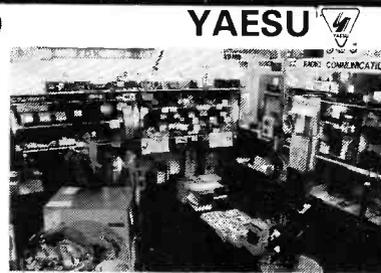




# WATERS & STANTON ELECTRONICS

TRIO  
FDK  
WELZ  
AZDEN  
BNOS



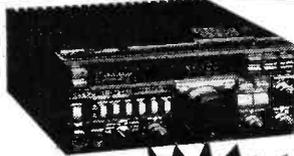
Pictured above is a corner of our Hockley shop.

ICOM  
JAYBEAM  
DATONG  
MICROWAVE  
MUTEK

## YAESU 757GX

COMPLETE HF STATION  
No hidden extras!

CW FILTER IAMBIC KEYER  
BREAK-IN NOISE BLANKER  
GEN. COVERAGE AM-FM-SSB-CW 1  
Accessories: — FC757AT £231.50  
FP757GX £149.50 FP757HD £162.50



£ 675

## PANASONIC. RF-B600LBS/LBE

NEW



New from Panasonic is the RF B600LBS/LBE deluxe communications receiver. Featuring green LED display accurate to 100Hz, computer controlled function selecting, this fully portable receiver is one of the best we have seen for some while. Coverage is 150kHz to 30MHz AM/LSB/USB/CW plus 87.5 to 108MHz FM. Its wider range of features include 9 memory channels, comprehensive scanning, lock and search, synthesised tuning in varying steps down to 100Hz, slow/fast tuning, AM bandwidth and noise limiter, memory battery back-up. RF gain control, internal whip, external SO239 connector, 230V AC, internal battery or external 13.8v DC.

£399

ONLY  
£199!

## PANASONIC RF3100



This highly acclaimed receiver has been a sell-out! We are hoping for better deliveries during May and June. Completely self-contained and portable, it covers the frequency range 150kHz to 30MHz in 32 bands. The bright digital display ensures accurate tuning of AM/SSB/CW and an additional band covers the FM band 87.5 to 108MHz. We can thoroughly recommend this as a good beginners receiver or where portability and domestic appeal are important.

**TRADE INS?** — We are always looking for good gear either as part exchange or for cash. Just give us a call.

**MAIL ORDER** — All orders despatched same day.

**VISA OR ACCESS** — Just phone your order in. Immediate despatch.

**INSTANT CREDIT** If you have a credit card or bank cheque card we can usually arrange instant credit.

**SECOND-HAND EQUIPMENT** — We buy for cash or part exchange — our major stock of second-hand equipment is kept at Hockley. All items carry three months warranty. Stock changes daily so call or telephone your requirements whether buying or selling. **STOP PRESS:** — Ex Dem TS930 £1049 12 months warranty, PCS300 handheld £135!

## YAESU

FT790R  
£249



Special Offer

- FT980Tcivr. £1265.00
- SP980Spkr. £58.65
- FT102Tcivr. £685.00
- SP102Spkr. £52.50
- FC102 ATU. £179.00
- FT77 Tcivr. £459.00
- FP700 PSU. £125.00
- FC700ATU. £98.00
- FT757GX Tcivr. £685.00
- FC757AT ATU. £231.50
- FP757GX PSU. £149.50
- FP757HD PSU. £162.50
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- FT726R Tcivr. £589.00
- FT230R Tcivr. £259.00
- FT730R Tcivr. £259.00
- FT290R Tcivr. £269.00
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- NC11C Chgr. £9.95
- FT480 Tcivr. £399.00
- FT208R Tcivr. £199.00
- FT708R Tcivr. £209.00
- FNB2. £21.45
- NC9C. £8.80
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- MEMG7700. £69.00
- FRT7700. £46.00
- FRV7700. Various
- YM24A Mic. £21.50
- YM49 Mic. £18.40
- MH1B8 Mic. £14.95

## WELZ

SP15M  
£41



- SP200 1.8-160MHz. £82.00
- SP300 1.8-500 MHz. £115.00
- SP400 130-500 MHz. £82.00
- SP10X 1.8-150 MHz. £28.75
- SP45M 130-470 MHz. £41.00
- SP250 1.8-60 MHz. £59.75
- SP350 1.8-500 MHz. £57.75
- AC38 ATU. £69.95
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- CT300D. Load. £58.00
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- DF72C Duplexer. £19.50
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- RS-655 6 Amp PSU. £65.00
- RS-1100 10 Amp PSU. £89.00
- RS-1150D 11 Amp PSU. £107.00

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- B285 2m Base. £17.50
- GH22 2m Base. £32.50
- GH72 70cm Base. £35.75
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- CP5 5 Band. £133.00

£32.50

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DIAMOND  
GH22

144-146MHz 6.5dB

In our opinion no other 2m aerial can match its performance and price. Ruggedly constructed it provides 6.5dB of gain with an almost flat SWR 144-146MHz!

ORDER YOURS NOW

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FDK M750XX  
2M FM - SSB - CW



The M750XX is the latest from FDK with a powerful output of 20 watts on all modes SSB-CW-FM.

FABULOUS RX40  
FM MONITOR  
141-180 MHz

Covers the major portion of the VHF band and is designed to professional standard.

£ 142



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R2000  
£421



- TS930S Tcivr. £1150.00
- AT930 ATU. £145.00
- SP930Spkr. £60.00
- TS430S Tcivr. £752.00
- PS430 PSU. £115.00
- SP430Spkr. £29.90
- AT250 ATU. £273.00
- MB430. £11.50
- FM430. £35.19
- TS830S Tcivr. £731.40
- AT230 ATU. £138.90
- SP230Spkr. £42.00
- TS530SP. £638.00
- TL922. T.B.A.
- MC50 Mic. £31.95
- MC42S Mic. £15.00
- LF30A Filter. £21.85
- TR780 Tcivr. £795.00
- TR9130 2m Tcivr. £442.00
- BO9A. £47.84
- TW4000A Tcivr. £469.00
- TM201A 2m Tcivr. £269.00
- TR790 2m Tcivr. £312.00
- SP40. £14.50
- TR2500 2m Tcivr. £237.82
- SMC25. £16.50
- TR3500 70cm Tcivr. £256.00
- TM401A 70cm Tcivr. £299.00
- R600 Rx. £263.00
- R2000 Rx. £421.00
- VC10 Conv. £113.00
- DM81. £72.90

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# SHORT WAVE MAGAZINE

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## AUTHOR'S MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of A4 sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made at a competitive rate for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

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# LOWE SHOPS

Whenever you enter a LOWE ELECTRONICS' shop, be it Glasgow, Darlington, Cambridge, London or here at Matlock, then you can be certain that along with a courteous welcome you will receive straightforward advice. Advice given not with the intention of "making" a sale but the sort which is given freely by one radio amateur to another. Of course, if you decide to purchase then you have the knowledge that LOWE ELECTRONICS are the company that set the standard for amateur radio after-sales service. The shops are open Tuesday to Saturday and close for lunch 12.30 till 1.30 pm.

**In Glasgow** the LOWE ELECTRONICS' shop (telephone 041-945 2626) is managed by Sim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive. That's the right turn off Great Western Road at the Botanical Gardens' traffic lights. Street parking is available outside the shop and afterwards the Botanical Gardens are well worth a visit.

**In the North East** the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (telephone 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington. That is on the A167 Durham road out of town. A huge free car park across the road, a large supermarket and bistro restaurant combine to make a visit to Darlington a pleasure for the whole family.

**Cambridge**, not only a University town but now the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (telephone 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1039, past the science park and turn left at the first roundabout. After passing a children's playground on your left turn left again into High Street. Easy and free street parking is available outside the shop.

**The Capital City** also has a LOWE ELECTRONICS' shop managed by Andy, G4DHQ. Easy to find, the address is 278 Pentonville Road, London N1 9NR (telephone 01-837 6702) and the shop is located on the lower sales floor of Hepworths. That's only a 3 minutes walk from Kings Cross railway station. So, when you're in the Capital City, visit LOWE ELECTRONICS.

**Finally, here in Matlock** David G4KFN is in charge. Located in an area of scenic beauty a visit to the shop can combine amateur radio with a outing for the whole family. May I suggest a meal in one of the town's inexpensive restaurants or a picnic on the hill tops followed by a spell of portable operation.

## if I am absolutely honest,

I am not certain whether I own a NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD515 is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all the others. This is difficult to define—the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items referred to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminal, Omega navigators, Doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wider range application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, this assumption is incorrect. The NRD515 is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readouts, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 100KHz to 30MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section to 600KHz to 1.6MHz has a preselector control to cope with crowded conditions.

To give real "armchair copy" JRC have introduced the NCM515 remote control keypad. As its name suggests the NCM515 enables frequencies to be quickly keyed into the receiver. Four memories are provided, two rates of frequency stepping in increments of either 100Hz or 10MHz and finally the ability to add to or subtract from the operating frequency by any frequency step. Add the optional 600Hz CW filter and the 96 channel memory unit and, as the other NRD515 owners would say, "a joy to own".



## the NRD 515

<b>NRD515</b>	monitoring receiver.....	£965.00 inc vat.
<b>NDH515</b>	96 channel memory unit.....	£264.00 inc vat.
<b>NCM515</b>	remote frequency controller.....	£125.00 inc vat.
<b>NVA515</b>	speaker.....	£34.50 inc vat.
<b>CFL260</b>	500Hz CW filter.....	£39.10 inc vat.
<b>CFL230</b>	300Hz CW filter.....	£64.00 inc vat.

# LOWE ELECTRONICS

Chesterfield Road, Matlock, Derbyshire. DE4 5LE.  
Telephone 0629 2817, 2430, 4057, 4995. Telex 377482.



**TR9130 TWO METRE ALL MODE TRANSCEIVER**

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones, even they are a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.

**TR9130..... £442.52 inc vat.**



**TS780 DUAL BAND BASE STATION TRANSCEIVER**

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFO's, up/down frequency shift microphone, IF shift, two priority channels, memory and band scan, etc. A superb rig, I have one myself, ring for a full enthuse!

**TS780..... £795.00 inc vat.**



**TR7930 TWO METRE FM MOBILE TRANSCEIVER**

Those who have used or owned a Trio TR7800 will know what I mean when I say that Trio, with the introduction of the TR7930 have improved on the unimprovable. The Trio TR7930 improves on the TR7800 by giving a green floodlight liquid crystal display, extra memory channels, both timed and carrier scan hold, selectable priority frequency and correct mode selection (simplex or repeater). The most significant change is the liquid crystal display, but closely following this must be the ability to omit specific memory channels when scanning and the programmable scan between user designated frequencies.

**TR7930..... £312.11 inc vat.**



**R2000 GENERAL COVERAGE RECEIVER**

The amateur bands are only a very small part of the radio spectrum, many other transmissions are available for the short wave listener. Broadcast stations provide an alternative source of current information both political and regarding the life style of the country. Fitted with the internal VHF converter the R2000 covers continuously frequencies from 118 to 174 MHz giving access to amateur two metre transmissions (am, fm, ssb and cw) plus a lot more. Having 10 memories, memory scan and programmable scan the R2000 provides in one rig the perfect receiver.

**R2000..... £421.36 inc vat.**



**TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES**

Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (150kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.

**TS930S..... £1150.00 inc vat.**



**TR2500/TR3500 HANDHELD TRANSCEIVERS**

Two first class hand held transceivers, one for two metres and the other for seventy centimetres. Ten memory channels, band and memory scan, repeater shift, reverse repeater and a low power position make the rigs extremely useful for the radio amateur who wishes to keep in touch with his local scene. A comprehensive range of accessories, base station charger, speaker microphone, mobile mount, etc. can be added to enhance operation, accessories used with one rig being compatible with the other.

**TR2500..... £237.82 inc vat.**

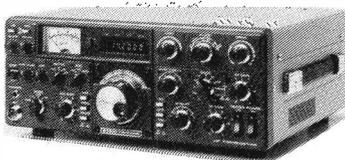
**TR3500..... £256.45 inc vat.**



**TS530SP HF AMATEUR BAND TRANSCEIVER**

A logic progression from the reliable TS520 series the TS530SP was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable world wide communication, the TRIO TS530SP. Now fitted with notch filter.

**TS530SP..... £638.00 inc vat.**



**TW4000A DUAL BAND FM TRANSCEIVER**

I have been waiting for this rig for the last three years, now it is here and I am using one, words fail me. Send for details.

**TW4000A..... £469.00 inc vat.**



just a part of the range

Securicor carriage on the above items £6.00

**LOWE ELECTRONICS**

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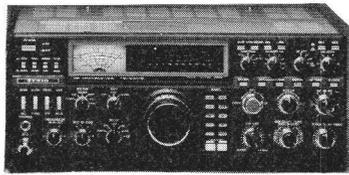
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The TS930S latest transceiver from Trio Price: £1,150 inc. VAT.



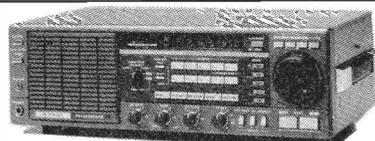
TRIO TS430's  
£ 752.00



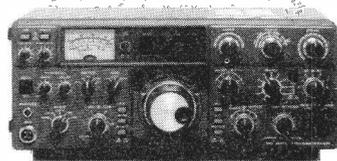
TW4000A  
£ 469.00



TRIO R600 RECEIVER  
£ 263.00

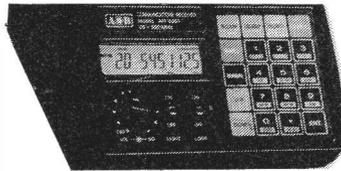


TRIO R2000 RECEIVER  
£ 421.00  
VHF CONVERTER. £ 113.00  
Covers 118-174MHz



TRIO TS830S  
HF SSB TRANSCEIVER  
£ 731.00

As the North West's only official Trio stockist we carry the full Trio range of equipment and accessories. Full service facilities. Send s.a.e. for up-to-date information.



We are proud to introduce the VHF/UHF communications receiver we have all been waiting for. A glance at the brief specification will tell you why the new AR2001 receiver is going to take the listener by storm.  
 \* Continuous coverage 25-550MHz (no gaps).  
 \* Receive modes of AM (for VHF/UHF airband), FM narrow (for amateur radio, CB, business radio) and FM wide (for broadcast and TV FM).  
 \* Digital display of frequency, mode and memory channel.  
 \* Memory channels which store frequency and mode.  
 \* Full range of scan facilities.  
 The performance of the AR2001 sets new standards. Gone are the complaints of "dead" receivers. The AR2001 has typical sensitivity of 0.2 microvolts for 12dB SINAD on FM (N) across the entire 25-550MHz range.  
 Finally, the AR2001 is small, light weight, and powered from any 12V dc source, so it can be used at home, in the car, boat or aircraft, and whilst out portable.  
 Now comes complete with 12V PSU. £ 325.00



### J.R.C. NRD515D

General coverage receiver 100 KHz to 30 MHz fully synthesised. Digital readout PLL synthesiser with rotary type encoder pass band tuning - modular construction. £965.00  
 NSD515 TRANSMITTER & AC PSU £1,371.00  
 NEW 96 CHANNEL MEMORY UNIT.  
 J.R.C. JST 100HF TRANSCEIVER + AcPSU £1,147.50

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AD270 Active Antenna (indoor)	£ 47.15
2M Converter	£ 39.67
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DR7500R	£ 139.00
DR7800X	£ 181.80
DR7800R	£ 196.00

<b>KENPRO</b>	
KR400C	£ 118.45
KR600RC	£ 167.90

Station Accessories	
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SP300	£ 106.00
SP400	£ 75.00
SP10X	£ 26.50
SP15M	£ 39.00
SP45M	£ 55.00
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SWR25	£ 12.75
HK 708 Morse Keys	£ 13.50
Diawa 2 way Ant Switch	£ 13.95
SWL 2 way Ant Switch	£ 4.75
V22 way Ant Switch	£ 6.00
V33 way Ant Switch	£ 10.00
V44 way Ant Switch	£ 11.00
DL50 500hm 50 watt D.Load	£ 6.50
DL300 500hm 300 watt D.Load	£ 24.95
DL600 500hm 600 watt D.Load	£ 29.50
KX3 SWL Antenna Tuner	£ 42.50

<b>DRAKE</b>	
MN75 Antenna Tuner	£ 174.80
MN2700 2KW Antenna Tuner	£ 235.00
TV3300 Low Pass Filter	£ 27.60
Full range of Drake accessories. Available to order.	
G-Whip Mob'r Antennas.	
Microwave Modules, FDK, and other equipment also available, including I.C.S. - Diawa.	

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14AVQ/WB 4Band Vertical	£ 66.70
18AVT/WB 5Band Vertical	£ 113.85
TH2MK3 2El. Tribander Beam	£ 169.06
TH3MK3 3El. Tribander Beam	£ 274.85
TH3JNR 3El. Tribander Beam	£ 202.40
TH6DX Tribander Beam	£ 396.75
205BA 5Element 20m Beam	£ 396.00
Explorer 14. Tribander	£ 325.00

Mini Products	
HQ 1 Mini Beam 10-15-20m	£ 169.00
C4 3Band Vertical	£ 59.00

T.E.T.	
HB23SP 2El Tribander	£ 172.50
HB23M Triband Mini Beam	£ 169.50
HB33M Triband Mini Beam	£ 230.00
HB33SP 3El Tribander	£ 231.50
HB34D 4El Tribander	£ 222.90
HB35C 5El Tribander	£ 283.95
HB35T 5El Tribander	£ 278.50
MV3BH 3Band Vertical	£ 45.95
MV4BH 4Band Vertical	£ 59.95
MV5BH 5Band Vertical	£ 99.00
TE214 14Element 2m Beam	£ 74.40
MV3BH with Radial Kit	£ 69.00

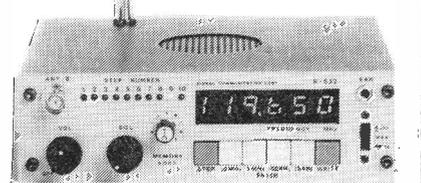
<b>G4MH</b>	
10-15-20m Mini Beam	£ 88.00

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4 Element 2m Yagi	£ 14.95
9 Element 2m Yagi	£ 17.71
17 Element 2m Yagi	£ 37.66
19 Element 432MHz Yagi	£ 20.70
21 Element 432MHz Yagi	£ 29.67

Welz Diamond Antennas	
DP.CP5 Vertical	£ 115.00
KB105 Vertical	£ 79.00
DP.CP4 Vertical	£ 89.00

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GPV 720 144/432MHz dual base station	£ 33.90
Revcone Discone	£ 25.00

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LW5 5El 2m Yagi	£ 14.37
LW8 8El 2m Yagi	£ 17.82
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THE R532  
AIRCRAFT BAND RECEIVER  
£ 159.40 inc. VAT

**SPECIFICATION.**  
 Frequency range: 110 to 136MHz, i.e. all NAV/COM channels.  
 Number of channels: 1040 (25KHz steps).  
 Sensitivity: Better than 0.75 microvolts 10dB / SN.  
 Memory channels: 100 (10 banks of 10). Memories can be scanned automatically or selected manually.  
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 Weight: approx. 1Kg. (including memory backup batteries).



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This microprocessor-based product is the ultimate in 'electronic keyers' and will send both live and stored messages in the speed range 12–30 wpm.

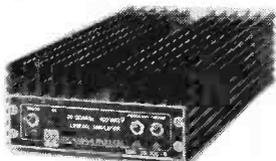
Four separate memory stores are provided, each of 256 characters capacity and an 80 character keyboard buffer is incorporated so that the morse code is actually read from this memory at a constant speed.

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- ★ 100 watts out for 10 watts in
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- ★ Straight-through mode
- ★ RF Vox with manual override
- ★ 13.8V DC operation



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### 1296MHz LINEAR TRANSVERTER — MMT1296/144

**NEW!**

- ★ GaAsFET preamp — 1.2dB N.F.
- ★ 2 watts TX power
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- ★ Compatible with most 2m transceivers
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- ★ RF Vox with manual override
- ★ 13.8V DC operation



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This low-noise 1691MHz GaAsFET receive preamplifier is intended for use with any METEOSAT receiving system and is ideally suited to direct mounting at the masthead. In this way feeder losses may be overcome. An NEC GaAsFET is employed as the amplifier stage, which operates with accurately controlled DC conditions. The use of microwave matching achieves the very low figure inherent in this preamplifier, 1.2dB.



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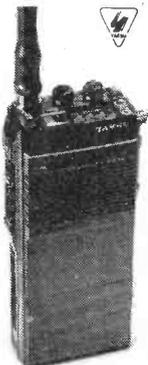


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### FT203R YAESU'S NEW COMPACT 2M HANDIE



The ultra compactness of the FT203R is due mainly to Yaesu's chip component circuit board assembly, the chip components being installed automatically by robots. The 203's features include thumbwheel frequency selection, built in S/PO meter, 2.5W RF O/P at 10.8V, (3.5W O/P with FNB4). Vox activated switching is possible when used in conjunction with YH-2. Accessories supplied include FNB3, FTE-2 tone unit, CSC6 case and YHA-14A antenna.

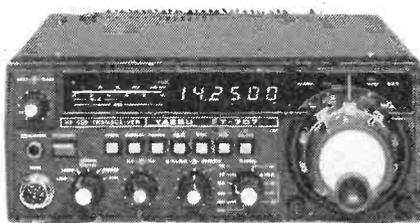
FT203R	2.5W transceiver.....	£169.00 inc.
FBA5	Case for 6AA cells.....	£6.50 inc.
FNB4	12V Nicad pack.....	£36.40 inc.
CSC7	Soft case (when FNB4 is used)	£6.50 inc.
YH-2	Headset/Mic.....	£13.80 inc.
MH-12A2b	Speaker Mic.....	£16.85 inc.
SMC8.9AA	Charger (13A style).....	£8.05 inc.
MMB21	Mobile mounting bracket.....	£7.65 inc.

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SMC8C	220mA Charger (13A Style).....	£8.80 inc.
MMB11	Mobile Mount.....	£26.85 inc.
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FL2010	2m 10W Amplifier.....	£63.25 inc.

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Those clever men at Yaesu have put together your total satellite transceiver requirements in one package. If you are interested in the RS satellite with 2M to 10M transponders, the answer is FT726R + HF module and satellite unit, or if you want to use Oscar 10 with 70cms to 2m transponder, the answer is FT726R + 70cms module and satellite unit. You can even use the FT726R with the mode L transponder on Oscar 10. However in this case the FT726R does require a little help from Microwave Modules and their MMX1268/144. For mode L the answer is FT726R + 70cms module, satellite unit and MMX1268/144 on all the above combinations, full duplex is possible when the satellite unit is fitted to the FT726R. So look no further, Yaesu have the answer, the FT726R!!



FT726R(2)	Transceiver c/w 2m.....	£739.00 inc.
FT726R	Transceiver main frame.....	£589.00 inc.
21/24/28	HF module.....	£200.00 inc.
50/726	6m module.....	£185.00 inc.
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In order to help promote further activity on 70cm we have been able to reduce prices of many of Yaesu's UHF transceivers. This has been possible due to S.M.C.'s bulk purchasing from Yaesu together with reduced production costs at the factory due to increasing demand on the Japanese home market since the introduction of UHF repeaters in Japan.

Check out the prices of Yaesu's UHF Transceivers against other manufacturers' models and you will probably agree Yaesu leads the way to 70cm.

