal liabilities.

Club membership lists qualify for exemption, but only if all the members agree to their details being held on a computer. Holding incorrect data will disqualify you from exemption, and remember that this could result from something as simple as a member changing his address, call sign or phone number without informing you.

It is the data user's responsibility to make sure that the data he holds is always accurate and up-to-date, and only refers to current members. Don't forget that a person becomes a 'non member' the moment his or her subscription runs out, unless the club constitution allows a period of grace.

Also the exemption is lost if you keep on the list any details of people who have never been members, so goodbye to the social secretary's hopes of keeping his list of possible guest speakers on Pete junior's computer.

## In doubt?

If you're in any doubt at all as to whether you should register, the Data Protection Registrar has a telephone service specially to give information to the public and to answer your questions about the new act. Ring (0625) 535777 for expert help and advice.

If you want to register, or to claim exemption, write to:

*The Registrar, Office of the DPR,  
Springfield House, Water Lane,  
Wilmslow, Cheshire SK9 5AX.*

*Val Rogers explains  
the complexities of  
the new legislation  
on data protection*

# 1986 DAYTON HAMVENTION

VIC J COPLEY-MAY G3AAG

'If you can't find it at Dayton, it doesn't exist', or so the saying goes. With more than 1500 spaces let for the flea market and in excess of 200 dealers represented, that is not difficult to believe. The organisers of the Dayton Hamvention, which took place on 25, 26, 27 April, were the Dayton Amateur Radio Association, led by their chairman Jim Simpson WB8QZZ, whose committee held innumerable meetings throughout the year to put together their 35th Hamfest.

Jim and his gang are to be congratulated on attracting somewhere near 28,000 visitors in glorious sunshine, with temperatures in the nineties each day.

The hamvention was held at the Hara Arena Exhibition Centre on the outskirts of Dayton, Ohio; the venue being ideal for this spectacular event in the ham calendar. A 76-page programme detailed the enormous list of lectures, forums, discussion groups and demonstrations taking place over the three day period. Rooms in the downtown hotels were set aside as hospitality suites so that those interested in different facets of our hobby could meet to discuss aspects of particular interest.

My own guide and mentor was John DayW4XJ, who ferried me to Dayton from Knoxville, Tennessee, a six hour drive in glorious weather through spectacular countryside.

## Facts and figures

The anticipated attendance was 22,000. However, a rough estimate indicated that 28,000 were there with representatives from all over the globe. As one who shrinks from crowds I was pleasantly surprised to find that a London bus driver

would not have had too much difficulty driving down the aisles separating the stands and tables. At no time was it difficult to get close to the exhibits.

Every available space was sold well before opening time. A free shuttle bus service ran every half an hour from most of the downtown hotels to take visitors to the convention.

Exhibitors were housed in five main halls, one of which is normally used as a stadium for basketball matches and where one could always find a comfortable seat to rest weary feet. In addition, five further halls were set aside to handle the numerous talks, demonstrations and side-shows. Refreshment was easily obtained in the many food halls and bars.

## Keeping in touch

I was warned that 2 metre QRM would be wall to wall. All our party carried hand-helds, not just to keep in touch but also to shout 'eureka' when we fell upon some goody that we had gone there to find. Judicious choice of frequencies enabled us all to maintain communication despite the QRM. Not to take any chance some enterprising visitors carried 2m directional quads on their helmets.

Unless what you were looking for was particularly rare and much sought after, one could haggle and almost always 'do a deal'. John picked up a virtually new Heathkit SB221 2kW linear, the latest model with delayed filament switch, for just \$475, and it works perfectly. Even if one were to add import duty at about 10% and VAT at 15% you're still going to be quids in. Just a few such purchases at those prices would defray the air fares. I bought several chips that I had had difficulty locating in the UK at 50 cents a throw. The mecca for these chips was a stand with cabinets housing over a thousand drawers. Each labelled in alphabetical and numerical order.

One hall was devoted entirely to computer cast-offs where one could pick up disk drives for \$25, monitors for \$25 to \$50 and complete IBM/PC compatibles for \$200 to \$300 or thereabouts. New PC/XT compatibles (and when I say compatible I mean both hardware and software compatible) could be bought for less than the sterling equivalent of £450.

As a visitor from the UK, I was inevitably comparing prices. With the yen riding high against the US dollar I wasn't expecting to find much difference between UK and US prices. Samples of the Dayton prices (before haggling a 10% discount) compared with those advertised in these pages are shown in the table. Surely import duty and VAT can not account for the high prices we have to pay. Averaging out, I found that UK prices were some 50% higher than US prices, and that's before haggling. Nobody buys without a haggle - it's routine.

## What's new?

It was immediately apparent that Packet Radio has taken off in a big way and many exhibitors were demonstrating their latest terminal mode controllers. The latest from AEA was their PK232 data controller for use with all RS232C compati-

ble computers. It's a five mode black box including Morse/baudot/ASCII/Amtor and a Packet data controller with internal VHF and enhanced HF modem.

They say a quick look at the front panel of the PK232 will show just how much the unit will do. With 20 front panel status indicators it's certainly easy to keep track of which mode you're working and what you're doing. The tuning indicators also make tuning a 'snap', especially HF Packet. AEA appear to be in the forefront of this new facet of amateur communication and the PK232 is expected to reach the market this summer, but has yet to appear in their current catalogue.

One cannot leave this subject without drawing attention to two other new controllers. Micrologue Corporation, who do a lot of military stuff as well as ham gear, were exhibiting their new TMC, the ART1. This is also an all mode terminal, although the differences between this and the AEA PK64 for the Commodore 64 seem to be marginal. The other controller, from HAL, would appear to be the Amtor and Packet operators' dream, but unfortunately your scribe did not find the time for a talk-in.

## Trade stands

Yaesu were represented, although their stand was smaller than that of Icom and Kenwood who appear to have the lion's share of the market. Yaesu seem to have been dragging their heels after launching the FT757GX more than two years ago. It caused a minor sensation and sold well, although even then it did not seem to have a great deal to commend it apart from bells and whistles. I was tempted and persuaded a dealer to lend me one thinking it might be a replacement for my Kenwood/Trio TS130S, which I had been toting around the world. I sadly came to the conclusion that it had nothing to offer which would justify the extra expenditure.

Consequently, I was expecting Yaesu to pull out the stops at Dayton and they may well have done just that. SMC had told me about the new all singing all dancing linear, the FL7000. The knobless, self tuning and band changing QSK slimline black box is suitable for Packet and Amtor and provides 1.2kW input power. It was on show at the event but a brochure wasn't available.

In addition to this was the real eye opener - the FT767 all band transceiver. All band? Yes - 160 metres through 70cms when fitted with optional modules. Again a leaflet wasn't available but the price was given as \$1759 and the rig should be available this summer. Time will tell if the performance compares favourably with the other rigs available from Icom and Kenwood.

Icom were displaying their IC48A, 70cms 25 watt FM rig which looked particularly interesting. It seems to be a current trend with most manufacturers to cram VHF and UHF mobile rigs into yet smaller boxes.

PX Shack were exhibiting the full line of Microwave Modules equipment but inexplicably their MML144/100s was on sale for the equivalent of £120, whilst in the UK the price is £149.95!



### What's old?

As an old timer I was fascinated to see the most incredible collection of 'junk' in the flea market, dating back over the whole history of radio. It had to be seen to be believed. I saw a 1925 vintage domestic wireless complete with teak cabinet, resplendent with litz wound coils, bright filament valves strung across the top and a swan neck horn speaker – the lot. Although this rig pre-dates me it was guaranteed in full working order, which is more than can be said for me!

### The social scene

Since I had worked BV0BG (Taiwan) on several occasions, I was particularly interested in Dave Siddall's (K3ZJ) slide illustrated talk about the expedition. The problems they had erecting a comprehensive set of antennas atop roofs littered with vast arrays of TV antennas and shaky power lines were mind boggling, and obviously demanded a great deal of ingenuity.

It was physically impossible to fit all that was going on into the time available and consequently we missed out on most of the talks and the splendid banquet.

Well over 100 exhibitors donated prizes and your numbered entry ticket stubs were tumbled in a vast drum. TV screens dotted about the halls listed the lucky prize winners. If you were one of them you could win a complete Kenwood ham station, the TS940/TL922 line with all accessories. Even in the States that would have set you back \$4,500.

John and I visited the South Eastern DX Club hospitality suite and were delighted to meet many DX hounds who, hitherto, had just been voices on the air. Pointless to list every encounter but talk of the social scene cannot stop without mentioning Iris W6QL who has given so many hams their first contact with far off exotic countries and islands.

### In conclusion

Perhaps the only black spot upon an otherwise memorable visit was the power failure which plunged the main halls into near total darkness between 9am and 2pm on the Sunday. It is also sad to relate that a number of exhibitors lost some valuable equipment. My thanks must go to the 'team' at Knoxville and to Professor John Day, in particular, who persuaded me to make the trip and whose hospitality knew no bounds.

Equipment	Dayton Price	UK Price
<b>Kenwood Trio</b>		
TS940S	£1235	£1795
Auto ATU	£130	£218
TS430S	£520	£750
TS930S	£975	£1395
TS440S	£617	£950
<b>Yaesu</b>		
FT980	£1100	£1795
FT757GX	£570	£879
<b>Icom</b>		
ICV751	£910	£1399
IC745	£650	£989
IC735	£578	£899

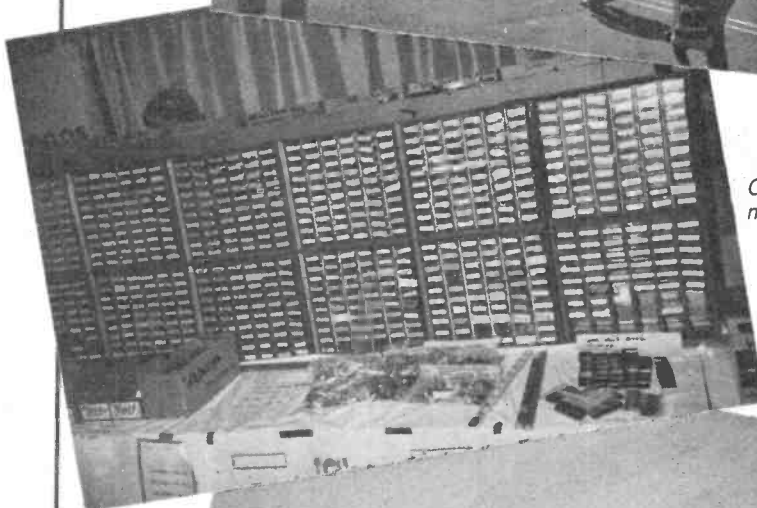


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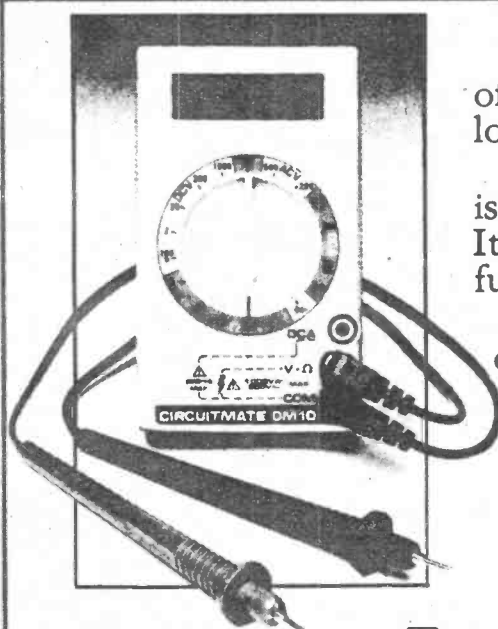
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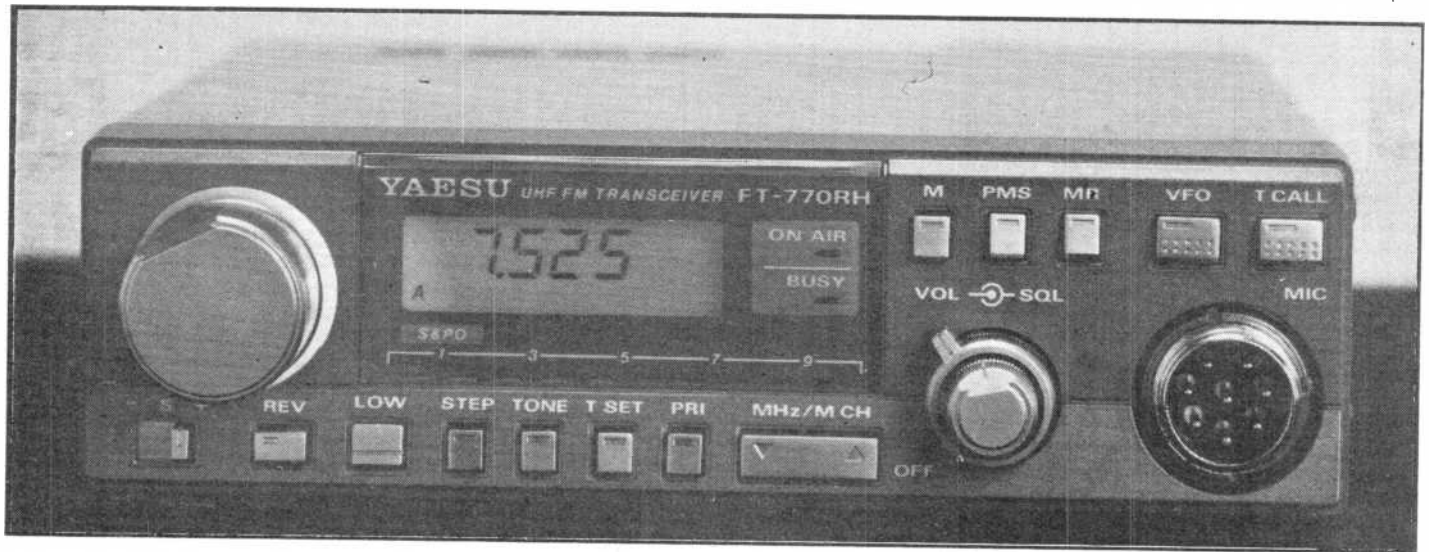
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# ANGUS MCKENZIE

## TESTS



### YAESU FT770RH 70cm FM mobile transceiver

In the June 1985 issue of *Amateur Radio* I reviewed the 2m version of this transceiver, so you can see that we have had to wait a year for Yaesu to introduce their 70cm version. The rig covers 430 to 439.9875MHz in 12.5kHz steps, a front panel button allowing selection of 25kHz channelling. Maximum output power is claimed as 25W, but another front panel button can select the low power mode: 2.5W as measured.

Frequency can be varied either on a tuning knob with click steps, on the front panel, or by using up and down buttons on the microphone. Holding the mic stepping button down causes the rig to scan, provided the squelch is in use. Either of two scanning modes can be selected by a switch underneath the chassis: the A position resuming scan after six seconds, while the B position resumes scan two seconds after the squelch closes, the scan having stopped on a station.

#### Memories

The FT770RH has ten memories, and these can accept simplex or separate Rx and Tx frequencies up to memory 8, memories 9 and 0 being used for setting a programmable scan range; eg 433.0 to 434.0MHz. The rig includes a simplex/repeater negative or positive switch allowing one to select repeater use from the VFOs A and B, or from a simplex frequency memory. Thus, you can either store a repeater channel as a simplex one and use the repeater shift switch, or you can select memory with built-in repeater shift. A reverse repeater button, when pushed in, transfers the Rx and Tx frequencies from VFO with repeater, or from simplex memory with repeater shift switched in, but reverse will not

work when separate Rx and Tx frequencies are stored. The rig includes a priority function for use when you are in the VFO mode: it monitors the selected memory channel every few seconds.

#### Toneburst selection

You can either select toneburst (1750Hz) automatically at the beginning of each transmission, or more desirably you can get a toneburst to open up a repeater by pushing a toneburst Tx button on the panel. Note that most 70cm repeaters do not require repeated toneburst access once the repeater is on. Sub audible tonebursts are available with programming if you fit an extra optional board, but these are not normally used in the UK.

A rocker switch button on the front panel selects MHz up/down if you are in the VFO mode, or memory channels up/down in the memory mode; buttons selecting memory recall and VFO A/B. Unfortunately, if you wish to shift MHz quickly, but you inadvertently go over a band edge, the selected kHz are wiped out, so you may have to redial the kHz again, which can be most annoying. A memory write button allows you to transfer a VFO frequency into a memory that has already been pre-selected, the button needing to be pushed twice for storage. A separate Tx frequency can be programmed by pressing the write, followed by PTT and then write again. Memory channels can be completely erased by pressing write immediately followed by recall. If you wish to scan memories then you can do this in the normal way, having selected the memory mode. You can also programme into memory a skip command, so that when memory scanning any desired channel

can be skipped over.

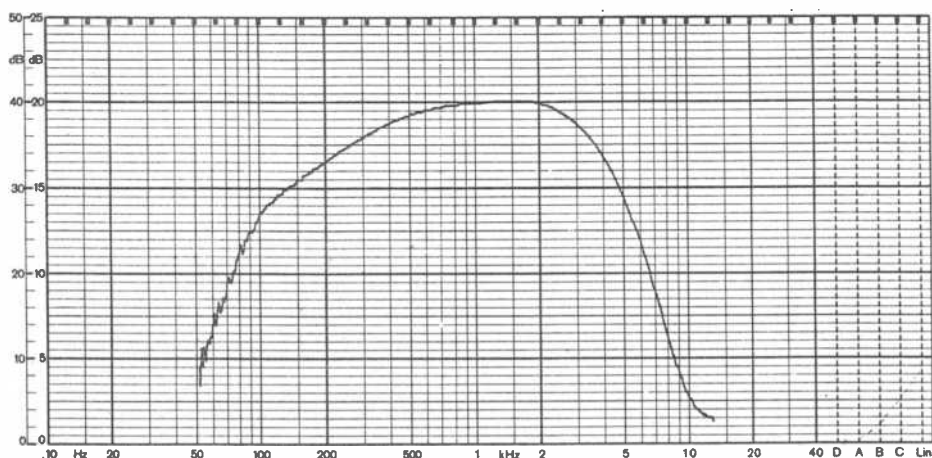
The front panel back lit green LCD gives frequency and all status functions that one would expect. The S-meter is in the form of a series of squares which double as power output indication on Tx and memory channel selected. On the front panel is an eight pin standard Yaesu mic socket, an MH14AB hand mic being supplied with the rig, which includes PTT, up/down buttons and an additional button to command the optional speech frequency/status read-out to operate. On the back of the mic is a slide switch which one can throw across to lock the frequency, thus disabling the up/down buttons on the mic, but not the tuning VFO knob. This facility is quite helpful in general use.

#### Speech synthesizer

The optional speech synthesizer, FVS1, can be switched to read-out whenever a frequency is changed, or just when the command button is pressed on the mic. I have to say that the quality of speech is poor compared with Icom and Trio speech read-outs. It generally gives too much detail, including the selected VFO as well as the frequency, and has some strange pronunciation anomalies. 'Point' comes out as a warped 'woink', but what is even more amusing is that 'error' reproduces as 'ellar'. As delivered, the read-out was painfully slow, but by fiddling inside you can speed it up, but you may take a while to get used to it!

The FT770RH is remarkably small, measuring only 140mm wide x 40mm high x 160mm deep, and weighing 1.2kg. The miniature built-in speaker is underneath the rig and consequently throws sound downwards, which of course is annoying if you are using the rig as a home base

## G3OSS TESTS



Yaesu FT770RH transmitter response chart

station. However, a wire stand for desk top operation is provided, but this has to be fitted by the user. A mobile mount is also supplied and the rig slides in and out of this fairly easily.

Underneath the rig are slide switches selecting VFO dial tuning: speech on/off, scan mode A/B, toneburst on/off and lithium battery back-up on/off. On the back panel there is an attached dc lead approximately 20cm long terminated in

bullet connectors. An extension dc power lead, also fitted with bullet connectors, is 3m long, and fused in both positive and negative lines at 10A. A short coaxial lead (20cm) is provided with an N-type female line connector for the antenna connection. A 3.5mm jack socket provides interconnection for an external speaker.

Also on the back panel is the PA heatsink and a fan which comes on when

the temperature exceeds a preset amount (it comes on after a minute or so of transmission). This fan makes quite a hissy noise, which is not too disturbing in a mobile installation, but is rather irritating in the shack.

### Subjective tests

I used this little rig for several evenings at home and was most impressed with its performance, although it was slightly fiddly getting to some of the buttons.

The repeater switch was rather stiff, although positive. Accessing the memories and band scanning was very simple and sensibly designed, and the VFO knob had just about the right feel to it. As with the FT2700 and the FT270, I was not impressed with the speech synthesizer.

RF sensitivity and selectivity seemed very good in practice and the reproduced quality was quite good, although limited by the mini speaker. An external speaker, however, sounded much better. The transmitted quality was considered by many to be at least average although a little coloured, and a better hand mic would undoubtedly have produced superb quality judging by our measurements of the transmitted audio.

Although the digital display is necessarily very small, it was quite bright and easy to read showing a clear advance over many older rigs. I rather like the idea of attached power and antenna leads, which makes it much easier to take the rig in and out of a mobile installation.

Perhaps my only real moan is that the use of the MHz button over a band edge removes the kHz, and it is so easy to make a mistake if you stab at the MHz rocker whilst driving a car. If you go the wrong way by mistake and lose your station after saying '4MHz up', when actually going perhaps to the bottom end of the band, you have to go 8MHz up again and fiddle the tuning for the correct kHz. Obviously something that would cause frustration.

### Laboratory tests

The receiver sensitivity is very good at the bottom and centre of the band, but at the top end (eg 439.975MHz) it was 2dB worse, although still acceptable. The front-end RF intercept point was at approximately -12dBm, which is quite good, although I have seen a lot better. The reciprocal mixing performance was audibly adequate, but not outstandingly good. The IF selectivity is excellent for 25 and 50kHz channelling, but inadequate for 12.5kHz channelling, which in any case is not even being considered yet for amateur use (nb: some users sharing the band, however, are using 12.5kHz offsets).

The S-meter gave a range of only 15dB between blobs representing S1 and 9, the final blob requiring only an extra dB to light up!

The S1 indication, in any case, requires a fairly good signal to indicate, and I cannot see that the S-meter, therefore, is of much practical use, other

### Yaesu FT770RH Laboratory Test Results

#### Receiver tests

Rx sensitivity RF level for 12dB sinad  
432 - 436MHz  
439.975MHz

-124dBm  
-122dBm

RF input intercept point

-12dBm

Selectivity 25kHz channels, wanted  
and unwanted channels modulated  
Selectivity 50kHz channels, wanted  
and unwanted channels

+66dB average  
+72dB average

S-meter

S1 -110dBm  
S5 -99dBm  
S9 -95dBm

Capture ratio

3.7dB

3dB limiting point

-131dBm

Quieting at 12dB sinad point

16dB

Discriminator distortion

1kHz deviation 1.5%  
3kHz 2.8%  
5kHz 1.7%

Audio output power for 10% THD

8 ohms 1.8W  
4 ohms 2.9W

#### Transmitter tests

RF output power high/low 26 to 28W/2.5W  
Max FM deviation into clipping 6kHz  
Typical speech deviation 4.7kHz  
Toneburst frequency 1750.2Hz  
Toneburst deviation 4.5kHz  
Tx frequency accuracy after very long warm up -380Hz  
Max dc current drawn on Tx 6.4A  
Rx current 280mA  
Tx audio distortion below 4.5kHz deviation less than 1.1%



than to indicate the presence of a signal which is at least fairly strong, but which is normally audible anyway.

The FM capture ratio measured very well, showing that the rig discriminates a strong signal from a weaker one on the same channel very well indeed. Distortion around the discriminator was about 1.5%, but it was rather odd that the highest distortion of 2.75% was noted at 3kHz deviation of 1kHz audio, while above this deviation the distortion fell again up to the point where it started hitting the edges of the IF bandwidth. The maximum audio output power into 8 ohms was slightly low, but there was a very useful improvement into 4 ohms.