Just consider with lower equipment costs than equivalent 2M transceivers, a larger number of UHF repeaters in the UK per amateur population than anywhere else worldwide and remember 70cm antennas because of their smaller size and similarity to T.V. antennas make them far more environmentally acceptable than 2M long Yagis.

*'Need we say more except see you on 70cms!!!'*



**FT708R**  
now only  
£179 inc.



**FT790R**

now only  
£249 inc.

shown with FL7010  
optional amplifier



**FT730R**  
now only  
£229 inc.

### 70cm ANTENNAS

D8/70	8 over 8 Yagi	£25.87
PBM18/70	18 ele Parabeam	£32.20
PBM24/70	24 ele Parabeam	£44.55
LW24/70	24 ele Yagi	£27.02
MBM28/70	28 ele Multibeam	£21.27
MDB48/70	48 ele Multibeam	£35.65
MBM88/70	88 ele Multibeam	£48.87
8XY/70	8 ele crossed Yagi	£42.55
12XY/70	12 ele crossed Yagi	£52.90
SMCGP432X	3 x 3/4 wave colinear	£32.20
SMCGP714	14 step coaxial colinear 10DBI	£78.60 <b>NEW</b>
SMC70N2V	2/70cm colinear	£32.20

Carriage on antennas £2.65.

### COAXIAL FEEDERS

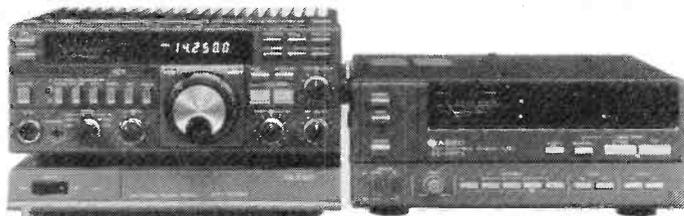
Don't throw away those valuable watts by using a poor quality feeder. Remember approximately 20M of UR67 will have an approximate attenuation 3dB at 432 MHz. This means if you invest around £250 for a 100W P.A. you will only end up with about 50W at the antenna.

UR67	att 3.9dB per 25M approx	£0.69p/m
Pope H100	att 2.25dB per 25M approx	£0.79 p/m
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*Andrews LDF2.50	att 1.9dB per 25M approx	£3.00p/m
*Andrews LDF4.50	att 1.3dB per 25M approx	£3.58p/m

\*Helical Foam-Dielectric cables.

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FC757AT Automatic Antenna Tuner.....	£231.50 inc.

Frequency range 160-10m Tx general coverage Rx. 10 Hz VFO steps and 500kHz band steps.

Modes, USB, LSB, CW, AM, FM all as standard.

Power output 100W SSB, CW, AM, FM 25W carrier AM.

3rd order products - 40dB at 100W on 14 MHz.

Dynamic range better than 100dB CW(N) at 14 MHz.

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Dual VFO's and 8 memories with VFO/memory transfer feature allowing more flexible split frequency operation.

Programmable memory scanning with scanstop threshold adjustable with the RF Gain control.

All accessories installed including AM, FM, Marker, Speech processor, shift filters, 600Hz CW filter and keyer.

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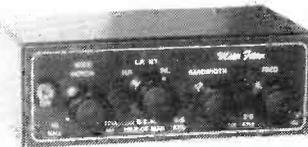
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## EDITORIAL

## Television Interference

For many years radio amateurs in this country suffered severe TVI problems with Band 1 and 3 television sets — indeed, back in the early years some manufacturers actually settled on IFs like 21 MHz! However, the advent of 625-line TV on UHF reduced the problem to manageable proportions for a while.

1984 is seeing a serious deterioration in the situation, and the prospect of worse to come. Three areas of difficulty arise: firstly, the widespread use of the video recorder, left patched permanently in the TV aerial-feed line; secondly, the increasing use of community TV distribution systems; thirdly, a foreseen problem, with cable and satellite TV systems.

In addition, the TV receivers currently available are very heavy interference generators, particularly the colour sets, by way of line output stage radiation, the harmonics of which are of nuisance value right up to 30 MHz in a serious case.

While we have, and will continue to, address the problem in the pages of *Short Wave Magazine*, we must accept the severe commercial constraints on the TV makers, and the lack of basic knowledge of many TV service engineers on this specialised topic. Thus, the proper way to reduce the nuisance to an acceptable level is by an improved design standard. It is unrealistic to expect that every member of every TV design team will be an HF-operating active radio amateur, and so the answer has to be legislation. This, in turn, implies lobbying in places where it can be effective. The RSGB does an excellent job in this area on liaison with the authorities who administer the present law and practice, but of course they haven't the manpower to lobby every MP personally, nor to maintain pressure on the Government — and without a Government undertaking to change the current law nothing can be expected to happen.

It seems to this writer that a practical approach, as a start, would be to prepare a reasoned statement of the position and the problems, and to circulate it to *all* members of *both* Houses, with a request that the matter be discussed; and then a follow-up request for a meeting with the Government.

*W. J. Skiff*  
G3KFE.

WORLD-WIDE COMMUNICATION

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

**C**ONDITIONS on the bands have been variable — some very good and some quite poor days. As usual though, on one band or another there has been something of interest. So — let's look at the reports.

## Ten

The amount of channelised FM on this band is quite surprising and does much to keep off the CB-er intruders, though sadly not enough. Otherwise it has been quite good, considering the state of the sunspot cycle on its good days, and on bad days — dead!

G4HZW (Knutsford) uses a TS-820 and a two-element Quad, mainly on SSB with a little CW for a change. Tony says the middle of the month was the best; early morning VK and JA plus short openings to W6 and W7, and on the Saturday of the CQ Phone contest things started well on the band but fell away considerably later. Contacts were made during the month with, for example: 5B4ES, 5H3HS, 9K2BE, C53AL, CE1CDK, CE3DKZ, CE3ZI, CE6EZ, CE7BIY, CE8ABF (Tierra del Fuego), CX5AO, CX5CK, H44IA, H44R, HL1AKH, J41JG (Greece), JA4, JA5, JA6, JA9, LU1DAB/M, LU4AA, LU8DQ, PY5BAB, UA1-2-3-4-5-6-9, UA0JFL, UA0SFM, UA0SMA, UA0TO, UK7PAL, UL7QF, UI8DAA, UI8LNC, UK8MFA, VE1-2-3, V01OS, VK3BY, VK3PH, all W call areas, YC0EY, YU3TCQ/MM off Senegal, Z23JO, ZS1CT, and ZX8JD in PY-land. Gotaway of the month was 5U7ES/M, an Englishman on an expedition, working some southerly G stations, but he was very weak in the "frozen North of Knutsford!"

G6QQ (Hoveton) was just getting ready for a trip to V2-land when he wrote, but found time to operate SSB with K4SAQ, K4FA, W9DC/C6A, WA4MMD, W9NXM, WA9LIC, PS7AAH, RF6QAI, plus, on March 13, a run of 13 QSOs in the contest with W4, W5 and W8 stations.

Nice to hear again from G2BON (Aldridge) who has his IC-740 firing nicely now on all bands, into a G5RV at 30 feet. This has brought him, on Ten, SSB contacts with ZS1CT, CE6EZ, 5B4ES, LU4MEE, VK6PM, UJ8JLO, AP2P, DF3NZ/ST2, UG6JJ, A4XRS, TL8DC, 7P8CM, 9X5MH, VU2DQP, A92NH, RJ8JCF, ZC4ID and VP2EC.

G3BDQ (Hastings) has spent a little more time on the other bands this month, and John reports CW contacts with J28EB and J28DM within minutes of each other, plus SSB out to UA6LAX, UA9CSS,

DA2ER, ZS1CT, VP2EC, YC0VM, 5B4ES and 4X6IZ.

The QRP Club Activity Weekend over March 17/18 was a whizz, says G4BUE (Upper Beeding). He found the band opening even to East Coast Ws with his Argonaut 515, and modified DX34 beam; and Chris says he is hoping for even better conditions when the SSB leg of the G-QRP Club Activity Weekend comes up over May 5/6.

G3NOF (Yeovil) is the one for analysis each month, though last time round he was laid up with 'flu. Don found the band patchy, with the long path open some days from 0900-1000 with JA, USSR, KH2 and East Coast Ws audible between 1300-2000z. Africans have been heard during both morning and afternoon sessions, with ZS and PY audible even on the poorer days, but it has been noted how stations can pop up for a few minutes and then fade away again. SSB contacts were made with A4XKA, A4XRS, A4XYQ, A71BJ, AP2ZA, C53FG, D44BC, FM7BX, G4DUW/DU1, J28DX, JA4JVX, K3ZO/HK3 (Fred Laun who was kidnapped some years ago when he was LU5HFI), HK0HEU, KH2BB, N8DCJ/8P6, PZ1CC, VP2KCA, VS6DO, UA0SMA, UA0TO, VP2EC, W5JW (New Mexico), W6QL/CE0Z, YB2BNJ, YC1COP/0, YV0AA, ZD8RC, 3D6AL, 5H3FG, 5N9GM and 8R1J.

Down on the Isle of Sheppey, G2HKU has been setting himself up for retirement, and in fact ceased to be employed on the day he wrote. Despite the reported frog shortage, Ted says his lot are busy keeping the island supplied, and the first mice are putting out inspection parties in broad daylight — so we suspect Ted's extra spare time will be spent, as it were, campaigning! Ten for this month was a CW band, and he worked WA6TLA, K5ZD, N0DDQ, YV1NX, 6Y5HN and VP8KF.

We have now a welcome to offer to G4VBP/A who escaped the clutches of Justin Cooper and "SWL". At the time he wrote, Brian was only set up for VHF FM portable and, at the /A location, a converted CB rig. This is an ICB1050 plus 25-watt amplifier into a half-wave vertical at the work address, and it is also intended to try the effect of various wire aerial combinations there. Sheffield, where Brian lives, is a very good spot for Ten FM with lots of mobiles, as well as some base stations and /A; much the same can be said of nearby Rotherham. So far, since licensing last November, Brian has put some 340 QSOs into the log — but already

the word has gone out: G4VBP/A missed some DX while decorating . . . join the club! Among the more DX'y stations worked were EA2AFR, RA3DGH, RA6ABL, RA6LXB, 4X6IZ and 5B4ES. Stations heard were EA5, EA8, G4EMM/MM, JE6QJV, an LU7, HB9, RA3, RA6, UA3ALA, VK6, YB3AP on at least five days, YC3FM in Java, ZC4EPI, ZS5BK, a ZS2 on Prince Edward Isle, several 4X4 and 4Z4 signals, 5B4JE and 5B4JY.

G2DHV (Sidcup) notes that at his place the RF and domestic electrical noise level has gone up. However, George's ten-metre FM gear has heard 5Z4, 4X6, EA and WB8VCB working an inaudible G4 station.

Last, but by no means least, we have G2ADV (Chessington) who reckons March was a wonderful month, just like the peak. Bill worked 4S7VK, UA0YT (Zone 23), HK2AMW, CE5BYU, CE6CFX, 3B8FG, TR8DR, ZD8TM, VS6JH and FB8WK (Crozet) for a new country. Rare stations heard included such as ZK2DA, ZM2UA, 9V1VQ, 3B8FK, HK1KU, HK5APE, YB0ASE, YC4FAV, 9J2GK, VU2IOC, J28DM, J39BS, VP2EA; the commoner stuff noted, but not worked, included JA, VK, ZS, all W call areas, PY, LU, CX, ZC4 and VE.

## Top Band

Naturally enough, by now the band has quietened down as far as the DX scene goes — although there are still some good signals to be noted. G2BON (Aldridge) is obviously meditating an attack on the band, as he asks for an article on low-band aerials suitable for gardens of 150-200 feet long that are proven successes and not just text-book lifts. Anyone out there with offers?

G4AAW (Maidstone) is a regular Top Band addict. He uses for an aerial a 100-foot flat-top, with a 35-foot fall into the shack, and at the far end a forty-foot drop to ground level where it is earthed with many earth stakes and radials; so the 'aerial' length overall is about 175 feet. So far this has brought in some 63 new countries, last month's crop including 1A0KM, C31LD and UO5GQ. Among the also-rans in the log we see such as all of Europe, 4Z4MK, KN3O, VE1YX, UL7MAN, UA9WHL, FC8TT, RA9AKM, W1RR, W4BT, AA1K, W2BA, W2ADK, UA9CBO, I0LXJ, GB0WPX, IN3DYG, UA6HOF, K2BU, AA1K, K1ZM, N3DAY, 4X4NJ, GM3TMK, EA9KQ and SM0KV/0.

Turning now to the Top Band log from G2HKU we see his usual skeds with PA0PN, plus SP3AGE, both on SSB, while a whirl on the key got him out to GM3PFQ and EA6KZ.

G3BDQ says he has now left Top Band for the summer; his last QSO on the band was on March 26 when he worked EA3EUM to give the latter his first Top Band contact. Earlier in the month good contacts were had with K1MA, W4VZB and N4PN, and on March 10 a long natter with VE1ZZ at 2324. Others worked during the contest were EA9KF, OE1DH, YT6A, IN3DYG, DL6FBL, OK2QX, SP3AGE, I5MXX, YU3EF, SP5INQ, I2BBJ, IK2DVG, G4UTI, EA6ET, OZ2CJ, LX1PD and 9H1CG.

### The New Bands

All we can report is a deafening silence! However, there *are* people who have worked stations on these bands, but reports — *rare!*

As to the 'possible' score we count some 59 countries with authority to use 10 MHz, or at least some part of the band; on 18 MHz, forty countries have all or part of the band, and on 24 MHz there are 42 countries at the current count. Incidentally, if anyone is thinking of home-brewing a rig for one or more of the bands, the allocations are 10.1–10.150 MHz, 18.068–18.168 MHz and 24.890–24.990 MHz. Go on, give 'em a whirl!

### Eighty

Just one contact is reported by G3BDQ; he was a mite chuffed to hook C31SD for a brand new one on SSB, but John seems to have been taking more interest in QRP operating on other bands.

The G5RV aerial at G2BON seems to be working okay, as Tom's SSB signals connected with K2BU, W1FC, VP2KCA, NP4CC and K2EK.

G4SXE (Rolleston) notes that the band conditions are beginning to fall away, but he still persuaded his two watts to contact with HA5JI, UK2GBL, DL5LAP and SK6DG, not to mention two-way QRP contacts with G4SIS, G3DOV, G13LFH, G4ERT, G4WMY, G4KTG, G4PLM, G4HBY and, for the best two-way QRP contact, F6EQO/QRP; LZ1YY/QRP escaped. Brian is a bit unhappy that he can't call "CQ de G4SXE/QRP"—but what's the matter with a little amendment such as "G4SXE QRP"?

Something quite unusual is a report on the band from G3NOF (Yeovil); Don operated a little in the contest, and made two-way SSB noises at UB5NQ, UK2FAA, UK2GAB and UO5OAO.

Finally, G2NJ's contribution on Eighty. Nick says that G2CNN's trip to EA6 was very successful with the HW-8, with some 38 countries worked QRP on Eighty, including W9IU/4 for a rare

Transatlantic contact (at least at QRP on Eighty). Another contact at QRP was a three-way one with W2BA and F2MA, most of the contacts being made in the dawn period. G2NJ's own most interesting QRP contact was with PA3BFH/M "on a North Sea oil rig near Amelund". Nick reminds us that the TOPS CW club net is at 2030 clock with G4RAR as net control for the first hour and G4GBG for the second, on Sunday evenings.

### Odds and Ends

We have a letter from Michael Murrey of the European DX Council saying that they are having a conference between June 8-11, in conjunction with the Swedish DX Federation and Radio Sweden International. Thus, they have a special station signing 7SK0AC over the period June 8-10; operators will be SM types, plus ops. from 4S, 9M, HV, OE and LA. Kick-off is 1500z and the frequencies look to be 14060 and 21060 kHz CW, 14320 and 21350 kHz SSB for the DX bands, dropping down to 3550 and 3700 kHz at night; there will also be some VHF operation.

The G-QRP Club Activity Weekend May 5/6 is worth a whirl; it is a weekend for the QRP chaps to get on the air — on SSB — and see who they can work. Not a contest as such, but after you have "done your thing", send a report to Chris Page, G4BUE, at 'Alamosa', The Paddocks, Upper Beeding, Steyning, West Sussex BN4 3JW.

G3NOF notes that there are some changes in French prefixes in the system; he has already noted Corsica is now to be TK. Macao is using XX as a prefix, and Lord Howe Is. is now using VK9L.

LA9PCA is asking DX-ers for support in two projects he has going. The first is a possible ZA DX-pedition; Robin feels that if, when applying for a licence, he can show a crop of letters from around the world, the ZA authorities may well feel easier about granting a licence. The second item is that the LA authorities are preparing their Antarctic Expedition, and he hopes to persuade them to charter a ship large enough to carry several amateurs who would do a DX-pedition to 3Y. Again he feels that letters from around the world in support would help. Write to him in suitable terms: LA9PCA, P.O. Box 88, N-5014, Bergen University, Norway.

The Chilean authorities seem to have been playing ducks and drakes with the accepted prefixing of CE0Z for Juan Fernandez, CE0X for San Felix, and CE0A for Easter Is. It seems that both CE0F and CE0Z calls have been issued interchangeably on both Easter and Juan Fernandez, and CE0A calls are not being issued. The authority for this is the letter from Lloyd and Iris Colvin to DXNS — and if Lloyd and Iris say so, that's good enough for the writer!

As from May 1 the USSR callsign allocations will be changed. The first letter will be U or R regardless of band; the second letter will denote the republic, essentially as in the present system. The first letter of the suffix, in conjunction with the call area number, will define the location in the Russian RSFR, and everywhere else by the first letter of the suffix. Individual stations will have three-letter suffixes of which the last two will be in the range AA-VZ. Club stations will have three letter suffixes ending in the letters WA-ZZ. Present two-letter calls will remain as is.

That Clipperton DX-pedition was a busted flush in the event. Basically, it seems that someone took the organisers to the cleaners after their original chartered boat *Svanen* failed to make the rendezvous after a major engine breakdown. As all the operators were there, they scurried around trying to find a replacement, and then were deluged with 'offers' which failed to show on the horizon as promised. All we can suggest for next time — and assuredly there will be one, as the operators are determined to get there — is that they confine their charters to reputable boats of North American or European origin, and possibly accept that a smaller sized craft is just as capable of making the trip. But it was a first class effort on the part of the boys, ruined by other people's dishonesty.

Just about the time this hits your mat, we hear that DU1CK is going back to Spratly; April 30-May 7 is the programme. Chito has just heard his earlier operation as 1S1CK has been accepted by ARRL; he stopped sending out cards while ARRL were making rejective noises but will doubtless now resume QSL-ing.

### "CDXN" deadlines for the next three months:

June issue—May 3rd  
July issue—June 7th  
August issue—July 5th

*Please be sure to note these dates*

### Forty

A couple of SSB signals were raised on this band by G3NOF, who found UK2BBB and UP2NK in the contest.

G4WIX (Droitwich) would seem to have heard of us for the first time when he recently saw a copy in a newsagent in his town; Phil took the R.A.E. and as his licence indicates is very much a 'new chum' — he got his R.A.E. pass slip in January, and was already through the Morse test — thanks to the attentions of G3TQD who bullied him through. Come February 9 with the licence on the mat, and the Yaesu FT-707 rig had some RF coming out of it, through the companion ATU to a half-sized G5RV. Already Phil has fallen for the CW way of life, and has over sixty G QSOs in the log now; he says he has been

greatly helped by the gang in helping him to get over a severe case of CW nerves by coming back to his slow Morse at a speed he could read, and being ready for a natter rather than the mere rubber-stamp QSOs he had expected. Notable among the contacts were G4NNN, and G3WUX — the latter is, as many know, a white stick operator in Harlow and G4WIX rates his CW as superb.

Amazing Coincidence Department coming up now! GM4CUX (Edinburgh) worked G3YXJ in Halstead some months ago, and they discovered that G3YXJ had stayed, some 25 years ago, in the very house from which GM4CUX was operating. When they actually met, it was discovered that they both taught the same subject, and had taken that subject at the same school where GM4CUX now teaches, though with a 15 year time gap! Amazing what happens to you on 7 MHz!

G2BON worked ZL4BO, ZL1BGK, CN8CX, W3LPL, W4QAW, ZP5JAL, PT7BAZ, UJ8JKD and UK2FAA, the last-mentioned in Kaliningrad.

Just one for G2HKU this month; CW with PA0VDV/PJ2.

Even G3BDQ ventured a little whistle on the band, and was rewarded by piping his CW to CN8EL.

Yet another 'just one' report comes from G6QQ, who snaffled K1MC on SSB by a bit of split-frequency operating.

### More Odds

By the time you get to read this the first great BV expedition will be over, but there is a follow-up, by the DX Family Foundation, over the time-slot April 28 to May 6.

The ZL8 Kermadec expedition had some quite horrendous luck. Once at Raoul Island where they were to operate, they anchored in a sheltered spot, but the boat dragged anchors and sank; much of the gear was salvaged but the expedition terminated early when a relief steamer, diverted to Raoul to collect them, arrived.

The BY stations seem to be going great guns; China has now formally applied to join the IARU, and visiting operators have operated SSB; and since the JA visit a few months ago, there is now a video at RSGB Hq. of the stations, and of some of the tourist sights.

JA8BMK has gone on record as saying that after May 1 he will no longer handle QSLs for the Burma stations XZ9A, XZ9B, XZ9C, 1Z9A and 1Z9B, the reason given being the difficulty of getting logs.

### Twenty

Hate it or love it, but this is where most of the action is!

G3NOF doesn't seem to like the band as much as he used to, but he does mention the early morning openings around 0730z to VK and ZL with some Pacific signals thrown in; in the evenings there have been

short path openings to VK and ZL around 1900. SSB contacts were knocked up with AH3AA/KH9, C6ADR, CT0BI, J41JG (= SV!), KH6FKG, JY9CL, OD5AO, T30AT, VP8KF, Y11BGD, YJ8TT, YV0AA (Aves Is.), VKs including VK9NS, VY1CW, ZB2FX, ZL2BOA, ZL4HI and 9M2HB.

For G4BUE new ones were ZM7VU, BY4AA (on SSB) for DXCC numbers 305 and 306, but he just missed the ZL8 expedition; Chris heard them say QRX ten minutes, but in the event they never reappeared. Others worked including ZK1XL, K9CU/HP1 (QSL via N9AVY), CX5RV who will be turning back into G5RV by the time you get this.

During the contest, GM4CUX stayed on Twenty mainly, and was rewarded by exchanges with CR6OF, KL7RA, WL7E, CN8ES, OX3SG, KD7P/NH2, 5Z4RS and ZS6CT. All appeared over a short period on the band and of course all dishing out 59 reports.

No doubt where the affections of G2BON lie; Tom's SSB worked out to YV5IE, 5T5RY, VP2KBZ, YV4AU, VU2VS, OD5MU, K9GL/VP2V, VY1CC (Yukon), Y11BGD, JY5CI, OD5AW, VK3YJ, VK3APT, VK5ON, VK3GI, WL7Y, VK7VV, KL7XD, VK3DSM, UK1PGO (Franz Josef Land), VK7GK, JY9TS, VY1CW (Yukon), VK5VQ, YK1AO and HZ1AB. On a different tack, Tom has his doubts about JY1ZZ worked last November — anyone any details?