FM limiting action was excellent, the recovered audio output level being virtually constant way below the input sensitivity level. The receive frequency accuracy was within 500Hz at worst, for sensitivity only improved very marginally indeed when the generator was off-set by this amount.

## Audio response

The reproduced audio response, charted with 750 $\mu$ sec pre-emphasis in the transmitted modulation, showed 6dB down points at 200Hz and 2.3kHz; the response curtailing quite rapidly above 2.5kHz. I might have preferred a slightly wider response on a 70cm rig, although this response would be about ideal on a 2m rig where 12.5kHz channelling is now in regular use.

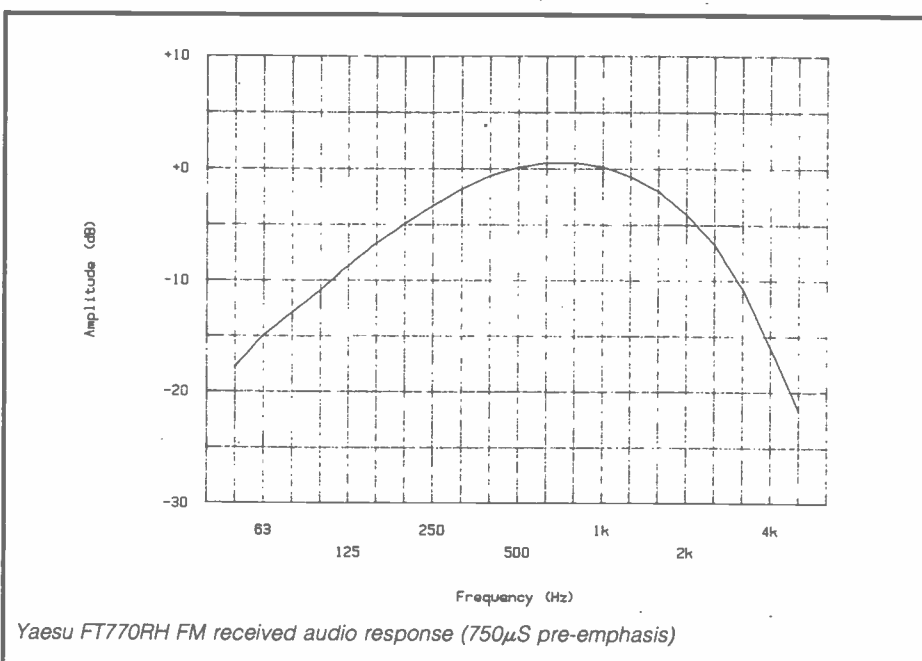
The transmitting section produced 26W output from a 13.8V dc supply from low to mid-band, but an increase to 28W was noted at the top end. The rig typically gave 2.5W in the low power position. Maximum dc current drawn was 6.4A, the receiver drawing around 280mA unless the volume is turned well up.

A brief check for RF harmonics showed that both the second and third were below -70dB ref the fundamental, which shows excellent PA filtering. The onset of audio clipping was at 5kHz deviation and absolute maximum deviation, when provoked, was 6kHz. Normal speech peaked at around 4.7kHz, showing the mic gain as well as deviation to be optimally set. The toneburst was set to 4.5kHz deviation and its frequency was only 0.2Hz in error; one of the most accurate we have yet seen.

## Transmitted frequency

The transmitted frequency accuracy was originally only 170Hz out, but as the rig warmed up the error rose to around 280Hz. After an extremely long over, the maximum error was 380Hz; the repeater shift however being extremely accurate. Any frequency errors noted are of no real significance, and it can be seen that the internal crystal is within one part in 10<sup>6</sup>, even when coping with a large temperature change.

We checked the transmitted frequency response from the input of the mic socket to the output carrier, which was subject to 750 $\mu$ sec de-emphasis in the Marconi 2305 modulation test set. The



published plot shows that the transmitted response is within 6dB or so from 200Hz to 4kHz, and is thus appreciably wider than the receive response. I feel this is about right in practice for the UK market, although inappropriate for 12.5kHz channelling. We noted only 1% THD at 4.5kHz deviation and this is excellent, the transmitted signal-to-noise ratio being very good.

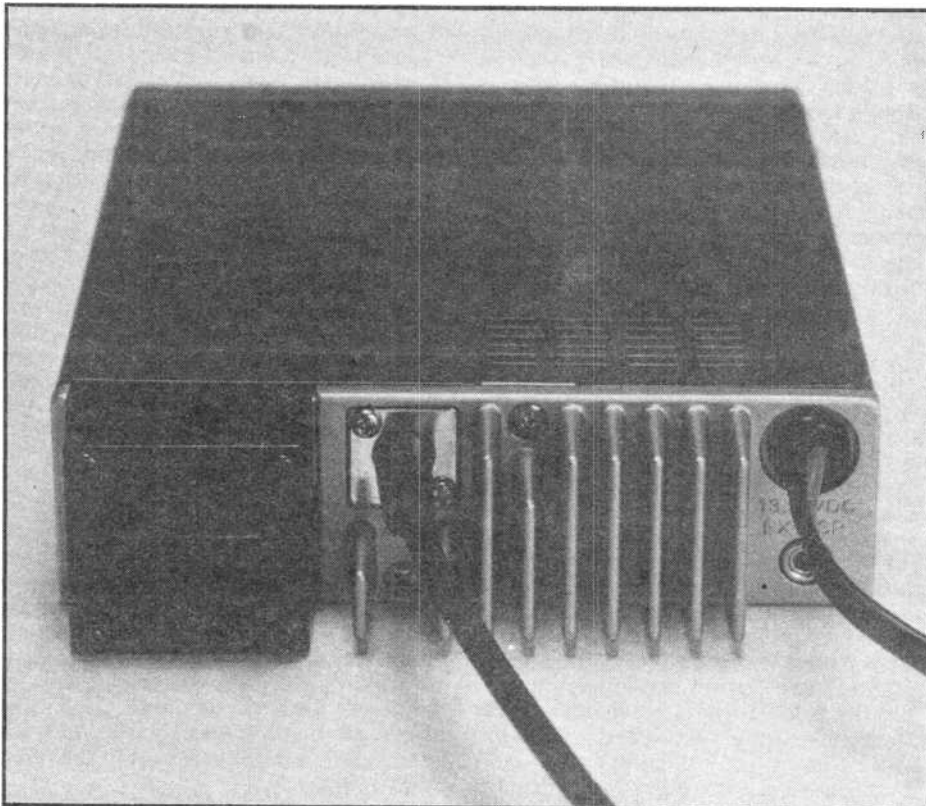
## Conclusion

It is remarkable how rigs have got smaller and smaller over the years, while Tx output powers have usefully gone up. This little rig worked very well and could

be tucked almost anywhere under a dashboard. In the context of operation on the 70cm band, I feel that it can be recommended highly, although you will need to watch that there is adequate ventilation space behind it. I would like to thank Amcomm ARE Ltd for the loan of the review sample, and Roy Brooker, for helping me with all the tests. Another most useful Yaesu product.

## Reference

Amcomm ARE Ltd,  
373 Uxbridge Road,  
London W3 9RN  
Tel: 01-992 5765/6





## TRIO TM2550E 2m FM mobile transceiver

This rig is designed with a very different concept to the average FM mobile that has been marketed so far, with very few exceptions. Frequency entry is either with direct entry of four numbers on a 4 x 4 keyboard matrix from 23 memories, or by using up/down scanning controls, as available on the supplied mic (only with 5kHz steps, unfortunately).

The rig is rated at 40W output, but there is a low power button which reduces this to just over 4W. Rather uniquely, repeater shift comes in automatically if you tune or enter between 145.6 and 145.845MHz, a negative shift being built in here. A reverse repeater button is provided, however, together with a 1750Hz toneburst on/off facility.

### Memories

Four of the memories can have split frequencies put in them for Tx/Rx. Scanning can either be achieved via the mic or by pushing a button on the rig itself, and you can scan up or down the whole band or between pre-determined limits in special memories. Priority channel monitoring is provided, and you can select any of the memories to become the priority channel. The new Trio digital channel link (DCL) system is incorporated, allowing identification of your station callsign at the beginning and end of each transmission, when enabled. This system also offers many other facilities, including semi-automatic QSY and automatic operation with appropriate additional options.

### Front panel facilities

Other front panel facilities include: frequency lock; memory/direct entry for frequency; offset variations, including user change of auto-repeater shift frequencies; a click step rotary knob for selecting memory channel (not a VFO

though); optional speech frequency read-out enable; and a lamp dim/bright adjustment button.

The front panel digital read-out includes all the basic status indications, and the S-meter display is in the form of vertical double bars indicating between S1 and S9, although there are three unlabelled levels above the latter. The S-meter, however, only had 9dB between S1 and 9, the higher levels only requiring a dB or two more RF to light them up.

### Mic socket

The mic socket has eight pins wired to the standard Trio convention, but only the audio, PTT and up/down facilities are connected to the socket, as well as an HT line for operating mics such as the Trio MC85. As well as a large heatsink on the back panel there is an SO239 socket for the antenna, and a 3.5mm jack socket for use with an external speaker. Captive 13V dc leads are terminated in a special dc socket, the positive line being fused and an extension lead with the appropriate dc plug also being provided, together with a mobile mounting bracket. The loudspeaker is mounted in the top of the case, but this position could be slightly awkward in some mobile applications, although it is fine for us in the shack.

### Subjective tests

As supplied the rig was very slightly off the correct received frequency, and the sensitivity was thus slightly poorer than that of other modern sets (see lab tests). Unfortunately, there is no provision for using the set for 12.5kHz channelling, but when I tuned to a main 25kHz channel, no breakthrough was audible from an adjacent 12.5kHz channel QSO. The received quality was good, and the transmission quality was up to the usual high Trio standard.

I personally found that the absence of a

tuning knob was irritating, especially when I only wanted to QSY up and down one simplex or duplex channel and the only practical method for this was to use five button pushes per channel on the mic. You can, of course, rapidly enter a new frequency by punching in four digits, but surely this is not so simple when you are driving your car!

You will find the large number of memory channels very useful, so you could use these for storing all the repeaters and a few of the more usual simplex channels. The high power of 40W is extremely useful, for it means that you should easily be able to access any repeater that you can hear, and it will also give you that extra bit of help when you are mobile. However, band usage being somewhat intense in the larger urban areas, you should go to lower power whenever you can, enabling others to use the same channel some distance away from you.

### Laboratory tests

The RF sensitivity was just adequate when originally measured, but after we had offset the signal generator by 1.4kHz, there was an improvement of some 2dB in the sinad rating, showing that potentially the rig was quite good.

Lowe Electronics informed me that an internal preset, L17, was obviously mis-set and its adjustment would have been comparatively simple and would have allowed the optimum performance to be right on channel. At the very top end of the band, the sensitivity was around 1dB poorer.

The RF input intercept point measured quite well for an FM mobile but there have been a few rigs that have measured better, although this rig's performance should be quite adequate. Selectivity was excellent, and quite a lot tighter than that of many other rigs. The S-meter

## G3OSS TESTS

range was so limited that many signals will be either at the bottom, or over the top, although it was quite easy to see at a glance. The received audio response plot showed a very steep roll-off below 400Hz, and frequencies above 2.5kHz rolled off quite rapidly.

### Distortion measurements

The distortion measurements were not particularly good, but I am sure they would have been better if the rig had been on channel; a quick shift of the signal generator by 1.4kHz showing a clear audible improvement at 3kHz deviation. There was plenty of audio power available, both from the internal speaker and into an external one, especially into 4 ohms, and this could be useful if you have a noisy car.

Even though the receive dc current drawn was fairly low, the Tx maximum current is, of course, very high for a mobile VHF rig. The transmitted frequency accuracy proved to be only 90Hz low, which is one of the most accurately set rigs that I have noted recently. Transmitted maximum deviation was also very accurately set at 5kHz, but this may be too high if and when we all change over to 12.5kHz channelling and we have more channels.

The transmitted response was quite normal; I noted just about the right amount of mic amp gain. This allowed quite heavy deviation, but it was not badly clipped when I was talking into the mic from around 5cm back. The toneburst frequency was within 1Hz accuracy and its deviation was about right.

I had a deep look on the analyser for RF harmonics but could not spot any trace of them, the noise floor having been set at -65dBc. I then spent some time searching for sprogs either side of the 2m band, looking  $\pm$  up to 25MHz for them, but despite the fact that we got down to a noise floor of around -80dB, we could not detect a trace of any.

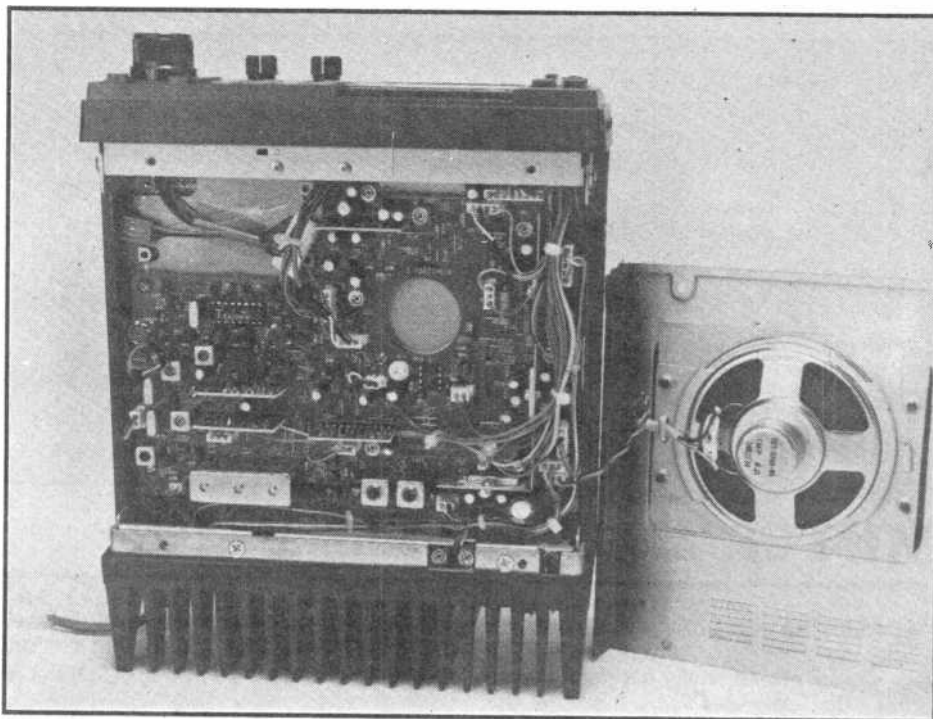
### Conclusion

Although this rig performed very well in general, apart from the slight received frequency error, I do not think it is likely to become all that popular in the UK as quite a number of its potential facilities are quite obviously primarily designed for use in the United States. I found it awkward to use at times, and quite frankly I prefer other Trio models and alternatives from both Yaesu and Icom. Nevertheless, it may be of interest to quite a few readers who like to access a required frequency very quickly. Not really a recommended rig, unfortunately, but nevertheless an interesting one.

I would like to thank Lowe Electronics for the loan of the review sample, and Jeff Ginn for helping with all the measurements.

### Reference

Lowe Electronics  
Chesterfield Road, Mattock,  
Derbyshire DE4 5LE.  
Tel: (0629) 2817, 2430, 4057.



### TRIO TM2550E Laboratory Test Results

#### Receiver tests

Rx sensitivity RF level for 12dB sinad  
144 - 145MHz -122dBm  
145.975MHz -121dBm

Sensitivity improvement with generator offset by 1.2kHz 145.95MHz

RF input intercept point -13.5dBm

Selectivity  
12.5kHz channels, wanted and unwanted channels modulated +19dB average

Selectivity  
25kHz channels, wanted and unwanted channels modulated +75dB average

S-meter  
S1 -110dBm (0.7 $\mu$ V)  
S5 -105dBm (1.25 $\mu$ V)  
S9 -101dBm (2 $\mu$ V)

Capture ratio 4.7dB

3dB limiting point -126dBm

Quieting at 12dB sinad point 20dB (nb slight frequency error)

Discriminator distortion  
1kHz deviation 2.1%  
3kHz deviation 3.6%  
5kHz deviation 2.9%

Audio output power for 10% THD  
8 ohms 2.7W  
4 ohms 4.5W

#### Transmitter tests

RF output power high/low 38/4.3W  
Max FM deviation into clipping 5kHz  
Typical speech deviation 4kHz  
Toneburst frequency 1750Hz  $\pm$ 1Hz  
Toneburst deviation 3.9kHz  
Tx frequency accuracy -90Hz  
RF harmonics below -65dBc  
RF spuri below -75dBc  
Max dc current drawn on Tx 6.8A, 2.4A low power  
Rx current 290mA



## MUTEK LBPf50u Bandpass filter

Hard on the heels of the launch of the BNOS low-pass filter, is this new muTek one which offers some distinct advantages. Not only does it attenuate the second and third harmonics of the 50MHz band at 100 and 150MHz respectively by at least 70dB, but its bandpass characteristic gives considerable attenuation to frequencies below

30MHz. The filter is supplied in a well finished diecast box, fitted with 50 ohm BNC sockets at either end, and measures 100mm wide x 50mm deep x 25mm high, excluding sockets. It is rated to take up to 100W throughput and its SWR is specified at better than 1.25:1.

I was interested to see how its filter characteristics would measure up in

practice, and the two frequency response plots taken broadband to show the complete bandpass characteristics and harmonic rejections, and the closer in plot to show the passband itself, indicate a superb performance. The attenuation at 50.2MHz is just 0.4dB, but note the attenuations by the 10m amateur band, and for the second and third harmonics.

I took a return loss curve with the filter feeding into a pure 50 ohm dummy load. This curve is very good and shows the filter to be quite satisfactory in our portion of the band. This test was done with extremely low power, but I thought it advisable to check the performance at a higher power level. Consequently I drove it from a Trio TS660 turned up to give about 15W. A Bird throughline watt meter with switchable power ranges showed only a miniscule amount of reverse power coming back from the filter and dummy load; considerably below 50mW.

### Personal preference

There is one particularly important reason why I prefer the muTek product and recommend it over the BNOS one: my 50MHz Tonna beam is about 15ft above my TH6 6-element HF beam, and I frequently use the HF beam at full power into it. In the past I have forgotten to disconnect a 50MHz converter and have had to replace many a front-end transistor in an ancient Microwave Modules converter! I got round the problem some years ago by using a slightly lossy Band 1 TVI protection high-pass filter, supplied around 20 years ago by the Post Office. In the last year or so I have had to be very careful to avoid blowing up equipment, which I have disconnected after use to avoid the problem.

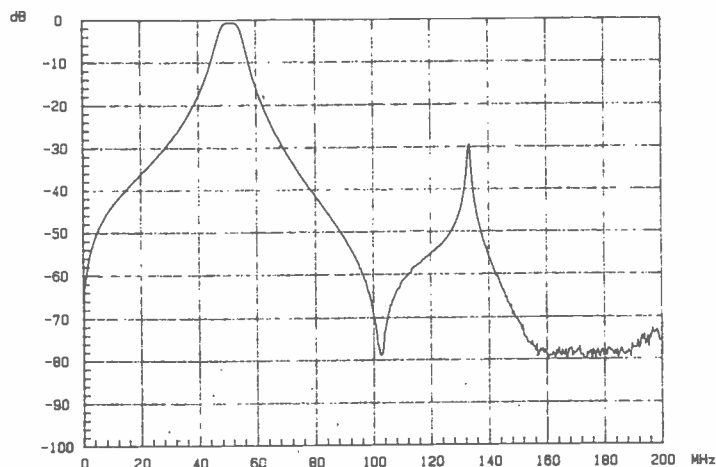
MuTek's own transverter did actually withstand full power at HF because of its excellent front-end selectivity, but many other rigs would probably not survive. Consequently installing this filter in the antenna lead would be highly advisable if your 50MHz antenna is anywhere near your HF beam. It may well remove some sprogs and spurious receptions from the HF bands reacting with local oscillator harmonics etc in some other makes of transverter. Most importantly, it should kill any harmonic problems that you may have, and there are a few DIY transverters around that are alleged to have very poor harmonic rejections.

### Highly recommended

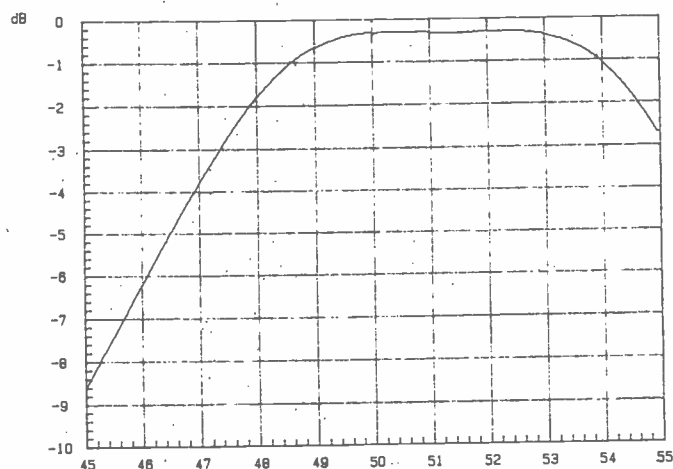
A worthwhile and highly recommendable product which costs £29.90 including VAT (add £1.85 p&p). The BNOS filter incidentally is £24.95, including VAT.

### References

MuTek Ltd, Bradworthy,  
Holsworthy, Devon EX22 7TU.  
Tel: (0409 24) 543.  
BNOS Electronics Ltd, Dept AR,  
Mill Lane, Stebbing, Dunmow,  
Essex CM6 3SL.  
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Bandpass response showing lack of ripple. Resolution bandwidth 3kHz



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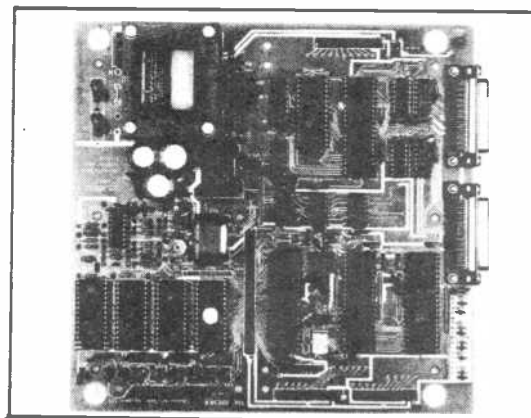
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An efficient aerial system is vital to the success of any amateur radio station. Often the capability of a good aerial is reduced by matching it poorly to the feeder or receiver and throwing away useful signals. This sort of situation is particularly common where long wire aerials are used when the wire is often fed directly into the receiver with no matching.

Long wires are probably the most convenient type of aerial to erect because: they only require two convenient points to anchor them; their length is not critical; they can be made fairly inconspicuous; and they can be made to cover a wide range of frequencies. However, they do present a very wide range of impedances at the feed point and an aerial has to be properly matched if the best results are to be obtained.

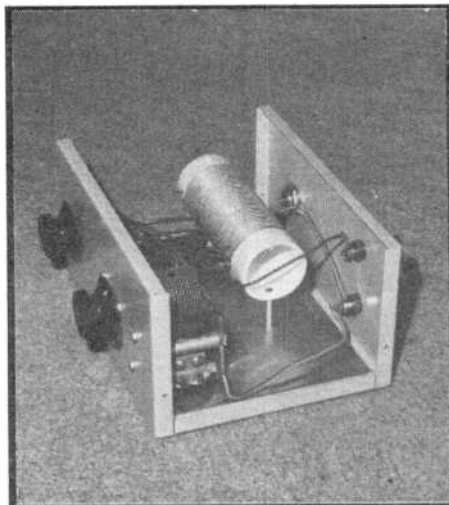
In order to match the aerial to the feeder or receiver input an aerial tuning unit of some form or another is required. Whilst there is quite a large range of ATUs available from the dealers it is a reasonably easy job to make one.

### Circuit

The circuit for this ATU is quite straightforward and consists of an L section arrangement. This type of configuration has been used very successfully on end-fed aerials for many years. Not only does it match a wide variety of aerial lengths but it also acts as a low-pass filter and will attenuate any harmonics. This is particularly important if a transmitting station is to be set up in a suburban location where there will be a lot of televisions in close proximity.

### Components

One of the most time consuming parts of a project can be in locating and buying the components. It can be bad enough with projects that use the more usual components, but for ATUs, which can use the more unusual high power RF components, a little more ingenuity may be



required. Club junk sales and mobile rallies are ideal hunting grounds.

One of the more difficult components to obtain is a suitable coil former. About ten years ago there seemed to be a fair number of those excellent ceramic formers around, however it is some time since I have seen one so a different idea had to be used. In the event it was decided that a piece of one and a half inch waste pipe could be used. This is not only cheap, but it is also readily available from all plumbing merchants and most DIY shops. As only a short piece is required it may even be possible to get an off-cut.

### Capacitor value

The capacitor is the next item on the list. The value of it is not critical, and something with a maximum capacitance of anywhere between 100pF to 300pF is ideal. If the ATU is to be used for receiving then almost any reasonable quality variable capacitor will be suitable. For example, an air spaced one would be very good and would even be suitable for low power transmitting. A single gang 365pF capacitor can be

obtained from Electrovalue for about £4.50, but it is well worth looking to see what is in the junk box before buying anything.

If the ATU is to carry any power then it is advisable to sort out a reasonably widespaced variable. As they are very expensive when they are bought new it is best to try to find an ex-equipment one from somewhere. Obviously rallies and junk sales are the best hunting grounds for these. The capacitor used in the original unit was taken from an old 19 set which was dismantled some years ago. This has proved to be very good and capable of handling the voltages produced by 100 watts of RF without flashing over.

Just as the capacitor ratings were less critical for a receive only ATU so it is with the switch. Normally it is useful to have about twelve positions to give a good choice of taps on the coil. However, the more switch positions the better the match it is possible to obtain. This is the reason why some top range ATUs have a roller coaster type of coil to give an infinite range of taps.

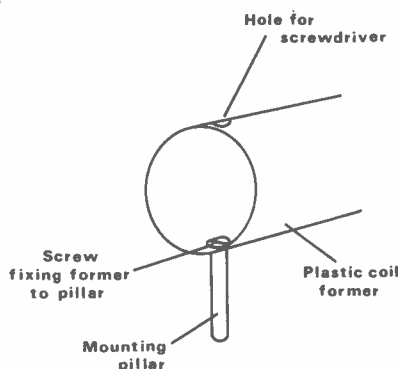
### Wavechange switch

For most listener applications a switch, such as a CK 1 pole 12 way wavechange switch, from Electrovalue would be quite adequate. However, if any amount of RF is going to be run through the ATU then something more substantial would be required. There are some high current wafer switches which can be obtained from some component distributors. However, a switch with a ceramic wafer would be excellent although rather expensive.

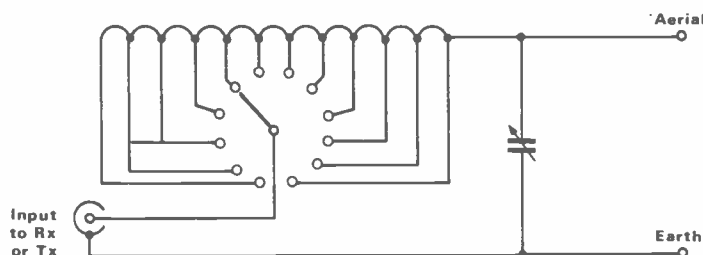
The connectors are really a matter of individual choice. Most stations seem to use SO239s and PL259s, at least for HF, and therefore it is probably best to use these for the coaxial input. The connection to the aerial itself is probably best made with a 4mm connector or screw terminal.

The final finish of a project depends very much upon the looks of the case. In order to give the best possible finish with the minimum amount of work, one of the wide range of ready painted cases was chosen. Many component stockists, like Radiospares, Verospeed and the like, stock them but the one chosen was one

Method of mounting coil



Circuit diagram of ATU



# BUILD SIMPLY

by Ian Pool

# DO EATU

## le G3YWX

of the Newrad range available from Electrovalue for about £6. As it can be seen from the photograph it consists of two U shaped sections, one of which forms the base with front and rear panels, and the other forms the top and sides. As both of the sections are painted the finished unit can be made to look very professional. When choosing the size it is worth making it too big rather than having to cramp the electronics into a space which is too small. The size of the one which was used was 200 x 150 x 100mm (width, depth, height) and this gave plenty of room inside for the components and wiring.

### Construction

The construction of the ATU is fairly straightforward, however a little ingenuity can help the unit come together more easily and improve the finished product.

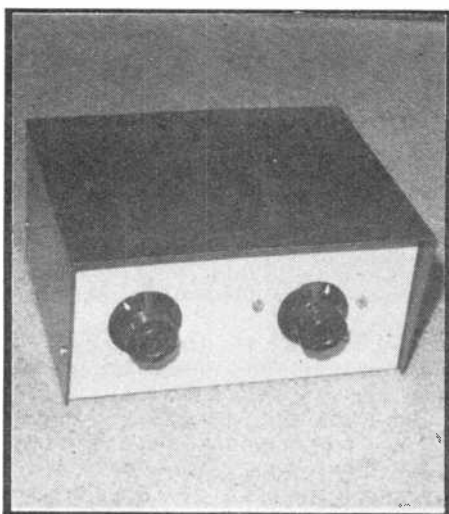
The first stage is to construct the coil former, which is best done by cutting a suitable length of plastic pipe. The length should be enough to take the coil wound on a pitch of about ten turns per inch, with sufficient space free at either end to mount the former. Normally about 50 turns is sufficient for 80 to 10 metres. Then about threequarters of an inch should be left at either end for mounting the coil.

Having cut the coil to length, a groove must be cut into the former to keep the wire from slipping. This is best done on a lathe, but if this is not possible it can be done by using a file carefully. Ideally the groove should be about 1/16 inch deep, or just enough to hold the wire.

Holes should be drilled at either end to take a screw to mount the coil former onto a pillar, as shown in the diagram. Directly opposite this another hole should be drilled to take a screwdriver shaft so that the screw can be tightened.

### Winding the coil

The coil should be wound out of reasonably substantial wire - 18 or 20 swg is ideal - which must be anchored at either end. This can be done in several ways, but probably the most efficient way is to use solder tags. A hole should be drilled to take a screw to secure the solder tag which then gives a secure terminal to solder, not only the wire for



the coil, but also the wire to the other components.

After the coil has been wound the wires for the taps should be soldered on. These wires should obviously be long enough to reach the switch, and attached to the side of the coil which will be nearest to the switch. The taps should be placed at varying intervals along the coil, but starting with taps about every turn and then increasing in their spacing so that by the end of the coil they are every 15 turns or so gives the best results.

Having constructed the coil the case can be prepared. If one of the ready painted cases is to be used, then the outside should be protected from scratches caused by swarf. This can be done by covering all the vulnerable areas in masking tape.

### Practical advice

When the positions for components have been marked out and the holes drilled then the masking tape can be removed. If the project is delayed and the masking tape is left on for a month or more then it becomes difficult to remove. In this case the tape should be removed

as best it can, and the residue removed using an organic cleaning agent such as 'Zoff' or similar. Nail varnish remover or acetone should not be used as it may take the paint off as well!

As the case is ready painted it does create a few problems, but these can be overcome by carefully removing the paint around any earthing points. This need not detract from the looks as it can be done on the inside, and only where necessary. For example, the SO239 connector needs earthing as well as the capacitor.

Wiring the unit should not create any problems, but it is worth not making the wire leads too long.

### Results

The ATU performed well and managed to give an almost unity VSWR match on 80 metres to ten without the random wire used. It was found that even though a point of minimum SWR was found on two or three switch positions, usually that using the minimum capacitance gave the best result. It is worth experimenting with the positions of the taps on the coil to get the best match for each band.

The ATU was tried on Top Band but it did not give a good match. However, if more turns had been put on the coil then no doubt operation on 160 metres would have been possible as well.

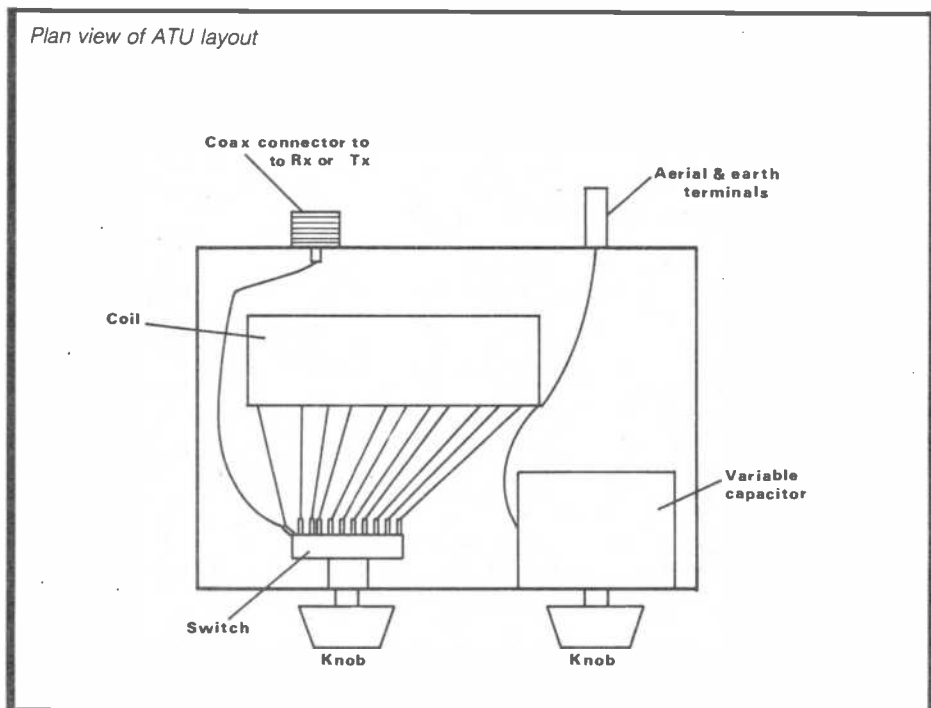
### Conclusion

Although this is not the last word in ATUs (and it will only match an end-fed aerial), this unit proved to be very useful. It did not cost a great sum, probably around £10, and this is considerably less than any commercial piece of gear. If good quality components are used to build it then it should provide many years of faithful service.

### Reference

*Electrovalue, 28 St Judes Road, Englefield Green, Egham, Surrey TW20 0HB. Tel: (0784) 33603.*

Plan view of ATU layout



# SHORT WAVE LISTENER

TREVOR MORGAN GW4OXB

With conditions continually changing, listening is getting more rewarding every day. A number of reports have come in from readers who have logged new prefixes on discovering that twenty metres has improved since British summer time began. Many of you are studying for the RAE so by the time this goes to print there should be some nice new licences in the pipeline.

Listeners hunting the QRP stations for the award should have had a field day over the April period with many stations equipped with their versions of the 'Oner' transmitter by GM3OXX that was published in the spring edition of *Sprat*. Lots of these tiny, one inch square transmitters were heard (and worked) in Swansea, especially during the RSGB low power contest.

## It seems to work

Our intrepid award hunters were at it, with Barrie Musselwhite of Warminster logging his first 250 prefixes including AP2, DU6, VK6, XT2, YB2, ZB2, ZS4, and 9M2. Barrie used a regular short wave receiver which he beats against a medium wave receiver to resolve the sideband signal. The antenna is a simple ended 'draped all over the place', as he says. Nevertheless, it all seems to work and that's the general idea.

Neil Rogers, also from Warminster, included CS4, TR0, CQ2, J40, UL7, CR0, TE1, JE3, HL9 YB1, TU4, ZY5, EH2 and XK2 amongst his claim for the Silver award. All the receiving was done with the Uniden CR2021 in SSB mode. Since getting his Bronze, Neil has passed the RAE and now boasts a nice new G1PAO call sign – now for the dits and dahs! Following my comment last month about listeners being loners, I wonder if Neil and Barrie were aware of each other?

Angela Sitton of Stevenage is also studying for the RAE while getting the awards tucked away. Angela had the

use of a Yaesu FR50B for a while, which rather spoilt her as she finds her regular receiver a bit deaf now. Nevertheless, she still managed to reach the Bronze award. Making contact through the *International Listeners' Association*, Angela has found some new listener friends and also re-found some old friends that she had lost contact with over the years.

## Old favourites

A warm welcome is wished to Huw Greenhough, a newcomer from East Dereham, who wrote regarding receivers available on the secondhand market. There are a number of 'old favourites' that are sought after, Huw, including the Eddystones and Racals which are excellent receivers if you can pay the prices asked (sometimes quite ridiculous!). The radio rallies are the place to look for a good buy, but get to hear it in action if you can and try for some sort of guarantee (most retailers give three months). Other lesser known receivers, such as the Drake SSR1, Lowe SRX30D, Realistic DX160 and others are available cheaper, but with all receivers watch for stability as some are notorious for drifting all over the place.

Huw lives in a DXer's dream from the description in his letters, with open aspects and some nice tall trees within easy reach just longing for some ladder work and a good antenna tuner!

Over to Stan Clark of Birmingham, who has the call sign G6NUO and is a member of the RAIBC. Stan uses the FRG7 and IC700R and drifted off the HF bands for a while but came back to listening after hearing a pile-up on RA0FA on Sakhalin Island. He is well into the WAB squares hunting and hopes to add the prefix awards to his targets.

Also on the WAB hunt is Jim Marchant of Northfleet who has gained the WAB counties and districts awards – well

done Jim! His HF listening on fifteen and twenty has reaped YB4EBW, 3B8FP, ZS6BFU, J28DN and HP8ABF amongst a whole list of new ones for his records.

E Powell of Penygraig finally took the plunge and was rewarded with GW1TDW for his efforts. His listening will not suffer, however, and he is still on the hunt for the prefixes.

Meanwhile, up in Lancaster, Jon Sales has been getting in some Morse practice with G0AZJ and is finding it hard work when some idiot calls CQ right over an established QSO! Jon now has the FT200 and a mini beam plus a five band vertical, which he finds a little poorer than he expected. Something to remember with verticals is that they favour the low angle radiation and are often better for the DX than for local working. It's often a good thing to switch from the vertical to a horizontal aerial to check occasionally.

Don Robertson GM3JDR, from Auckengill, wrote to tick me off for missing out the WICK lifeboat from the award list. Sorry John, it was in the book too, so rapped knuckles at this end! John had some nice catches from his coastal QTH in 7J3, H18, 7X2, WO4, and NY5 to bring his score nearer the Premier level (for 2000 prefixes since January 1985). It's a bit harder when you're working them!

## Planning hassle

In Stratford upon Avon, Tony Blackburn is having a bit of hassle with the local planning office with regard to aerials – looks as though it will have to be the AD370 for a while. Tony is looking forward to the JOTA in October and is hoping to steel the first prize this year. JOTA is the occasion when scouts world-wide 'shake hands' over the air. During the weekend I operate GB2WFF and run a competition for listeners to see how many scout troops can be heard. Tony mentions that the *RSGB Awards Manual* is out

of print, so if you require any details regarding particular awards, drop me a line.

Stephen Nixon BRS87799, of Shildon lists rallies as one of his hobbies but clarifies by mentioning Hanne Mikola – and I thought he was queuing for tickets to Longleat *et al*! Stephen is hunting the 'lifeboat' stations and threatens me with his list before too long.

Jane Mullany has installed the Daiwa AF606K filter into her set-up and is pleased with the results. Jane G4GIG is finding the second 500 prefixes a bit harder to find, but adds that that is the challenge – and I bet it's not long before the engraver is working on your award, Jane!

## Many interests

Stan Porter ORS45992/7Q001 writes from Malawi to verify his details as I had his JOTA trophy award but not his surname! Stan works as a liaison officer for a local bank, but finds time for bird watching, recording and a bit of sailing in his 'Tiger fish' class dinghy. Some 'ne're do wells' took a liberty by robbing him recently, but only kept the cash, dumping the rest of the haul on the nearby beach. He spends much of his time monitoring the HF bands and recently had QSLs from KH0AL and a nice certificate on parchment from VK75A. His broadcast listening brought a nice blazer badge from RSA (South Africa).

Often it seems the case that newcomers believe the only way to get into the hobby is to go out and buy the latest all singing, all dancing receiver and consequently tend to stay away if they can't afford the 'going rate'. I am often asked to recommend a receiver with the added comment 'I can't afford much'.

With a number of companies offering complete kits for receivers at very good prices, doesn't it make sense to build your own? OK, so you've never handled a soldering iron in your life and you don't know a capacitor



from a hole in the ground, but many of the kits around take you through all the necessary procedures before getting down to work.

The Howes 'DCRX' is used by many of our readers and some of them have heard a hundred countries on it. It is simple to construct by anyone with even a very limited knowledge of soldering, provided the instructions are read thoroughly before starting and a 'dry run' is made before soldering.

## Wealth of information

If you can handle a soldering iron and know a bit about circuits, the *G-QRP Circuits Handbook*, available from the RSGB, is a wealth of useful information.

If the idea of a multiband receiver comes to mind, then Maplin can supply the Heathkit SW7800 for a handsome £349! However, that's defeating the purpose of getting on the air cheaply—but it is a nice receiver.

There's also the 'one-upmanship' in having made your own receiver, be it purely self designed and constructed, or built from someone else's design in kit form, and there is the added bonus that you will gradually learn what the components are there for.

Getting back to the mailbox, David Wilkinson of Ventnor uses the Uniden CR2021 and has heard 8Q7AV working VE3CRG on 20m and CO7GC working G4SAH on the same band on April 12th. On the following day he found lots of VKs and ZLs and mentioned that he heard three VKs working the UK on 30m SSB. Like myself, David thought the agreement was that 30m

was to be used on CW only, but it was only a suggestion, I believe. It is a pretty narrow band, like 6m, and it remains to be seen what the results will be on these bands as time goes by.

Cyril Ball from Doncaster put in his claim for Bronze and Silver, plus an extra 250 prefixes to warn me that the Gold was in the offing! AT1, A5D, AP2, CS1, DU7, FM5, HP3, HR8, J28, SJ9, TK5, VU2, XX9, YB4, 3A2, 5N0, 5Z4 all featured in a comprehensive list. Cyril uses the Sony ICF7600D, the little portable receiver, with an end-fed wire, but finds he is losing a few because of high level Europeans.

Having served in the RAF for 37 years, Cyril comments that there seems to be little discipline on the bands and the 'standard' phonetic alphabet is used as little as possible, not to mention tuning on occupied frequencies—welcome back to the rat race Cyril!

## Caught the bug

PF Buckmaster of Newark caught the bug after a stint on CB, but with mum and dad both having licences it wasn't really surprising! Now he's having a go for himself and is using the Trio 9R59DS with a computer helping with the RTTY and CW sides of the hobby. He is studying for the RAE, and is hoping to get into satellite working once the licence is in the bag.

Dave Howes from Rochester has been getting into the broadcast side of the hobby and is a regular listener to the 'Two Bobs' on Swiss Radio. He has been logging their DX programme on 6.165MHz on Saturdays at 1300. He has also

received a certificate from Radio Prague for good monitoring—well done Dave! Dave also mentions Radio Berlin International which is on every evening around 6.115, 7.185 and 9.730, with their DX programme on Mondays.

A few more for Dave and others to note are; Radio Moscow on Sundays and Thursdays with their DX News at 0100 on 7.325; United Arab Emirates, Dubai, at 1300 on Saturdays around 17.770 with an excellent DX section; Radio South Africa at 1300 on Saturdays on 21.585; Radio Kuwait broadcasts at 1800 on 11670; Radio Norway International at 1300 on 9.590 and 15305; and Radio Vilnius, Lithuania, at 2200 on 7160. Radio Baghdad is on at 2200 on 7.170 but seems to be concentrating on the Iran-Iraq conflict. Radio Japan is on at midnight on 9630 and Radio Polonia, Warsaw, at 2330 on 7.010.

Whatever your interests, there's always something that will be of interest on the bands whether it's on radio, music or travel; that's the interest in this hobby!

Another newcomer to the bands is Clifford Queeley of Maesteg who also uses the favoured Trio 9R59DS and the end-fed wire. Award hunting is Clifford's aim and he is on the way to getting his first prefix certificate.

A letter from Mike Hudson of Canterbury, who is on the 'lifeboat' hunt informs me that he is over 1200 prefixes towards the Premier. Mike also passed the RAE in December and is planning to build his first rig rather than buying it—there's a good lad! At the moment he's building a

GDO to help with future construction. He's also added a Spectrum Plus to his shack so the RTTY looks like being high on his list for future operation.

## ILA progress

Finally for this month I'd like to mention the progress with the recently formed *International Listeners' Association*. This was started in February from the listeners' information group and is now over 70 strong. The idea was to form a group of listeners who could help each other in various ways or swap information and ideas. Letters are exchanged initially through the Association headquarters, but from then on it's up to the individuals.

We are gradually building up a list of the listeners throughout the country and a number of overseas listeners have joined us. Eventually I hope to be able to issue a comprehensive list of listeners to all those interested.

Meanwhile, we have a healthy mail exchange going on with suggestions for a 'round robin' tape section and a 'DX phone-in', as well as the various awards available. There is a quarterly newsletter giving updates of membership and other items of news for the amateur and broadcast bands listeners. If you are interested in the scheme, please write to; ILA, 1 Jersey Street, Hafod, Swansea SA1 2HF.

So, that's it for this month. Keep listening and please let me have your band reports for amateur or broadcast bands. Next month we'll be having a look at the Sony ICF7600D portable receiver from the user's angle. Cheers for now!

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QQV06-40A	U191	0.70	2C40	37.00	6AM5	0.65	6GM6	0.95	12BL7	2.75	431U	4.50
27.50	U192	1.00	2C42	29.50	6AM6	6.00	6GS7	2.15	12CA5	1.50	572B	5.95
QQV06-40B	U251	0.85	2C51	0.75	5A6V	1.50	6GV7	2.50	12CX6	1.20	5636	1.50
42.50	U251	1.00	2C55	1.50	5A6S	2.85	6GW8	0.80	12DQ6B	3.50	6146A	7.50
QQV07-20A	US01	0.75	2B7	1.50	5A8A	2.85	6H1	9.50	12DWA4	3.50	6158	3.20
63.50	UAF40	1.00	2D21	1.50	5A85	2.15	6H3N	1.10	12DW7	2.50	6383	14.50
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QS150/30 1.15	UC285	0.80	2K56	250.00	5A6U	2.00	6J4	2.15	12SA7GT	1.95	803	39.00
QS150/45 7.00	UCF80	1.00	3A108A	9.00	5A6A	0.95	6J4WA	3.15	12SG7	4.75	805	14.50
QS150/60 3.95	UCJ21	1.20	3A107B	12.00	5A6V	0.75	6J5	2.50	12SH7	1.95	807	1.95
QS1207 0.95	UCM41	2.50	3A109B	11.00	5A6B	2.50	6J6	2.05	12SJ7	1.50	810	85.00
QS1203 4.18	UCM42	2.50	3A110B	12.00	5A6C	0.95	6J8BA	3.95	12SK7	1.95	811	15.00
QS1205 3.95	UCM81	0.85	3A114K	11.50	5A67	2.80	6J6EC	5.50	12SN7GT	1.85	813	14.50
QS1206 3.95	UCB2	1.75	3A147J	7.50	5B8G	1.50	6J6M	3.95	12SQTGT	1.95	829B	15.00
QS1206 1.05	UCLB3	2.50	3A167M	10.00	5B8A	0.95	6J6EC	4.95	12SR7	2.50	832A	14.50
QS1207 0.95	UF85	1.50	3A2	3.95	5B8A7	4.50	6J7	2.50	12S3	3.20	833A	95.00
QS1208 0.90	UF41	1.15	3A3A	3.95	5B8B	3.50	6J7	2.00	12S7	3.20	862A	4.50
QS1209 3.15	UF42	1.15	3A4	1.10	5B8C	1.00	6K7G	2.00	12D9	3.20	876A	25.00
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QS1211 1.50	UF89	2.50	3A72	3.35	5B8G6G	3.00	8KDE	5.95	13DR7	2.95	884	5.50
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QS1215 2.10	U05	3.95	3B7	4.00	5B8							

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# AmRad 10GHz system

by Glen Ross G8MWR

We have now got to the point where we have the head aligned and both the transmit and receive boards built. The next thing that we have to look at is the aerial system that we are going to use. The Solfan unit comes with a small horn aerial fitted to it and is usable for first tests, but this is not really suitable for serious work over long distances. Having said that, the longest contact reported between two units using the small horn at both ends of the path is 15kms, so if your interest in the band is simply to maintain a link with your friend across town these small horns may well suffice.