Twenty for G2HKU means his SSB ZL skeds; this month only his regular ZL3FV, plus CW to HH2VP, VK3CCD, ZK1XL, ZL3LM and, at low power, VE3DMC and UA9OEK.

CW contacts were the thing for G3BDQ, when he worked ZS1CT, A92ED, PY3BC and W4MJ, the last two with thirty watts input.

G2ADZ says he "took one look at Twenty — can't think why!" and heard a pile-up on IT8VV, very QRQ CW, and giving QSL address as IT9TQH; just what IT8 means escapes Bill, and indeed your scribe too!

### Fifteen

G2DHV says that in the evenings, he has found 21 MHz CW workable out to W, VE1, NP4, KP4 and PY, but gives no more details.

In four hours in the CQ contest, G6QQ worked all W call areas except W7, in 27 States, out of a total of 67 SSB contacts.

It was 21 MHz SSB, too, for G3BDQ, John making mention of N5CG, K5RX, YC0VM, PY7EG, VE6WK, VE2ZP and VE7DGI; on CW it was a bash through a pile-up to hook R1Z, believed to be up in Murnansk.

Over to G2BON, who offers his SSB contacts with UA0ADO, 5N3RTF, PY2AJK, PT7ACZ, EC9HI, UM8MKF, EC9HR and VP2EC.

Sad to say, GM4CUX couldn't find

enough time to spend on the rig, but he did find the moments needed for TU7I, JY9CL, VU2GI, VK2DLB, JAs, CE3BOC, CO7RM and HR3JJR who has as good an accent as you will ever hear in Sauchiehall Street, according to GM4CUX's ear!

Fifteen for G4BUE was a matter of the CW G-QRP Club Activity Weekend; it began around 1430z with K9PNG and his two watts on the Saturday, running on to a final QSO with KW9N and his five watts. Sunday saw an opening to W that was even better with WA2PIL coming through first, until 'lights out' with KA3FIX at 1900z; in between the Argonaut's five watts managed some 37 two-way QRP QSOs, including the Texas gang Chris and G3RJV met on their trip to Houston last year, like K5BOT, K5NT, W5JQM, K5HGB, N5EM and N5BA. The word that G4BUE was on appeared to have been spread through the local repeater!

Variable, from very good to poor, about sums up the G3NOF reaction to the band; BY1PK was S9 around 0915, and BY4AA around the same time at RS55, but Don couldn't raise them. The short path to Australasia, Asia and Indonesia has opened up from around 0900z right through till 1600z; it starts with the AP and VU chaps, then around 1100 the VK/ZL ops., and YBs up till stop time. Some VS6s were to be heard about 1130, and XU1SS was patronising the DK9KE net on 21157 kHz around 1000. Africans were best between 1500-1900, at which latter time the odd KH6 might be audible. Oddly enough the Americans have been poor, yet at times there all the way from noon to 2000z. SSB contacts were wrapped up with A4XJI, A4XYQ, CT0BI, DU1PLM, DU9AB/1, EL2BB, F6BFN/TT, FG7BG, FG7BZ, FG7CH, FH8CR, FR0FLO, HL9RC, HZ1AB, J37AH, JAs, JW6MY, KG6DX, KH6WU, KK9A/V2A, TG9NX, TR8JLD, TU2NH, VE7DRO/8, VKs, VP2EC, VP2KCA, VP2MKS, VP8KF, VP8MT, VP9IJ, VP9LP, VS6HI, VU2GDG, VU2JAG, VU2REC, W3TB/TF, W6s, W7s, WB3KBZ/VP9, WP4CBB, XU1SS, YC4FRX, YC5QZ, YC0VM, YV0AA, Z21GN, ZC4WW, ZD7BW, ZD9BV, ZD9CC, ZL1AXO, ZL2BND, ZL8BQD, ZS1CT, ZS3BI, ZS4IGF, 3V8PS, 5B4MH, 5H3DH, 5H3EM, 6Y5IC, 7P8CL, 7Q7LW, 9L1SL, 9V1VP and 9U5JB.

### The End

As the story tellers say; well, we too have finished our story of the bands for another month, so now it just remains to mention the deadline for next time is **May 3**, your letters addressed to your scribe, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. In the meantime, why not surprise the mower with a new set of blades?

# An FM Conversion for the Yaesu FT-707 Transceiver, Part 2

RETAINS AM AND AVAILABLE IN KIT-FORM

IAN KEYSER, G3ROO

**T**HERE should now be six screened cables connected to the terminations on the switch PCB, and six unconnected braids. It is necessary to earth all six braids to a suitable point and I soldered them to the rear of the clarifier potentiometer as being the easiest way out!

There is now one final connection to make to the switch PCB terminations and this is to number 20 which is the clarifier line. It is important to locate the correct wire and to ensure that this is done it is worth tracing the wire back from the VFO box plug J4301, pin 4, back to the PCB. Using a 9-inch length of grey wire (to match existing colour code) route this along with the two lengths of screened cable.

Before putting the set back together it is worth while testing to ensure that there are no wiring faults. At least if it works now but not when bolted together we can be pretty sure that we have an earthing problem. Plug in all the PCB plugs and apply power; switch to AM with the 'FIX' switch out. Noise should be heard from the loudspeaker and tuning across the marker signal should indicate its presence by a reduction in the noise output; push the 'FIX' button in and the noise should reduce and the marker signal should not now be audible. By touching the inner of the screened cable that is attached to termination 15 a hum will be audible from the loudspeaker: this is where the FM audio is fed into the audio amplifier. Connect a suitable dummy load to the aerial and press the p-t-t on the microphone, adjust the carrier control until four LEDs are illuminated on the meter, turn the mic. gain to maximum and whistle into the microphone; nothing should happen! Depress the 'FIX' button, so connecting the mic. audio to the modulator, and the LEDs will now indicate modulation. As one final check, connect a pair of phones to the screened lead connected to termination 12, push the 'FIX' button in and press the p-t-t, and audio should be heard from the microphone; this is the signal which is fed to the FM modulator PCB.

## Testing and Setting-Up

Having completed the PCBs and the switch wiring it is time to start connecting and testing. Firstly check that there are no errors or solder bridges on the boards and then connect the PSU control PCB to the Tx and Rx 13.5V terminals on the AVR board of the FT-707, and the control input to J2001/8 on the IF PCB. With the mode switch in the AM position check that there is zero (or very nearly) volts on the output of Q301 and 8 volts (8.5V typical) on the output of Q303. Connect a dummy load to the output of the FT-707, turn the carrier control to zero and push the MOX to place the transceiver into Tx mode. Now check that the situation has reversed on the outputs of Q301 and Q303: there should be 8 volts on the output of Q301 and zero on the output of Q303. Finally check that the output of both transistors is zero in SSB and CW modes on both transmit and receive.

Having checked the correct operation of the control we can connect the output of Q303 to the demodulator PCB and the audio output to the screened cable connected to termination 15. On turning on the power, depending on the setting on R12, a loud hissing should be audible from the loudspeaker. If this is not the case rotate R12 and the hiss should become audible; the correct setting for R12 is the point where the noise just disappears. Now connect the input to the demodulator (termination 5) via a length of small diameter coax cable to the junction of C2049 and R2057 on the IF PCB. Tuning across one of the amateur bands signals will be audible although not readable properly, so now tune to 29.600 MHz and see if there is any activity and peak L1 for best quality audio.

In most electronic circuits there is a thermal drift problem and the squelch circuit of the 3359 is no exception. If the preset squelch is used it is necessary to adjust this over a period of time to ensure that under different temperature conditions the noise does

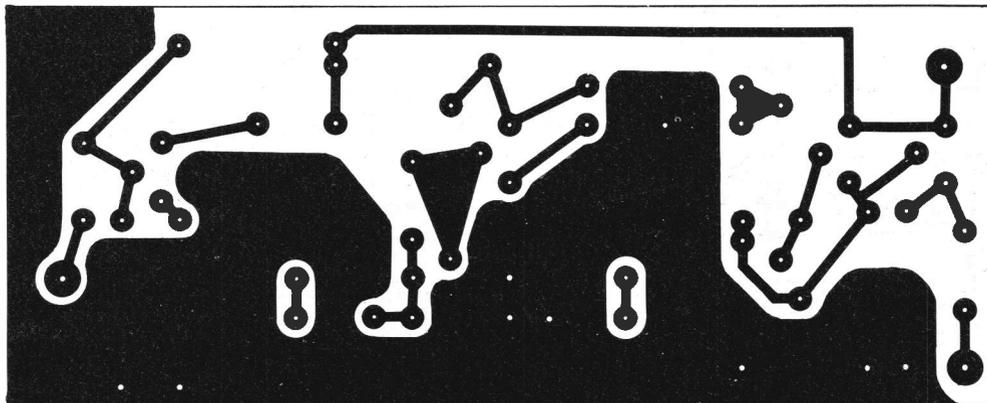


Fig. 6 FM MODULATOR PCB FOIL

Twice full size

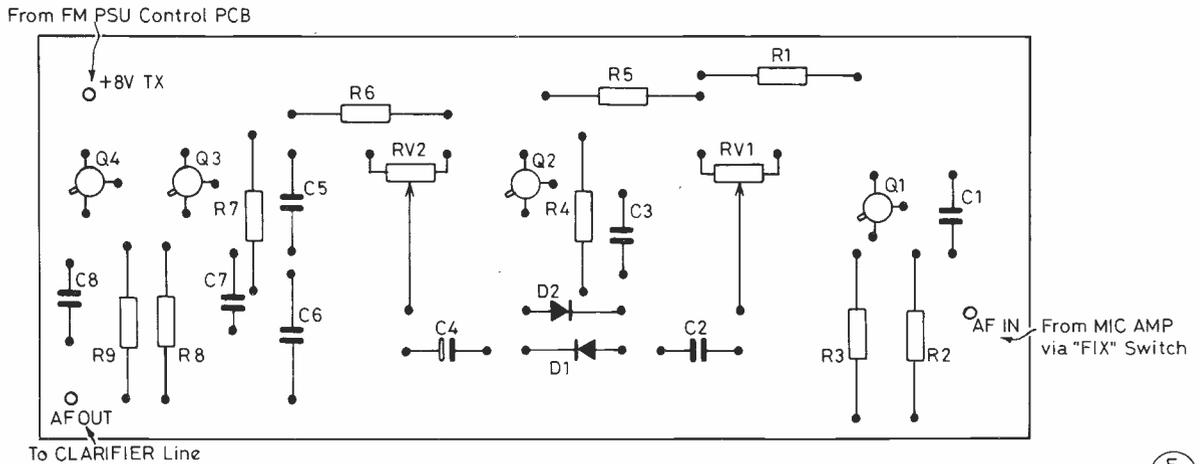


Fig. 7 FM CONVERSION FT-707 MODULATOR COMPONENT LAYOUT

E 210

**FM707 and Modulator PCB in position.**

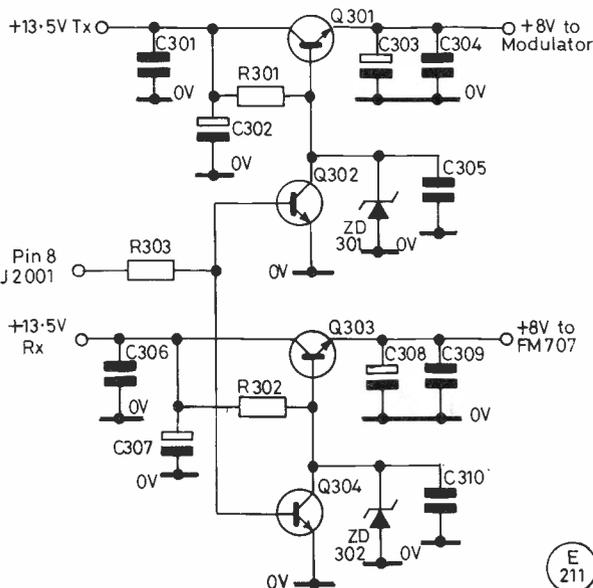
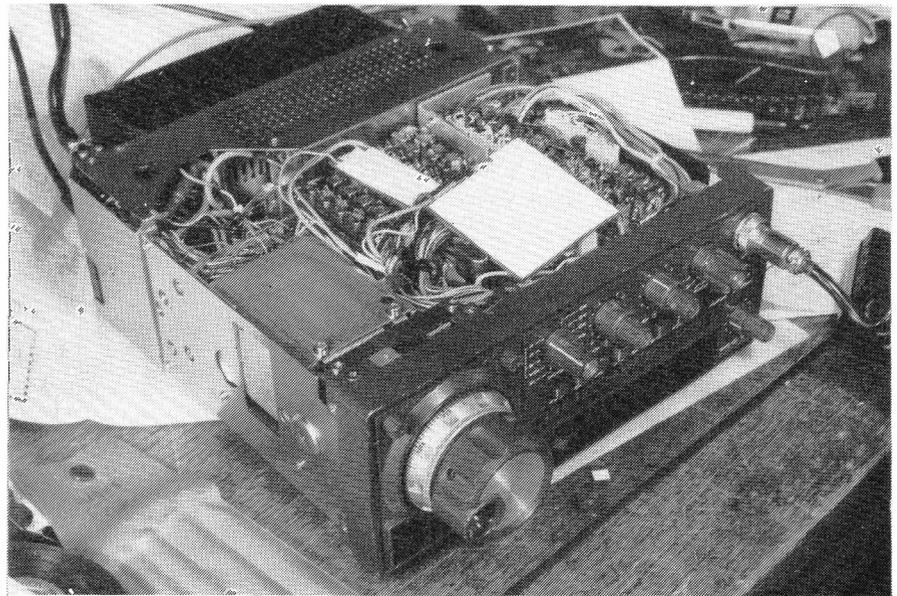


Fig. 8 FM CONVERSION FOR FT-707 PSU CONTROL PCB

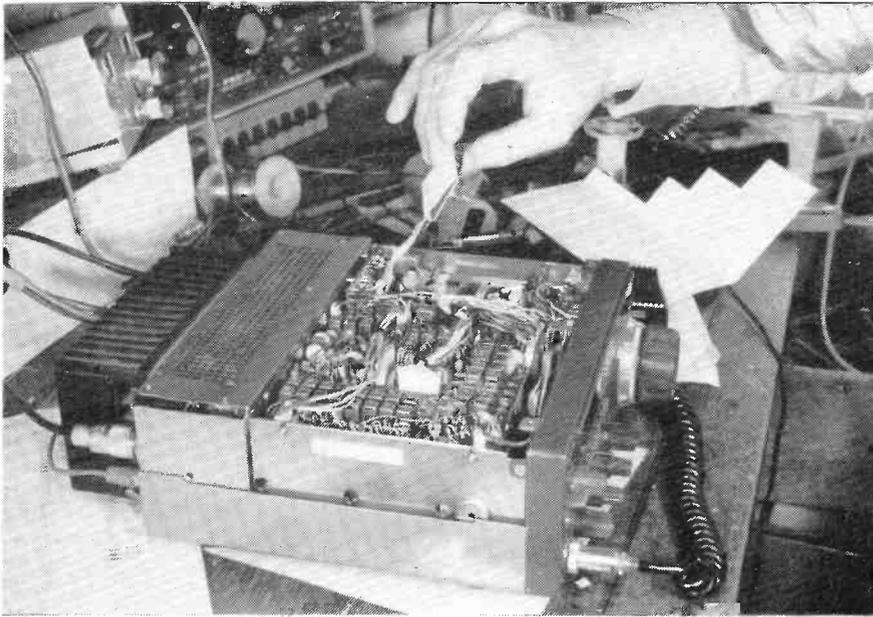
E 211

**Table of Values**  
**Fig. 8**

R301, R302 = 1K, 1/4 W	C302, C303, C307
R303 = 47K, 1/4 W	C308, = 1 μF tant.
C301, C304, C305, C306, C309,	ZD301, ZD302 = 9.1V, 500mW
C310, = 0.01 μF ceramic plate	zener diode
	Q301, to Q304 = BC548 or BC108

disappear. Where the microphone gain control is used as a squelch control set it to the 'one o'clock' position and adjust R12 until the receiver just goes quiet; in this position all usual temperatures can be compensated for.

Now connect the modulator and set RV201 and RV202 to half-track positions and put out a call on 29.600 MHz and hope for a reply; if you're unlucky it will be necessary to arrange a sked with an amateur with Ten FM. Having made contact re-adjust RV201 to full anticlockwise (max.) and adjust RV202 until the other station is happy with the deviation. Again re-adjust RV201 until the other station reports that there is little change in audio level when the microphone is moved from close to the lips to about one



**Insulating the PSU Control PCB.**

Twice full size

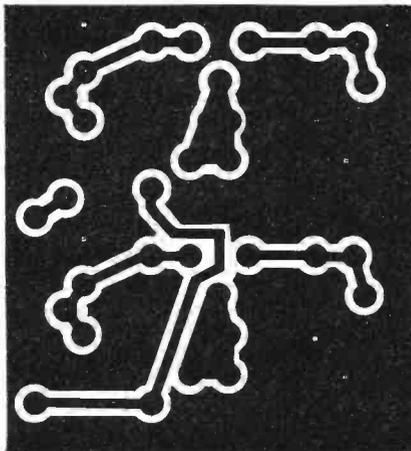


Fig.9 PCB FOIL FOR P.S.U CONTROL PCB

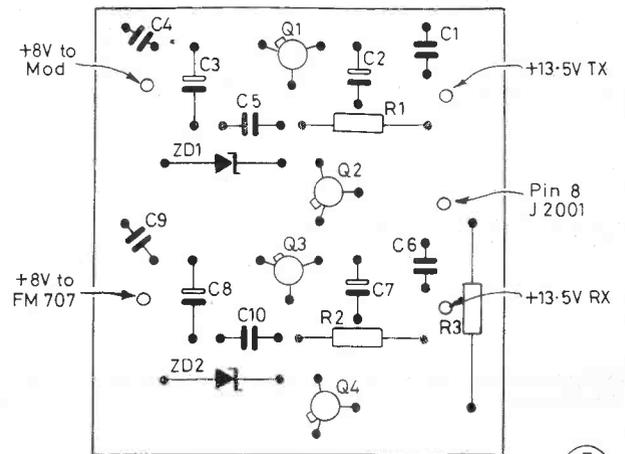
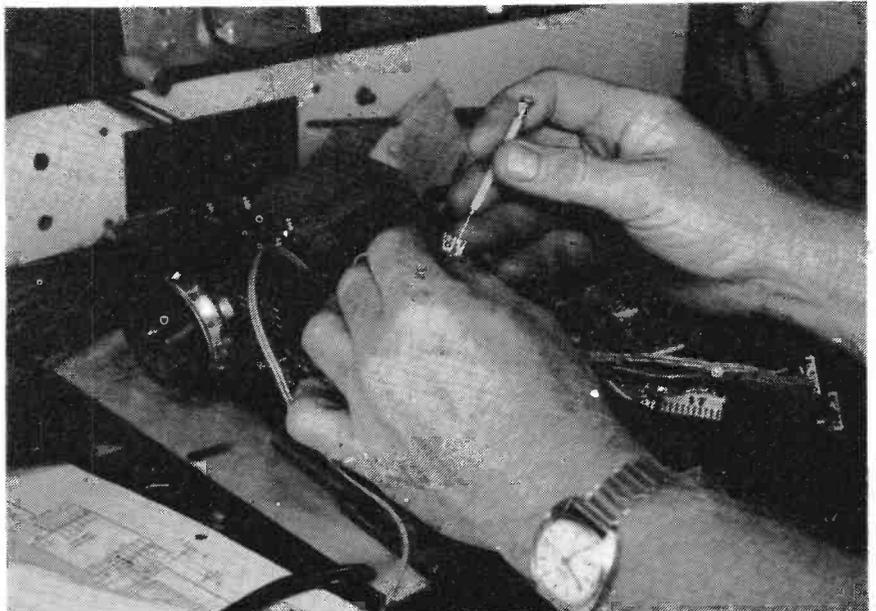


Fig.10 COMPONENT LAYOUT FOR PSU CONTROL PCB

**Removing the connections from the line plugs.**



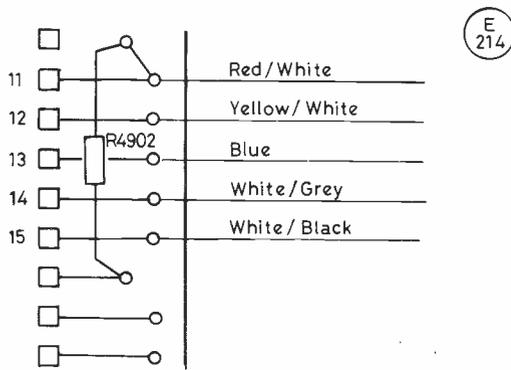


Fig.11 REAR VIEW FT-707 SWITCH PCB (Original connections)

foot away. That completes the setting up of the FM conversion.

It is now only necessary to shorten off the cables to place the PCBs in suitable positions in the set. There is insufficient room to fix the PCBs in place, but the cables themselves hold them securely enough. The FM modulator is positioned upside-down between the two rows of coil cans on the AF PCB, the PSU

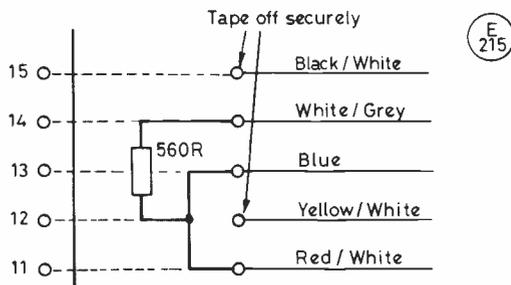


Fig.12 FT-707 FM CONVERSION (Method of hardwiring original wires).

control PCB is situated upside-down above the counter PCB, and the FM demodulator is positioned upside-down above the components of the unused 'FIX' channel facility on the AF PCB; it is necessary to remove TC3005, TC3006 and TC3007 to enable the can of L1 to fit in. The PCBs should then be insulated using a thin piece of card to cover the PCB side of the board and clear book binding plastic sheeting to cover the components.

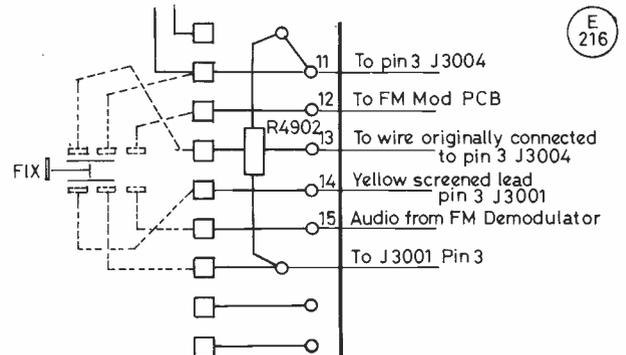


Fig.13 REAR VIEW FT-707 SWITCH PCB (New connections)

### Kits

Timestep Electronics Ltd. in co-operation with *Short Wave Magazine* have agreed to provide a special offer on the kits for this project. The FM-707 discriminator kit will be supplied at £14.00 and a ready-built and tested module at £18.00. The PSU control kit is available at £6.40. All prices include postage and packing and VAT. Timestep Electronics Ltd. are at Egremont Street, Glemsford, Sudbury, Suffolk, their telephone number is 0787-280154.

# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By Justin Cooper

**R**EADING through this latest crop of letters before starting the piece, one was struck by the number of mentions of aerials falling down! Perhaps we should make a few comments on this subject.