## Mast mounting

If you are contemplating using a system mounted on a mast or tower then careful consideration should be given as to how much gain to put up there. It is all too easy to go for the most you can get without considering the problems involved in this type of installation.

The main problems are mechanical stability and pointing it the right way. Taking the second point first, it must be obvious that if you have a dish with a beamwidth of only three degrees then you need a rotator unit that you can set to an accuracy of only half that amount, and they are not easily found. You then have to hold the dish in that position both horizontally and vertically in the presence of winds. Even moderate vibration of the dish will be seen at the other end of the path as a bad case of QSB.

Under these conditions it is usually much better to settle for a moderately sized horn aerial with a gain of 15 to 20dB. My own tower mounted system uses a horn of only 10dB gain, but has been copied at 5 and 9 at a distance of forty-five miles. The relaxation in the mechanical problems has been obtained while still having a useful amount of range.

## Horn advantages

There are several advantages to the construction and use of horn aerials. Firstly, they are very tolerant of dimensional inaccuracies within reasonable limits. If you set about building a nominal 20dB horn and get the dimensions out by 0.25 inch it will make very little difference to the achieved gain. Secondly they are 'self-terminating' to a large degree so they provide a system with no SWR problems and also, in effect, a useful matched termination for test purposes. In addition,

the fact that the gain is known to a fair degree of accuracy they can be used as a standard against which the gain of other systems can be judged.

The third advantage is a combination of simplicity of construction and the ease with which the materials can be obtained; two one gallon oil cans providing more than enough metal for the construction of a 20dB horn.

## Design

One thing you cannot do with a horn is to take, say, the Solfan small horn and simply extend the sides to give more gain than the original. The lengths, widths and angles of the panels have to be correct if the gain is to be achieved. The required sizes for all these dimensions are given in the table and it is simply a matter of choosing the gain you want and cutting the material to size. As shown in *Figure 1*, tabs should be left along the sides of the panels to assist in fixing. These are bent over on to the adjacent panel and soldered to hold the horn in shape while the edges are fully jointed.

It is *most important* that all solder is kept away from the inside surfaces of the horn and waveguide because it absorbs microwave energy like a sponge. The easiest way to make the assembly is to initially fit a short length of WG16 to a suitable flange.

Cuts are then made up the corners of the WG16 for a length of about ½ inch, and the faces of the waveguide bent out to suitable angles to accept the horn section. This should then be soldered into the waveguide on the outside faces only, and a smooth joint between the inside of the horn and the inner faces of the waveguide obtained by carefully filing away any surplus metal.

In an ideal world the horn would be made of similar thickness material to the WG16 and the whole thing would then be butt jointed together. This system normally results in a weak joint and the present method provides greater mechanical strength with virtually no loss of gain, providing the construction is carefully done. The various drawings should make the whole process clear.

## The dish

This is the one thing that people think you must have before you really arrive on the microwave bands. They come in a vast range of sizes and prices and most people think 'the bigger the better',

although this is not really the case. The same constraints apply to portable operating with a dish as is the case with the home installation.

You still have to support it, perhaps in a howling gale, and directional stability remains a problem. So, what size dish should you go for? For most purposes an 18 inch dish with a gain of nearly 30dB is probably as much as you will need. If you feel more adventurous then go to a 24 inch and get an extra couple of decibels; much larger than this and you start to run into problems, not the least of which is actually transporting the beast.

## Selection

There are many items which can be pressed into service as a dish. These vary from smooth contoured dustbin lids, through circular snow sleds to the infamous Chinese Wok design of G6EWZ (this incidentally has brought comments about being WOK bound on 10GHz; producing a WOK crushing signal and inquiries as to how many people have been Wokked in a day's operating).

The nearer the chosen object is to being truly parabolic the better, but good results can still be obtained from things that are an approximation of the desired shape.

## Focal length

The one thing you must know is the focal length of the dish that you are going to use. This is the point at which the radiating part of the feed has to be placed, so that the power is focused into a narrow beam. There is a method of calculating this distance, and reference to *Figure 5* will clarify this procedure.

First of all, measure the diameter of the dish (a), then place a piece of wood or metal across the face of the dish and carefully measure the depth of the dish (b) at the centre. The focal length is then given by

$$F_L = \frac{a \times a}{(b \times 16)}$$

obviously keeping all the measurements in the same units.

## Gain

The gain of a dish depends upon its size, the frequency it is used at and also how well the dish is, in optical terms, illuminated. With the types of feed normally used in the amateur world it is usually reckoned that a feed will effectively illuminate about 50% of the dish.

This results in a loss of 3dB compared to the theoretically available gain from a dish of a given size, but still results in some impressive figures. At 10GHz a 12 inch dish has a gain of about 28dB, an 18 inch gives about 31dB, a 24 inch will put you up to 34dB and a 36 inch will give a colossal 37dB. You might like to try working out how many 16 element yagis you would have to stack on two metres to get this sort of gain.

30dB represents a power gain of 1,000 times, so your 8 milliwatts or so from the Gunn diode will give an ERP of around 8 watts. If the station at the other end has the same gain then you have the equivalent of 8 kilowatts to dipoles!



## Supplies

The demand for the bits has been staggering and some items have had to be re-ordered from the suppliers, but all orders received have now been sent. If you have not received your goods please contact the Microwave Society, 81 Ringwood Highway, Coventry, or telephone (0203) 616941. Parts for the horn aerial are available from them at £3.75 for a standard WG16 square fitting flange to mate with the Solfan head and £1.50 for a suitable length of waveguide. Dishes are available at £9 for the 16 inch size and £11 for the 23 inch; all prices include postage. Next month we discuss various methods of making a feed for the dish.

### Horn panel dimensions

Gain	A	B	C
15dB	2.4	2.4	3.0
20dB	7.8	4.3	5.3
25dB	24	7.25	9.6

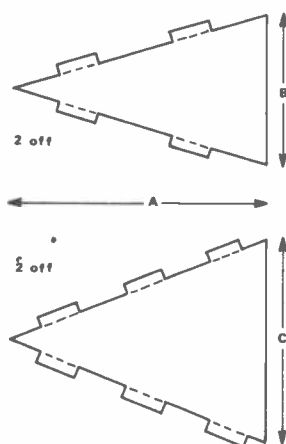
All dimensions in inches

### Approx gain and 3dB beam width for dishes at 10GHz

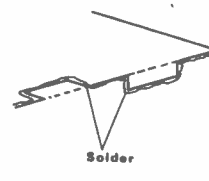
dia (ft)	gain (dB)	width (deg)
.5	21	15
1	28	7
2	34	4
3	37	2.5
4	39	2.0
5	41	1.5
6	42	1.3

assumes 50% illumination

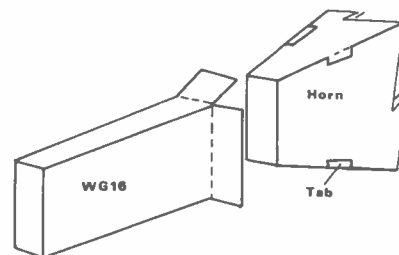
**Fig 1** Horn panel dimensions



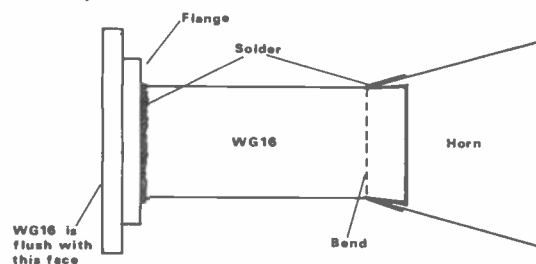
**Fig 2** Method of using tabs to give extra support at edges of panels



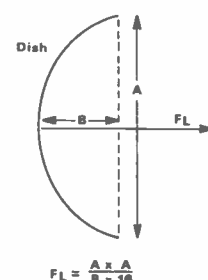
**Fig 3** Showing flared waveguide and horn prepared for fixing



**Fig 4** Side view of completed assembly



**Fig 5** Calculating the focal length



# COMING SOON IN

**Radio & Electronics**  
The communications and electronics magazine **World**

The action-packed August issue of *Radio & Electronics World* will feature a TVRO project written by John Wood, Editor of the BATC's *CQ-TV*. It will show how to build a set-top tuner for satellite TV reception easily and cheaply.



Kits will be available, and there will also be low-cost frequency converters on offer to convert down the Ku band signals. So to be certain of getting your copy (on sale 10 July), place an order with your newsagent.

# BUILD A TOP BAND RIG FOR OLD TIMES' SAKE

## PART TWO

DV Pritchard G4GVO and TR Mowbray G3VUE detail the construction of a Top Band transmitter/receiver tuned (!) to the character of the good old days. Support CRAM (?) and build a rig like dad's!

### The power supply unit

Again, this is quite straightforward and few problems should be found. R1 is a 220k 5 watt bleed resistor to discharge the electrolytic capacitors on switch-off, and also to provide a load for the HT supply should an open circuit occur in either the transmitter or receiver. The OA2 voltage regulator furnishes a stabilised 150 volts at the required current level for the VFO. All the output wiring is taken to the tag-strip under the chassis for distribution. Sw2 is a 4 pole, 3-way wafer switch mounted on the panel, provision also being made on one bank for switching the antenna between transmit and receive. 50 ohm co-ax is used for this purpose and Figure 2 shows all the connections.

A 250-0-250 volt, 120mA mains transformer with a 6.3 volt winding at 4 amps is required, which may be obtained from advertisers at a reasonable price. A shrouded unit is preferable to reduce stray magnetic fields. The 16 $\mu$ F electrolytics should be good quality components, and the 20 henry choke at 100mA used in conjunction with these assists in providing a very smooth dc output free from hum. A capacitor input circuit of this nature will deliver 350 volts off-load, and for this reason a 1k 10 watt resistor, R3, is

placed in series with the HT line and decoupled by C3, an 8 $\mu$ F electrolytic capacitor at 450 volts working.

Generally, room should be found below the chassis for mounting the smoothing choke which can be conveniently bolted on to the inside of the rear apron. The smoothing capacitors are also mounted underneath the chassis, and all components such as R1 and R3 are mounted on the tag strip nearby. R3 will generate a little heat, but not enough to worry about.

### The transmitter

The wiring of the Clapp VFO should be rigid and direct, and its associated components should be supported on tag-strips to prevent undue movement. The RF chokes should be mounted in opposing planes to cancel out any interaction. No screening is required, as the VFO provides signal injection for CW and SSB resolution when in the NET position. Whilst the best components should be used throughout, this is of even greater importance in the VFO.

On completion the VFO is tested by listening for its output on a communications receiver. With the receiver tuned to 1.9MHz, C1 is set to mid-travel, ensuring that if it is a completely rotatable type its

maximum capacity should be in the left hand position to follow the usual dial read-out from left to right. C2, the 50pF trimmer, is also opened to its mid-point. Switch to the NET position and tune the slug until a beat note is heard on the receiver, then tune to 1.8MHz and 2MHz respectively and note the VFO dial positions. If these appear too close or too far apart, adjustment of the slug in conjunction with C2 should result in an equal spread. If complete coverage still occupies a small area, vanes from C1 are removed one at a time until the read-out covers just within a 180° arc.

It is a good idea to leave it running for a while to check for drift. Valve oscillators take a few minutes to reach their optimum temperatures and are just as prone to temperature changes as any other device. When you are satisfied, remove the slug, smear a little Vaseline on it and wrap a small strip of cigarette paper round it. This method of preventing slug movement is so old it is in danger of being forgotten. Replace the slug and retune as before (but make sure that the paper follows the thread pattern otherwise it wraps itself up at the top). Give all the components a liberal dollop of Araldite, wipe your hands on the XYL's best tablecloth and continue.

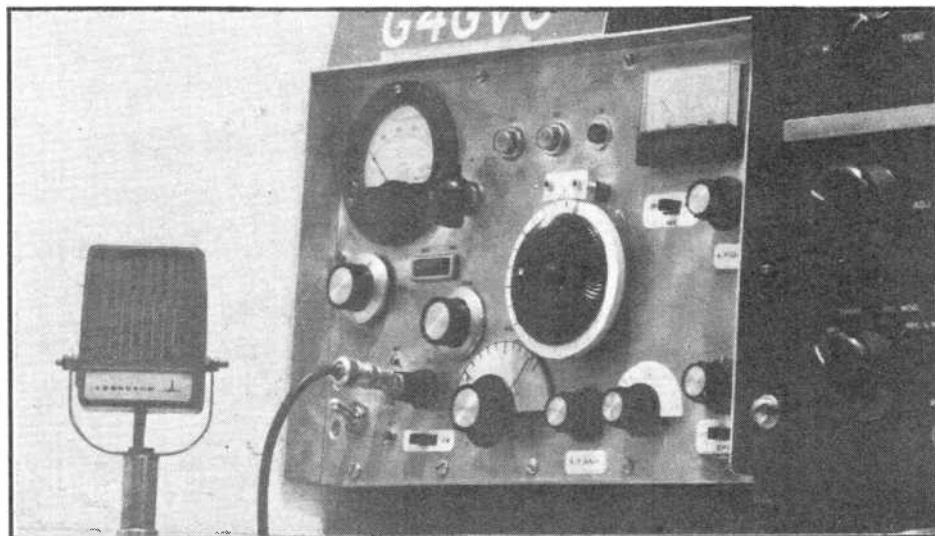
### Buffer stage and PA

The buffer stage calls for little comment apart from mentioning that the RF choke at the anode should obey the same principle of opposing planes, especially in relation to the RF choke in the PA anode. Although the coupling capacitor C12 is shown as 300pF, anything between 200pF and this figure will do.

The PA uses a 6BW6 beam tetrode and although it is a little more expensive these days, it is worth it owing to its ruggedness and reliability. An EL84 could be used in its place with a few changes in resistor values, but its heater consumption is a fraction over .75 amp compared to the 6BW6's .45 amp.

The 5763 also calls for a .75 amp heater current, and for these reasons it is better to use the slightly higher priced 6BW6 in order to reduce the current consumption. Note that R7, the screen resistor, is 12k 2 watts. The anti-parasitic choke (APC) is 10 turns of No 18 enamel wound on a 1.5k 2 watt resistor. C15, the 1000pF coupling capacitor, should be a ceramic type of about 500 volts capability. C16, the tune capacitor, is a receiving type, as is the 2 gang load capacitor, C17, which is strapped to make 1000pF. It is advisable to obtain the wider-spaced vane types (ones found in old BC receivers are first-class) rather than the smaller varieties obtainable today, and again, rallies and junk sales are often an abundant source of these items.

L2 is 50 turns of No 22 enamel wire wound on a 1 inch diameter former; an off-cut of plastic water-pipe being very suitable for the latter. The anode current meter may be anything between 50 and 100mA fsd and, as mentioned earlier, these are easily obtainable at rallies. Sw 1 is a 2 pole slider type change-over switch, which removes the HT from the modulator when in the CW position;



# TOP BAND NOSTALGIA

Figure 3 showing the connections to this component. The key socket is a standard 5mm pattern, the old Post Office type being used here to preserve an authentic appearance. L2, the Pi-network coil, may be mounted horizontally or vertically, but with a little ingenuity it can be fitted above the tune and load capacitors and supported by brackets.

All heavy-duty components, such as resistors, capacitors, the RF and anti-parasitic chokes, etc, should be supported by tag-strips in the appropriate positions.

## The modulator

Figure 4 shows the circuit diagram of this stage. A 12AX7/ECC83 speech amplifier is capacitively coupled to the 6BW6 modulator, the output being delivered to the PA via the auto-transformer Tr1. A crystal microphone (an Acos mic 43 is ideal if you can find one!) provides excellent speech quality, the level being controlled by R6, a 500k potentiometer.

N1 is a small panel-mounted neon lamp to indicate modulation peaks. This should show just a faint glimmer when speaking in a normal voice at about three feet from the microphone. The gain control is usually turned right up when you want to punch through QRM, but for normal use it is reduced slightly. There is plenty of gain in reserve and over-modulation is virtually impossible owing to the function of the auto-transformer. This may be either the secondary of a centre-tapped 250-0-250V mains transformer (a small low-current type is ideal), or the primary of a centre-tapped audio output transformer of the type used in old push-pull audio equipment.

The microphone socket is a Belling-Lee coaxial type which is perfectly adequate for the job (the AT5 used them with great success). Buy the genuine article and you won't be let down.

Wiring should follow the same pattern as the rest of the circuitry. Screened cable is used at the microphone input stage and to the CW/AM switch, and conveniently this can be good quality 50 ohm co-ax if desired.

## Receiver alignment

A signal generator and a multimeter are the only instruments required for this purpose, but one little tip, if you are not accustomed to working with these voltages, keep one hand in your pocket when prodding about in the wiring.

Check the wiring carefully and switch on. If all is well you should see the heaters glowing and hear a faint sound from the speaker. If a heater does not appear to be working, remove the valve and check the heater pins. If this is in order, examine the wiring and ensure the tags are soldered correctly.

Test the ECL80 output stage with an AF prod, or by placing a small screwdriver on the wiper of R19. A distinct hum should be heard which increases as the AF gain control is advanced.

Apply a 465kHz modulated signal to the heptode anode of the ECH81 mixer. If it is

heard at the speaker, peak the IFs for maximum sound using the S-meter as a convenient visual indicator by adjusting R15. If no signal is observed, apply the input to the grid of V3 and tweak IFT 2. If no signal is heard at either stage, re-check the wiring and test the voltages. When all is in order, turn C5/C13 to half-capacity and apply a 1.9MHz modulated signal to pin-2 of the mixer. Adjust the slug in L4 until the signal is heard. Should the triode section fail to oscillate, reverse the connections to L5. The oscillator tuning should occupy a coverage just within 180° of the range, and the correct positions on the dial are found quite easily by slug adjustment.

Signal tuning and tracking is carried out by adjustments to the slug of L3 and to the trimmer C6. The trimmer is opened to mid-capacity and the slug adjusted at the LF end for maximum signal. C6 is adjusted at the HF end. This standard procedure is carried out in this order until the best results are achieved.

The RF stage is adjusted by inserting a 1.9MHz signal at the antenna socket and

placing C1, the 100pF preselector, at mid-capacity. The slug of L2 is adjusted for maximum signal with R5, the RF gain control, set at maximum. Should oscillation occur, the stage can be 'tamed' by increasing the value of R4 in 100 ohm stages until stability is achieved. If space permits, a 5k pre-set potentiometer may replace R4, but as space was at a premium in the prototype, fixed resistors were used. If the dial range needs extending, remove one vane at a time from C1 until the desired coverage is attained. Finally, re-peak all stages for maximum signal, remove the signal generator and insert an antenna. If everything has been carried out correctly, you will now hear very satisfactory Top Band signals.

## Transmitter, tuning and loading

Connect a dummy load to the antenna socket, set Sw1 to the AM position, and tune the VFO to 1.9MHz. Set C16 and C17 to maximum capacity and advance C16 until the anode current meter shows a dip. This is likely to be between 20 and

Fig 1 Circuit of PSU

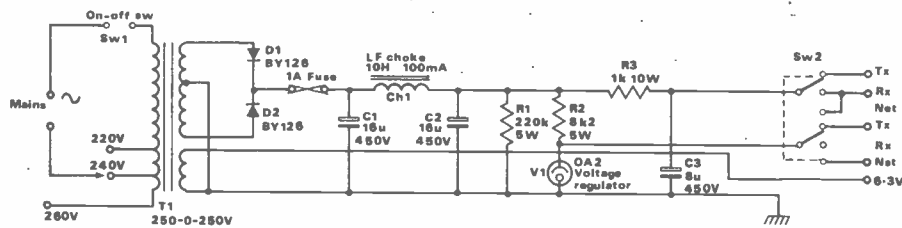


Fig 2 SW2 connections (4-pole 3-way wafer)

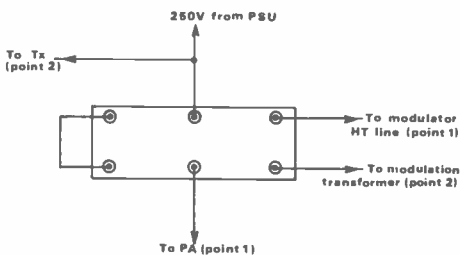
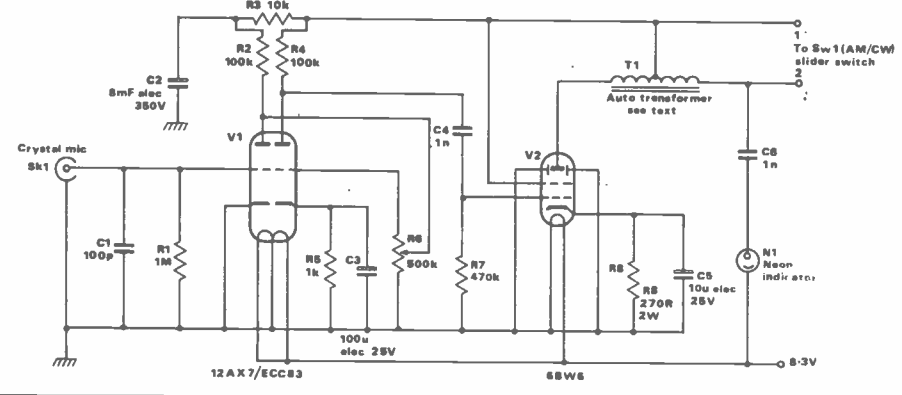


Fig 3 SW1 connections (2-pole changeover slider switch)

Fig 4 Circuit of modulator



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Yaesu FT270RH 45w F.M. mobile	399.00	(—)
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Icom IC27E 25w mobile	399.00	(—)
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Yaesu 70cm module for FT726R	309.00	(—)
Icom IC4E Handheld	285.00	(—)
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# TOP BAND NOSTALGIA

30mA. Advance C17 until the current rises, then retune C16 for minimum dip, continuing in this way until 40mA is shown on the meter. This reading, with 250 volts at the anode, represents an input of 10 watts. Insert a microphone and turn up the modulation gain control. Check that the neon indicator glows on speech peaks, and monitor the results on another receiver with the RF gain turned down. Switch to NET and re-tune the VFO to the LF end. Check the load and tune controls here, then do the same at the HF end. Set Sw1 to CW, insert a key and monitor the note. This should be completely free from clicks and chirps. With the modulator switched off the PA screen and anode voltages will be higher, so dip to approximately 30mA to keep within the legal limit.

Although no spurious emissions are to be expected, it is wise to check for these with an absorption wavemeter (or the spectrum analyser the XYL bought you for Christmas).