Firstly, we can assume that almost everyone reading this uses wire aerials, at HF at least. For wire aerials one has two main problems to contend with, of which the first is the distance between the supports — house and tree, house and mast, mast and mast, and whatever. While houses don't move in the wind (with luck!), masts do slightly, and trees — relatively — a lot, the more so when the wind gets up. Imagine an aerial strung between two trees and a good gale. Maybe at one moment the trees are waving 'in phase', to crib a radio term; the whole aerial moves but apart from a waving feeder, there isn't much problem. Now we have a series of gusts and the trees become 'out of phase' which means

that, at some part of the motion, the aerial span has two choices — extend by six feet or break!

Clearly then, the answer to that is to arrange some sort of variable system which allows the trees to move without affecting the aerial. The usual system is a pulley on the tree branch, and a bucket full of stones on the halyard — don't forget to knock a couple of holes in the bottom to let rainwater drain out!

The second problem is the whole question of joining the feeder wire(s) to the aerial span. Let's look at some of the angles. Firstly we want to keep water out of the feeder; secondly we need the mechanical strength; and thirdly we have the problem of corrosion. The first problem is best dealt with by use of lots of the self-amalgamating rubber tape which can be obtained at some boat chandlers and, rather expensively, as 'radiator hose bandage' in garages. As for the second one, bear in mind that

solder is *not* mechanically strong and the soldered joint must never carry any strain or weight by itself. Thus, the insulator must be so arranged that it takes all stresses and strains off the actual joint. Thirdly, the problem of corrosion — and this is more important than some people think. Apart from the obvious deterioration due to rain, which in city areas or near the sea is in itself corrosive, we have also the problem of dissimilar metals. Electrolytic corrosion results, and this type of action may result in minute electric currents flowing and hence noise in the receiver. All joints therefore must be protected from the atmosphere and inspected at regular intervals. Moving out to the ends of the span, again we must make sure the thing stays up by virtue of mechanical strength alone — and *then* solder, if you must.

Now, what about choosing aerials. Essentially one has the choice between vertical and horizontal aerials; the former is better in terms of long-distance reception, the latter over medium to short ranges. It is usual to find the vertical is a bit more responsive to rain static and to most of the man-made noises, which for some reason are predominantly vertically polarised; verticals need more attention to ground connections, and are not so good as multi-band systems unless one resorts to loading coils or traps. Horizontals really do need height — every extra inch or so upwards helps. If one end-feeds them — hanging the end straight on the aerial terminal of the receiver or tuning unit — then again one must do a lot of work on the ground, improving the earth connection, and if possible operating such an aerial with the help of a tuning unit to 'peak up' the aerial on any chosen frequency.

Summing up then, aerials should *not* fall down in the first strong wind. If you are in an exposed spot you will need to take extra precautions. Don't forget that if the top of the pole is higher than the house, then the top is in any case *much* more exposed. Make arrangements so the whole lot can be dropped for at least an annual inspection with reasonable ease, even if the masts stay up.

### The Letters

*B. F. Hughes (Harvington)* was one of those having aerial problems. At his previous home in Worcester he never lost an aerial; not a bad record for 22 years. However, in the short time at his new address, the receiving aerials have been down five times, and while penning his letter the TV aerial fell off its mast! It has to be said that Bernard is right "in the clear" for winds to get at him, being 460 feet above sea level and with no shelter.

The next one on the pile is a familiar name who hasn't reported in for a decade or more — *Norman Henbrey*. Although he doesn't say so, we understand he is still at *Northiam*. This time, Norman has not only re-entered the Phone ATPW list at 1123, but he has also put in a starter for the RTTY list, which will please at least two other readers!

On to *S. Clark (Birmingham)*, who is a bit puzzled by the wording of Rule 10. It seems clear enough to us; all we want to do is to stop a proliferation of mini-tables of all-AM, all-SSB, or all-FM to be kept up, separate from the main any-mode-of-Phone list. If your personal list happens to be all SSB, then no matter — it's a valid entry for the Phone-Only section. Since we happen to know Stan can handsomely reach the All-Time list, we now await developments. On a totally different line, Stan wants to know if anyone has seen an article on the half-size G5RV aerial. Your old J.C. rather doubts if there has been one, since it only involves 'scaling' all the dimensions. Thus instead of two 51-ft. legs up aloft, you have two 25' 6" pieces poking out of the insulator in the centre. The open-wire down-lead now becomes not 34-ft. but 17 feet long to the low-impedance twin or coaxial feeder. If one insists on using 300-ohm ribbon for this bit the dimension of 17 feet becomes 14' 9". The half-size G5RV is just a special case of the centre-fed Zepp. The full size one is optimised for 14 MHz, and works acceptably on 80-10m. as it is, plus 160m. if one is game to strap the feeders and tune it against earth by way of an ATU. The half-sized version, the argument goes, will work on 7-28 MHz acceptably, and on 3.5 and 1.8 MHz as a Marconi fed against ground after a fashion. On the latter two bands, adequate operation is very much a function of the earth connection quality.

It must be realised that the G5RV in either form is a *compromise*, but at least it gives multi-band operation without too much trauma if you have an ATU down below for the lowest band. Alternatively, of course, you can use it with *any* length of open-wire feeder or ribbon and an ATU at the bottom. Either way, if you use ribbon you will almost certainly have trouble with the tuning altering in wet weather. Open-wire feeder is best, or if you must use ribbon turn it into open-wire feeder by cutting away as much of the 'web' as you can, leaving just enough to keep the wires roughly in place. You will now have an open-wire feeder so use the 34-ft. or 17-ft. dimension; and you will find, as an incidental profit, that the feeder doesn't cavort about so much in the wind!

*Stephen Baker (Cwmbran)* must be the youngest ever entrant to the lists — he is just 7 years old; father does the entry for him — father being GW6VZW, Paul Baker, an entrant to this piece in the days before your conductor became involved. The receiver Stephen uses is a JR-310, fed through an ATU to a five-band trapped vertical, and this combination has obviously done well, with some very interesting DX gleaned over some 18 months. Obviously, another GW in the making!

We turn now to *Mrs. T. Parry (Blackpool)* who has been somewhat occupied in other directions and so has not been very 'radio active'. However, all is not lost — there is now a 19-element Tonna for 432 MHz up aloft to replace "the rubbish that was there originally" — we suspect that might be a reference to a home-brew aerial! Tina says that if anyone wants an address from her copy the *DX Listings*, a letter enclosing an s.a.e. to her will produce a reply — she's not on the phone; her address is 42 Convent Crescent, Blackpool, Lancs. FY3 7QF.

*M. R. Warburton (Anstey)* is still using the 9R-59DS more than the youngster for whom it was bought, and a comparison with other listeners indicates to Martin that it is doing as well as many a more modern receiver on Eighty — which is where he listens most of the time.

On to *A. J. Hall (Lockington)* — we shall have to get used to the idea of him not being at Alvaston any more! So far there hasn't been time for radio listening from the new QTH and we guess the cold weather doesn't encourage one to go out and hang up aerials. On a differing line, Tony reckons we should have some more on the very basics of listening pure-and-simple in the *Magazine*; and like lots of others he wants to see "SWL" every month.

*J. Goodrick (Newport, I.o.W.)* has some very hard words to say about receiver-makers who put in wide filters for AM phone but omit CW filters; and some choice words too for the increasing habit on CW of not sending one's call-sign at the end of a QSO. As he rightly says, it's against the licence conditions, and it wastes much time for the listener. To old J.C. it brands the operator as a bit of a 'lid' anyway — he won't know what he could have missed by way of a tail-end call from a DX station.

Just a list this time from *N. Askew (Coventry)* to take his score up to 1304.

*D. B. Shapiro (Prestwick)* is now G1EIB and still doing lots of SWL-ing. He has also operated a Class-A station under supervision in accordance with the licence and this has made him doubly determined to get that Morse under his belt as soon as possible. Keep up the good work! And, of course, we are all in

## ANNUAL HPX LADDER

### Starting date, January 1, 1984

SWL	PREFIXES		
A. J. Chapman (Newark)	413	N. Fox (Wakefield)	248
A. Woods (Norwich)	395	M. R. Warburton (Leicester)	244
C. Burrells (Stevenage)	352	P. A. Cardwell (Sheffield)	211

Minimum of 200 prefixes to have been heard since January 1, 1984, in accordance with HPX Rules — see March issue p. 25. At score 500, transfer to the All-Time Table is automatic.

## HPX LADDER (All Time Post War)

SWL	PHONE ONLY	PREFIXES	
B. Hughes (Harvington)	2804	A. Chadwick (Bury)	724
Mrs. R. Smith (Nuneaton)	2376	G. Shipton (Rye)	691
E. W. Robinson (Bury St. Edmunds)	2250	G. A. Carmichael (Lincoln)	689
H. M. Graham (Chesham)	1685	B. Patchett (Sheffield)	662
Mrs. T. Parry (Blackpool)	1560	R. Wooden (Staines)	652
M. Rodgers (Harwood)	1425	S. Baker (Cwmbran)	645
M. G. Toms (Rayleigh)	1418	T. Morris (Headingley)	626
N. Askew (Coventry)	1304	A. J. Hall (Alvaston)	624
N. E. Jennings (Rye)	1301	A. Pilkington (Chesterfield)	534
R. Fox (Northampton)	1230	S. J. Bedford (Wakefield)	522
D. B. Shapiro (Manchester)	1200		
H. Bale (Cardiff)	1186	CW ONLY	
A. Pyne (Bradford)	1179	E. B. Ward (Ruddington)	1811
R. Everitt (Bluntisham)	1143	J. Goodrick (I.o.W.)	1607
N. Hembrey (Northiam)	1123	A. F. Roberts (Kidderminster)	1293
Mrs. J. Charles (Colchester)	983	R. Fox (Northampton)	433
P. Lincoln (Aldershot)	874		
I. F. Thorpe (Bracknell)	813	RTTY ONLY	
E. M. Gauci (Sliema, Malta)	768	N. E. Jennings (Rye)	568
P. Oliver (Paisley)	766	P. Lincoln (Aldershot)	440
J. Heath (St. Ives, Hunts)	741	J. Routledge (Hartlepool)	206
		N. Hembrey (Northiam)	204

Minimum score for entry: 500 for Phone, 200 for CW or RTTY. Listings to be in accordance with HPX Rules, see p. 25 March issue.

favour of the newly-licensed continuing to be SWLs — it is often said that the onlooker sees more of the game and it seems to us that the best way to avoid bad operating is to be an SWL and hear the results!

On to *A. F. Roberts (Kidderminster)* who didn't find much to report upon until he took pen to paper, at which moment Ten was wide open and giving new prefixes!

Another one who is a little short of time for listening is *Mrs. R. Smith (Nuneaton)*. Of course in her position in the Table you have to be fairly lucky to switch the receiver on and immediately find a new one!

One of our really competitive readers is *G. Carmichael (Lincoln)*, and so far his limited spare time for SWL in 1984 has been very fruitful; Gordon has collected the Yeovil Amateur Radio Club Award and the Luxembourg 'European Community' one too, not to mention lots of good DX heard on Eighty where the countries score has gone up to sixty-odd now. The main object of the moment is to kick the HPX score up to the 1000-plus mark!

Turning to *T. Morris (Headingley)*, the big news is that Tom has been told he has passed the Morse test, so a full 'A' call should be operational before the next time — congratulations! Tom has enjoyed his SWL time, and says how much he has learned by listening — we couldn't agree more!

*E. W. Robinson (Bury St. Edmunds)* has been so fed up with conditions that for much of the time the EA-12 has been switched off and the Eddystone 940 has been providing broadcast-listening facilities by way of a change. OM Robinson noted the remarks by R. Wooden last time regarding his 'dead' Eddystone 730/4, but says he got considerable help with his problems with an 888A from Eddystone some three years ago, so he thinks J. C. was being a bit pessimistic when he doubted their ability to help.

That seems as good a spot as any to bring in the query from *R. J. Swann (Hyde)*, who wants to get hold of a copy of the EC-10

manual, and thus Eddystone's address. Eddystone became part of G.E.C. many years ago, and we believe that the part of G.E.C. that looks after communications equipment is in fact Marconi at Chelmsford. There is also said to be a company in Liverpool which handles such things as elderly receivers — does anyone know of this company?

### Contacts

We had a telephone call from a *Mr. Brody of Plymouth* who would like to get in touch with R. Stone of Plymouth who wrote in to "CDXN" — February 1984 issue, page 636. If SWL Stone reads this will he please ring Mr. Brody — the telephone number is Plymouth (0752) 333253.

*N. Jennings (Rye)* would like to see something of SWL interest every month, but otherwise he likes the 'mixture as before'. He says, and we agree with him, that ISWL is the only group for SWLs, so he continues "why aren't their details present in the *Clubs Roundup* feature each month?" That's an easy one to answer . . . because they never report. It is a standing rule that our Club Secretary will only continue to mention clubs which provide regular updates, otherwise the whole feature could become outdated — we know of clubs in his card-index system from which there hasn't been a cheep for ten years or more. As for ISWL, they have never reported as a club!

*E. M. Gauci (Sliema, Malta)* next, and Eddie has a query about a suffix such as, for instance, G4ZZZ/ST2; this is covered by Rule 3 — see p. 25, March issue — and is clearly an ST2 under this Rule. Likewise G8GRN/5X who appears in Eddie's list, counts as a 5X8 under this same Rule.

Now we come to the two letters from *I. F. Thorpe (Bracknell)* who wonders whether the VU7 stations are now gone, he having been unfortunate enough to have missed them. By and large, Ian reckons conditions have been a bit better this year, albeit a lot of noise has also been in evidence. An interesting logging from the second list was U5ARTEK near Yalta — this station has been around for years but not very active of late.

Now a letter from someone signing 'Mick' from *Rayleigh* — we suspect *Mike Toms* might be the writer! The new QTH is about 200 feet above sea level and has a garden long enough for a Top Band quarter-wave which has already served to hear 22 countries on Top Band, including VK6HD, and a revised HPX entry appears in the Ladder — but we hope to receive some 'confirmation of ownership' for next time!

*P. A. Cardwell (Sheffield)* didn't notice the HPX Rules in the March issue, as he asked for a copy in his letter — shoot that man! As for a list of the books we carry in stock, these are advertised in every issue; the main listing is usually on the back cover, as it was in the March issue. However, SWL Cardwell seems to have a valid claim for 211 prefixes; he queries two others, namely T6DWP and AM2FS, both of which we feel are duds.

*W. G. Shipton (Rye)* sent in his list with just one comment — "still plodding on!"

As usual, a long interesting letter from *H. M. Graham (Chesham)* who reports that he was grabbed for a talk on HPX by the Chesham club at the end of February; somewhat to Maurice's surprise it went off very well, the members seeming to be much more interested in the SWL end of the hobby than he had anticipated. To his horror, Maurice found his station featured on the cover of the club magazine, along with threats of R.A.E. studies — but we think Maurice enjoyed the experience, for all that! Turning to the log it is interesting to notice how, on Ten, one has to be 'on the spot' — mostly the openings were of less than thirty minutes in mid-afternoon.

A. Pilkington (*Chesterfield*) is obviously into computing — he reckons that by next time he should have joined the growing band of readers who use a computer print-out as their HPX entry — all at the touch of a button.

Happy entry this time from E. B. Ward (*Ruddington*), who brought home the bacon handsomely in the R.A.E. results; a Distinction and Credit wasn't as good as he'd aimed for but a darned sight better than he'd expected. . . . Congratulations! Now of course there is the Morse test, booked at Humber Radio on April 26 — but in the meantime there is still the 2000 barrier to break! During a visit to the local emporium, Barry met a local 'white stick' operator — Jeff Twells — who was buying an FRG-7; the owner of the shop suggested that Barry was the guy who 'knew about' using FRG-7s and so there is yet another interest — initiating Jeff into the Sublime Mysteries of Propagation, and even Morse! A light pen, held against the 'MHz' LED on the FRG-7 enables Jeff, after making allowances for the spurious indications, to start logging and know where he is on the bands, and Barry will transcribe the log from tape on the paper for an HPX entry when the time comes. Meanwhile, Barry has to think hard about a rig. . . .

A brief note this time from P. Oliver (*Paisley*) who had to rush his latest list into the post and shoot away to finish some of the season's curling matches before time runs out.

A. P. Lincoln (*Aldershot*) seems to have been quite active, but hasn't been bagging much new on RTTY; he does however mention the Friday RTTY bulletins from ARRL on 14.190, 21.190 and 28.190 MHz around 1600. They start on 45 baud RTTY, then go on to ASCII at 110 baud, and finally AMTOR, with various notes as to what's going on.

J. Heath (*St. Ives*) found conditions picking up on the HF bands in the week or so prior to his letter, and cites in particular the weekend March 3/4 — of course, 'band conditions' do seem to perk up when there is all the activity of a world-wide contest to show the form. The point here is that a big world-wide contest weekend will bring on activity, and it is by the presence of activity that we measure band conditions subjectively. If the band is in fact wide open world-wide and no one is operating in an area where the skip will reach our aerials, then we promptly assume the band is dead. . . . The answer is in the operating practice, particularly on 21 and 28 MHz, of putting out a speculative CQ call to see what it will scare up.

C. Burrells (*Stevenage*) is making progress towards the 500 — Charlie says that being retired he has time for many things such as "doing nothing and taking all day over it!" However, while Charlie likes the SWL piece as it is, he clearly doesn't go much on the new cover style!

Gardening and car repairs have occupied much of the time of A. J. Chapman (*Newark*) but some intensive listening was done in January and February, and some early-morning sessions in March proved worth-while. A lift of almost 100% in the HPX score seems to say the gardening and the car repairs weren't all that time-consuming!

Finally, a warm welcome to new contributor J. Routledge (*Hartlepool*). His first entry is into the RTTY section, and he has an Icom IC-R70 and a Telereader CWR670E RTTY converter, with a Datong active aerial at the sharp end.

### Changes

Almost everyone seems to want to keep the piece in its present style, and almost everyone wants it to be monthly. The latter presents problems, as we've mentioned before — but we'll think about it. As for style, perhaps we won't make too many changes just yet!

### Finis

That's the lot for this time; the deadline for next time looks like May 17 to arrive, your letters addressed to your scribe, "SWL," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, take care and good hunting.

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# • • • "Practically Yours" • • •

with GLEN ROSS, G8MWR

## An RF Powermeter

**M**OST people like to keep an eye on the power output of the rig but few amateurs have a reliable way of making the measurement, mainly due to the price of commercial meters. This month we describe a small meter which will measure up to 15 watts. It is usable to 450 MHz and, with reduced accuracy, on 1296 MHz.

### The Theory

If the output from your transmitter is fed into a "dummy load" then an RF voltage is developed across the load which is proportional to the amount of RF. All we need do is to rectify the RF and measure it. We can then do the calculations and calibrate the meter to read power out.

### The Snag

There had to be one! Fortunately it can be easily overcome. To make the measurement with any degree of accuracy means that we need a purely resistive load. Now this is fairly easy to achieve on the HF bands but as we go higher in frequency the effect of leads and stray capacity becomes more important and steps must be taken to eliminate them.

### How Does it Work?

The circuit diagram is shown in Fig. 1. The resistors R1-R6 form the dummy load. We use six 330-ohm 2-watt resistors in parallel to provide a total resistance of 55 ohms with a power rating of 12 watts; levels above this can be applied for short periods with no problems. 55 ohms is a bit high for the 50 ohms we were hoping for, but this is taken care of in the next part of the design. We need to rectify the RF voltage and this is done by D1. However, if this were connected straight across the load it would provide undesirable loading effects. To eliminate these the diode is fed via the resistors R7, R8. These not only isolate the diode from the load but, because they are in parallel with the load, its effective value is reduced to very close to the 50 ohms we want. R9 provides a load for the rectified voltage to be developed across, and C1 removes any stray RF from the output of the unit.

### The Readout

- This can be achieved in two ways,
- (A) The shack multimeter can be connected to the output.
- (B) An inexpensive meter can be built in.

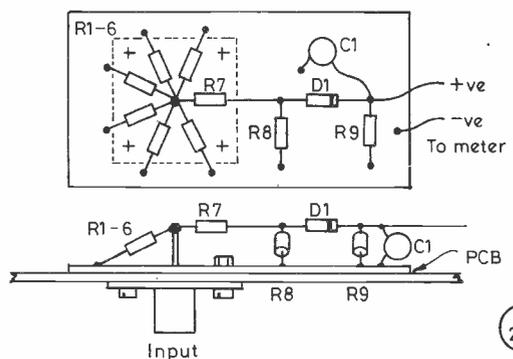
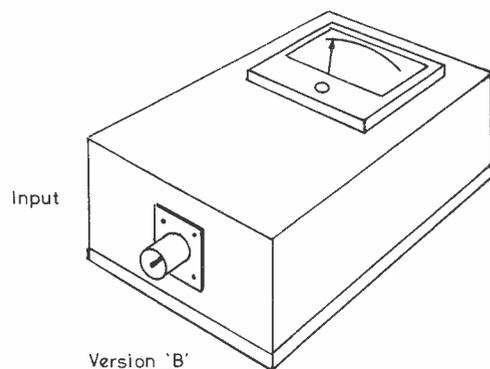
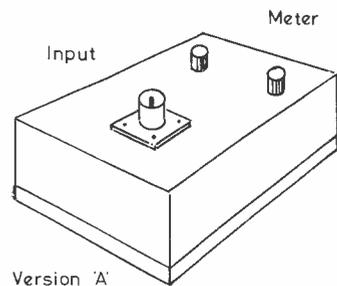
If you decide on option 'A' mount a suitable pair of terminals on the box and the job is complete. If you use option 'B' then, referring to the circuit diagram, M1 is the meter and R10 sets the range. The meter can be anything from 100 microamps to 1 milliamp full scale, and suitable values for R10 are given in the component listing.

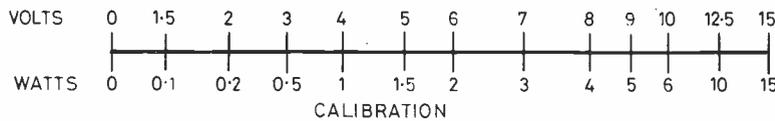
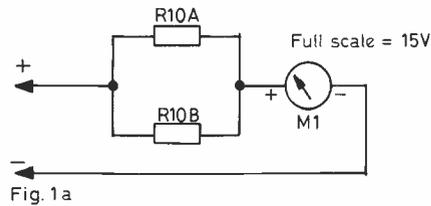
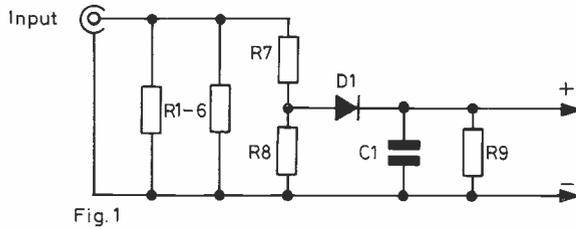
### Building the Beast

If you are building version 'A' the whole thing will fit into a small die-cast box (approximately 4 x 1 x 1 in.); for version 'B' go

**Table of Values**  
**Fig. 1**

R1 to R6 = 330R, 2 watt	If M1 = 100 $\mu$ A,
R7 = 220R, 1 watt	R10A = 270K
R8 = 180R, 1 watt	R10B = 330K
R9 = 4K7, 1/2 watt	If M1 = 500 $\mu$ A,
C1 = 1 nF disc	R10A = 39K
D1 = OA81	R10B = 120K
	If M1 = 1 mA,
	R10A = 27K
	R10B = 33K





E  
254

up a size (4 x 2 x 2 in.). The only critical part of the construction is the dummy load. When the input socket is mounted on the box fit a piece of PCB material under the fixing nuts and solder the nuts to the board. The six 330-ohm resistors are then connected from the centre pin of the connector to the PCB using the *shortest possible* leads. Next connect R7, R8 then D1 and C1, again using the shortest lead length possible. The higher in frequency you

want the meter to be usable the more important short lead lengths become. Get out the soldering iron, and an RF powermeter is practically yours.