It should be emphasised that two dip positions are commonly found with this type of transmitter: one, close to C16's maximum capacity, is the true one; the other, near minimum capacity, is commonly known as the '80 metre dip' and is quite normal. Usually, an 80 metre winding is incorporated in the buffer stage (as exemplified by the AT5) and there is no reason why one should not be installed here if so desired. However, as the receiver only tunes 160 metres, its inclusion may be somewhat pointless.

When everything has been checked and found satisfactory, remove the dummy load and give the rig an air test.

Another tip may be useful here: many amateurs insist on using an ATU with a

long-wire antenna, however unless good reasons exist for this a matching unit is unnecessary as the Pi-network tuning is an ATU and should load up quite easily into any length of wire between 60 and 130 odd feet. Indeed, the use of another ATU in these circumstances may rob you of useful radiated power!

## Conclusion

We both hope you will enjoy building this rig, and have great pleasure with it on the air. The signal is beyond reproach. S-9 plus reports are not unusual on AM from many miles distant, and comments on the superb speech quality are too numerous to mention. On CW the note is constant and absolutely free from chirps. Again, DX reports speak highly of this.

Don't be misled by the simplicity of the receiver. While it is no substitute for a communications receiver, it has plenty of gain and sensitivity – more than adequate for local and not so local contacts. Naturally, with only one stage

of IF, the bandwidth is only about 6kHz, but there is no reason why an outboard audio filter for CW should not be used. If it comes to that, there is nothing to prevent constructors from incorporating other suitable filters if they wish.

So have fun and discover for yourself what the old-timers mean about the (good) old days of real plate and screen modulation. Top Band is not yet dead. Try it for yourself and keep 160 metre AM alive!

## COMPONENTS LIST – MODULATOR

C1 – 100pF  
C2 – 8μF elec 350V  
C3 – 100μF elec 12V  
C4, C6 – 1000pF  
R1 – 1M ¼ watt  
R2, R4 – 100k ¼ watt  
R3 – 10k ¼ watt  
R5 – 1k ¼ watt  
R6 – 500k log pot  
R7 – 470k ¼ watt  
R8 – 270 ohm 2 watt  
N1 – Neon indicator (see text)  
Tr1 – Auto-transformer (see text)  
V1 – 12AX7 or ECC83  
V2 – 6BW6  
Sk1 – Belling-Lee coaxial socket

## COMPONENTS LIST – RECEIVER

C1 – 100pF variable  
C2, C10, C11, C12 – 100pF  
C3, C4, C8, C14, C15, C16, C24 – .01μF  
C5, C13 – 75pF 2-gang variable, 5 vanes removed from C13  
C6 – 50pF beehive or similar  
C7 – 150pF  
C9 – 1000pF  
C17, C20 – 500pF  
C18 – 25pF  
C19, C22 – .005μF (.047 is close enough)  
C21 – 100μF elec 25V wkg  
C23 – 22pF

R1, R16 – 100k ¼ watt  
R2 – 22k ¼ watt  
R3, R6, R11, R17 – 47k ¼ watt  
R4 – 2k ¼ watt  
R5 – 20k lin pot  
R7, R9 – 470k ¼ watt  
R8 – 220k ¼ watt  
R12 – 56k ¼ watt  
R13 – 2.2k ¼ watt  
R14 – 220 ohm ¼ watt  
R15 – 1k lin pot  
R18 – 2 ¼ watt  
R19 – 500k log pot  
R20 – 1M ¼ watt  
R21, R22 – 180 ohm ¼ watt  
R23 – 220k ¼ watt  
R24 – 22k ¼ watt  
R25 – 270k ¼ watt

L1, 2, 3, 4, 5 – see text  
IFT 1, IFT 2, Maxi-Q IFT 11 – 465kHz valve types  
Tr1 – 36:1 audio output transformer for 3 ohm speaker  
M1 – 500 microamp – 1mA meter  
Sw1 – 1-pole change-over slider switch  
V1, V3 – 6BA6  
V2 – EOH81  
V4 – EB91  
V5 – ECL80

Note. 5 extra .01μF RF by-pass capacitors required for valve heaters

## COMPONENTS LIST – TRANSMITTER

C1 – 75pF variable  
C2 – 50pF beehive or similar  
C3, C4 – 2,200pF silver mica  
C5, C7 – 100pF  
C6, C8, C9, C10, C11, C14 – .01μF  
C12 – 300pF  
C13, C15 – 1000pF  
C16 – 500pF variable  
C17 – 2-gang 500pF strapped as 1000pF

R1, R2, R3 – 47k ¼ watt  
R4 – 220 ohm ¼ watt  
R5, R6 – 20k ¼ watt  
R7 – 12k 2 watt  
R8 – 1k 2 watt

L1, L2 – see text  
RFC 1, 2, 3, 4 – 2.5mHz RF chokes  
APC – Anti-parasitic choke. See text  
M1 – 50-100mA meter  
Sw1 – 2-pole change-over slider switch  
Sk1 – For standard 5mm jack  
V1, V2 – EF91  
V3 – 6BW6  
Note: 3 extra .01μF by-pass capacitors required for valve heaters

## COMPONENTS LIST – POWER SUPPLY UNIT

C1, C2 – 16μF elec 450V  
R1 – 220k 5 watt  
R2 – 8.2k 5 watt  
D1, D2 – BY126 or equivalent  
Ch1 – 10 henry, 100mA, smoothing choke  
V1 – OA2 voltage regulator  
Tr1 – 250-0-250V, 120mA, 6.3V 4 amp, mains transformer  
Sw1 – Mains on-off switch 3 amp, any type  
Sw2 – 4-pole, 3-way wafer

## MISCELLANEOUS COMPONENTS

Aluminium Chassis 12×9×2½ inch  
Bottom panel 12×9 inch  
Cover to fit

Approx £9 (p&p extra) from HL Smith and Co, Edgeware Rd, London

Coil formers  
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Approx 60p each (p&p extra) from Maxi-Q, Brunel Rd, Clacton-on-Sea, Essex

IFT 11's – approx £1.50 each (p&p extra) also from Maxi-Q  
Value holders: 6 B7G, 5 B9A  
Small neon indicators 250V striking  
Plastic feet for base  
Grommets  
Assortment of 2,4, and 6 BA nuts, bolts, washers and soldering tags.

CQ

1940

by Tony Smith G4FAI

It was the summer of 1940. Germany was in process of occupying most of Europe. The British expeditionary force had been evacuated from Dunkirk. School children were being sent from London to escape the bombing, and part of the UK, the Channel Islands, was under enemy control.

In the midst of all this, where was amateur radio? There were no licensed stations in Britain any more. The BBC nine o'clock news, on 31 August 1939, had announced the immediate suspension of all transmitting licences, and all equipment had been taken into official custody for the duration of the war. Now, less than a year later, many amateurs were in the forces, and the RSGB was keeping in touch with its members from temporary headquarters at the North London home of its Secretary, John Clarricoats G6CL.

While the practice of amateur radio communication had disappeared for the time being, interest in the subject definitely had not. Specialist magazines were still being produced, and a study of their pages gives some interesting reflections of the times.

### Invasion danger

The July issue of the *T & R Bulletin* (forerunner of *Radio Communication*) carried an editorial, *If Invasion Comes*, advising amateurs not already in the forces or engaged on government work, on how to prepare themselves for this possibility.

The Bulletin carried a regular feature, *Khaki and Blue*, which published information about members in the forces. L Frank G4NU, wireless mechanic 1st Class, RAOC, reported reading his *Bulls* on the beaches of Dunkirk:

'I was waiting for nearly four days, and I read them from cover to cover during that period. Conditions were slightly trying, and the *Bull* took me back into the past for a brief while. Unfortunately, these valued copies had to remain on the beach with the remainder of my kit.'

The Society replaced his magazines free of charge. It did the same for all members reporting similar losses on active service and, later, arranged for regular copies to be sent to the home addresses of all those known to be prisoners of war. A list of members on active service was published each month, and there was also a list of others offering 'Ham Hospitality' to any amateurs finding themselves in their locality.

It was announced in this issue that QSLs could no longer be posted to censorable countries, with the exception of those under American and British possession. Activity on the HF bands was sparse; a combination of little activity and poor propagation conditions. On 28MHz, only six amateur stations were reportedly logged in June, ie OQ5AB, PY7VB, CE, W3FJS, LU1DJ and D1DSR.

### Publishing success

The RSGB was advertising the revised and enlarged second edition of the *Amateur Radio Handbook*, price 3/6 (post 6d). The first edition had been going well, and a new reprint had been delivered from the printers the day before war was declared. With war imminent, and amateur radio suspended, it seemed unlikely that many of the 3,000 reprints would be sold, but demand was such that by the following July a second edition was in print.

Over the next six years twelve reprints, totalling 181,500 copies, were sold to radio enthusiasts and to the services who used it as a training manual.

Membership of the Society had fallen following the outbreak of war. There were 3,600 members in August 1939 which reduced to about 2,500 by the following May. By the end of 1940, however, numbers were up to 4,000, mainly because of interest stimulated in the Services by the Handbook.

In July, *Electronics and Television & Short Wave World* ran to 48 pages, and cost 1/-6d. This magazine carried a report of an American attempt to adopt 'preferred' valve types, thus reducing the wide variety then available to manufacturers. The British Institution of Radio Engineers had made similar recommendations, and proposed a range of just twenty 6.3 volt, 0.3 amp valves, compared to the full range of nearly a thousand types.

An article described the attempts of the technical staff of the ARRL to find a low priced television tube suitable for amateur two-way experimental transmission, and looked forward to the time when such tubes might become available in the UK.

### National shortage

No amateur transmitting equipment was on offer at all, and very few receivers either. *Webb's Radio* advertised the Hallicrafter SX24 at £24, with a double balanced crystal filter giving 'knife edge' selectivity but, like every other supplier,

could give no guarantee of delivery because of 'urgent national demands' for short wave equipment. They were, however, offering a full range of Morse keys, practice sets, oscillators, recorders, and other radio telegraph apparatus, 'designed and manufactured by TR McElroy, the world champion telegraphist'.

The same month, *Wireless World*, price 1/-, had several articles of interest to amateurs, including a design for a simple 4-valve direction finding receiver, a home-made Morse recorder (inker), capable of recording signals up to 80wpm, Morse key manipulation, a list of short wave broadcasting stations and receiving conditions for July.

### No mobile equipment

The Postmaster-General had announced that 'no person shall use or have in his possession or under his control any wireless receiving apparatus installed in any vehicle'. Any portable set and all apparatus, including aerials, were to be removed by 2 June, whether a vehicle was in use or laid up. On 6 June, the Home Secretary announced that, with immediate effect, enemy aliens were prohibited from having any wireless transmitting or receiving apparatus whatsoever.

An 18 year old youth in Sedgely, Staffs, had recently been fined £50 on a charge of possessing an unlicensed transmitter. He had used a call sign allocated to the RAF and was frequently heard transmitting messages to his friends. The transmissions, it was stressed in the court case, 'were in no way harmful to the country'.

*Practical Wireless*, published weekly, raised its price to 4d on 1 June. Its emphasis, as with other magazines, was on receiving broadcast stations. Articles covered intermittent fault-finding, frame aerials for small portables, coil winding and matching feeders for short wave reception.

There was a regular column from the British Long Distance Listeners' Club, with one member reporting 'I find that a 1-v-1 gives splendid results, in fact a hot O-v-O using an HF pentode gives wonderful results when used with a good aerial'.

### German stations

At the outbreak of war, 121 of the 250 DXCC countries went off the air, but in the year ahead there was still some activity on the amateur bands including, incredibly, some enemy stations.

In April 1940, *QST*, journal of the American Radio Relay League, published a note from a German amateur.

'There seems to be a wide misunderstanding concerning the activities of German amateur stations today. According to a statement made by our government, all sport activities etc will be continued during the war to as large an extent as possible. Consequently amateur stations D4ACF, D4ADF, D4BIU, D4BUF, D4RGF, D4TRV, D4WYF, D4HCF and D4DKN have recently been relicensed. More stations will follow shortly. The stations are supposed to

carry on strictly in the usual manner. Please notify all those interested'.

## American neutrality

At the outset of the European war, the ARRL had issued a neutrality code for amateurs suggesting they should not work any stations from countries engaged in hostilities. An editorial in *QST* of July 1940 recommended US amateurs not to work any European stations at all, and in the same issue an official order was reported which overtook any suggestion of voluntary action by banning all foreign contacts.

Other regulations followed prohibiting portable and mobile operation on frequencies below 30MHz. All holders of operating licences were required to provide positive proof of US citizenship, including details of place and date of birth, basis of citizenship, military record and nationality of close relatives. Faced with such searching questions, some 100 amateurs quietly relinquished their licences.

Station WRUL broadcasted a talk about amateur radio, which could be heard in Britain on the 25MHz band. This confirmed that the ban on foreign contacts was due to the German stations. An appeal was made for amateur assistance in forming an anti-fifth column corps. The formation of an emergency corps was announced to work with the police and Red Cross, and certain frequencies were to be reserved for their use. All amateurs were asked to improve their code proficiency, and to this end special

Morse practice transmissions were to be made from W1AW, headquarters station of the ARRL.

The FCC radio monitoring system expanded to several times its peacetime size. By the spring of 1941, calling procedures were tightened and identification was required at the beginning, end and every ten minutes during a QSO to assist the monitoring stations. War was still in the future, and US amateur radio continued to function until the attack on Pearl Harbour on 7 December 1941 brought the inevitable shutdown.

**LARU news**

During 1940, the International Amateur Radio Union, via *QST*, was still reporting amateur activities in some countries, although international contacts were becoming increasingly rare.

The 10th annual meeting of ARI, the Italian national society, had been held in Bologna on 26 May. The 'Hungarian Test' had taken place on 28 April with 75 stations active on 80m and 40m. Lithuania's annual contest was held in February, but all stations were closed down in July.

In Australia 'over-enthusiastic' experimenters were making illegal transmissions on the amateur bands. Amateur radio was suspended there, but examinations for licences were still being held. Amateurs were permitted to retain their equipment, but they were not allowed to dispose of it, or acquire more, without a special permit.

The South African Radio Relay League discontinued normal activities on 30 June. Argentina announced a proposed affiliation of radio amateurs with the military services. Several South American countries had severely restricted amateur activity. Uruguay closed all stations down, but a few months later, together with Brazil, it was back on the air with normal operation.

On 10 June the Philippines prohibited contacts with any external country except the USA, although by this time the ban on US foreign operation had been imposed. And so it went on. Amateur radio struggled to survive in different ways, but the extension of hostilities around the world gradually put an end to all normal activity.


## Tenuous freedom

The publications did their best to keep amateurs in touch with their lost hobby. They were subject to censorship, particularly if they wanted to describe recent developments in the technical field. In view of the shortage of paper, it seems surprising they were allowed to continue at all.

Fortunately, they were, and they provide a valuable record of a world, and a way of life, vastly different to what we know today. They also remind us that we have no inviolable right to practise our hobby. We are allowed a tenuous freedom of the airwaves which can be restricted, or taken away from us at any time. It is a freedom we should never take for granted.

*Samples of adverts published in the July 1940 issue of Electronics and Television and short wave world*

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Said "Eh", that us  
- the girl  
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# ALINCO ALM203E

## 2m hand-held transceiver with the ELH24B RF power amp

### A user's review by Ken Michaelson G3RGD

I am normally an HF man, only occasionally using 2 metres for Amtor on 144.590MHz, but I must concede to the attraction and satisfaction of 2 metres after having used this little hand-held transceiver for a short while. The interest and friendliness I found on both the simplex channels and when using the repeaters was very pleasant.

The ALM203E, (the European version as opposed to the US version which is designated the ALM203T) comes complete with a number of accessories. These include a ni-cad battery pack, ac wall charger, rubber flex antenna, hand strap, belt clip, earphone and external speaker and microphone plugs. It is quite small, measuring 200mm high x 69mm wide x 37mm deep with the ni-cad powerpack, but the rig can also be run from dry cells which reduces the height to 170mm. The frequency coverage is from 144 – 145.9875MHz using transceiver band A, and 150 – 160MHz using band B.

#### Band change

The band in use is changed by removing the ni-cad battery container and altering a slide switch which is then exposed. Band B is for reception only, and apart from running through the frequency range, it was unused. You can tell whether the unit is set on the 144 – 145MHz or the 150 – 160MHz band by looking through a little window to the right of the unit type letters in the middle front, which shows either A or B.

The frequency stepping is at the rate of 12.5kHz, giving 160 channels. Antenna impedance is the normal 50 ohms unbalanced and the unit requires 9.6 volts dc, which is supplied by either the ni-cad pack or dry cells. The current

draw is as follows: Maximum audio output – approximately 150mA; when squelched – (approx) 35mA; when save is switched on – 5mA; when transmitting high power (3/5 watts) – approx 900mA/1.2A; when transmitting low power (0.1 watts) – approx 220mA.

The power output is as given above, but when referring to the '5 watts', this was achieved with the use of the EDH25 dc/dc module available as an extra. This unit was unavailable for review so I had to suffice with 3 watts of RF power, although this was sufficient to get into the two London repeaters.

The emission mode is 16F3 (variable reactance frequency modulation), and the maximum frequency deviation is  $\pm 5$ kHz. The spurious emission is stated to be more than 60dB below the carrier. The rig carries a built-in Electret condenser microphone, and a 3.5mm socket for an extension unit.

The operating modes are simplex or duplex, with a  $\pm 600$ kHz offset from the receive frequency. The memory channel 0 will accept any non-standard offset frequency for those odd repeaters.

The receiver is a double conversion superheterodyne with two intermediate frequencies; these being 10.5MHz and the usual 455kHz. The sensitivity is quoted as less than 0.3 $\mu$ V for 20dB noise quieting and less than 0.2 $\mu$ V for 12dB sinad. The selectivity is better than 6kHz at -6dB and better than 11kHz at -60dB, and the audio output is more than 350mW at 8 ohms.

In the past I have been used to using analogue dials and controls, so it was necessary to learn how to use the controls on this unit. Looking at the top of the transceiver, with the keyboard

facing you, a female BNC socket for the antenna is situated top left, and next to the tone button which has to be pressed to produce the 1760Hz audio tone to enter a repeater. The low/high power button follows in line (depress for low power), and then the 'manual offset' key.

At the bottom left are the two sockets for the extension microphone and extension speaker; 3.5mm for the mic and 2.5mm for the speaker. Since the microphone in the instrument is an electret type, if you decide to use an extension mic other than an electret condenser type, it will be necessary for you to insert a capacitor of between 0.47 $\mu$ F and 1 $\mu$ F (10V dcW) to block the voltage from the unit. Next to these two sockets is the combined S-meter and RF output meter, and finally bottom right the combined on/off and volume control, with the outside ring operating the squelch control.

#### Front panel functions

On the front of the unit we have one green and one red LED. The green LED lights up when receiving and the squelch isn't in use, and goes out when the squelch is turned up to its threshold. It comes on again when a signal is received which opens the squelch. The red LED lights up when transmitting. Below these there is the LCD panel on which the frequency is displayed by four digits; ie a frequency of 145.650MHz would be displayed as 5.650.

There are five slide switches across the front of the unit above the LCD window. These are, from left to right: lamp, on/off; PTT, stop; key/lock; offset  $\pm$ ; and dup/simp. The lamp switch illuminates the LCD display in case of difficulty. PTT stop disables the push-to-talk switch at the side of the unit (for use when keeping it in your pocket). The key/lock switch disables all seventeen keys on the keyboard, again as a protection in case of accidental pressure. Offset  $\pm$  alters the offset frequency of 600kHz, added to or subtracted from the transmitting frequency for repeater working. This switch is used in conjunction with the next one, dup/simp, which for repeater working would be on dup.

London repeaters are set so that the transmitting frequency of the caller is 600kHz below the nominal frequency of the repeater which transmits at the frequency to which the unit is set in order to work it. When the unit is put in the transmit mode the lower frequency is shown on the LCD display. However, for world-wide working there is another alternative. When the offset switch at the far right of the unit's top is depressed into the locked position, any frequency recorded in the memory 1 position is transmitted, the unit returning to the





original frequency keyed in for reception. This means that any shift can be accommodated for different repeaters.

Now for the keys themselves. Leaving aside the actual numerical keys, there are four keys on the right of the keyboard. From top to bottom: yellow key, C; blue key, F; and two grey keys, MR and MS. The yellow key, C, is the clear/stop key and has two actions. If it is pressed normally the entered frequency is cancelled and the lowest band-edge frequency is recalled. If, however, it is pressed during a memory or program scan, the scanning stops on the displayed frequency.

The F key is the function key and has four actions. It is used to store or erase the memory in conjunction with the next key down, MR, and is used in conjunction with the grey upward arrow key marked scan W, to the left of key marked MS, to preset the scan width and scan step. It is also used to operate the program scan together with the grey downward arrow key at the bottom, pro.s. The two arrow keys can also be utilised for manual tuning if desired, so that by continually pressing the up arrow (to increase the frequency) the unit will step up at the rate of 12.5kHz at a time. Similarly, using the down arrow decreases the frequency at the same rate.

The final grey slider, marked MS is memory scan. Scan speed is fixed at 0.5 sec per channel, and stops for 2.0 secs when a signal is present. To continue the scanning just press MS again.

## Using the memories

To recap, there are ten memories, so the first thing is to enter your desired frequency, press F and then MR, followed by the channel that you want the frequency to be stored in (from 1 to 0). The frequency is then stored in your chosen channel number. To erase that particular channel, press F, MR, F and then the channel number to be erased. To delete all the memories, switch the unit off and push the reset switch just below the MS key.

Having memorised all the frequencies, it is now possible to scan them all by setting the squelch control on the threshold level and pressing MS. The scan then commences and the frequencies and channel numbers are displayed in the panel. To stop, press MS again, and to continue press MS yet a third time. To end the scan function press the C key and the scanning ceases at the memory channel displayed. You can also stop the scan function when the PTT switch is depressed.

Below the arrow down (pro.s) key is one marked b.save. This is rather ingenious and operates in the following manner. Set the squelch to the threshold position and the receiver will monitor the selected frequency for about 500ms at 5.0 sec intervals. If a signal appears between the save intervals the receiver will function normally, and when the signal disappears the save action will resume after about 2.0 secs. Since the receiver is

only on (in the absence of a signal) for 500ms out of every 5.0 secs, there is obviously a saving in battery current. To clear this function press the C key, PTT switch or turn the unit off.

## Program scan

Yet still another facility is available on this little marvel, namely program scan. This scans between two chosen frequencies by setting the scan width and scan step beforehand. First enter the low edge frequency and press F and arrow up (scan.w). Next enter the desired frequency steps followed by pressing the same two keys, then enter the highest frequency you wish to go to, again followed by the same two keys.

Set the squelch control to the threshold level and press F and arrow down (pro.s). Scanning will then commence from the low edge entered to the highest frequency, returning to start at the low edge again, providing endless scanning of the desired range. Scanning will stop where there is a signal and begin again 2.0 secs later. If you want to resume scanning when it stops on a signal, just press the arrow down (pro.s) key again. In order to clear the scanning function you need only press the C key or the PTT switch as in the other scanning operations.

In addition to the little marvel (!), I also had the VHF RF power amplifier, the ELH24B, for review. This is part of the package deal offered by ICS who handle the equipment. The ELH24B is a compact high performance unit, measuring 5 x 3.5 x 1.5 inches and weighing only 1.2lb. The power output varies, obviously, in accordance with the power in, so that for 5 watts in, one has 30 watts out, but for 1 watt in there's only 15 watts out. In addition to functioning as an RF amplifier, for improved weak reception the ELH24B is equipped with a GaAsFET 10dB gain pre-amplifier. The changeover from receive to transmit can either be automatic or manual.