*We welcome ideas from readers as to what they would like to see described in this feature.*

## Book Reviews . . .

**T**HESE days, few of us have enough time to do much practical construction work. Only a tiny proportion of radio amateurs build complicated equipment from scratch, but quite a few do make useful accessories. In its publication **Weekend Projects for the Radio Amateur**, the ARRL has collected together a number of simple projects that can be completed during a few hours. The six chapters are Receiving, Transmitting, Test Equipment, Accessories, Power Supply and Miscellaneous. In its 53 pages of actual text, no less than 34 projects are described. These range from receiver preamplifiers for HF and UHF bands, QRP transmitters built onto fish tins, a sweep generator for FM radio alignment, a "handie-talkie" power supply to delayed action braking for the Ham-M series of antenna rotators. Something for everyone here, so well recommended at £3.05 including postage and packing.

**J**UST published by the ARRL is a much larger volume entitled **The Satellite Experimenter's Handbook** by Martin Davidoff, K2UBC. The author has divided the book into three parts, the first of which, "Introduction", comprises three chapters which cover from the dawn of the space age, through *Oscar-1*, the various Soviet amateur satellites to *Oscar-10*, with a reference to future projects.

The second part, "Fundamentals", consisting of four chapters, takes the reader right through from the "how do I get started?" phase to the actual use of satellites. The basics of tracking are dealt with very clearly describing the use of polar projection maps with overlays, sometimes referred to as *Oscarlocators*. Chapter 6, "Antennas", makes fascinating reading and includes antenna types rarely mentioned for circular polarisation, such as the Lindenblad, Quadrifilar helix and TR, or Turnstile Reflector concepts.

The third part, comprising six chapters, is entitled, "For the Advanced Radio Amateur". The first chapter in this section, actually no. 8, deals with satellite orbits and is an excellent

exposition of the subject, including numerous examples of the mathematical calculations. The following chapter on tracking topics discusses the various map-based methods of satellite tracking using different map projections. While reference is made to computer-based tracking, no programs for this are included as they tend to be rather long and not universally applicable due to 'language' problems.

Chapter 10 on satellite radio links deals extensively with Doppler effects, Faraday rotation and other unusual propagation effects. It includes a power budget calculation for a Phase 3 satellite, like *Oscar-10*, all very clearly explained step-by-step. The next chapter covers non-amateur satellites such as the various weather, TV relay, TV direct-broadcast and scientific ones. Chapter 12 is devoted to satellite systems and describes the beacons, telemetry, codestore, synthesised speech aspects as well as the more obvious transponding facilities. It includes data about attitude control and guidance and there is a small map showing the main Soviet and Western launch sites. The 13th chapter comprises notes and advice for groups contemplating building their own satellite.

There are four Appendices, the first of which gives technical details of *A-O-8* (now defunct), *UOSAT-1*, *A-O-10* and the Soviet *RS* series, including telemetry information. Appendix B covers practical tracking aids for the various orbiters, including the NASA Space Shuttle. Appendix C is a one-page one, listing various conversion factors and constants used in calculations, while Appendix D is of no interest to non-U.S. amateurs. A glossary of terms and an index complete this book, the back cover of which contains a fold-out of a polar projection map for use with overlays.

This is a really first class book, expertly written and very easy to read and understand. The author's chatty style avoids much of the waffle that sometimes puts off newcomers to this fascinating aspect of our hobby. This 208 page, A4 book is unreservedly recommended at £8.45 including postage and packing.

Both books are now available from The Publications Dept. SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

N.A.S.F.

# Basics for the SWL and R.A.E. Candidate, Part 15

## SUGAR-COATED THEORY

**O**UR last discussion centred on receivers and some circuits. It is now time for us to try and define just what is required from a good receiver.

Perhaps the first term we should mention is 'spurious response'. If we take our receiver, and load the input with a fifty-ohm resistor as a substitute for an aerial, then we can spin the dial from end to end of each range, and if it is a superhet receiver, we will find at various points upon the dial tunable whistles, their size varying from so small as to be inaudible to large enough to crack up an S-meter needle to S9 or higher. Each of these 'birdies' is a spurious response within the receiver, and arises because we have two oscillators — the local oscillator for the mixer and BFO (or it maybe called CIO for 'carrier injection oscillator'). What is happening is simply this: the oscillator signals are leaking out from where they belong and coming together in some stage where they can be mixed; and the results of the mixing will be as we discussed last time around. If the receiver is a 'double superhet' in which there are two IFs, then we have three oscillators, and the problem is much worse. However, by calculation of the mixer products we can, in practice, so arrange things that over a small band there are no significant tunable whistles. However, the wider the band we try to cover, the more it becomes inevitable that there are possible combinations of any two of the oscillators which will beat to give us spurious responses. Note again, these are *all* internal to the receiver.

A second class of spurious response arises in a superhet receiver, involving the reception of signals to which the receiver has not been consciously tuned. These are known as 'images' or 'second channel interference'. The way of it is thus: imagine a receiver having its dial tuned to, say, 1 MHz. Let its IF be 500 kHz, so that its local oscillator is tuned to 1.5 MHz. Now, imagine a big fat Top Band signal on 2 MHz appears on the aerial. Although the tuned circuit at the front of the receiver is nominally at 1 MHz, it is of low 'Q' because of the damping of the aerial which we will assume is 50 ohms. Thus, the 2 MHz signal rides in to the receiver, and can get to the input of the first mixer in significant strength. There is beats with the local oscillator, and the difference frequency comes out of the mixer at 500 kHz. The wanted 1 MHz signal and the unwanted 2 MHz signal have both, therefore, been turned into a 500 kHz signal at the input to the IF — and now all the selectivity in the world won't separate them!

The answers to this are not too easy; if we make the first IF a higher frequency we ease the problem of the image, as the tuned circuit can do a more effective job despite its low 'Q'; and of course we can use a tuned aerial, such as a dipole, and also an ATU, to reduce the unwanted image as much as we may before it even sees the receiver. With a double-superhet there is another frequency at risk, and that is the image frequency due to the second IF — this one is equally vulnerable if there is any chance of a signal at this frequency riding through the front-end of the receiver; but it doesn't often get mentioned in the reference books.

'Break-through' is, unlike all the others so far mentioned, not tunable as such; imagine a receiver with a 1.6 MHz IF, tuned to the

lower end of Top Band. Now let a big signal at 1.6 MHz from a broadcaster, say, be present on the aerial. This may well be able to 'leak' through the front-end unchanged, and then nothing at all can get rid of it and the receiver is useless until a suitable modification is made, or a change of band made to somewhere where the front-end will reject the 1.6 MHz signal. This break-through problem may be a nuisance if you are using a converter to listen to a band for which the receiver wasn't originally designed.

Modern receivers have synthesizers to generate the first local oscillator signal, and often have counters to give a digital frequency read-out. These two facilities *always* result in a multitude of unwanted spurious signals; so many, indeed, that the usual result is a loss of sensitivity, as the weakest signals are just lost under the wideband noise which is the summation of all the

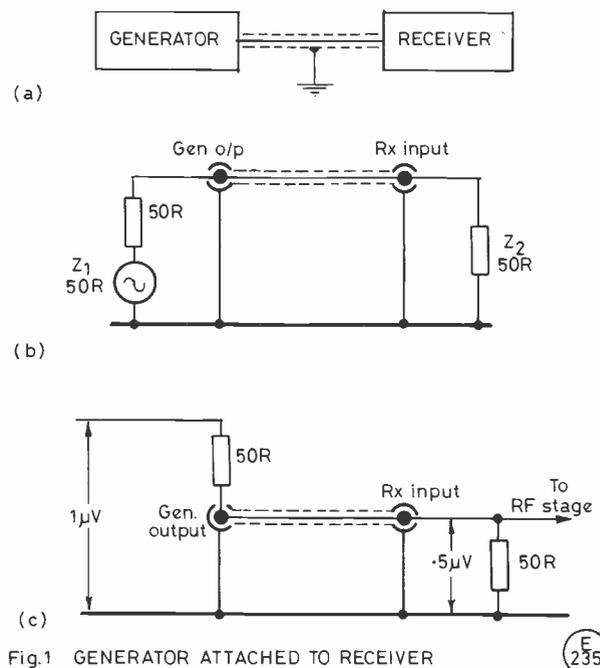


Fig.1 GENERATOR ATTACHED TO RECEIVER

(E 235)

In Fig. 1(a) we see the physical connections of the generator and receiver. Fig. 1(b) shows that the generator has an output impedance of 50 ohms. Turning, to Fig. 1(c) we can see that an e.m.f. from the generator of  $1\mu\text{V}$  results in a potential difference of  $0.5\mu\text{V}$  appearing across the 50 ohms of the receiver input impedance. Thus, when talking about the sensitivity of a receiver in these terms it is necessary to specify what we mean — the statement " $1\mu\text{V}$  e.m.f." makes it clear that we are talking about the generator's output, which results in  $0.5\mu\text{V}$  p.d. appearing across the receiver input circuit.

synthesizer and counter spurious outputs. This is inevitable with any device having digital circuitry embodied; on the lower HF bands it may not be too important if the receiver is well designed as to its internal screening and filtering, but at VHF it can be an unmitigated pain in the neck. However, it is at least fashionable!

Next we must discuss dynamic range — and one could write a whole paper on the subject. In essence, the dynamic range of a receiver may be defined as the difference in decibels between the minimum discernable signal (MDS) and the level of one of two identical signals which will cause distortion products to appear above the noise floor of the receiver. The 'noise floor' is the level of noise of the receiver under normal conditions, so obviously any distortion products below this level are unheard even if they exist. This is a rather important definition because it represents the case of the rare DX you are straining your ears to hear, sitting alongside a real Big Gun. Obviously the Big Gun could be a bit bigger than this before he swamped our rare DX, but not much at all. In general, until about 1980, valve receivers were better than solid-state ones, but then people got to realising just how important it is, and things are now much better in modern receivers — some of 'em, anyway! But there are still some very expensive receivers about which are plain *awful* in this department.

Sensitivity now — this is simply the size of the minimum discernable signal measured at the input terminals of the receiver. Easy enough, but there's a catch. The blurb sheet says, for example "1  $\mu\text{V}$  sensitivity at X MHz" — an utterly meaningless statement. Consider Fig. 1. Here we see a 50-ohm output impedance signal generator looking into a receiver having 50 ohms input impedance. If there is 1  $\mu\text{V}$  e.m.f. (electro-motive force) at the generator terminals, then the potential difference across the receiver's 50 ohms is only 0.5  $\mu\text{V}$ . Dear old Ohm's Law again! So — we should say either "1  $\mu\text{V}$  e.m.f." or "1  $\mu\text{V}$  p.d." if the statement is to have any meaning. A good receiver should be able to see a signal of less than 1  $\mu\text{V}$  p.d. on the HF bands, but must better doesn't matter save at VHF. In fact with a 1  $\mu\text{V}$  p.d. sensitivity on Ten you won't miss much.

### Other Requirements

Now we come to the relatively minor points. Selectivity is definable as the ability to separate two signals close to each other — and a lot of the selectivity in practice resides in the skill of the operator's brainbox! However, we can measure it by defining the bandwidth across the top of the IF filter and the steepness of the sides of the IF. For SSB we want about 2.5kHz across the 'nose', falling away sharply to about 4 kHz wide at 60dB down the sides. For AM, the figure would be about 9 kHz for broadcast reception, but practically somewhat less. FM needs something like AM on the amateur bands, although the FM broadcasters need nearer 100 kHz: On CW, the position is that 250 Hz is about as narrow as one would like, and 400 Hz suits many. Narrower than these and one gets into trouble in two ways: firstly one is liable to tune right over a signal without ever noticing him if you are not very careful, and secondly there are still people on the air with chirpy signals, and these may be wide enough that half of each dot or dash disappears off the side of the filter, making it very difficult to copy. Some people just use the SSB bandwidth, and rely on the good old 'crystal filter ears' to sort it all out.

Sometimes confused with selectivity is bandspread, or perhaps more exactly, tuning rate. If our tuning dial goes 100 kHz up the band for one turn of the knob, it's too fast for comfort; 10 kHz per turn is much nicer. The snag of course comes when you have a good tuning rate and then want to shoot up the other end of the band — with a good tuning rate you end up with cramp trying to get to the other end of the band. On the Eddystone 898 dial, so much beloved of the home-brewers, the solution was to fit the dial with a flywheel, so you could spin it from one end to t'other with one good hard flick; but no modern receiver, sad to say, has anything as good. So — the tuning rate is a compromise and the only way to decide is to try the receiver.

Now to stability; what we as amateurs want is not so much that



The new Panasonic RF-B600LBE portable communications receiver incorporates PLL and a microcomputer multi-tuning system, with FM/LW/MW/SW coverage. This synthesized receiver has many other advanced features and a price-tag of £444.50. For more information contact *Panasonic U.K. Ltd.* on Slough (0753) 34522.

the receiver should 'stay put' for months on a given spot, but rather that the box should not drift to any significant degree during the course of a contact. In fact the old AM signals would tolerate quite a lot of drift during a contact, and those old receivers didn't often lose a CW QSO by drifting either; but once we came to SSB, and the use of a transceiver, the picture changed. Indeed the advent of SSB gave receiver designers a whole new ballgame to play; which is not to say that an AR88 or HRO can't be used for SSB reception — it can, if you are able to accept that one hand is on the tuning-knob of the receiver all the time. Even in the valve days, the SSB transceivers like the KW-2000 series and the rest were greatly improved, but the advent of the solid-state receiver made things better still, mainly by reduction of heat; and with a modern rig you can operate within a couple of minutes of switching on without too much difficulty.

### Priorities

What should we seek when we are selecting a receiver? And in what order of priority? This is very much a matter of personal choice, but a good list might put good dynamic range as paramount. Secondly, reasonably high-quality audio — no good being able to receive him at 5-and-9 if you can't understand the noises coming out of the speaker! Thirdly, reasonably good tuning rate by your own standards — this depends on whether you like to spin around the bands or stick to a small segment in an operating session. Fourthly, good enough stability so that when you go over after a period of transmission you can expect him to be still where he was (this assumes the other guy doesn't drift!). Fifthly, good selectivity for the modes you want to operate; this implies different filters for CW, or SSB, unless you own crystal filter ears. Finally, and very important, is reliability — nothing more infuriating than diving into a receiver to mend it just when that rare new country is due to appear!

When it comes to how best to actually *use* the receiver — which of course is where the pay-off lies! — you could do no better than read up Justin Cooper's ideas and comments on receiver operation in his *SWL* column over the last couple of years or so.

Next time we'll start talking about transmitters.

*to be continued*

# “Kitchen Table Technology”

A SERIES OF OCCASIONAL ARTICLES TO PUT THE ‘AMATEUR’ BACK INTO AMATEUR RADIO

REV. G. C. DOBBS, G3RJV

## No. 5: A Beginners’ Receiver Kit

I HAVE never been very much in favour of kits for electronic construction: either they tend to be expensive ways of buying components, or sets of incomprehensible instructions to do the simplest jobs. A friend of mine once bought a very expensive training kit in basic electronics for his son which he proudly showed to me. I had to hold back my opinion that it was really just a rather sophisticated technological jigsaw puzzle and his son would probably not learn much about electronics from using it. I am not even very much in favour of people buying ready etched and drilled printed circuit boards for magazine projects; the pre-drilled hole spacings mean that the constructor has to buy components with suitable hole spacings rather than use the cheapest available types. In spite of this caution, I understand constructors do have to begin somewhere and an introduction through kits can lead to success and further confidence, whereas failure in an early do-it-yourself project can prompt a rapid exit from the construction scene. The problem remains in deciding which kits are value for money and easily buildable.

A receiver is always a good beginners’ project. Building a receiver is the ‘real stuff’ of amateur radio. Even the seasoned constructor responds to the thrill of hearing the first signals on a homemade radio receiver with the distinct advantage that non-technical family and friends can appreciate what has been built. For many years I have been an advocate of the direct-conversion receiver as a suitable beginners’ project. The technique has its drawbacks but the constructor gets a lot out of a good direct-conversion receiver for the little he puts into it. I was, therefore, interested to see that a company, *C.M. Howes Communications*, was producing a new range of kits which included a direct-conversion receiver at a very competitive price. Two types of receiver kit were advertised, one for the 80m. band and the other for the 20m. (or 30m.) band. I determined to try one of the kits and chose the 20m. version.

### Howes Communications “DCRx” Kit

The kit comes complete with all the components for the printed circuit board and with clear placement markings on the top side of the board to enable even the novice constructor to get it right first time. The instructions, though concise, are very clear with an exact building procedure linked to columns for ticking off component placement and checking. Unlike many less-expensive kits, I found the instructions were unambiguous making it possible to build the kit as a first construction project. The

components were good quality standard items and the printed circuit board was a thick fibreglass board. The coils were already wound and ready to place onto the board.

The feature which really won me over to the kit was the option for saving money. The essential components for the receiver board are all supplied ready to go, but not supplied are the two variable capacitors (50pF), slow-motion drive, knobs, case and other hardware. “That’s not much good” the ill-informed might say, “I want a complete kit”. In fact I believe that these omissions are one of the best ideas about the kit: in conventional terms, buying all the items from upmarket retailers the missing items would be the most expensive part of the receiver. But it is possible to get all of these items, with a little care, at very much cheaper prices. I used two old surplus variable capacitors, a cheaply bought drive, some knobs and switches I bought at a radio rally and a case from a cheap source. This gives the constructor a chance to save a lot of money, and by a little looking around and visits to radio rallies and surplus sources produce a bargain item. One of the features that detract from enjoyment of kit building is that it is such an easy option, but the chance to save money and search out a few items adds to the sense of personal achievement. If the constructor wants it easy, *Howes Communications* will give usual sources of these parts or even supply them.

The block diagram of the receiver is shown in Fig. 1. The circuit

### Tables of Values

Fig. 2

R1 = 33K	C4, C5, C6, C8, C13,
R2, R5 = 1K	C18 = 0.01 $\mu$ F
R3, R4 = 470R	C10 = 22 pF
R6, R13 = 100R	C11 = 47 pF
R7, R9, R16 = 270R	C19 = 220 pF
R8, R10, R14, R17 = 100K	C21 = 100 pF
R11 = 1M5	TR1 to TR3 = 2N3819
R12 = 4K7	D1 = 1N4148
R15 = 2R2	D2 = BZX79
C1 = 10 pF	IC1 = TLO71
C2, C15, C17, C20 = 100 $\mu$ F	IC2 = LM380
C3, C7, C9, C12, C14,	CV1, CV2 = 50 pF variable
C16 = 0.1 $\mu$ F	(not supplied in kit)

Fig. 3

R1 = 560R	D2 = LED
D1 = 1N4002 or similar	FS1 = 500mA fuse

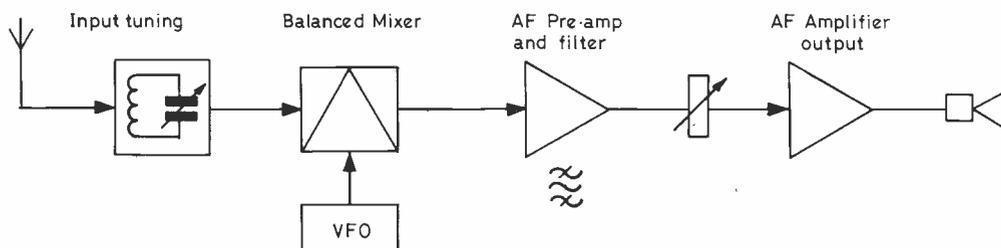


Fig. 1 BLOCK SCHEMATIC DIAGRAM DC RX RECEIVER

Front view of the completed 14 MHz "DcRx".



is reasonably conventional but sound. The tuned input is mixed with the signal from an FET VFO by a twin JFET mixer; the audio product is preamplified and filtered in a single low noise op. amp. stage and the final audio amplification is done in a single integrated circuit amplifier. There are 80m. and 20m. versions. The 20m. could be used for the new 30m. (10.1 MHz) band by

simply adjusting the core in the VFO coil. In fact, the more experienced constructor could adapt the circuit for other bands without much effort. The tuning range covers the whole band for SSB and CW reception, and the receiver is capable of 1 watt of audio output and requires a 12-14 volt DC supply, the quiescent current being some 30mA.