## Automatic changeover

I used the automatic version which is dependent on the input of a carrier to change over, and merely by pressing the PTT switch on the transceiver the amplifier was switched from receive to transmit. To use the manual transmit/receive control a 3.5mm stereo socket has been provided, and all that has to be done is to either short the centre connection to ground in order to operate the amplifier directly, or provide 1.5-16V to the end connection, the other side being ground. This method actuates the relay inside the unit.

The front panel of the ELH24B has two push on/push off switches. The right-hand side one controls the amplifier and next to that is the switch for the receive pre-amplifier. On the far left of the front panel is an output level meter which indicates RF out when the amplifier is in use (the reading should be about 8) and also the RF out direct from the transceiver barefoot when the amplifier is

switched off (the reading should be about 2).

In use, the amplifier worked perfectly, and was a worth-while addition to the ALM203/E. The hand-held worked very well, but it must be appreciated that there was only a maximum of about 3 watts of RF available barefoot (since, as mentioned above, I did not have the EDH25 dc/dc converter for the maximum of 5 watts out). Having got used to the keyboard method of operation I felt quite at home with the unit and had a number of very satisfactory QSOs.

Of course, bringing the amplifier into circuit and using my normal pair of crossed dipoles on the chimney stack enabled me to get further and at least call CQ with a fair hope that someone would answer, but the hand-held was used out of doors with very good results using simplex channels. I preferred manual tuning, together with the memories, which were great fun to use, and the number of facilities available in this little unit was nothing short of amazing, although I don't think I had completely mastered the different variations when I returned the equipment.

## ELH24B amplifier

Finally, in addition to the ALM203E hand-held and the ELH24B RF amplifier, I was sent a new type of telescopic aerial: the AEA HR Hot Rod Antenna. This is shorter than the normal half-wave at these frequencies due, I imagine, to a loading coil of some sort at the base, and there was no doubt as to its efficiency when compared with the rubber duck supplied with the hand-held.

When working indoors on the first floor I found that I could not gain access to the London repeaters barefoot with the rubber duck. However, with the AEA antenna there was an immediate answer. This antenna was not really part of the review, but it's certainly a useful item to think about, as the relative increase of signal strength between half-wave and the rubber duck was quite extraordinary.

I don't really have any adverse comments, although it did require a knack to remove the battery case. Having pressed the release button and pulled on several occasions with no result, I couldn't see any way to remove it without levering it off with the aid of a screwdriver, and this I was loath to do. However, the secret lay in the fact that I had to pull the case away from the unit before pressing the release button. The battery case moved about 1/8in and then if the release was pressed it became free without any further trouble. Just one of those quirks of life, I suppose.

The two units, the ALM203E transceiver and the ELH24B RF amplifier are offered as a package for the very reasonable price of £249.95 plus £4 P&P. This is a saving of over £58.00, according to ICS, and that can't be bad. Thanks are due to ICS Electronics Ltd, PO Box 2, Arundel, West Sussex BN18 0NX, tel: Arundel (024) 365 590, for the loan of their equipment.



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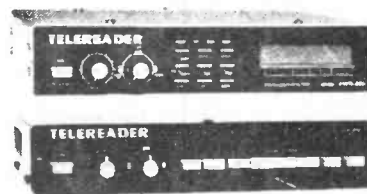
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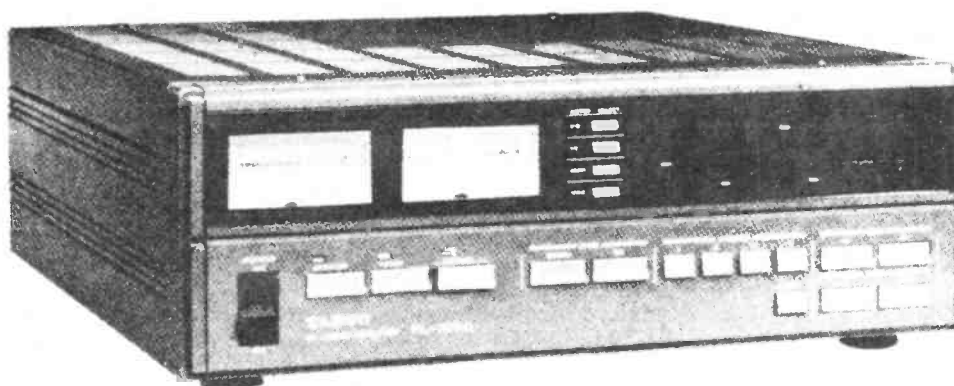
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## Happy birthday!

Every year, on the Saturday nearest the 27 April, the Morse Telegraph Club celebrates the birthday of Samuel F B Morse, who was born in 1791. This year, 38 chapters throughout the USA and Canada held local gatherings, linking up with each other through a line circuit provided courtesy of Western Union and CNCP Telecommunications.

Just once a year the Morse telegraph lives again with hand keys, early bugs, sounders, and American Morse code. Whilst many members are old-time telegraphers, some of whom spent their whole working life on the key, others are non-professionals, equally interested in this remarkable survival from the past.

Many are amateur radio operators who can work fluently in either American or International Morse. There will be more news about this club and its activities in a future report.

## Class B Morse

During last year's experiment the RSGB issued over 6,000 letters of variation permitting class B licensees to use Morse on VHF and UHF. Now Morse operating is a permanent feature of the B licence, intended to help learners practise the code under 'real' operating conditions.

It seems a pity, though, that the RSGB guide-lines exclude them completely from the CW sections of the bands. Why not have A1A operation on, for example, 144.100 to 144.150MHz to give them an opportunity to find, and work, class A stations as well as each other?

A number of experienced operators arranged skeds with learners last year, and 'lessons' on a one-to-one basis were frequently heard on 2m. Perhaps some of the RSGB slow-Morse transmissions on that band could now be revamped to become 'on-the-air tutorials', with immediate feedback to the tutor both in speech and Morse. At least he would know if he had any listeners or not, and could adjust his output to suit their needs.

## Realistic

The RSGB recommends on-off keying of an audio tone, particularly when using the channelized parts of the bands, but this is far from ideal. If the idea is to gain experience of 'real' conditions, the mode should be realistic as well, ie A1A, and those with suitable equipment should seriously consider this in preference to F2A etc.

My only reservation about class B Morse is that the facility is not for learning the code, but for *practising* it. Those desiring two-way QSOs should be able to read and send at about 6wpm first, and have some knowledge of the more common Q-codes, standard abbreviations, and procedures. Having said that, if anyone working for the test is keen enough to get on the air in this way, my attitude is 'Welcome, I'm glad to help!'

## High speeds

Every now and then one finds reference to Ted McElroy's world record for copying Morse at 75.2wpm which was

achieved in North Carolina on the 2 July 1939. The text was sent by automatic machine, and was copied direct onto a typewriter. This was the normal way of copying code for many professional telegraphers, who were used to continuous Morse operation at high speed, both in receiving and in manual sending.

Amazingly, on the same day McElroy set another record, copying American Morse, which is a faster code, at 77wpm. In both cases, four letters counted as a word, and in a contest situation the text would have been checked for capitals at the beginning of each sentence and on proper nouns!

In 1935 McElroy wrote about his experiences in earlier championships in QST. Two years previously he had lost his title to Joe Chaplin of Press Wireless at 57wpm, but in '35 McElroy upped the record speed to 69wpm with one error, typing 'inefficient' instead of 'ineffective'.

He attributed his increased speed to a control on his typewriter which regulated the touch on the keys, and advised anyone wanting to take the title from him, 'get yourself a good typewriter and a good short wave receiver, and sit down and practise for ten or fifteen minutes a day, and you'll be surprised at how quickly you develop speed. For high speeds the typewriter is important.'

## Better reading

I don't suppose many people are interested in achieving such high speeds today, but it does sound like a good way to improve one's performance. An ability to receive at high speeds must enhance one's capability to read Morse at slower speeds or in difficult conditions, or have I got that wrong?

I keep meaning to try it myself but, similar to so many other shacks, there isn't really space for a typewriter on the operating bench. It really should improve things though because, assuming a modest ability to type, a single strike of one key per letter must be infinitely faster than handwriting.



## Tony Smith G4FAI takes his bimonthly look at the world of dots and dashes

### Lost ability

Of course, press copy, or message traffic, is different to amateur style operating in the UK. With informal 'conversation', we only need to jot down the relevant bits, although I sometimes think this results in a loss of operating ability. How many of us could accurately copy even a thirty minute run of straight text at whatever speed we normally use on the air?

There are some who could do it, especially those who were trained professionally in the first place. But what about those (including myself) who are mainly self-taught, and who are forever in the process of 'self-training'? This opens up the whole issue of the best way to improve receiving speeds after passing the 12wpm test. Comments and/or advice from speed buffs will be particularly welcome on this one please.

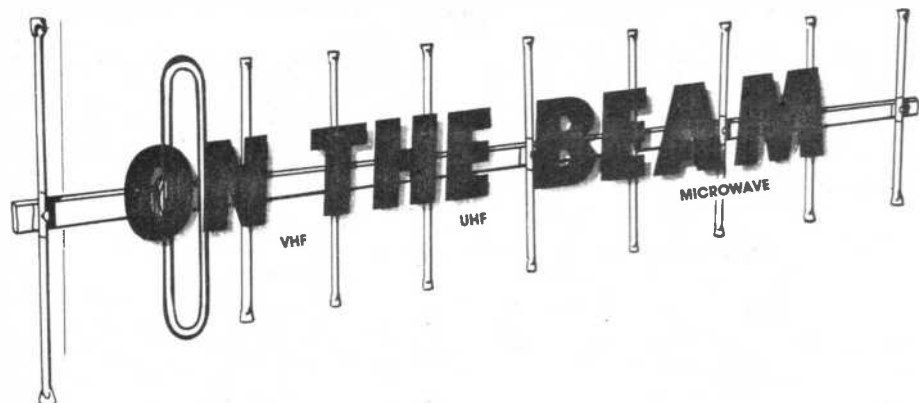
### Mailbox

I would like to thank several readers who have written with encouragement and good wishes for the success of the column. I have even received some material from G8PTH which will help my research into how International Morse began.

Mike Rhodes G4FMS wonders if he had the first Triambic to Triambic QSO when he worked G4LZA/A on 4 April. If not, he would very much like to know who got there first!

He is the designer of this ingenious hand-held unit which uses three keys to equalise the amount of time needed to activate either dots or dashes. No, I didn't believe it either until Mike loaned me his prototype. He feels it is particularly handy for /M or bed-bound operation. He is currently working on a Mk 4 version which is a rather interesting memory keyer with some added extras.

Readers' letters are always welcome, address them to me, QTHR. Comment on anything that has appeared - you don't have to agree with me - or raise new issues. It's your opportunity to show that Morse is truly alive and well!



## News and comment from Glen Ross G8MWR

The main criteria for all operators getting on to 50MHz was that there should be no undue interference to other services, particularly on the continent. The way the band is shaping up I am able to tell you that the chances of a general release must be looked upon as excellent.

The reason? If nobody uses the band then there can be no interference problems and that just about sums up the usage of the band at present.

When we first got the band there was a predictable rush of activity, but that has now died down to the point where regular monitoring using a good receiver and aerial combination shows very little activity. This is particularly true during the day, except for regular skeds between a few enthusiasts, most of whom were amongst the original permit holders.

### Interesting

The band is an interesting one in that it is subject to propagation modes that are common to both HF and VHF practice, and perhaps this is where the root of the current lack of activity lies. At the moment the band, in its HF sense, is suffering the effects of the sunspot cycle, even more than ten metres, so intercontinental openings are virtually impossible and these are perhaps the greatest attraction of the band.

In the VHF sense the band is at least more likely to get sporadic-E type openings more frequently than two metres, and this has indeed happened. The problem then is that, being a shared band, it fills up with continental TV and assorted weirdies, to add to the crashing and banging of thermostats.

People also seem to be a bit shy of putting up what is, compared to two metres, a rather massive beam, so that most operation tends to be with dipoles which seems to give operators a rather poor impression of the band.

It is, however, making a general release much more certain and when those sunspots start doing their stuff in a couple of years time it will be great to work into the States with a few watts and a dipole in the loft.

### B Morse

The expected press release from the DTI on this subject surfaced at the start of May as we predicted and confirms the use of Morse by class B operators, thereby clarifying the Gazette announcement of last December. There is, of course, no need to apply for a letter of variation as some people have suggested. However, although there is nothing in the Gazette about doing so, it is in the interest of all operators if the RSGB guidelines are adhered to by all users.

A copy of these can be obtained by sending an SAE to the RSGB, Cranborne Road, Potters Bar EN6 3JW. In essence these are simply that all operation should be in the all mode section of the bands and that the call sign should be given using a speech mode at the beginning and end of each transmission.

### Spectrum

The right place to indulge in this activity on two metres is in the spectrum between 144.5 and 144.8MHz. This is a non-channelised part of the band and it would make sense to do the announcements using SSB. Why take up 15kHz or so of bandwidth when you need only use three? Another advantage of using SSB is that you can slot your transmission neatly in between those using FM and the various special mode calling frequencies, of which there seems to be an ever increasing number.

### The awards

The first one this month comes from John G4TGK, who claims a Silver award on 144MHz. John says that he spent some time trying to get the QSL cards in until he suddenly realised that we trust people and that he did not need them. He is located at New Romsey in Kent and runs 100 watts to a 16 ele beam, the QTH being at sea level. John lists 13 countries, 56 counties and 30 squares, with a best distance to LZ1KDP in Sofia coming up at 1900kms.

On now to Michael G0EGM up in Leeds who also goes for 144 Silver. His best DX was to OK1KHI at 1229kms, all operating being done using FT290 30 watt linear

and a five ele yagi at 30ft.

Another claim came in from Hazel G1NOD, located near Banbury, who goes for a 432MHz Bronze award. Having already led the way to 144 Bronze and Silver she seems determined to make a YL clean sweep of the awards. Her best distance for this one was 447kms.

While we are on the subject of awards, it was nice to hear that the first person to win the WAB Islands Award did it on two metres. The award involves contacting ten offshore islands and went to Jack G4WXX near Wigan.

### Repeaters

Two more of the two metre spot frequencies have been allocated for use by a new Packet repeater system. The RSGB have allocated 144.650 and 145.275MHz for these devices. These are not input and output frequencies but two discrete spots; Packet repeaters, in effect, both transmit and receive on the same frequency. There are as yet no units ready to run, but if any group is interested in getting one up and running please contact G3XDV who is QTHR in the callbook. There is already a certain amount of Packet radio running on 144.675, so effectively three spots now go to this mode.

### Spacing

The idea of using 12.5kHz spacing becomes more attractive all the time, but I have received several comments from people that it 'is illegal to do it' because the bandplans all show 25kHz increments. This is not so; remember that the bandplan is a gentleman's agreement set up many years ago when there was not nearly so much demand from specialist interest groups for their own spots in the band. It was intended to minimise interference and this was completely possible using 25kHz spacing. Your licence does not stipulate any bandplan and the bandplan does not even ask you not to use 12.5kHz spacing. It is up to the individual to make the best use of the available space as he or she sees fit.

### The beacons

This is another area of spectrum usage that brings up a lot of heated argument from time to time. The idea of using up 150kHz of the band for propagation indicators can no longer be accepted, and the RSGB says that 'the band will have to be smaller' and that they are preparing a *consultative document* (!) for discussion at the Region 1 conference next year.

This means that by the time the delegates have gone away and thought about it, put forward counter proposals, got together again to take the final decision and then given the beacon keepers a year to comply with the new plan, we should be able to expect an improvement somewhere around 1990.

Surely the need for this change is so apparent to everyone that a speedy decision should be capable of being brought about simply by correspondence between the various national societies, even if this has to be formally approved at a later regional meeting. It



## ON THE BEAM

seems as though the most commonsense changes in our hobby have to be undertaken as though they were world changing decisions; a steamhammer approach to cracking a walnut sized problem?

### Headings

G8XAF brings up the old problem of people not giving enough information about themselves when calling CQ. This usually occurs with people who have recently graduated to SSB and beam aerals after a period of FM and omnidirectional systems like the ubiquitous Slim Jim.

On FM it is normal to call CQ with no thought to directivity, but this is not enough on SSB and you can improve your chances of a reply by giving more information as to where you are located and which way you are beaming.

This helps the other man to get his beam turned in the right direction before replying to you, and also gives him an indication that your weak signal may be due to him hearing you off the back of your beam.

It is also worth giving your locator square and county from time to time as a lot of people are hunting these for various certificates, including our own, and you could be in an area that he wants; he won't know unless you make it clear in your CQ call.

### Netting

A useful tip to the newcomer, especially during big openings, is to listen carefully before trying to call the DX station. Most contacts are a no go before you even start if you do not bear in mind the fact that the DX station will most likely not be listening on the frequency he is transmitting on. This is due to the fact that he has had to use his RIT to get accurately tuned to the station he is working and, due to the leapfrogging effect of consecutive contacts, he could be listening anything up to 10kHz away from where you hear him.

The trick, then, is to tune to the station who is working him and then use your RIT to clarify the DX station. Obvious when you think about it, as is the idea of sending your callsign slowly and distinctly rather than rushing it. Remember that in all the gabble that he is getting, your signal needs to stand out. It is also worth mentioning your square occasionally as he may take notice of calls from greater distances or from what are, to him, rarer squares.

### Expeditions

There will be a good chance of contacting the Scilly Isles between 2nd and 25th of July, when they will be activated by G8YYB during his annual visit. Frequencies to keep an ear on are 144.222 and 432.222MHz. The locator is

WJ19F (IN69UW), and QSL cards will be forthcoming.

If you are an experienced operator who would fancy a few days under canvas on the top of Snowdon, then G8YHB would like to hear from you on 01-743 0747. The idea is to keep a station running throughout the whole of July and August and manpower is required to keep the project running for that length of time.

Advance information on the Square Bashers club foray into Scotland: from 2nd to the 8th of August they will be in ZR square and will then move to YS square for the period from the 9th to the 16th. Operation will be on 50, 70, 144, 432 and 1296MHz plus 2.3, 3.4, 5.7, 10 and 24GHz, which is as near a full house as you are likely to get.

If you think expeditions are all fun, just think of the problems of getting all that gear together and carting it around the country. They will be available for tropo contacts but on the lower frequencies they will be concentrating on meteor scatter. Skeds can be set up in advance by contacting GW3LXO who is QTHR.

### Closedown

Once again space has defeated us. Thank you for your letters and please keep them coming to 81 Ringwood Highway, Coventry CV2 2GT, or on Prestel 203616941; and best of luck with the sporadic-E that is starting to appear.

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### ■ ANGUS McKENZIE TESTS

Next month G3OSS reviews the new Icom ICR7000 scanning receiver

### ■ A BALANCED ARGUMENT

Balanced feeders and baluns, resonant or no-resonant antennas. Confusing? VJ Copley-May G3AAG explains the whys and wherefores.

**DON'T MISS THE AUGUST ISSUE**

**On sale 31 July**

## - by Hugh Allison G3XSE

must know the sort of thing, a couple of quid then, about a fiver now. Either the bit evaporated after a few months and you couldn't get the stump out due to it oxidising in, or the element went in about the same period of time. With my first pay packet I bought a real iron, your actual Weller TCP (Temperature Controlled Pencil). I opted for the mains powered type for portability, although you can get a 24 volt version with integral transformer and stand.

What's the point of this story? Well, it has just played up on me for the first time in eighteen years, the temperature sensing magnetic switch has gone open circuit. When you consider that it has probably been used for a couple of hours every day (sometimes I even get lumbered with repairs on Christmas Day!), that's 13,000 trouble-free hours of use. With reliability of that magnitude the secondhand ones you often see for sale are probably a better bet than an equivalently priced 'hobbyist' one. I immediately bought another one, exactly the same. After all, I've got plenty of good spares for it, and I shall not moan if the switch goes in the year 2004.

### 50MHz

One thing that's not available on the secondhand market at the moment is any form of 50MHz rig. Well, a slight lie since I've seen a few very old valve American

AM rigs offered at obscene prices, but no proper SSB rigs at sensible prices. So what is your average amateur, the sort who breaks out in a sweat at the thought of spending money involving two figures, let alone three, going to do to get on the band?

One solution is to roll your own, and your scribe has just finished a happy week of spare time construction doing exactly that.

A right dog's breakfast of bits of old Westminsterers (great for yielding whole chunks of a rig, just pull out the boards you need, and at £1.50 for a boot mounter without control cables, head etc, very cheap), old CB sets and general junk; it works surprisingly well. My real problem was the PA, half a watt was no agro, I 'stole' great chunks of the RSGB design, but getting more umph was hard work. Linearising Westminster PAs was a disaster, they would not stop hooting (why do all my amplifiers oscillate and my oscillators do nothing?).

### Desperate

In desperation I was chatting to a colleague and he came up with a brilliant idea - VMOS: VN66s to be exact. You can buy them for a quid a throw, and one device was happy to take half a watt up to three, and another took the three up to ten watts. No hooting, and a 12 volt supply to boot.

I quite enjoyed getting them to match in. You have to appreciate that they are very capacitive, I ended up with nine turns on a quarter inch former, tuned by a 60pF variable, tapping the relevant electrode in at four turns.

I thought a two-stage ten watt linear PA quite reasonable for an outlay of a couple of quid all up. OK Mrs Editor (*Miss, if you don't mind - Ed*) I know that it's not strictly stuff for a secondhand column, but if you can't buy secondhand and you don't wish to buy new, then you've got to roll your own, haven't you? Also, much interest has been shown in it over the air, so here it is.

### No hassle construction

I built the original to my normal style, ie badly, with a scant regard to screening, and with no hassle whatsoever. Copies have been built quite neatly in small diecast boxes, and even *they* work. Adjust the select on test resistors to give 25mA standing current down each device - probably about ten kilohms.

Most of the copies seem to have ended up on the business end of 'meons' and seem to have mated quite nicely. I quite like power FETs now, which back off the current as they heat up, unlike normal bipolars which self destruct in my hands. In fact, I only blew up one example whilst developing the above circuit, a record for me.



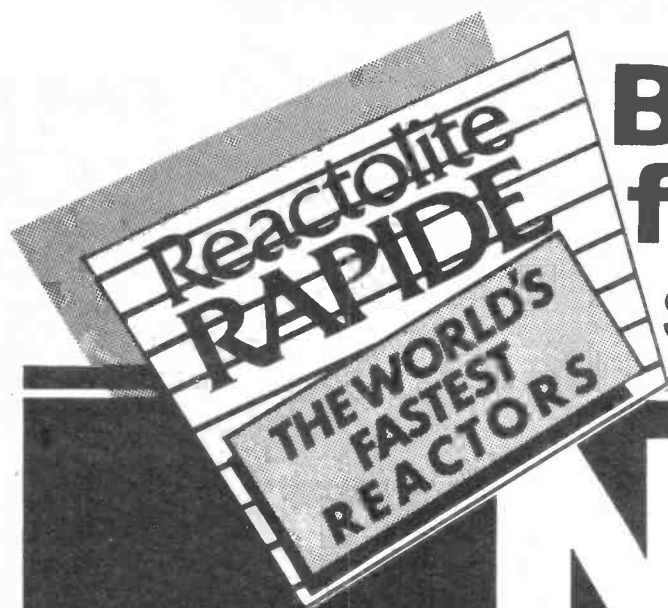
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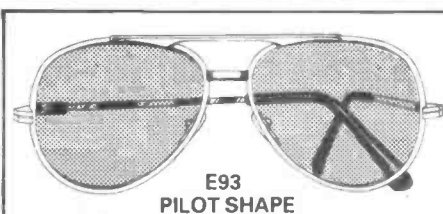
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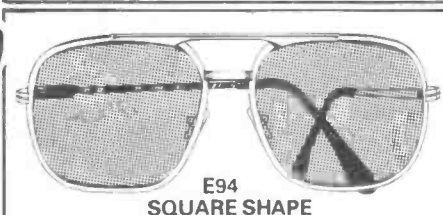
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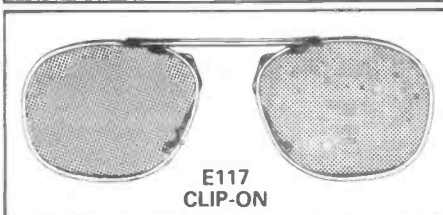
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■ 1980 Muirhead M100M commercial receiver, 10Hz-30MHz, solid-state, digital readout, offers around £400, buyer inspects and collects. BNOS linear LPM 144-10-180, £200. Trio MC85 mic, £60, unused. RM940 infra-red mic, £20, unused. Meteor 600 frequency counter with aerial and PSU, £130, unused. Tel: Dronfield 413413

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■ BC348L modified for mains, plus spares, £30. WS19 with mains PU, £20. WS62 12 volt with crystal calibrator, £20. WSB44, £5. Pye Ranger AM, high band, unmodified, £5. All working. *Wireless World* 1948-61, complete, offers? Geoff Jones, Brentwood. Tel: (0277) 221136

■ Valves: Two QQUO-640 (new), £10 each. Three 6146B (S/H), £5 each. One 6146A (new), £5. One QQUO-20 (new), £5. 70cm 4x1/2 collinear, £25. One FF501 DX Yaesu low-pass filter, £20. All above surplus to requirements. G1BOF. Tel: (0952) 52126. No time wasters (especially people who ring at 6.30am, 73)

■ Kenwood TS711E 2 metre multimode base station, as new, only 8 months old, with original packing, any trial, £600 ono. Pete. Tel: (0386) 858829 evenings (Worcs)

■ Yaesu FTV901R transverter, mint condx, with manual, orig box, £140 or would exchange for a 2 metre home base with cash adjustment. Tel: 01-890 4666 near Heathrow Airport

■ 144 to 28 converter, RF mixer, 3SK88 self contained 240V power supply, RS cased, £15. AVO electronic test meter, 45 range, £25. Heath signal generator, RF/U c/w hand book, £15. Heath scope OS2, c/w hand book, £35. 144 50W linear, self contained 240V power supply, £50. Isolating transformer, tapped input/output, mains voltage, £10. New 2BP1 with screen and base, £10. Earl G3OXV. Tel: Davenport 702265

■ Ex-Air Ministry 10K/103043 hand generator, HT/LT, 10KB/22 motor generator, 23/24 volt, 1.8 amp to 480 volt, 0.04 amp. 10K/13126 type 222 power unit in original packing case. 14A/535 12 volt dc electric motor, offers. Edwards Greystone, Fairlight Hall, Martineau Lane, Hastings, E Sussex TN35 5DR. Tel: (0424) 812854

■ Realistic DX400PLL phase lock loop synthesizer communicator receiver in new condition, cost over £200 new, £120 or near offer. RJ Seabury, Flat 6 Sterte Court, Sterte Close, Poole, Dorset BH15 2AU. Tel: (0202) 671067

■ Mizuho MX-2 SSB/CW 2m hand-held transceiver, £70. Also Commodore Joystick model 1311 for Commodore 64 or Vic-20 computers, £5. Tel: Hamilton 286078 after 6pm

■ National Panasonic DR48 communications receiver, premix, double superheterodyn system, FM/AM, 10 band, 1.6MHz to 27.3MHz, good working order, £130, cost £319 new. Also Partridge Joystick variable frequency antenna, £15. Fits on curtain, ideal for flat dweller. Updating. With operating instruction manual. GH Fern, 25 Fulleyslowe Court, Bolsover, Chesterfield, Derbys S446EZ. Tel: 824257

■ Icom ICR70 marvellous general coverage receiver, cost £600. Also two pairs quality H/phones, several speakers, components etc. Also new E&V 500 volt battery megger, cost £140, and almost new £100. Radiomobile PB car radio with new unused antenna, emigrating so £400 the lot. Cash callers only. Tel: Exmouth 278737

■ Sony ICF-7600D portable communications rcvr, £105. Lafayette communications rcvr, £50. Two metre receiver, crystallised R2, R6, R7, S-10, S-12, £30 plus postage. Airband converter, £10, no connections, stands next to radio. Tandy CB, hand-held 4 watts 40 channels with extension microphone, £70. CB base station, Harvard H-407, £65. Portable colour TV, Philips, 14 inch, not remote, £75. Might deliver, callers by appointment please. Mike, 14

Doverfield Road, Brixton, London SW2 5NB. Tel: 01-674 0513, Thursdays 6-9pm

■ Hammarlund HQ170 amateur band receiver, £95. AR88D, £40. Cossor 1049 Mk2 dual beam scope, £30. Eddystone 770R 19-165MHz VHF Rx, £80. US navy receiver, 60-80MHz xtal con, £20. Marconi CT106 sig gen, £20. Creed 75 teleprinter, £20. R1155 Rx, £25. Large number pre and post-war valve wireless sets, plus mags back to 1923, telephone for list. D Evans, 70 Kingsway, West Wickham, Kent BR4 9JG. Tel: 01-462 4614

■ TS520S, HF SSB/CW, mint, £340. TR7010, VHF SSB, £95. IC202S with Mutek SLNA144S and DBM, £130. Mirage B1016, 10W/160W 144MHz linear, £120. MML144/30-LS linear, £40. Portable 9ele tonna with feeder, £15. JVC3040 DX TV, £50. SMC 12V/25A PSU, needs attention, £40. Datong RF clipper, £25. AR40 with cable, £40. Mutek SLNA144S, £15. Katsumi EK121D keyer, £20. Jaybeam 144MHz 4ele quad, £10. SWR meter, £10. Nick. Tel: Basingstoke 27220 5pm to 10pm or weekend

■ Drake TR4CW HF tcvr, the last and best of the famous range, 300 watt, CW filter, MS4 speaker/PSU, Shure 444 mic, speech processor, manual, some spare valves, £430, all mint. Consider exchange HF tcvr for mobile use. Will deliver reasonable distance. G4FPU. Tel: (0707) 320741

■ Radio shack printer type DMP110, used only 2 hours, spare fabric ribbon, serial and parallel interface, £180 ono, carriage extra. Supply of paper free if printer collected. Letters only please. D Bemister, 69 Woodfield Drive, Gidea Park, Romford RM25DD

■ Home Brewer's delight. I have several big, ugly 50 watt valve audio amps ideal for making linears, transverters, etc. Contain heavy duty power supply, KT66s, etc, £12 each. Also make FB guitar amps. G0DLN. Tel: 01-657 0716 evenings

■ Yaesu SP102 extension speaker, £43. Icom SP3 extension speaker, £43. Mutek GDIF 107UB 10GHz Gunn diode board, £45. Solfan in line Gunn (10GHz) unit, £14. Rank Xerox 400 tele-copier, £20. NEC high resolution monitor (12 inch green etched screen), £50. Paul. Tel: (0293) 515201

■ Burndept 471 in gwo, with batt, only £55 plus p+p. Pye Westminster W15 FM dash-mount with xtals and speaker, £45 plus p+p. Dragon 32K computer RTTY CW cartridge plus all leads, £70 ono. Tel: (0302) 835280, South Yorks

■ Yaesu FT707, FC707 ATU, FP707 power supply, FV707DM VFO and memory unit, also FTV707 transverter as new, boxed manuals, £650 ono. Tel: (0563) 34366

■ Trio TM201A 2m mobile transceiver, 25 watts, complete with mobile mount and 7/8 aerial, £200. Tel: (0582) 505112

■ Hygain TH3JNR three element 10/15/20 metres beam antenna and CD45 rotator, complete with 25 metres 8-way control cable, excellent condition, buyer collects, £320. G4MBP QTHR. Tel: (0242) 527651

■ Microwave Modules MMT432/50 tvtr, 50MHz IF, ideal for 70cm, £75 ono plus post. G8AYY. Tel: (021) 783 2996 evenings or weekends only

■ Quad antenna - Gotham tri-band, two element quad kit. Never assembled, contains boom, spreaders, wire, etc, all in original box, £60. R P Ockman, 1 Wodhams Drive, Brackley, Northants NN13 6NB. Tel: (0280) 700367

■ FM/AM signal generator, Hewlett Packard 202H, 54-216MHz, in absolutely mint condition, recently serviced, with service manual. Offers please, or swap for FRG7 or similar general coverage receiver, must be mint. Tel: (0224) 40241 ext 5485. Ask for John, distance irrelevant

■ Inverter, 12 volt dc input, 240 volt ac output, 100VA solid-state, boxed unused, £45. Beckman 3020 digital multimeter, needs attention, offers. Micklewright, 64 Crowthorne Road, Sandhurst, Camberley, Surrey GU178EP. Tel: (0252) 874168

# CLASSIFIED ADS

■ Advance mainframe storage oscilloscope, type OS2200 with OS2006 and OS2007 plug-ins with instruction manual, not working, requires new transformer, hence very low price, £125 ovno. Akai model ACB1 colour bar generator, RGB output, £20. AVO transistor and diode tester, model TT537, with instruction manual, £25. NTSC TV monitor, 115V, 20in screen, working, complete with auto transformer, £30. ENM dot matrix printer, 15in paper, £50. Mr K L Phillips, 3 Linden Court, Frithville Gardens, London W12 7JJ. Tel: 01-743 0811

■ Yaesu FT290R with nicads, charger, case, flexi-whip, 30W linear with pre-amp and 8 element antenna, £285. Transistor linear amplifier, 3-30MHz, 200W output with pre-amp, £45. SEM Europa 28MHz to 144MHz, 100W output and PSU, £85. Tel: (0388) 662630

■ Amstrad CPC464 64K home computer. Green monitor, TV adaptor, leads and lots of software and manuals, £180 ono. Drop me a line with your phone number and I will call you back. M Jackson, 6 Pilning Close, Peak Lane, Fareham, Hants PO14 3BW.

■ Sommerkamp 767, matching external VFO, ATU, power supply and speaker, scanning mic, offers around £600. Ham International Jumbo, full FM converted, legal stamp, £90. Standard 2 metre C8800, £120. Zetagi 400 watt linear, £100. Scanner, Realistic 2002, UHF, VHF, £120. Tel: 01-892 7694

■ Lowe SRX30 receiver, 0.5 to 30MHz, good condition, in original box with manual, £60. Tel: Luton (0582) 451057

■ PA equipment, Philips amp type LBB1022/01, 150W 2 x 8 electrostatic column speakers type LBC3051/01, any reasonable offer. Nicoll, 19 Bridge Street, Barford, Warwicks CV35 8EH

■ Cobra, lo low, lo FM, USB, LSB, CW hi and hi. As new. Offers. Tel: (0283) 221870

■ Electrohome high resolution RGB monitor (colour), brand new, still in box, never used. Ordered for the Sinclair QL computer, but due to bad delivery QL cancelled. Cost £279, no reasonable offer refused. S G Carvell, 11 Himbleton Croft, Shirley, Solihull, West Midlands. Tel: (021) 744 9371

■ Sharp MZ80B micro computer. MZ80FB twin disc drives. MZ80PS dot matrix printer. 64K high res graphics. Fast tape deck, built-in green screen. Basic Pascal and assembler. CP/M and lots of software on cassette and disc incl MZ80K/A to MZ80B converter. A complete computer system for £500 ono. Suit home and/or business use. Norman G2DWB. Tel: (061) 761 5001 evenings and weekends

■ AR2001 VHF scanner with discone aerial and co-ax. As new and hardly used, cost £370, a bargain at £250. Tel: Doncaster 4829 or 67975

■ ZX Spectrum 48K with joystick, interface and Alphacom printer, over £150 software, mags, etc and dust cover, £120 ono. G0ENF. Tel: (0594) 42917

■ Pye Cambridge AM10B six channel with leads and remote, mic etc, plus spare lead, remote and manual, £25. Two for £45. Trio KA3700 stereo amp, £20. Scientifica NMR ESR power supply, offers. Solartron LM1402.2 digital voltmeter, bench type, offers. Rory Hall, Treen House, 42 Worcester Road, Chipping Norton, Oxon OX7 5YF. Tel: Chipping Norton 3558

■ Petrol/paraffin portable generator, 1.5kV/A 240V 50Hz, trolley mounted with handle. Recoil start, ideal for NFD, £100. 19in x 6ft rack with two separate amplifiers, push-pull 35Ts and push-pull 4-250A, both switchable linear/C with bias and plate supplies etc, variac and metered, high quality components and performance. Selling to clear space. Large quantity of PW, QST, WW and CQ and other mags. KW1000, HW100, Tiger Z-match, G2DAF parallel 813 linear amp, 80-10m with 3kV power supply. Eddystone die-cast loudspeaker cabinet, HRO with power supply and all coils, Hallicrafter's S20R and much more. Write to Mr Baker, New Bungalow, Bontnewydd, Aberystwyth, Dyfed, Wales

■ TCS12 Rx, £20. TCS12 Tx, £25. WS19, mods, £20. HRO complete, £50. Marconi Atalanta, spares, meter, £55. CR300, £20. Scope, CT316, £12. Signal generator, 9/300MHz, £25. Heath HW100 Tx/Rx, PSU, £140. BC342, no mods, offers. AE1 double metered PSU, spares, £25. T1154, £65. R1155A, R1155B, £45. W1191 wavemeter, PSU, £10. FRG7, as new, £110. Fullerfone, £8. SAE full list; CRTs, PSUs,

valves. Gain, 18 Oaky Balks, Alnwick, Northumberland NE66 2QE. Tel: (0665) 602487

■ Drake TR7, DR7, AUX7, RV7, fist mic, base mic, RV75 RF clipper, £650, bargain. PS7, FA7 if required, £250. All filters fitted, NB7 fitted, £800 extras. Upgraded Sony 2001D latest portable air FM, AM, SW, 32 memory, £250. Hardly used hence not required. 26in ITT CTV, £80. Remote Commodore 64K +4, 11 games - worth £70, hence £75, bargain. Codar preselector free with Sony. Miss Fordham, 31c Anerley Park, London SE20

■ Yaesu FT207R FM 2 metre hand-held transceiver, rubber duck and telescopic antenna, ac charger and dc charger, excellent condition, 2½ watt output, £85. 2½ watt in 25 watt out linear for mobile use for above, £10. Storno 500 high band FM transceiver, two nicads, £25. Two pairs Pye PF1 pocketfone, nicads, working order, Tx/Rx, £10 pair. Two Pye PF70 transceivers, £10 each. 70cm module, 10 watts out, brand new, £10. 3 Peacock Court, Chapel Street, Wellesbourne, Warwicks CV35 9QX

■ Uher report stereo 4400 professional tape recorder with mic and leather case, £375. Marconi sig gen TF801D/1/S 10-485MHz, vgc, £95. Advance sig gen S2, 100kHz-100MHz, vgc, £27. Tech vacuum tube voltmeter (and ohms), 1.5 to 1600V fs, £22. Sinclair digital multimeter PDM35, 0.1µA to 1000µA, etc, £20. Eagle megohmmeter MG510 0-100MHz 500V, £15. Belco ARF sig gen 100kHz-300MHz, plus audio 20-20kHz, £17. B/W TV vgc, 18in, £10. IXL BGSC precision lathe, 44in between centres, 15in swing, 1HP 240V single phase, many chucks, face plates and tools, £550 no offers. Audio IFR training course, approved FAA, projector, manuals, records etc, £100. Canon 110ED, flash, leather case, £38. Minox B 'spy camera', £50. Polaroid 350, portrait kit 581A, flash gun 268, £90. Philips ultrasonic burglar alarm, £10. Sextant, Hezzanith with certificate No 66127, as new, £200. Jaybeam 12XY/70, £25. XY/2m, £20. Both with phasing harnesses. Wayne Kerr component bridge B521, £25. Yaesu maintenance service manual, FT-901DM, £12. Record-a-call remote telephone answering machine, £95. Norton Clipper Major saw, 4HP 3 phase, £395. Discone antenna, £12. Portable typewriter, £10. SX200N with SSB kit, £195. 47000µF, 25V electrolytics, £2 each. Mr May, 'Upper Durdur', Durdur Wood, Petersfield, Hants GU31 5AN. Tel: (0730) 892143 or 893534

■ Yaesu FT480R 2m mobile transceiver, 10 watts, ½ and ¼ wave mobile antenna. Drae 13.5V, 24 amp PSU. Practical Wireless Sept 72 to Sept 75 and June 80 to Oct 82. Radcom July 81 to April 86. Best offer secures. J Russell, 13 Stonebridge Lea, Orton Malborne, Peterborough PE2 0LY. Tel: (0733) 59263 daytime

■ Selling complete HF station: Trio TS130V, 0.5kHz CW filter, HF5 ant, SEM Z-match with Ezitune, PSU, mic, ant switch, SWR bridge, G4BMK RTTY software and I/face for CBM64, £475 ono. Exchange for CBM128 with d/drive and monitor. Will collect or deliver within 50 miles. G3PXU (Cams). Tel: (073129) 403

■ Rascal R17 gen cov receiver, ex/cond, complete with service manual, £175 ono. Eddystone EA12 amateur bands, ex/cond, must be seen, complete with service manual and ex/spkr, £175 ono. Buyer must collect. FT708 70cm hand-held, charger, whip, case, original box, spkr, mike, ex/cond, £165 ono. GW1SSQ QTHR, 11 Mynydd Court, Blaendare Road, Pontypool, Gwent

■ One Heathkit SW717 receiver, £60. One Realistic DX302 receiver, £130. Tel: Wood Clochen 378

■ Realistic DX302 receiver, £130. Heathkit SW717 receiver, slight fault, £40. Yaesu FRG7700 receiver with Yaesu FRA7700 active antenna, both £300. The Yaesu FRG7700 receiver is without a memory unit. Tel: Clochen 378

■ Yaesu FT480R 2m tcvr, £280. Tono 2m 100W linear, £95. MMT144/432R transverter, £110. MMT1296 transverter, £165. Jaybeam D15 23cm Yagi, £20. Jaybeam 6 ele quad, £10. 20m LDF250 heliax, with plugs, £20. All open to offers or £600 the lot. Julian Tether G6LOH, Highview, Culworth OX17 2AX. Tel: (0295) 768152

■ FT290R 2 metre, complete with batteries, charger, carry case, mobile mount and mike, £240 plus carriage. Bill G4ZRG QTHR. Tel: (051 638) 1550

■ Grundig Satellit 3400 AM 145kHz - 30MHz, FM 88-108MHz, frequency counter, 6 memories, 3 step

bandwidth, noise limiter, with adapter, can be used on ship as direction finder. AFC, SSB, BFO, MVC or AVC, perfect condition, mains, 6x1.5V cells or dryfit accumulator, £175 ono. Grundig Ocean Boy 820, AM 145kHz - 22MHz, FM 87.5MHz - 108MHz, coarse and fine tuning, tuning meter, bass treble controls, AFC, mains or batt, £40 ono. Excellent condition. James Dalton, 2 Warren Ave, Milton, Southsea, Hants PO4 8PU. Tel: (0705) 733186

■ Spectrum 48K with Saga keyboard, I/face 1, microdrive 15 + cartridges, Alphacom printer and paper, green screen monitor, loads of software, mainly graphics, business and utility, books and manuals, £180. Dyer. Tel: Warwick (0926) 491848, evenings

■ HRO miniature valve front-end, HRO 697 power pack, 9 coils, speaker, £60. J M Barber, 13 Chertsey Mount, Carlisle, Cumb CA1 2PH. Tel: 26436

■ Yaesu FT730RH, fitted FVS1, little used, £285, no offers. Datong Morse tutor, used 2 months only, £35. Tel: 01-514 5998

■ Sony multi-band receiver, ICF6800W, £240 ono. Ham Conc II, 26 - 28MHz, £80. Zetagi B300P amp, cost £135, £100 ono, unused. Zetagi C45 frequency meter, cost £59, £40, unused. Nigel. Tel: (0298) 71834, Buxton

■ Radio and TV servicing vols 1-6. Covers pre 1953 to 1958 models. Ideal for the radio or TV restorer. In good cond. Solatron regulated power supply, 0-500V at 100mA plus heaters etc. Buyer collects, offers. A Dunsmore, 21 East Croft, Ratho, Midlothian EH28 8PD. Tel: (031 333) 2610

■ Heavy duty lattice tower in two 20ft sections. Would consider splitting, offers? G3UEG. Tel: Harlow (0279) 27788

■ FT790 and FL7010 amp with beam and collinear, exchange for HF mobile. 50MHz rig with 3 ele beam, exchange for 2m linear 3W input, 2m mobile, hand-held, 20 amp+ PSU or WHY. Tel: Rotherham (0709) 67471

■ AOR2002 scanner, freq coverage 25MHz - 550MHz and 800MHz-1300MHz, in excellent condition, £330. Martin Duffy, 44 Cortolvin Road, Monaghan Town, Eire. Tel: 047 82057

■ Sommerkamp FT2772D MK3 with fan power supply fitted, instr, hand mic, Protel AM601 base mic, only been used for SWL, very good cond, £480 ono. Will swap for Yaesu FT901D/DM. Tel: Dave (0570) 470362, any time

■ 2 metre FM rig, FDK multi 700EX, 25W, very good condition, £110. Tel: (051) 430 9615, after 5.30pm please

■ MM144 to 28.30 Rx converter, £22. Super Saturn legal CB ant, as new, £15. Marconi xtal calibrator mod, TF1374, £20. Advance sig-gen type B4-B5, 30kHz-30MHz 240V, £10. Solatron scope mod 4 inch tube, needs slight attn, £20. 2 Creed 75 printers, 1 for spares, £7 pair. Marconi RF pwr meter + dummy load, 0-25W, £20. Mod CT419. Want original HRO power pack, not rack job. Tel: Milton Keynes (0908) 314095

■ Converter HF 100kHz to 60MHz input, 100.1MHz to 160.0MHz output. Suitable for VHF scanners, £25. Tel: Stevenage (0438) 725926

■ AVO model 8 type, with new leads, leather case a bit ropy, meter is excellent, £55. 10mtr SSB rig, £65. 38 set plus PSU and books, £12. 10 set xtal calibrator, £6. FDK multi 700EX 2mtr FM, 1W to 5W, unmarked, only £130. Bob, Canvey Island, Essex. Tel: (0268) 697906

## WANTED

■ Drake R7A Rx and TR7A tcvr. Must be vgc. Bob McHenry G3NSM. Tel: (0865) 56321, Oxford

■ Rotator - CDE30, 40 or 45. Must be in good condition and working order. Other makes may be considered. Tel: (0224) 636828 after 6pm. Ask for Ian

■ Sony CRF330K SW receiver, must be in excellent condition. Tel: (0206) 394336, Essex

■ BFO unit powered by a small 9V battery, built and boxed and tested. Details to Mr L Haworth, 11 Joffre Avenue, Castleford, W Yorks WF10 5AZ

■ Swap Colecovision TV games console, 2 joysticks, power supply, Atari games module allowing the use of all Atari cartridges with the Colecovision, plus 7 cartridges and Kodak 4000 disc camera, for any general coverage receiver. Joe, 21 Newbarns Road, Barrow-in-Furness, Cumbria