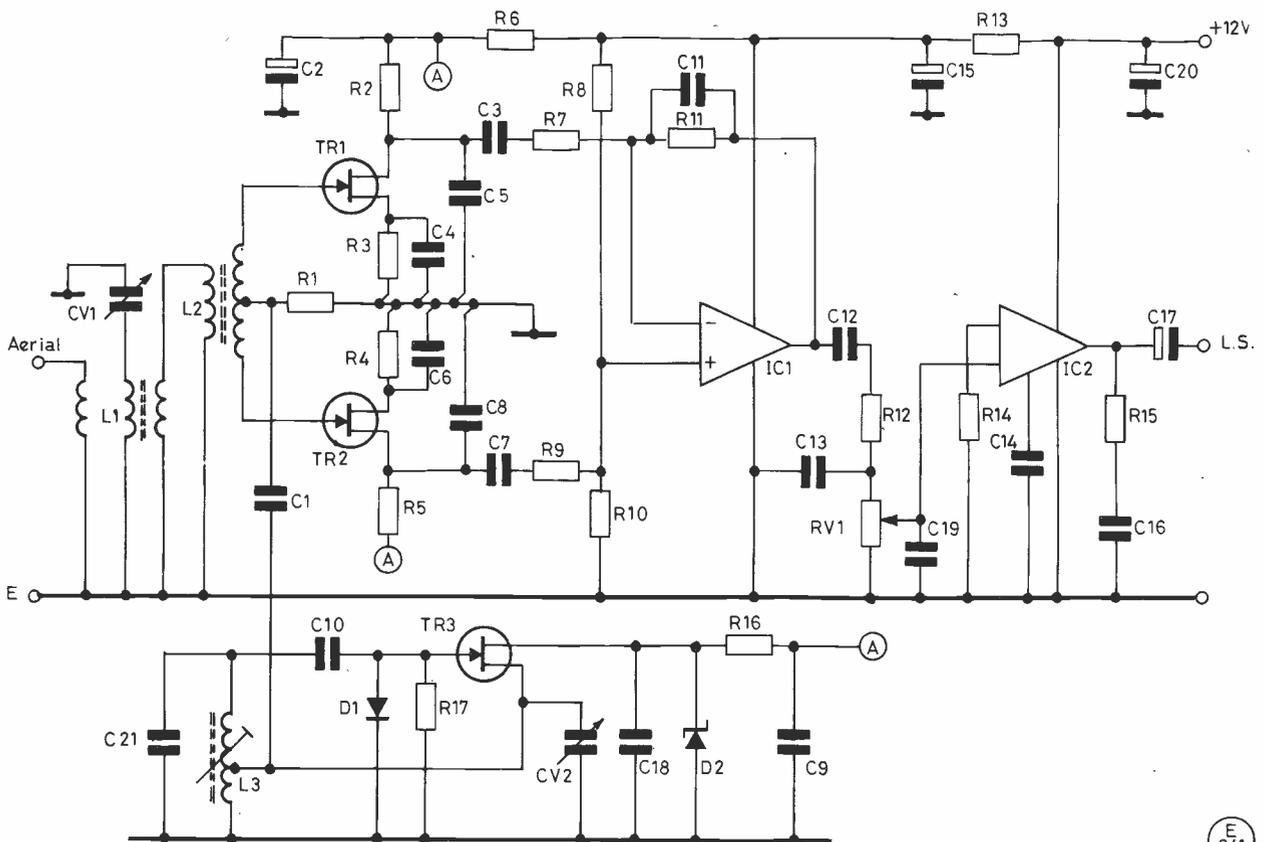
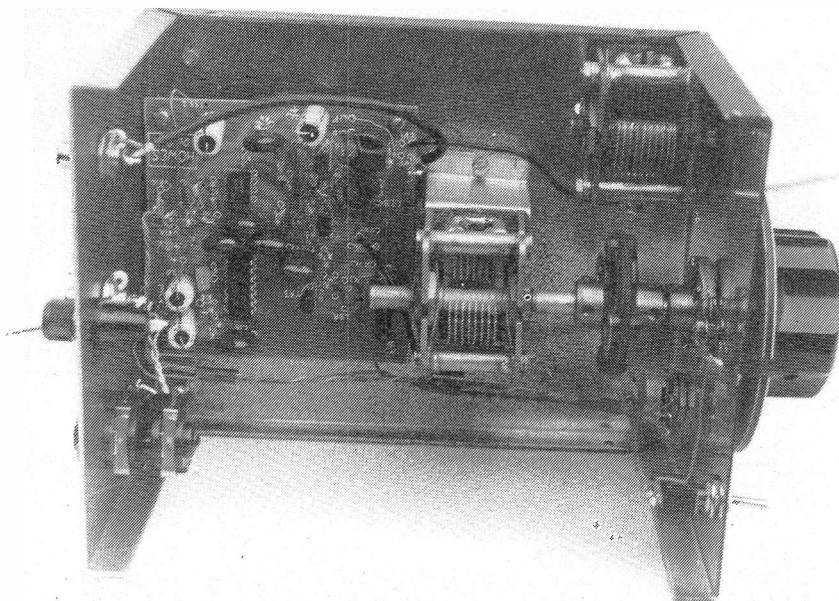


Fig. 2 DC RX CIRCUIT DIAGRAM



Inside view of the "DxRx". The main tuning capacitor (centre) has a small epicyclic slow-motion drive and home-made dial.

photo: Jo-Anna

The circuit diagram is reproduced in Fig. 2. The VFO is a single Hartley coupled FET transistor, a configuration which is surprisingly stable in receiver applications. The mixer is a couple of FET transistors fed out of phase from a centre-tapped winding on the coil L2. This mixer circuit is similar to ones I have tried in the past and is capable of handling quite high signal levels and reasonably free from cross-modulation problems — the bane of simple direct-conversion receiver, front-ends. Some filtering and preamplification is provided by IC1 and the final audio amplification by IC2. If anything, the weak part of the circuit is the use of the well known LM380 as the audio amplifier as it is not exactly known for its quietness. (This is a little odd coming from me, though, as I have used this same amplifier in several of my *Short Wave Magazine* receiver designs.) The LM380 is simple, convenient, does an adequate job and keeps the price down. I do not wish to give the whole game away and have omitted details of the coils and the printed circuit board layout — after all the company has kits to sell!

I built my version of the **DcRx** in a case supplied by *Minffordd Engineering*, in fact their standard case sold for the *PW* "Severn" design (127 x 102 x 171 mm) and one of the cheapest nice cases around. It is a little large, you could keep a hamster in it as well as the receiver, but this size allows a conveniently sized, easy to read, tuning scale to be used. The two variable capacitors were old radio rally buys. Jackson Bros. 50pF airspaced variables would do the job very well, but at a price. I urge all constructors to buy up all the good variable capacitors they find at radio rallies (but not before I get there!) and I suggest that some of the neat little airspaced variables which have been around the rallies and are marked "SSB" — they seem to be about 30 to 35pF — would probably serve in this receiver. The slow-motion drive is one of the common in-line epicyclic drives which can be bought quite cheaply, and mounted onto this is a large tuning scale marked out with

rubdown numbers and covered with clear plastic 'library' film. I usually mount my scales inside the case and cut a viewing hole in the front panel. In this instance I found a nice plastic disc in the junk box so mounted the scale on the outside.

The volume control is supplied with the kit. I added an on/off toggle switch for the supply and wired it to a triangular LED to act as the pointer for the scale; this indicates when the receiver is on, shows the frequency on the scale and adds a touch of class. The case was sprayed with three coats of matt-black car spray and lettered in white. The main control markings are white water slide transfers which give a neat straight line legend and have a protective coating. Part of the pleasure of this kit is adding one's own individualism to the finished receiver.

I added one minor piece of extra circuitry. There is no provision in the kit for accidental reversed polarity of the power supply — and solid-state devices don't like having the supply connected the wrong way round. Adding a diode in series with the power line would do the job, but I added a reversed diode and a fuse. If the supply is reversed the diode conducts heavily and the fuse blows. Any fairly hefty silicon diode serves the purpose and a 1 amp or 500mA fuse will give adequate protection. The circuit for the polarity protection and the indicator LED is shown in Fig. 3.

In use the receiver performed very well. I have not done any objective testing of sensitivity but most of the DX, such as it was at the time of testing, which could be heard on the main station receiver could also be heard on the **DcRx**. The selectivity is adequate for SSB but a little wide for CW but this could be solved, as with most direct-conversion receivers, by using an audio filter. I was very pleased by the **DcRx**. At a cost of under £14 for the basic board, plus the cost of the case, capacitors and hardware (all existing stock for me), it represents good value for money and is a suitable project for a beginner or the more experienced constructor who wants to build a useful amateur bands receiver. The instructions assume that the builder has never constructed any electronic circuit before, but the really faint hearted can pay extra for a ready wired board.

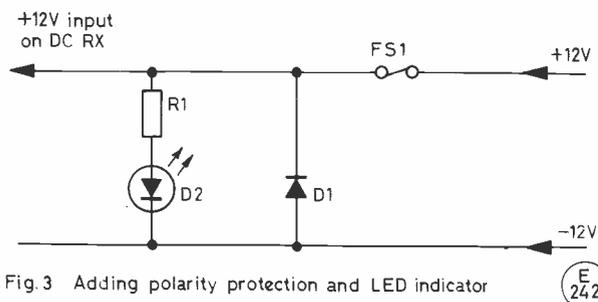


Fig. 3 Adding polarity protection and LED indicator

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#### SOURCES:

The "DcRx" Kit: *C.M. Howes Communications*, 139 Highview, Vigo Village, Meopham, Kent DA13 0UT. (Send an s.a.e. for price list of kits.)

Cases: *Minffordd Engineering*, Sun Street, Ffestiniog, Gwynedd LL41 4NE. (Send an s.a.e. for price list of cases and hardware.)

Waterslide Transfers: An A4 sheet of amateur radio legends in white is available for £1.25 from John Kaine, G4RPK, 74 Camden Mews, London NW1 9BX.

# VHF BANDS

NORMAN FITCH, G3FPK

## VHF Convention

NOTWITHSTANDING the heavy rain, a record number of visitors attended the *RSGB's* twenty-ninth *VHF Convention* at the Sandown Park Racecourse on March 24. Over 2,500 people were there, more than 50% up on last year's figure. Such were the crowds that the comments over the air beforehand — "See you at the Convention" — did not always result in "eye-ball QSOs". Even so, your scribe had the pleasure of meeting many readers, some for the first time after numerous radio contacts.

While the majority of visitors would seem to go to hunt for bargains and to buy the kind of components unobtainable in local radio shops, many appear to treat these events as mere social occasions spending most of their time at the bars. Even so, it is all part of the hobby and, even if one does not buy anything, such meetings provide an ideal venue for discussing VHF amateur radio topics.

Unfortunately the *RSGB* did not include a list of exhibitors on its leaflet handed out when the tickets were bought. The lecture information was given, as to content, but it would have helped more if some indication of where the various rooms were. For example, nobody seemed to know where the Claremont restaurant was, thus many missed the formal opening of the Convention by *RSGB* President Bob Barrett, GW8HEZ. The "prominent notices" referred to in the leaflet were rather inconspicuous.

As for the trade show, there seemed to be more exhibitors than last year with some new names. Most had crowds around them all day long and one deduces that many radio amateurs still do actually build equipment, after all. There is no doubt that the microwave bands are the real growth area at present with an increasing number of amateurs getting onto 1.3 GHz and many thinking about, or already on, 2.4 GHz. One enthusiast is Cyril James, G3VVB, from Cornwall, who kept producing all sorts of microwave goodies from his large brief case, rather like a magician pulling rabbits out of a hat. News of his wares has thus far gone by word of mouth but even so, envelopes with money in have arrived from Portugal demanding immediate supply of 23cm. modules. Many readers are using Cyril's

modules to good effect and they are beautifully made.

Another current growth mode is satellite operation, now that *Oscar-10* is proving to be such a successful machine. So the *AMSAT-UK* stand attracted many members and would-be satellite users, anxious to learn the latest news about *UOSAT-2* and quiz the staff on satellite matters generally. The stand featured large TV screens displaying current *O-10* information.

As usual, there were three streams of three lectures over a three hour period in the afternoon. These were all very well attended and your scribe stuck with Stream "B" so missed some other very interesting talks. The *AMSAT-UK* lecture was about *Oscar-10*, introduced by Secretary Ron Broadbent, G3AAJ, and given by Jim Miller, G3RUH, who took some of the mystique out of orbital prediction, proving you do not need a computer after all. He included a recording of his own transponded signals right down to a fraction of a watt input at 435 MHz.

Next was Charlie Newton, G2FKZ, who dealt with Solar Cycle no. 21. As usual, his talk was copiously illustrated with projections showing many solar and geo-magnetic parameters. An unusual feature of this current cycle was the very rapid rise in solar flux levels in the year following the accepted minimum. One cannot but admire G2FKZ's efforts in collecting and studying the large amount of data received from amateur and professional sources, then putting it all together so that we get a better understanding of propagation. It seems a pity that it is left to private magazines, like *DUBUS INFORMATIONEN*, to publish this work instead of giving it the much wider exposure it deserves in the *RSGB's* own journal.

The final talk was introduced by Ken Ellis, G5KW, and it dealt with the 50MHz story so far. The main speaker was the *RSGB's* VHF Manager Keith Fisher, G3WSN, who reviewed the progress of the 6m. experiment and of the new opportunities to be afforded when the next 60 licensees get their 6m. permits later this year. One point Keith made was that the *Home Office* will not grant any permits to Class B licensees. However, the question of crossband working is under review and it is hoped to resolve this rather grey area, favourably, soon.

This *National VHF Convention* goes from strength to strength. Convention organiser Geoff Stone, G3FZL, and Exhibition organiser Less Hawkyard, G5HD, are to be congratulated for providing a fine event. Plans are already in hand for the 1985 Convention at this popular and convenient venue.

## Ånnaboda 1984

This annual Swedish event is scheduled for June 8-10 this year. It will feature the

usual antenna gain measurements, this year concentrating on 432MHz. There will also be facilities for measuring the noise figure of 2m. and 70cm. receivers. For more information, the fellow to contact is Gun Grännsjö, SM4LMU, whose address is in the latest *Call Book*. His telephone no. from the U.K. is:— 010 46 19 246280.

## Cable TV

Listeners to recent *RSGB News Bulletins* will be aware of the problems caused by *British Telecoms* Cable TV distribution system which was causing severe problems to 2m. operators in the Milton Keynes area. As the problem could not be solved by *BT*, the *Department of Trade and Industry* ordered the network to be closed down from March 12. This has established a useful precedent, even though the Amateur Service is not a protected one in the usual sense. Hopefully, the same mistake in choice of carrier frequency will not be repeated elsewhere.

## Awards News

Another reader has joined the 144 MHz QTH Squares Century Club. Stephen Ayling, G4ASL, from Coulsdon, Surrey, is member no. 34, his certificate for 102 squares confirmed being issued on March 14. He also has VHFCC No. 349 for this band and his station details are the same as those mentioned in the October, 1982 issue of the *Magazine*. However, the *Icom IC-260* has been disposed of recently and a new VHF set is being considered. 22 countries were represented in Stephen's list and 96 contacts were on SSB, five on CW and one on FM. 88 were made on tropo, and seven each on *Es* and *Ar* modes. G4ASL hopes to get going on MS soon to try to work more squares.

Bob Hamer, G6NVQ, from West-houghton, near Bolton in Lancashire, becomes VHF Century Club member no. 364, his certificate being sent on March 17. He became interested in amateur radio about three years ago and passed part of the *R.A.E.* in December, 1981. He took part 1 again in the following May and passed, the licence being received on October 19, 1982. His station details are as published on page 31 in this March's issue. Future goals are to get going on RTTY using his *Dragon 32* computer and home made terminal unit, to get the Class A licence, and start up on ATV.

## Contest News

The 1983 *IARU* Region 1 VHF/UHF/SHF Contest was organised by the Norwegian national society, the *NRRL*, which has recently published the results. On 144 Mhz, GJ4ICD came 3rd in the single-op. part and G4LIP/P were also 3rd in the multi-op. section. On 432 MHz, highest placed U.K. single-op. entrant was G4CQR, who came 59th. In the multi-op.

section, G4PUB/P were a creditable 9th. On 1.3 GHz, G3JXN was 20th in the single-op. part and G4ALE/P were 2nd in the multi-op. section. On 2.3 GHz, G3JXN was 18th, while the multi-op. part saw G3ZIG/P in 6th spot. On 3.4 GHz, G4MBS was 10th in the single-op. and G3TQF/P were 8th in the multi-op. sections. Finally, G4FQH/P came 43rd in the 10 GHz single-op. part. In the overall context, G3JXN came 24th and G4PUB/P, 3rd in the respective sections.

In the 144 MHz CW contest on Feb. 5, the winner was G4MDZ whose 112 QSOs were worth 1,132 points. In second place were the *North Bucks. Contest Group*, G4NUT, who notched up 1,045 pts. from 110 QSOs.

May sees the start of this year's 10 GHz and Microwave Cumulative Contests, on the 13th from 1000 to 1800 GMT. In the latter contest, the band will be 2.3 GHz. On May 5/6, there is the 432 MHz-24 GHz event from 1400-1400 with radial ring scoring on 432 MHz and one point *per* kilometre on all other bands. This is a two section affair, single-op. and multi-op., the latter allowed to operate on several bands concurrently, using different call signs.

The May 19/20 weekend, 1400-1400, is devoted to the 144 MHz and SWL event, another single-op. and multi-op. contest. Only in the Cumulatives are actual QTHs required to be sent in addition to the QTH locator; in other contests the "X kms from Y" information is not required with portable contestants left to make up their own minds about how to comply with their licence conditions, it seems.

The results of the *Swale ARC* January contests have arrived. The 144 MHz Open section on Jan. 22 was won by G8JAY/P who amassed 12,784 pts. 2nd was G4ARI with 11,340 and 3rd, G4NVA/P with 10,936. There were 16 entries. In the Low Power section there were 26 participants and G4WAD/P came first with 10,755 pts., runner up being G6SLZ/P with 10,168. In 3rd place was G4RLF with 7,848 pts. On 432 MHz on the 29th, there were six entrants in the Open section which was won by GW8TFI/P with 4,712 pts. G4CQR was 2nd with 3,488. The Low Power part attracted 13 logs and the winner was G4PSX with 1,325 pts., followed by G6SNO with 1,276 and G8JAY with 1,000 pts. A total of three entries were disqualified for claiming excessive points.

**HB0 DX-Pedition**

Last summer, Piet van den Bos, PA3BZO, and four other Dutch amateurs, operated briefly from Liechtenstein but did not work into Britain due to a combination of poor conditions and too much snow preventing access to the mountain top. Piet and PA3BXM, PA3CII and PB0ACG plan to operate from HB0 again on June 23 and 24 from

**ANNUAL VHF/UHF TABLE**

January to December 1984

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G4ROA	—	—	47	7	33	2	7	1	97
G4ARI	17	1	61	12	—	—	—	—	91
G3BW	15	2	37	9	15	6	2	3	84
G1EZF	—	—	61	9	8	2	2	1	83
G4TIF	—	—	43	4	32	2	—	—	81
GD2HDZ	21	2	25	6	20	3	1	1	77
GW4TTU	—	—	58	13	1	1	—	—	73
G6HRI	—	—	39	7	23	4	—	—	73
G3FPK	—	—	59	9	—	—	—	—	68
G4MUT	18	2	23	5	17	2	—	—	67
G8TFI	—	—	—	—	47	10	5	3	65
G6ECM	—	—	51	10	—	—	—	—	61
GW3CBY	5	3	34	6	6	2	1	1	56
GW8UCQ	—	—	32	4	15	5	—	—	56
G4NRG	10	1	14	8	17	2	—	—	52
G6HFF	—	—	31	6	9	3	—	—	49
G4VXE	—	—	38	4	3	2	—	—	47
G8PNN	—	—	8	1	24	4	4	2	43
G8FMK	—	—	3	1	21	2	7	2	36
G6NVQ	—	—	32	3	—	—	—	—	35
G6XSU	—	—	—	—	28	5	—	—	33
G4LZD	—	—	20	3	—	—	—	—	23
GU4HUJ	—	—	16	3	—	—	—	—	19
G2DHV	3	1	9	2	—	—	—	—	15
G6CSY	—	—	6	1	4	1	—	—	12
GM4CXP	—	—	6	2	—	—	—	—	8
GW4HBK	5	2	—	—	—	—	—	—	7

Three bands only count for points. Non-scoring figures in italics.

0800-1700 GMT on 2m. and 70cm. from EH79g, hopefully at the top on 2,365m. *a.s.l.* The group will be on the HF bands on June 22-24 after 1700 GMT. Anyone wanting to arrange a 70cm. sked can write to Piet at Arendstraat 10, NL-5341 RR Oss, Netherlands or telephone him on 010 31 41 20 23292 and ask for Piet. When he wrote on March 14, no equipment details were available.

**Satellite Notes**

The *University of Surrey's UOSAT* news line on April 9 reported no progress in the attempt to regain control of *UOSAT-2*. An 85ft. dish at Jodrell Bank was used as an antenna to see if the faintest of signals could be heard from the satellite but nothing was heard. Thus there is no clue whatever as to what has gone wrong. All the *UOS* team can do it think up various scenarios based upon tests on the satellite systems conducted prior to launch. When the satellite comes within range — a total of only one hour per day — ideas can be tried. Gradually they are eliminating various possible faults and it seems they are fairly confident they will regain control although this could take some time yet.

*Oscar-10* continues to attract its increasing number of devotees. However, as regular user Adrian Chamberlain, G4ROA, (Coventry) mentions, it has been in an "unsocial hours position" recently. He is a low-pass enthusiast and, on Mar. 17 had a QSO with VS6HH in Hong Kong, to the east, the following day bringing a contact with W1BIH/PJ in Curacao.

From Wales, Kelvin Weaver, GW4TTU, (Gwent) has been listening on *O-10* and has heard A71, HZ, JA, LU, VE, VK, VS6, W, ZS. He also listed ZL but surely that is the one country out of

range from the British Isles? He plans to put up a bayed pair of 21-ele. Yagis for 70cm, with elevation control, so should have no trouble working through *O-10*.

Reg Woolley, GW8VHI, (W. Glam.) has been using *O-10*, too and he worked on Mar. 17, JA7DJA, UA0LFK and JR1FQD, the following day bringing VS6HH, JA7BWG, HL3UJ, JA2DON, then on westerly low pass orbit no. 574 VE3HD, N4HX and N0AN. Reg heard some VKs on the 19th. Through RS-8 on the 17th, he worked N7ZL in Washington state and N9CUE in Illinois.

For the record, working on the latest available *Keplerian* elements, *O-10's argument of perigee* will reach its highest southern hemisphere latitude around May 11/12, thereafter precessing northwards. By late February, 1986, the *argument of perigee* will be at its highest northerly latitude — equal to the orbit inclination of 25.6632° — so that southern hemisphere stations will then be enjoying the long periods of use currently on offer to northern hemisphere operators. Anyone with a computer program for *O-10* can easily look ahead; it is a great time waster!

**TV Repeaters**

Effectively for U.K. amateurs, the 70cm. band is only 8 MHz wide — 432 to 440 MHz. It is shared on a secondary basis

Station	ANNUAL CW LADDER				Points
	4m.	2m.	70cm	µWave	
G4ARI	11	120	—	—	131
GW4TTU	—	94	—	—	94
G4NOZ	—	75	—	—	75
G4VXE	—	24	—	—	24
G3FPK	—	15	—	—	15
G2DHV	3	9	—	—	12

No. of different stations worked since Jan. 1.

with other services and in the amateur context, accommodates EME, CW, SSB, repeaters, satellite up and down links, and amateur TV. A more logical place for ATV would be the 23cm. band, grossly under-used, but operators feel that the lesser range possible would be a grave disadvantage.

All this could now begin to change following the DTI's granting licences for the first five ATV repeaters on Feb. 16. These are GB3GV/Leicester, GB3UT/Bath, GB3TV/Luton, GB3UD/Stoke-on-Trent and GB3VR/Worthing. The first two are on channel RMT-1, the others on RMT-2. The respective vision in/out QRGs being 1.2675/1.3115 and 1.249/1.3185 GHz and the sound in/out QRGs 1.2825/1.3175 and 1.255/1.3245 GHz. Further details can be obtained from the *British Amateur TV Club* who have a "hotline" new service on 0533 600108.

**Four Metres**

Scant news on 70 MHz activity this month reflecting the rather mediocre tropo. conditions of recent weeks. Due to abysmal conditions on 432 MHz, Bill Hodgson, G3BW, reports that he, G3KMS and GD2HDZ have moved their evening net onto 4m, thus creating a little more activity in the northwest.

For the CW Ladder, Tim Raven, G4ARI, (Leics.) added one more, G3CUN, on Mar. 17, plus one more county, Gloucs., thanks to G4ERP/P on the 11th. Martyn Jones, G4TIF, (Warks.) has opened his account on the band, the present set-up being just five watts to an indoor 3-ele. *Yagi*. By the time this appears, he had hoped to have the antenna outside at 26ft. *a.g.l.* He got on in time for the Mar. 11 leg in the *Cumulatives*. Arthur Breese, GD2HDZ, found six more counties in the Mar. 11 and 25 legs of the contest, including G3ZTZ (Surrey) and G4FXW (S. Yorks.).

**Two Metres**

Mick Allmark from Leeds has been a regular contributor to this feature as a short wave listener with a formidable record of DX heard. Congratulations are now in order as he is now G1EZF, with his first entry in the Annual Table, in fourth position. He commenced 2m. operations on Feb. 19 and has already worked 61 counties and nine countries. Mick's station consists of an *Icom IC-202* with a *Lunar 150w* amplifier, the antenna being a 9-ele. *Tonna Yagi* at 35ft. He has been concentrating on the counties collecting due to the overall poor conditions, but has already accumulated 32 squares. One unusual contact from his long list was LA0DT/MM in BN square. On Mar. 8, around 1600, he heard some weak EA stations chatting in Spanish on 144.300 MHz from VD square and beacon EA1VHF was just audible.

Station	QTH LOCATOR SQUARES TABLE			Total
	23cm.	70cm.	2m.	
G3POI	—	—	417	417
G3IMV	—	91	346	437
OZ1EKI	—	116	345	461
DK3UZ	—	—	317	317
G4IJE	—	—	314	314
G3VYF	—	117	307	424
SP2DX	—	—	280	280
EA3LL	—	30	261	291
G4ERG	—	16	243	259
G4DEZ	—	—	241	241
G8VR	2	24	239	265
G3BW	6	36	233	275
GJ4ICD	1	115	230	346
9H1BT	—	11	210	221
GW4EA1	—	—	210	210
GW3NY	—	48	209	257
GM4COK	—	28	204	232
LA8AK	25	62	200	287
G3FPK	—	—	197	197
G3UVR	17	79	196	292
G3KEQ	—	—	194	194
G4KUX	—	36	193	229
GJ8KNV	12	76	191	279
G8KBQ	22	96	188	306
GJ8SBT	20	35	182	237
G4MCU	—	77	176	253
G4OAE	—	31	174	205
G6FCM	—	—	172	172
G3PBY	33	101	171	305
GM4CX	—	27	165	192
G8LFB	—	—	165	165
G3JXN	67	108	164	339
G3COJ	40	91	163	294
G8TGM	—	—	158	158
G4NQC	57	80	157	294
G4TIF	—	82	157	239
G4BWG	—	64	152	216
G4AWU	—	50	150	200
G3XDY	51	100	149	300
G8RZO	—	75	148	223
G4RZP	—	76	147	223
G6HKS	—	—	147	147
G4HMF	2	35	144	181
G6CMV	1	29	142	172
GM4IPK	—	—	139	139
G8HHI	20	77	135	232
G6ADH	—	35	135	170
G4MEJ	—	—	135	135
G4ERX	7	61	132	200
GW4TTU	—	2	130	132
G8ATK	23	82	129	234
G3NAQ	—	58	128	186
G6DDK	2	13	127	142
G8TFI	51	109	126	286
G4MJC	—	12	120	132
G4MDW	—	1	120	121
G4DOL	—	—	116	116
G8ULU	31	85	115	231
G8PNN	41	73	115	229
G8XIR	—	—	115	115
G4STO	29	48	113	190
G4HFO	—	69	112	181
G4GHA	—	2	110	112
G4RGK	—	48	108	156
G8SRL	—	53	106	159
G6JNS	1	3	106	110
G6DER	22	65	105	192
GW8UCQ	1	64	105	170
G6DFT	—	—	105	105
G4MUT	—	68	100	168
G8VEV	—	—	97	97
G14OMK	—	—	96	96
G4NBS	14	77	94	185
GM8YPI	—	—	94	94
G8WPL	—	54	93	147
G8RWG	—	—	92	92
GD2HDZ	13	50	91	154
G4TJX	—	59	90	149
GW3CBY	9	30	90	129
G8FUO	39	105	88	232
G4FRX	—	58	87	145
G4NRG	—	30	87	117
G8ZDS	—	16	86	102
G8KAX	35	57	82	174
G4RSN	2	22	81	105
G8FMK	35	68	80	183
G6ABB	—	—	80	80
G8XTJ	—	—	74	74
G6NWF	—	—	67	67
G4PEM	—	—	63	63
G4ROA	19	56	61	136
GW8VHI	—	30	61	91
G4CQM	—	48	55	103
G8ZYL	—	—	54	54
G6PFR	—	13	50	63
G4LZD	—	—	50	50
G6HRI	—	26	49	75
G4FRE	33	91	46	170
G4IGO	—	—	43	43
G6CSY	15	25	30	70
G4BVS	9	100	—	109
G6XSU	—	37	—	37

Starting date January 1, 1975. No satellite or repeater QSOs. "Band of the month" 2m.

G3BW reports only one event of note during March, a small *Aurora* on the 28th in which Bill contacted LA, SM, GW and GM stations. He was called by UR2RIW

(LS) but the Estonian station was drowned in QRM. John Quarmbly, G3XDY, (Suffolk) also reports poor conditions and only mentions LA8SJ (FT) worked in an *Ar*.

G4ARI has found county chasing a bit hard going but reckons CW mode is where to find new stations. Tim has added another 14 to his Ladder total including GI4OPH and OZ1FGP in the Mar. 28 *Ar*. New counties were EI4AEB (Meath) on the 7th, GM1BLC/M (Central) on the 8th, and on the 17th, EI6BLB/P (Wicklow).

Derek Hilleard, G4CQM (Surrey) is a regular reader and has been since the late 1960s when he was G8CIW and used to participate in the Annual Table. After a couple of moves, he now operates from a QTH 800ft. *a.s.l.* in the centre of Hindhead. His basic transceiver is a *Belcom Liner-2* fitted with a preamplifier, the antenna being a home made 5-ele. *Yagi* to the *N.B.S.* design, but only about 28ft. *a.g.l.* on an unguayed mast fixed to a wall.

Ken Osborne, G4IGO, (Somerset) reports GM4ILS (YR) on CW in the Mar. 8 *Ar* as the only station of much interest in March. He was heard from 1929 to 1937 and was the only *Ar* signal copied. Nick Peckett, G4KUX, (Co. Durham) thought the Mar. 28 *Ar* quite good. He worked SM3AKW (JW31h) for a new square, along with the more usual stuff. On Apr. 4, another *Ar* was discovered and he contacted EI8EF (VO) and UQ2AO (MQ), and the next day, in yet another event, he mentions GM6PZX (ZU) in the Shetlands on SSB.

Welcome to Les Bober, G4NOZ, (Essex) who spotted the CW Ladder and enters it with 75 stations up to Mar. 26. His gear comprises an *FDK-750E* and 9-ele. *Yagi* by *Tonna*. The power used is 10 or 60w. G4TIF, having been busy on 4m, only added GW8ELR (Dyfed) to his 2m. score on Mar. 29.

Bill Biltcliffe, G6NB, (Bucks.) had visitors on Apr. 4 so only managed to catch the tail end of the *Ar*, but did work LA7KK, LA6QBA and GM3XOQ (ZT). The next day, he heard half a dozen Russians calling "CQ" on CW but they did not seem to work anyone. Glenn Bates, G6HFF, wishes the take-off from his Bolton QTH was better to the south. To illustrate how poor it is, he reckons to have contacted more SMs last year than stations to the south-east of England—but only two SMs were worked. He thought the contest on Mar. 3 was very good and was glad to work G8ECI (AN) and G4DEZ/A (AL). Glenn mentions not being able to buy the *Short Wave Magazine* until either on or after the deadline. Well, that is why the following *two* deadlines are always given at the end of this piece so that contributors can note them in their diaries.

Russell Coward has been a regular contributor for some time now under his call, G6HRI. Now he has passed the morse test on Mar. 30 so will be on CW as soon as

the G4 ticket arrives. Just five more counties were added in March, plus ZO for a new square. Gordon Emmerson, G8PNN, (Northumberland) lists five 1984 counties added in the Mar. 3/4 contest in an otherwise flat period. His best DX was G4RFR/P in Dorset.

Most of GD2HDZ's March additions were from the contest during the first weekend. Some of the longer distances Arthur worked were to G2BRS (Dorset), G6CAQ (Gtr. London) and G8LNC/P (I.o.W.), plus F1KBF/P for another 1984 country. From South Wales, GW4TTU reports only the occasional sea duct to northern Spain to liven things up. Kelvin reports G4KUX as the most outstanding signal in Gwent lately and with whom several QSOs have been made recently. He comments that CW activity is on the increase and that "solid" QSOs are possible when the band appears quite flat. To illustrate this, he cites a contact with G4NHQ (Wilts.) who was running half-a-watt to a 9-ele. *Yagi* yet who was RST599. Kelvin is sorting out his antennas, the current temporary one being a 13-ele. *Tonna* at 35ft. with a great deal of cable loss. A pair of 17-ele. *Yagis*, bayed, and with elevation control are to go up soon so that MS, 0-10 and some *EME* work can take place.

Sheldon Hands, GW8ELR, (Dyfed) remarked to your scribe about the consistently good signal from ON1AJQ in rather flat conditions. GW8VHI was looking forward to the *Lyrids* and subsequent meteor showers. Reg has arranged a few back scatter MS tests with Dutch stations but no Gs had asked for such skeds. G4IJE has had many successful attempts using this technique whereby the two stations beam to a common point while eliminating any tropo. reception; *i.e.* antennas sideways on to each other. Reg's telephone no. for skeds is 0634 821308.

From G3FPK, activity has been minimal. The only item of note was the *Ar* on Apr. 5 which was discovered at 1615.

### Seventy Centimetres

G1EZF is active on the band using his contest group's equipment which consists of an *Icom* IC-402 and 17-ele. W0EYE *Yagi* at 40ft. So far, up to Mar. 30, Mick had worked the three Yorkshire counties, G4UPG (Gloucs.), G4DEE (Gtr. Manchester), GW8AAP/P (Clwyd), G4VCJ (Cleveland) and G1DSC (Notts.) G3BW found the band empty up in Cumbria so has nothing to offer this month. G4CQM uses a *Belcom* Liner-432 fitted with a preamplifier for this band, the antenna being a 24-ele. long *Yagi*. Derek has worked 48 squares with this station since August 1981.

March was a quiet month for G4ROA and Adrian's best DX was G3PBV (Devon). He suggests conditions were not bad in mid-month. G6HFF uses a *Yaesu*

FT-480R running 10w, the antenna being an *Ant Products* Silver-70. So far, Glenn has worked GW8TFI/P (YL25j) for best DX. G8PNN lists only two new 1984 counties, both worked in the contest, G6GFO/P (Hants.) and G8KQW (Suffolk). The contest also gave Gordon a new square, G4MVN in AK12f.

Another new correspondent is Roy Gibbons, G6XSU, who is "on our doorstep" in Welwyn. He went straight on to 70cm. using an *Icom* IC-402. He mentions the antenna as a 28-ele. *Multibeam*, but that seems a slip of the pen. In the four months to the end of last year, this low power combination had accounted for nine countries and 31 squares and in the first quarter of this year, another six have been added. Home built preamp. and 10w PA have been added and Roy is awaiting a nice lift to see how much better he can do. The QTH is 84m. *a.s.l.* and the antenna 10m. *a.g.l.* and on a hill overlooking our offices. He hopes that his modest station from an ordinary QTH will encourage others, "... to explore the delights of 70cm. with simple, low power equipment."

GD2HDZ's additions for the table were made in the contest and Arthur's best DX were G8KQW/P (Cams.) and G3TGE (Bucks.) GW4TTU will be putting up a pair of 21-ele. *Yagis* on the new tower which should make for a superior station for Kelvin. From Dyfed, GW8ELR has worked G6XLL in London and G6LYU (ZM) with just 3w, so is quite pleased with these QRP results.

### The Microwaves

Hardly anything to report this month. G1EZF is operating now from Leeds, and Mick uses an *Icom* IC-202, *Microwave Modules* transverter and 23-ele. *Tonna* antenna at 45ft. G3XDY added G8ECI (AN) and F6DWG (BJ) but John found conditions generally poor. However, over the period Mar. 20-23, coast-to-coast tropo. across the North Sea brought good signals from PA and ON on 23cm. as well as 70cm., "... but no real DX." G4ROA, who worked G3PBV in Devon on 70cm. on Mar. 19, heard Dave's signals well on 23cm. but Dave just could not pull Adrian through; just a few, short bursts.

### Moonbounce

Clive Penna, G3POI, worked 2m. country no. 62 on Apr. 7, WA1JXN/C6A in the Bahamas. He now has a total of 417 squares and 30 Maidenhead fields to his credit. G4KUX, with his four 19-ele. *Yagis* now has *E-M-E* capability although Nick admits that he is likely only to work the stations with much bigger arrays. His first successful sked was with Y22ME and, when your scribe last spoke to him, further tests with UA3TCF and VE7BQH were in the offing.

### Contest Scoring

GW8VHI heard only ten stations on 70cm. in the March contest and concludes that, "... nobody beams to the west." this puts participants in his — and similar remote — area at some disadvantage. To make things fairer, he suggests a points multiplier based upon QTH locator squares worked which could encourage, say, south-west Englanders not to keep their beams facing the continent. He points out that giving county information is no good as it would involve extra information the continentals do not have to give. For the local *RSGB* contests, this seems a sensible idea. What do others think of it?

### Heresy Corner

A lot of time and effort went into the building of the two *UOSAT* research satellites and a proportion of the cost was met by donations from radio amateur members of *AMSAT-UK*. However, it is pertinent to ask just what practical use have they been, or are they likely to be — if *UOSAT-2* can be made to work — to radio amateurs in whose bands they operate?

Great play has been made about the educational aspects of these devices but is it the role of radio amateurs to educate school children in space matters? After all there are a number of professional satellites whose transmissions can be received much more reliably in the classroom.

Especially in the 2m. band, it is difficult to justify non-communications satellites, particularly when QSOs on FM in the Guildford area are wiped out when the *University of Surrey's* command station is activated. What if a number of other Universities around the world decided to use the *UOS* precedent as a justification for their using the amateur bands for similar projects? Surely we have amateur bands for the purpose of communicating with each other, either directly or *via* terrestrial or orbiting relays or *via* a passive reflector such as the moon.

A check with Charlie Newton, G2FKZ, who provides the propagation details for the weekly *GB2RS* new bulletins, revealed that *UOSAT-1* has never been used for this purpose. All the information needed comes from Boulder in Colorado from the *NOAA* satellites.

Perhaps readers may like to comment on this topic for, only if the *UOSATs* do, or could, *provide information of practical use to radio amateurs and which cannot be obtained elsewhere*, can their use of our bands be justified.

### Deadlines

The June deadline is early, **May 2** and the following one is June 6. All your news, comments and claims to:— "VHF Bands," *SHORT WAVE MAGAZINE*, 34 High Street, WELWYN, Herts., AL6 9EQ. 7<sup>3</sup> de G3FPK.

# Traps and Trapped Antennas for the Home Constructor, Part 4

ALL YOU NEED TO KNOW!

A. P. ASHTON, G3XAP

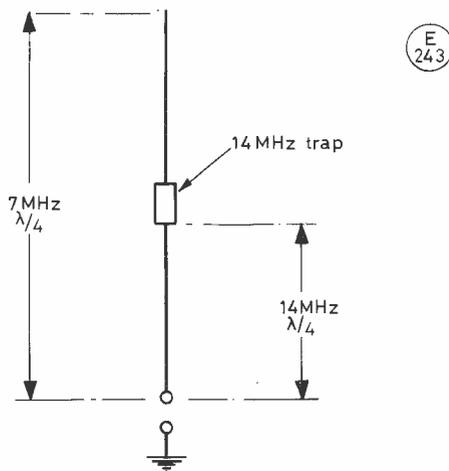
**I**T must be appreciated that once the traps have been tuned to their required resonant frequencies they must not be altered again, and that the antenna is tuned by adjustment of *its* physical dimensions and *not* by adjustment of the traps.

The most common method used to tune antennas is to measure the VSWR on the feeder and adjust the length of the antenna until minimum VSWR is achieved. This particular method is fraught with danger since we do not necessarily need a resonant antenna in order to achieve an indicated VSWR of 1:1 on the feeder! The author *only* uses an SWR bridge to determine the VSWR on a particular feeder *after* the antenna has been resonated by some other means — usually a grid dip oscillator is used, or occasionally a noise bridge; the measured VSWR should then be in broad

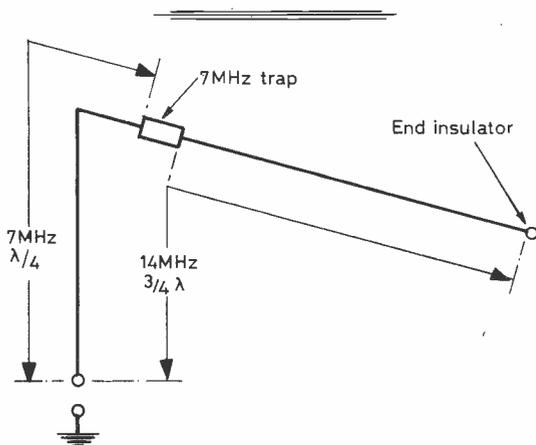
agreement with the result that theory tells us to expect.

Theory tells us that we should not expect a 50-ohm impedance at the base of a quarter-wave vertical antenna or at the centre of a 3.5 MHz dipole which is only 25ft. from the ground, but we can sometimes “tune” either type to give an indicated 1:1 VSWR at the transmitter end of the feeder. Clearly, either the theory is incorrect and we have achieved a 50-ohm impedance *or* we have not established resonance! It is up to the individual to determine for himself whether he is happy to have a mediocre antenna and a 1:1 reading on his SWR bridge, or to do the job correctly and use a resonant antenna that may well give him a 1.5 or 2:1 reading. If no other method is available, an SWR bridge can be used provided that it is installed directly at the feed point (this can be tricky with dipoles) or that the feeder is *accurately* cut to a half-wave at the measurement frequency — or a multiple of half waves. It must also be appreciated that the bridge will not necessarily give the same reading at the transmitter end of the feeder as it does at the antenna end, although the readings should differ much less with a resonant antenna than with a non-resonant device.

Having decided upon the method to be used, we must look at the antenna design and decide the order in which the various parts of the antenna are to be adjusted. For example, we saw earlier that



(a) A "conventional" vertical for 7 and 14MHz



(b) The G3XAP alternative to the 7/14MHz vertical.  
Figure 1

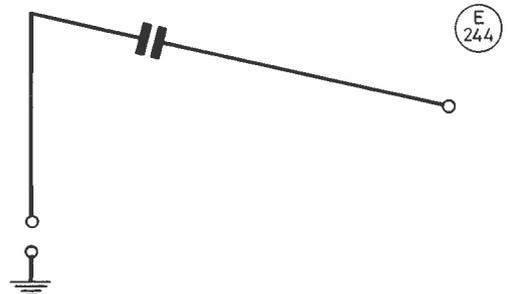


Fig. 2 Mode of operation of the G3XAP 7/14MHz inverted-L antenna when operated on 14MHz

a trapped antenna for 3.5 and 7 MHz, using a pair of 7 MHz traps, must first be resonated on 7 MHz by adjustment of the lengths of the inner sections and then on 3.5 MHz by adjustment of the outer sections. If we are more interested in, say, 14 MHz operation than in 3.5 MHz, we may decide to adjust the overall length of the antenna to give a better 14 MHz resonance — at the expense of 3.5 MHz (this was also discussed earlier). The important thing to realise here is that this practice will lead to changes in the resonant frequencies of all of the 3.5, 14, 21 and 28 MHz bands, but will not affect 7 MHz operation. The order of resonating the 14, 21 and 28 MHz trapped dipole is also quite straightforward as we saw earlier (assuming traps at 28 MHz and 21 MHz), and the general rule is to resonate the highest frequency first, then the next highest, etc., continuing for all of the bands covered.

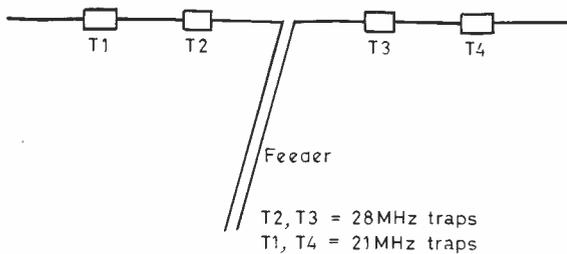


Fig 3 A three-band trapped dipole for 14, 21 and 28MHz

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### Fault Finding

During the initial tuning of a newly constructed antenna it may be noted that it is not possible to obtain resonance on one or more bands, or that in order to achieve resonance the antenna's dimensions are very, very different to those expected. It is possible for an antenna which has performed satisfactorily to suddenly malfunction—usually being noted by the VSWR on the feeder being considerably higher than normal — and this may affect one or more bands. Logic must be applied to any investigation to find the cause(s) and an example may prove helpful.

Let us assume that we have constructed a wire dipole for the 14, 21 and 28 MHz bands, using two pairs of traps resonant on 28 and 21 MHz — such an antenna was described in *Part 3* of this series and is shown in Fig. 3. We will resonate first at 28 MHz, so let us assume that we obtain a very high VSWR on this band and that trimming of the inner sections makes no significant difference to the indicated VSWR. These symptoms almost certainly indicate a mechanical breakdown between the SWR bridge and one or both of the 28 MHz traps; or that one or both of the 28 MHz traps are not functioning correctly, or that the traps have been inserted in incorrect positions on the antenna. Even allowing for the fact that it is normal practice to build the dipole slightly larger than its expected dimensions because it is easier to shorten the device than to lengthen it, it is unlikely that some degree of trimming would not lead to some change in indicated VSWR.

The first step, then, is to lower the antenna and check that the traps have been positioned as shown as in Fig. 3; transposition of the traps will give the symptoms indicated. Assuming that the traps are in their correct positions, the next step is to connect an

However, the writer has also suggested that the experimenter might do well to move away from accepted practice and not assume that, for example, a trapped vertical *must* use  $\lambda/4$  sections for each band covered: it is in such cases that the order of tuning may change and common sense and logic must be used. For example, let us consider the case of an operator who wishes to build a vertical antenna for the 7 and 14 MHz bands only. He has the option of building a "conventional" device as depicted in Fig. 1(a) which consists of a quarter-wave section for 14 MHz (approx. 16ft.), a 14 MHz trap and then sufficient extra vertical to resonate the complete antenna on 7 MHz (approx. 14ft.). The order of tuning is also conventional in that we first resonate the higher frequency (14 MHz) by adjustment of the length between the feedpoint and the trap, and then the lower frequency (7 MHz) by adjustment of the length of the section above the trap. The author would not be happy with this antenna, however, and would prefer an electrical length of somewhat more than  $\lambda/4$  on 14 MHz in order to lower the angle of radiation on this band and make DX working a little easier!

I would therefore opt for the device shown in Fig. 1(b) which consists of a quarter-wave on 7 MHz, a 7 MHz trap and a further section to resonate the complete antenna as a  $3/4\lambda$  on 14 MHz. Note that the device is an inverted-L rather than a pure vertical — the top loading sections between the vertical and the 7 MHz trap, and from the 7 MHz trap to the remote end, are constructed of wire. With this antenna, the order of tuning is reversed and we firstly resonate the lower frequency (7 MHz) by adjustment of the length of wire between the vertical section and the trap and *then* the higher frequency by adjustment of the wire between the trap and the end insulator. Note also that when the antenna is used on 14 MHz, the 7 MHz trap will display capacitive reactance and the total length of the antenna will be around 51 to 52ft., as compared to the normal length of about 48ft. for a 14 MHz  $3/4\lambda$  inverted-L antenna. The mode of operation of the antenna on 14 MHz is depicted in Fig. 2, the capacitance of the trap being responsible for the "extra" 3 or 4 feet of wire to resonate the device at this frequency. Obviously the L:C ratio of the trap will determine the actual length required and accurate figures cannot be quoted.

Application of similar logic will permit the experimenter to determine likely lengths for his antennas and to decide on the order in which the device must be resonated on the particular bands that it covers.

The only other point that requires note when resonating dipole antennas is that *extreme care* must be taken to ensure that identical lengths of wire are removed from each side of the device if symmetry is to be maintained — failure to do this will completely cancel out the effort put into constructing a matched pair of traps in the first place!