## FREE CLASSIFIED ADS

- Does anyone have an out of date copy of the *World Radio/TV Handbook* that they no longer require? If so, year and price to B Wright, 33 Bradshaw Avenue, Glen Parva, Leicester. Tel: (0533) 777636
- Servicing manual (or copy) for an R109 army receiver. Expenses will be met. A Quayle, 38 Greenways, Haywards Heath, Sussex. Tel: (0444) 451241
- German or resistance radio gear from WW2, also German radar etc. Parts, incomplete units, literature, WHY? Need not be working or in perfect condition, museum purposes only. Offering cash or hardware swap. Coil sockets or complete coil for B2 suitcase needed. R Otterstad 028RO, Vejdammen 5, DK-2840 Holte, Denmark. Tel: 010 452 801875
- Trio R600 or Trio R1000 wanted at a reasonable price, or part exchange for a Sony 6700 receiver. B Collins, 5 Railway View, Macfin, Bally, Money, Co Antrim BT53 6QU, N Ireland
- Pye, Telecom/Philips, PFX synthesized hand-held Pocketphone. Tel: (0705) 831641
- Pye F460 UHF base station service data wanted to tune to 70cm. Also circuit for Starphone UHF tscvr. G8BSK, 290 Priory Road, St Denys, Southampton SO2 1LS
- Manual for oscilloscope, Telequipment type DM53A, photocopy or borrow, will pay all costs. Also parts or cheap Eddystone EC10. S Brumby, 69 Gilbert Road, Lichfield, Staffs WS13 6AY. Tel: Lichfield 256816
- Is anyone starting a band? Why not exchange your FT290R, FT480R, TR7800, TR9000, WHY, for my two guitars, one electric, one twelve-string, both vgc. Plus Canon cine camera, projectors and Texas T199/A computer. Please write. Ian, 'The Dourmouse', 5 Sunset Walk, Bush Estate, Eccles-on-Sea, Norfolk NR12 0SX. Sorry no phone, all letters answered
- IC720A, 745 etc, around £500, no rubbish please. Limited budget. All letters answered. Consider TS430S, TS130S etc. Mr T Waters, 42 Tregrundy Road, Perranporth, Cornwall TR6 0EF
- Swap Polaroid Polarvision player, and Polaroid Polarvision instant movie camera, as new, for HF Tx/Rx in vgcw: KW2000B, HW100, SB101, FT7, or consider good HF Rx, R1000, FRG7700, EA12, or similar WHY? Any HF gear considered in gwo or 2m multimode in vgc. Tel: 01-200 3825, North West London
- Yaesu FT77 100 watts and PSU, all in good condition, 10 watt PSU, good price paid, also Yaesu FT757GX and PSU. Mr Liam McCann, 1 Ross Road, Belfast. Tel: 242663
- YC7B digital frequency display unit for FT7B tcvr. Ron Dow G4LHK, 78 Thorley Drive, Cheadle, Stoke-on-Trent ST10 1SA. Tel: (0538) 757225
- Exchange Storno 900 system 4 car telephone, direct dial, perfect condx, for UHF or VHF mobile rig or HF linear. G4VNG. Tel: (0733) 231639
- Wanted urgently: HQ1, mini beam, or AQ20/2E. Must be in vgc. Malcolm. Tel: (0203) 456128 Coventry, evenings
- Cheap two metre 70cm HF rig, Tx or Rx. Valve, xtal or PMR OK. Tel: (0705) 261399, Hants
- Matching power supply and external VFO for the Belcom liner 2, plus handbook, circuit and details of any mods. G6CJL QTHR. Tel: (0422) 54635
- FT102 or TS830S etc, £500 cash waiting. Write giving history etc. Also I have a Kenwood AT230 and SP180, mint, will anyone swap for FC102? Please write to G0EUI. 5 Hollybank Court, Highfield Road, Widnes, Cheshire WAB 7DP. Tel: (051) 259 4660 to leave a message. All letters answered.
- Cobra, Stalker 9, Superstar 2000, for conversion to 10 metres. Will exchange Lafayette HA350 communications receiver, vgc. David Kneale, 14 Bromet Road, Castletown, Isle of Man. Tel: 822012
- Burnped BE600. Pye Whitehall control head. Tel: (0302) 835280, South Yorks
- Help wanted to remove excessive background noise on two C90 cassettes containing very important phone talk. Recorded via telephone pick-up. Postage etc refunded. Bruno Liebich, 88 Sandridge Road, St Albans, Herts AL1 4AR. Tel: (0727) 52420
- Yaesu FT102 fitted AM/FM board, FY102DM ext VFO, FC102 antenna tuner, fitted 4-way selector, all delivered as housebound. QTHR G4GOF, Jess, no phone. J H Luxton, Berghem, Battery Hill, Fairlight Cove, Hastings, East Sussex TN35 4AP
- Yaesu FRT7700 ant tuning unit, in working order (I don't mind the odd scratch). Urgently required for recently set-up listening station. Please phone Lawrie. Tel: 01-459 5489
- R70, R71 or R2000. Must be in good working order, for cash. Phone day or evening. Tel: (0304) 367676
- Realistic DX302 communication receiver, digital readout, immaculate, boxed. 0-30MHz with Zetagi AM, SSB pre-amp. Swap for RTTY complete, Marine scanner, satellite receiver, discone antenna, Dressler ARA30, Morse code reader, or 2m Tx/Rx, mobile hand-held or base. Must be gwo. Communicator, 37 Collingwood Close, Peacehaven, Sussex BN9 8BG. Tel: 81095
- FRV7700 converter or any other converter suitable for FRG7700. Also Nato 2000, cash waiting. Tel: (0283) 221870
- YC7B digital display unit, to suit Yaesu FT7, must be working. G4LFB, QTHR. Tel: (0707) 29756 Welwyn, Herts
- TS700S or 700G, must be in mint or good condition. Can collect Midlands. Contact John Wheeler after 7pm. Tel: (021) 357 1575
- Circuit details of Seavoive VHF marine FM transceiver. Your price paid. Also Foreland VHF marine FM transceiver, maker Kelvin Hughes, 24V dc type, to swap for a good 12V dc Seavoive, cash adjusted. A E Jeffrey, 42 Dennis Road, Padstow, Cornwall PL28 8DE. Tel: 532723, after 7pm
- Norway calling. Wanted for museum in Oslo: WS11, Electra rcvr, AR77, TR1196, R1124 rcvr, R1084 rcvr, R1125. Test sets 12A, 5A, type 11, type 12. Junction box, A113Ya. Radio set No 1 transmitter T1190, AD67, WS65, 52ERT, GP-set, SG, WS66, YQ RE37 rcvr. Adequate compensation offered. Will collect or pay transportation costs. WHY? Leads also welcomed. Lashe Rag, PO box 73, Ljan, N-1113 Oslo 11 Norway

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Mochdre Ind Est,  
Newtown, Powt  
SY16 3LE  
TEL. 0686 - 24846

## RF DEVICES AT ROCK BOTTOM PRICES!

**Nobody beats us!**

Over 30,000 RF devices at low prices

### REPLACEMENT RF TRANSISTORS

MRF454 HF/SSB 80W	£18.20
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2SC2043/1307 HF 16W	£2.00
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M57727 VHF/SSB 38W	£45.00
M57749/SAU11 934/FM 7W	£29.00

Send £1.00 p&p and SAE for full list  
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B68 OBS

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Send a large (A4) SAE for full Cat  
Please add VAT at the current rate.  
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East Sussex BN9 9SB  
Tel: (0273) 514465

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PREVIOUSLY MADE BY  
DENCO SAE PRICE LIST

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Military etc. Thousands Stocked. SAE enquiries

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series from 10p, Linear from 12p  
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Dorset.

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Selling? I pay the  
BEST POSSIBLE PRICES for your Clean  
Used Equipment! BUYING? I have the  
BEST SELECTION  
of top Quality Used  
Equipment Available!

For the Deal You've been Looking for. Phone Dave, G4TNY  
ANYTIME ON HORNCHURCH (04024) 57722 or Send SAE

**G4TNY AMATEUR RADIO**  
132 Albany Road, Hornchurch, Essex RM12 4AQ

## AGRIMOTORS

MERTON CB AND RADIO CENTRE  
MERTON GARAGE AND POST OFFICE, MERTON.  
Nr OAKHAMPTON, DEVON EX20 3DZ

OPEN 6 DAYS 9-6 LUNCH 1-2pm  
(SUNDAYS BY APPOINTMENT)

SPECIALIST IN 934 MHz

SUPPLIERS OF ALL 27MHz AND 934 MHz EQUIPMENT  
AMATEUR ACCESSORIES CATERED FOR  
08053 200

## Amateur RADIO

This method of advertising is available in  
multiples of a single column centimetres —  
(minimum 2cms). Copy can be changed  
every month.

### RATES

per single column centimetre:  
1 insertion £7.00, 3 — £6.60, 6 — £6.30, 12 — £5.60.

# SMALL ADS

## AMATEUR RADIO SMALL AD ORDER FORM

TO: Amateur Radio · Sovereign House  
Brentwood · Essex CM14 4SE · England · (0277) 219876

PLEASE RESERVE.....centimetres by.....columns

FOR A PERIOD OF 1 issue..... 3 issues..... 6 issues..... 12 issues.....

COPY enclosed..... to follow.....

PAYMENT ENCLOSED: (Add 15%VAT)....

£ —

Cheques should be made payable to  
Amateur Radio. Overseas payments  
by International Money Order and  
credit card

CHARGE TO MY ACCOUNT.....

COMPANY .....

ADDRESS .....

SIGNATURE .....

TELEPHONE.....

C P I



# NEXT ISSUE ON SALE

*Amateur*  
**RADIO**

**Thursday 31st  
July**

# XXX

**ADULT VIDEO CLUB**  
OUR GIRLS WILL GIVE YOU  
THE INTIMATE DETAILS. NOW RING  
**0924 471811** (24 HRS)  
OR WRITE: AVC, PO BOX 12,  
BATLEY, W YORKSHIRE

## MORSE CODE PREPARATION

Cassette A: 1-12 wpm for amateur  
Cassette B: 12-25 wpm for professional examination preparation  
Each cassette is type C90  
Price of each cassette (including booklets) **£3.95**.  
Morse key with separate battery (PP3) — driven solid-state  
oscillator and sound transducer produces clear tone for sending  
practice. Price of key with electronic unit **£3.95**.  
Price includes postage etc. Europe only  
**MH ELECTRONICS (Dept AR)**  
12 Longshore Way, Milton Portsmouth PO4 8LS

## D.P. HOBBS (Norwich) Ltd

13 St Benedicts Street, Norwich Tel: 615786



Open Mon-Sat 9-5.30  
Closed Thurs 1.00pm

Stockists of:

**YAESU, FDK, ICOM, JAYBEAM**  
& Electronic Component Specialists

## JAYCEE ELECTRONICS

JOHN GM30PW

20 Woodside Way, Glenrothes,  
Fife KY7 5DP

Tel: 0592 756962

Open: Tues-Sat 9-5

Quality secondhand equipment in stock. Full  
range of TRIO goodies. Jaybeam — Microwave  
Modules — LAR.

## BEAM VIDEO

Throughout the house on Channel 36.  
Price £8.90 + P&P 50p. Phone for leaflet:

**Electronic Mailorder A**

62 Bridge Street, Ramsbottom

Lancs BLO 9AG

Tel: 070682-3036 (24hrs)

## ALPHA GOLD

Precision engineered keys for the  
connoisseur. Twin paddle. Single paddle.  
and the new Straight Key. Now even better  
value.

### CAVITY WAVEMETERS

One Wavemeter to cover 144MHz to over  
2500MHz. Now with improved pickup and  
frequency readout.

### 10 GHz WAVEMETER KITS

A pre machined cavity block to make a 10  
GHz wavemeter using your own  
micrometer.

Send large SAE for full information  
to:

**Paul Sergent**

6 Gurney Close, Costessey  
Norwich (0603) 747782

## G4BMK RADIO SOFTWARE

\*\* NEW FOR DRAGON 32/64 AND TANDY COLOR \*\*

SSTV RECEIVE decodes audio direct from radio with tuning  
indicator and printer support. Tape £11.25 GREYLINE &  
MUF/LUF PLOT. Draws great circle world map with  
propagation data superimposed. Tape £8.

CBM64/128 RTTY TRANSCEIVE with Baud rate detector, and  
unattended mode. Tape £11 disk £14.  
CBM64/128 MORSE TRANSCEIVE with speed tracking and  
full type ahead. Tape £10. RTTY+CW disk £22

DRAGON AND TRS80C PROGRAMS ON TAPE OR ROM  
RTTY+ASCII, Morse and AMTOR transceive.  
Send SAE for details. State call sign (if any).

**GROSVENOR SOFTWARE (REW)**

2 Beacon Close, Seaford, Sussex (0323) 893378

## WE'RE OFF AGAIN!

To the biggest mobile rally in the South of England on Sunday 13th  
July 1986 from 10am to 5pm at the Brighton Race Ground. Huge  
"Bring and Buy" stall, 20,000 sq ft, under cover exhibition area, plus  
attractions for the XYL and children and restaurant facilities. The  
rally which caters for the whole family. Talk-in on S22 and 3.5Mhz.  
Admission £1, children free if accompanied by an adult. Further  
details ring 0903 782594.

## ESR ELECTRONIC COMPONENTS

- FULL RANGE OF COMPONENTS
- MOTORS & SERVOS
- ROBOT ARMS & INTERFACES
- VELLEMAN ELECTRONIC KITS

Send for new catalogue

60p inc P&P

13a Station Road, Cullercoats,  
North Shields, Tyne & Wear NE30 4PQ  
091 251 4363

## Booth Holdings Bath

"934 MHz STOCKIST"

**GOLF CLUBLANE  
SALT FORD  
BRISTOL**

Tel: 02217 2402

Open Tues-Sat 9am-9pm

Closed Monday

## SP ELECTRONICS

48 Limby Road

Ruckhall, Nottingham

Tel: (0602) 640377

Open Monday-Saturday 8.30-5.30

## SCOTCOMMS

OPEN TUES-FRIDAY 10am-12.30pm, 2pm-5pm  
SAT: 9am-1pm, 2pm-4pm. CLOSED MONDAY

25 Morton Street, Edinburgh 15  
Tel: 031-657 2430

## TECHNICAL INFO SERVICES

76 Church St — Larkhall — Lanarks  
FULL SIZE SERVICE SHEETS  
Any radio, audio £2.50 + SAE  
CTVsMusC £3.50 + SAE complete set

Worlds largest collection  
service manuals 30's — date  
from £4.50-£35 each

Comprehensive TV Repair Course  
Complete Radio Service & Repair Course  
ONLY £9.50 EACH

Unique comprehensive repair  
data & circuits for almost  
every TV & video in stock

SAE brings any quotation  
FREE 50p mag. inc. service sheet!  
Pricelists unique elect publications

## FOR FAST QUOTES RING

0698 884585 before 5pm

0698 883334 after 4pm

## HEATHERLITE PRODUCTS

FOR THE RADIO AMATEUR

A new range of products  
manufactured by us:-

## THE EXPLORER RANGE OF HIGH POWER VALVE AMPLIFIERS

**HF-Explorer . . . 2 x 3-500Z Triodes**  
in grounded grid to run the full  
legal limit; in a desk top cabinet.  
£950.00.

**2M-Explorer . . . Choice of single**  
4CX350A or 4CX250B, capable of  
300 watts output, with built-in PSU  
and full metering. £485.00.

*Mobile microphones still available  
for all types of rigs*

Write or ring for full details . . .

**Telephone 0401 50921**  
**75 St Catherine's Drive,**  
**Leconfield, North Humberside**  
**HU17 7NY**

## Ian Fisher Communications of Stanhope

CS Works, Bondisle Way, Stanhope, Bishop Auckland  
Co Durham DL13 8TY

Main Distributors of 27Mhz C.B. radios and  
aerials also manufacturers of the new  
27Mhz mobile electron coil whip. This is a  
powerful aerial designed for 10m and 11m  
mobile use.

**PRICE £16.50 each**  
**Guaranteed for five years.**

Large stocks of coaxial cable, plugs,  
sockets and adaptors.  
All available via mail order.

OPEN: MON-SAT 10.30am-6.00pm  
RING FOR DETAILS  
(0388) 528464

**VALUABLE  
SPACE FOR  
SALE!**

**Telephone  
the advertising  
department on:  
0277 219876  
for details**

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## ADVERTISING RATES & INFORMATION

DISPLAY AD RATES		series rates for consecutive insertions			
depth mm x width mm	ad space	1 issue	3 issues	6 issues	12 issues
61 x 90	1/8 page	£66.00	£62.00	£59.00	£53.00
128 x 90 or 61 x 186	1/4 page	£115.00	£110.00	£105.00	£92.00
128 x 186 or 263 x 90	1/2 page	£225.00	£210.00	£200.00	£180.00
263 x 186	1 page	£430.00	£405.00	£385.00	£345.00
263 x 394	double page	£830.00	£780.00	£740.00	£660.00

COLOUR AD RATES		colour rates exclude cost of separations	series rates for consecutive insertions			
depth mm x width mm	ad space	1 issue	3 issues	6 issues	12 issues	
128 x 186 or 263 x 90	1/2 page	£305.00	£290.00	£275.00	£245.00	
263 x 186	1 page	£590.00	£550.00	£530.00	£470.00	
263 x 394	double page	£1,130.00	£1,070.00	£1,010.00	£900.00	

SPECIAL POSITIONS		Covers: Bleed: Facing Matter:	Outside back cover 20% extra, inside covers 10% extra 10% extra (Bleed area = 307 x 220) 15% extra
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DEADLINES		*Dates affected by public holidays			
issue	colour & mono proof ad	mono no proof & small ad	mono artwork	on sale thurs	
Aug 86	3 Jul 86	9 Jul 86	11 Jul 86	31 Jul 86	
Sep 86	31 Jul 86	6 Aug 86	8 Aug 86	28 Aug 86	
Oct 86	28 Aug 86	3 Sep 86	5 Sep 86	25 Sep 86	
Nov 86	2 Oct 86	8 Oct 86	10 Oct 86	30 Oct 86	

CONDITIONS & INFORMATION	
<p><b>SERIES RATES</b> Series rates also apply when larger or additional space to that initially booked is taken. An ad of at least the minimum space must appear in consecutive issues to qualify for series rates. Previous copy will automatically be repeated if no further copy is received. A 'hold ad' is acceptable for maintaining your series rate contract. This will automatically be inserted if no further copy is received. Display Ad and Small Ad series rate contracts are not interchangeable.</p>	<p>If series rate contract is cancelled, the advertiser will be liable to pay the unearned series discount already taken.</p> <p><b>COPY</b> Except for County Guides copy may be changed monthly. No additional charges for typesetting or illustrations (except for colour separations). For illustrations just send photograph or artwork. Colour Ad rates do not include the cost of separations. Printed - webb-offset.</p> <p>Above rates exclude VAT. <b>PAYMENT</b> All single insertion ads are accepted on a pre-payment basis only, unless an account is held. Accounts will be opened for series rate advertisers subject to satisfactory credit references. Accounts are strictly net and must be settled by the publication date. Overseas payments by International Money Order or credit card.</p> <p><b>FOR FURTHER INFORMATION CONTACT</b> Amateur Radio, Sovereign House, Brentwood, Essex CM14 4SE. (0277) 219676</p> <p>Commission to approved advertising agencies is 10%.</p> <p><b>CONDITIONS</b> 10% discount if advertising in both Amateur Radio and Radio &amp; Electronics World. A voucher copy will be sent to Display and Colour advertisers only. Ads accepted subject to our standard conditions, available on request.</p>

# DEWSBURY

## G4CLX

# ELECTRONICS

### THE NEW STAR MASTERKEY ELECTRONIC CMOS MEMORY KEYER



FOLLOWING THE OUTSTANDING SUCCESS STORY OF THE DEWSBURY ELECTRONICS STAR-MASTERKEY WITH OVER 500 UNITS IN USE WORLD WIDE, BY AMATEURS, AND AT SEA BY PROFESSIONAL OPERATORS, MANY USERS REQUESTED MEMORY FACILITIES, AT A REASONABLE PRICE. SO HERE IT IS. THE STAR-MASTERKEY CMOS MEMORY KEYER.

- \* FEATURES FULL IAMBIC KEYING. \* EIGHT 50 CHARACTER MEMORIES
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- \* ULTRA LOW CURRENT DRAIN. \* USES 4 AA SIZE CELLS.
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- \* DIRECT & GRID BLOCK KEYING SOCKETS FOR BOTH SOLID STATE & VALVED PA'S.
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- \* ADJUSTABLE SIDETONE PITCH & VOLUME. \* COMES COMPLETE WITH BATTERIES.

\* British Built & Fully Guaranteed.

**PRICE £95.00. POST, PACKING AND INSURANCE £3.00.**  
**VIBROPLEX, HI-MOUND & BENCHER KEYS AVAILABLE.**

**Dewsbury Electronics offer a full range of Trio Equipment always in stock**

We are also stockists of DAIWA - MET ANTENNAS - MUTEK - WOOD & DOUGLAS - TASCO TELEREADERS - MICROWAVE MODULES - ICS AMTOR - AEA PRODUCTS - DRAE

**Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.**

**Telephone: Stourbridge (0384) 390063/371228.**

**Telex: 337675 TELPES G**

VISA

Instant finance available subject to status. Written details on request.



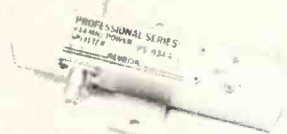
## 934 MHz PERSONAL RADIO

# The Nevada Range

Join the growing number of people  
discovering this exciting radio band.

934 MHz offers 2 way high quality communications from 10 - 250 miles  
(according to location/weather conditions).

7.



**POWER SPLITTER**  
Enables the co-phasing of any two similar 934 MHz antennas to give an additional 3 DB gain.  
**£24.<sup>50</sup>**

### HRA 934 L IN-LINE GaAs FET PRE-AMP

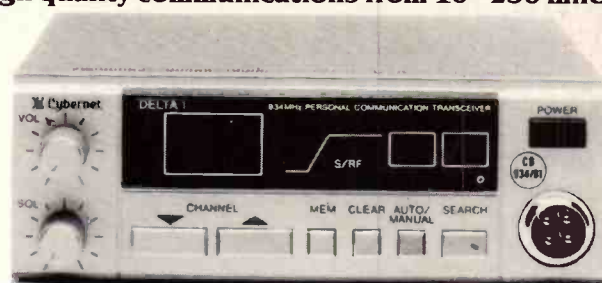
A super new ultra-low noise pre-amp which fits in line on any base or mobile installation. Guaranteed to give a staggering increase in received range. Extremely low noise 0.7 DB NF, 20 DB gain.

**£125**

### HRA 900 MASTHEAD PRE-AMPLIFIER

Super low noise GaAs FET pre-amplifier that mounts at the masthead. Low insertion loss and noise (typically 0.8 dB) coupled with 15dB gain enable this unit to double the received range of many sets.

**£139.<sup>95</sup>**



### THE CYBERNET DELTA 1 934 MHz TRANSCIVER

Has been engineered specifically for the UK market using latest "state of the art" technology.

- Sensitive RX (0.25  $\mu$ V for 12 db SINAD).
- 16 memories available.
- Auto/Manual scan and search facility.
- External 'S' meter socket.

**£355**

+£5 SPECIAL DELIVERY

### SWR/POWER METER

This precise and extremely accurate meter features an illuminated scale, low loss 'N' type connectors and twin meters for both power and SWR measurement. Power 0-50 watts in two ranges.

**£89.<sup>95</sup>**

### REMOTE ANTENNA SWITCH

High quality weatherproof masthead mounting switch. For switching 2 antennas with one cable feed.

**£59.<sup>95</sup>**

### HAS-2

Remote DC switch for mast head antenna switch

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**£49.<sup>50</sup>**

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3. **P7-ME**  
High gain mobile magnetic mount antenna. **£44**
4. **P7-E**  
High gain gutter mount mobile antenna. **£44**
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Low profile, bolt thru mobile antenna. **£25**
6. **G900R**  
Low profile bolt thru mobile antenna in black. **£25**
7. **Tc 12L MKII 12 ELEMENT BEAM**  
A new aluminium version of our successful 12 element loop quad. Gain: 18dBi. **£49**

# NEVADA 934

Professional Series

ASK YOUR DEALER FOR MORE INFORMATION  
OR CONTACT US DIRECT.

Telecomms, 189 London Road, Portsmouth PO2 9AE. Tel: 0705 662145 Telex: 869107 TELCOM G

Nevada 934 MHz Catalogue with full details and specifications of the complete range is available from Telecomms £1.00.