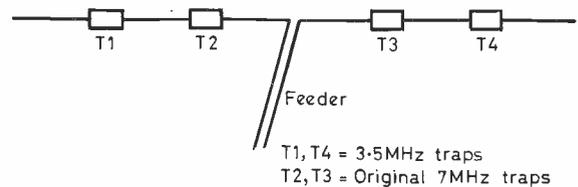


Fig.5 The W3DZZ dipole modified to provide 1.8MHz coverage

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ohm-meter between the two conductors of the feeder, upon which we should obtain a near infinite reading — a low reading will indicate that either the coaxial connector is faulty or incorrectly fitted, the feeder itself is faulty or damaged, or that the feeder is incorrectly connected to the wires of the antenna, *i.e.* "shorted out."

However, assuming a near infinite reading is obtained, next check the "continuity" of the system by connecting the ohm-meter between one conductor of the feeder at the transmitter end and the same conductor at the antenna end — this test then being repeated for the other conductor. A high resistance reading on either of these two measurements indicates a break (or near break) in the feeder, the remedy for which is clear! Assuming that all is correct again, we check the continuity between the transmitter ends of the feeder conductors and the "inner" terminals of the 28 MHz traps: a high resistance reading again shows the fault and its obvious remedy, while a low resistance shows that all is well — in which case the fault lies within one or both of the 28 MHz traps.

If the traps are newly constructed this is unlikely (although not impossible) and it is likely that the fault would have been found before this stage of the investigation had been reached. However, with an antenna which has been in use for some time, this is a possibility and the only way to find out is to remove the traps from the antenna and first check that there is continuity between the two terminals — *i.e.* determine that there is not a break in the coil or in the internal wiring of the device. Assuming that we have continuity, we must next check whether they attenuate energy as they should at their resonant frequency. The test set-up is the same

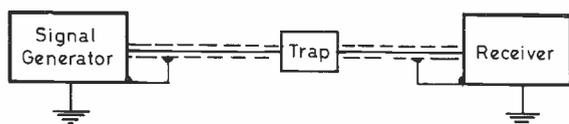


Fig.4 Test set-up for checking possible malfunction of a parallel resonant trap.

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as that for trap tuning and is shown in Fig. 4. The trap is shorted out, the signal generator and the receiver are set to the trap's resonant frequency, the generator's output is found on the receiver and its output is adjusted to give an S9 reading on the 'S' meter. Removal of the short will produce a very sharp drop in 'S' meter reading if the trap is functioning correctly. A very small drop or none at all indicates that the trap is not working and the fault probably lies with the capacitor, although it is possible for turns of the coil to be shorted out, thus altering the effective inductance. It is also possible for the 'S' meter reading to increase considerably when the short is removed; this is simply an indication that the load impedance "seen" by the signal generator has changed as a result of removing the short and its output level has increased in consequence. This indicates, again, that the trap is not functioning correctly since the trap attenuation should more than cancel out any increase in the generator's output level.

Following the same logic it can be deduced that if the 28 MHz function of the antenna is as it should be, but the 21 MHz section is not working, the fault lies between one or both sections between the 28 MHz and 21 MHz traps, or with one or both of the 21 MHz traps themselves (in either case it is probable that a very high VSWR will also be noted on 14 MHz).

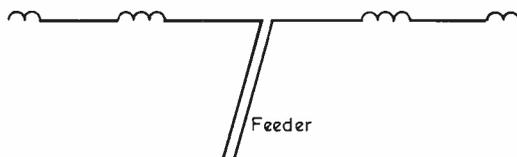


Fig. 6(a) Equivalent circuit of the modified W3DZZ antenna when operated on 3.5MHz. Note the small amount of end-loading contributed by the 3.5MHz traps.

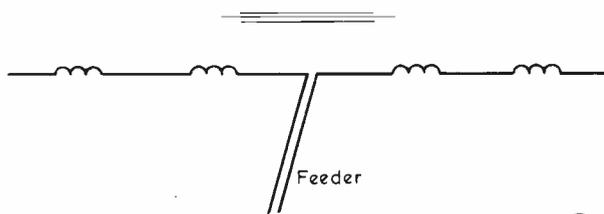


Fig. 6(b) Equivalent circuit of the modified W3DZZ antenna when operated on 1.8MHz

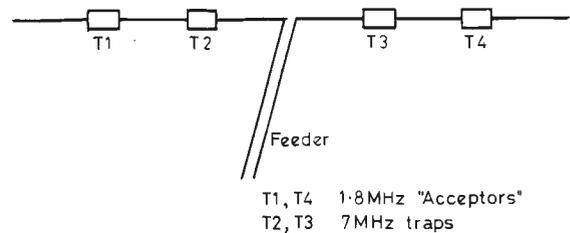
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Finally, assuming satisfactory performance on 28 and 21 MHz but a high VSWR on 14 MHz, about the only possible cause is lack of continuity between the "outer" terminal(s) of one or both of the 21 MHz traps and the end(s) of the antenna.

### Extension of Band Coverage

Perhaps one of the most neglected features of parallel resonant traps is their usefulness in providing coverage of additional bands when inserted in existing antennas. The following ideas are put forward to illustrate the principle.

**1.8 MHz coverage with the W3DZZ antenna.** At least one manufacturer markets pairs of 3.5 MHz traps for use with W3DZZ type dipoles in order to extend their coverage to include the 1.8 MHz band, the "modified" antenna being depicted in Fig. 5. The existing W3DZZ will need to be retuned for the 3.5 MHz band and it will be noted that a few feet of wire will need to be removed — this is because the 3.5 MHz traps will "end load" the 80-metre section to a small degree and the device will work in the manner shown in Fig. 6(a). On 1.8 MHz the traps contribute their full inductance and the devices behave as shown in Fig. 6(b). Typical overall lengths for these "modified" W3DZZ dipoles are from about 210 to 240ft., depending, of course, on the L:C ratios of the traps employed.



T1, T4 1.8MHz "Acceptors"  
T2, T3 7MHz traps

Fig.7 G3XAP proposal for adding 1.8MHz coverage to a W3DZZ antenna by the use of 1.8MHz series tuned acceptors.

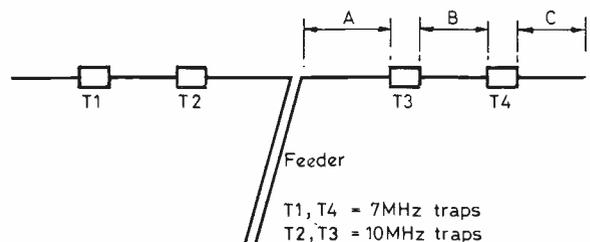
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For the amateur who, like the author, regards the W3DZZ type dipole as a two-band antenna, the addition of the 3.5 MHz traps provides him with a three-band device. However, many operators regard the W3DZZ antenna as a five-bander and they will look upon the modification as the removal of the 14, 21 and 28 MHz bands from the antenna's coverage, since attempts to use the modified device on these bands will almost certainly give rise to high VSWR readings — unless by pure accident the antenna happens to resonate on a harmonic of one or more of these bands.

The author would suggest that there is, perhaps, room for the experimenter here since it is theoretically possible for the W3DZZ antenna to include 1.8 MHz coverage without seriously disrupting operation on the three HF bands, by use of series resonant circuits instead of the usual parallel resonant traps! Fig. 7 shows the idea, but the author would stress that he puts the proposal forward without having tried it out in practice, purely with the intention that it might provide some readers with an interesting project to pursue. The basis of the design is that the acceptor circuits will display a very high impedance on all five bands from 3.5 to 28 MHz and therefore will not materially affect the W3DZZ principle on these bands, but will become very low impedance on 1.8 MHz and bring the outer sections of the antenna into play *only* when operating on this band. It is likely that the original 80-metre section of the W3DZZ antenna will need lengthening slightly after the addition of the 1.8 MHz acceptors in order to re-establish resonance at 3.5 MHz.

I would very much welcome "feedback" from readers who actually put this idea to the test since my investigative work on high-gain trapped vertical antennas means that I don't have the time to carry out the work myself — at least in the foreseeable future!

**10 MHz coverage with the W3DZZ antenna.** By introducing a pair of 10 MHz traps to the inner sections of a W3DZZ antenna, it can be made to operate effectively on 10, 7 and 3.5 MHz, although coverage of the 14, 21 and 28 MHz bands will be lost except "by accident" as discussed in the previous example. The antenna will take the form of that shown in Fig. 8; dimension 'A' will be of the order of 27 to 28ft., 'B' will be around 1 to 2ft. and dimension 'C' about 22 to 24ft. Again, the dimensions will vary considerably according to the L:C ratios of the traps used. Some



T1, T4 = 7MHz traps  
T2, T3 = 10MHz traps

Fig.8 A 3-band trapped dipole for the 3.5, 7 and 10MHz bands. For details of dimensions A, B and C, see text

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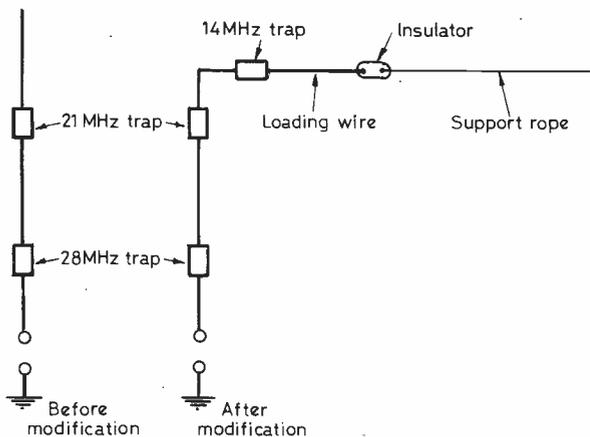


Fig. 9 Modification of a 14, 21, 28MHz vertical to provide 7 MHz coverage.

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operators have reported that the W3DZZ antenna displays a low feeder VSWR on 10 MHz without modification but the author has been unable to determine how this can happen, unless the length of feeder in use accidentally puts a 50-ohm impedance at the point in which the SWR bridge is inserted. Certainly the W3DZZ antennas checked by the author have not shown a true resonance in or near the 10 MHz band.

**7 MHz coverage with a vertical tribander.** The 10, 15 and 20-metre trapped vertical is a very popular antenna and the author has seen more than one article in which the coverage of the device is expanded to include 40-metre coverage (and sometimes 80-metre coverage) by insertion of a coil at its feedpoint. True, this does enable 40 or 80-metre coverage to be obtained, but the approach does have two disadvantages: (a) the loading coil is inserted at a current antinode, which is also the area of maximum radiation of the antenna (and maximum signal pick up in the receive mode) — hence the mean current and therefore the mean radiation from the vertical part of the antenna itself is lower than it would be if the antenna were loaded at some other point; (b) the coil must be switched into circuit every time operation on the additional band is required — and switched out when it isn't!

The G3XAP approach is to introduce a 14 MHz trap into the device and convert it into an inverted-L as shown in Fig. 9. Basically the idea is to shorten the upper section (14 MHz) of the existing antenna and run a wire off the top of this to the 14 MHz trap, and then to provide sufficient extra wire on the other side of the trap to resonate the total length of the antenna on 7 MHz. If

2ft. is cut off the top of the vertical, the wire between this and the trap will be around 1ft. in length — the actual length being adjusted to re-establish resonance on 14 MHz (21 and 28 MHz operation is not affected by this modification and no changes are necessary to the lower sections of the antenna). The length of the outer loading wire will be dependent on the sum of the inductances of all three traps and will vary considerably from one antenna to another, but lengths between about 11 and 15ft. should be necessary to give 7 MHz resonance. The slight reduction in effective height will make little difference to the 14 MHz performance of the vertical, whilst on 7 MHz the height of the vertical section is about  $0.1\lambda$  which means that it will not be a good DX performer but should give a good account of itself for inter-G or European working; 7 MHz radials should be used with the modified device, and it is probably good practice to run a thin nylon line from the top of the vertical in the opposite direction to the trap/loading wire in order to counteract the pull of the latter and hence keep the antenna vertical.

If 3.5 MHz is preferable to 7 MHz operation, the modification is very similar — the only difference being that the loading wire

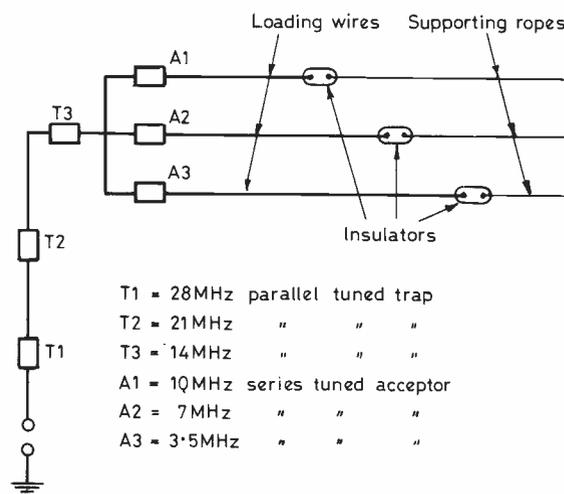


Fig. 11 Theoretical design for conversion of a tri-band trapped vertical antenna to 6-band operation using both parallel and series resonant circuits.

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will need to be around 40 to 45ft. in length in order to establish 3.5 MHz resonance, and 80-metre radials should be installed in place of the 7 MHz radials. The 3.5 MHz radiation will be largely horizontally polarised (the vertical section is only around  $0.05\lambda$  long at this frequency) and since the horizontal portion of the antenna is only about 13 or 14ft. from the ground, this radiation will be at very high angles, making the antenna an effective device for inter-G working.

**Addition of 3.5 MHz to a 4-band vertical.** The four-band (10 to 40-metre) vertical can be modified to include 80-metre coverage in exactly the same manner as that described above — a 7 MHz trap and about 30 to 35ft. of wire being all that is necessary to convert the antenna into a 5-band inverted-L (plus additional radials for 3.5 MHz, of course). The modification is so similar to the previous example that no more needs to be said here other than to mention that the device will perhaps surprise some operators by giving a fair DX performance on 3.5 MHz. Although the vertical section is only about  $0.1\lambda$  high at this frequency, the author has found that contacts with stations in North America have been relatively simple to obtain, indicating that some radiation at relatively low angles is present.

**Conversion of a triband vertical to a 5-bander.** It should be obvious from the example given above in which a triband vertical

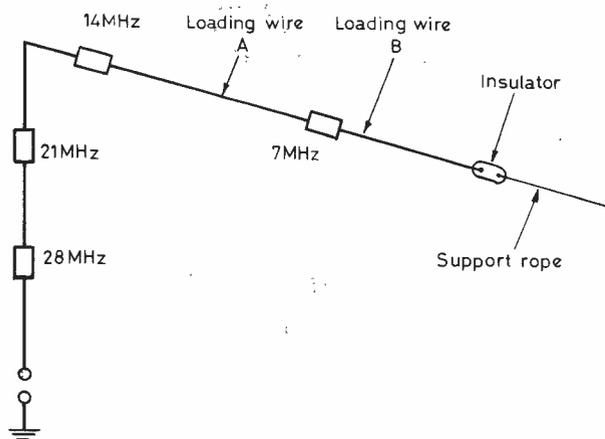


Fig. 10 Modification of a 14, 21, 28MHz vertical to provide 5-band coverage.

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was modified to include coverage of 7 MHz, that the addition of a 7 MHz trap plus an additional loading wire would enable 5-band coverage to be obtained. The device is shown in Fig. 10 and consists of the original trapped vertical plus two additional traps (14 and 7 MHz) and two loading wires 'A' and 'B', whose lengths are adjusted in order to resonate the antenna on 7 and 3.5 MHz. As the conversion is identical in principle to the examples quoted above, there is no need to give further details here.

### An Alternative Approach for the Experimenter

For those who like to experiment with antennas, the author offers the following method of obtaining 6-band coverage from the conventional 10, 15, 20-metre trapped vertical — again he would like to carry out the work himself but there are only 40 hours in a G3XAP day!

One disadvantage of adding additional traps to the single length of antenna as discussed above is that on the lower frequencies a

large number of traps in circuit mean losses can be high. By using a 14 MHz trap, three "acceptor" type series resonant circuits for 10, 7 and 3.5 MHz (as discussed above) and three loading wires, it is theoretically possible to construct the antenna depicted in Fig. 11. Again the author has not actually built the device, but the principle is that when operating on 28, 21 or 14 MHz, the antenna behaves as a conventional trapped vertical, but when it is subjected to RF energy at 10, 7 or 3.5 MHz, the appropriate series tuned circuit becomes low impedance and switches the appropriate loading wire into operation! The lengths of the loading wires are adjusted to resonate the antenna on the three lower frequencies and adjustment of any one of them will not affect the antenna's operation on any of the other five bands.

Again, I would welcome feedback from any reader who decides to try out this idea.

The final part of this series will describe another G3XAP innovation — some simpler approaches to the construction of traps for use in antennas made from tubing, *i.e.* verticals and Yagis.

*to be concluded*

## An S-Meter Calibrator

G. W. SUTTON, C.Eng., MIEE,  
G4EVW

**T**HIS project is simple in concept, but difficult in execution. The idea is to generate a 7 MHz signal of about 50 microvolts which will drive a receiver S-meter reliably to S9 for calibration purposes.

### Circuit

There are two parts to the circuit — an LC Colpitts oscillator, and an attenuator. An LC oscillator was chosen because its stability is adequate, and it can be built for under £2, whereas a crystal controlled oscillator would be twice as expensive.

The circuit diagram is shown in Fig. 1 for the oscillator, and Fig. 2 for the attenuator section. The oscillator is a standard Colpitts arrangement built around a 2N3819 FET. The core of coil L1 is adjustable and is used to set the frequency to 7.05 MHz (chosen for convenience only). The output is taken, somewhat unusually, from the feedback capacitor C4, *via* C5 to the attenuator. This is done partly to reduce oscillator loading, and

partly to keep the output voltage low in order to make the job of the attenuator easier.

The attenuator comprises two pi-sections, the first capacitive, and the output section resistive. These sections are screened to prevent RF leaking through to the output connector. The task of these two sections is to reduce the input voltage from the oscillator to the 50 microvolt level — not an easy thing to achieve.

A voltage of about 1.2mV was available at the junction of the pi-sections and this was also brought out to a separate BNC connector to give a really beefy S9 + 30dB signal. The output from the unit is intended to plug directly into the 50-ohm aerial socket of a receiver.

### Tables of Values

#### Fig. 1

- |                         |                                    |
|-------------------------|------------------------------------|
| R1 = 180R               | C5 = 1000 pF disc ceramic          |
| R2 = 560R               | TR1 = 2N3819                       |
| R3 = 1M                 | L1 = 4.8 µH osc. coil type 10K     |
| R4 = 680R               | (Ambit ref: 35-41740)              |
| C1 = 0.01 µF            | RFC = 4.7 mH (Ambit ref: 35-71475) |
| C2, C3 = 220 pF poly.   | ZD1 = 6.2V zener diode             |
| C4 = 22 pF min. ceramic |                                    |

#### Fig. 2

- |                   |                           |
|-------------------|---------------------------|
| R5 = 470R, 0.125W | C6, C8, C9 = 470 pF poly. |
| R6 = 56R, 0.5W    | C7 = 4.7 pF min. ceramic  |

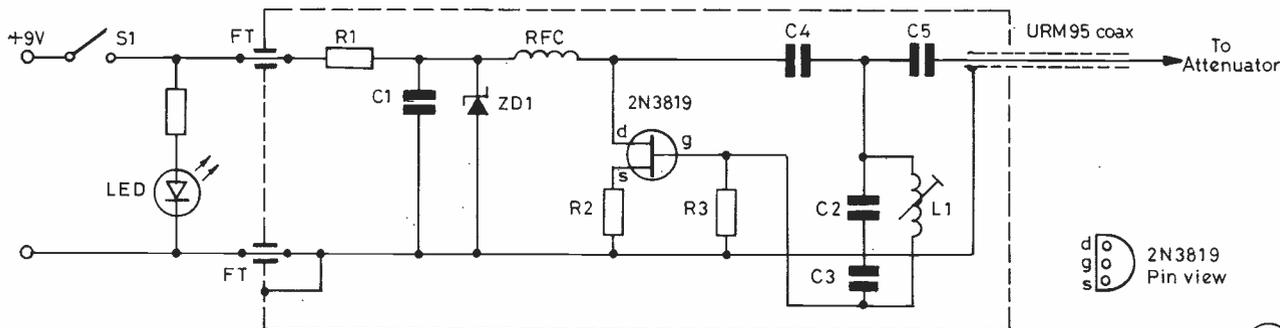


Fig. 1 7.05MHz OSCILLATOR SECTION

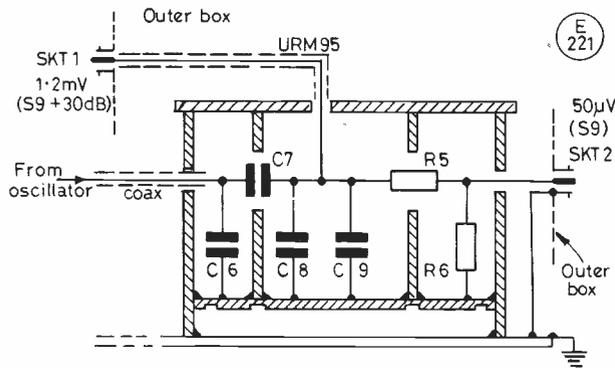


Fig. 2 ATTENUATOR SECTION

### Calibrating the Unit

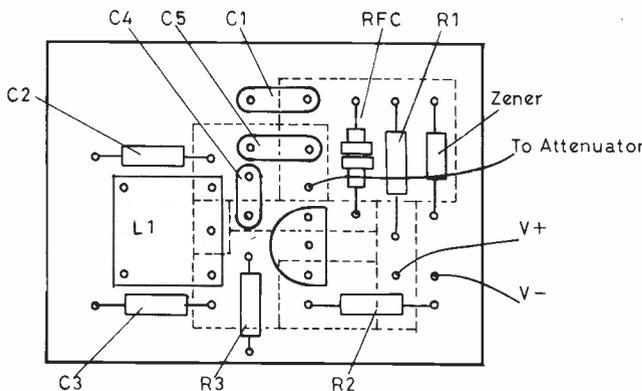
The output is to some extent affected by the construction, and some adjustment may be required. Measuring the 50 microvolt output is not practicable, so it is necessary to measure, and if necessary adjust, at the high level output of about 1.2mV.

If a good oscilloscope is available, it is easy to check for 1.2mV r.m.s. (3.4mV peak to peak); adjustment can be made either by altering the value of C5, or of C6. Alternatively, a high impedance voltmeter and RF probe can be used. Hopefully, if the construction is as suggested, the output will be more or less correct.

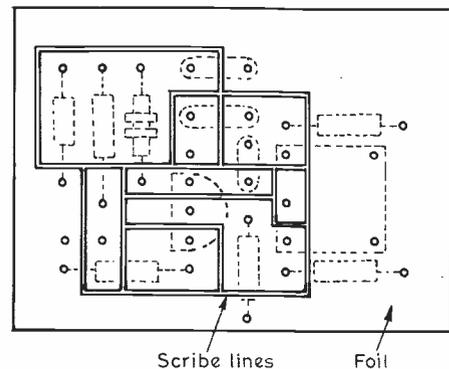
S-Meter Reading	Input Voltage (r. m. s.) Approx. Microvolts
S9 + 40dB	5000
S9 + 30dB	1600
S9 + 20dB	500
S9 + 10dB	160
S9	50
S8	25
S7	13
S6	6
S5	3
S4	2
S3	1
S2	0.5
S1	0.2

Table 1

The oscillator circuit is constructed using the scratchboard method, and the component layout and underside copper lands are shown in Fig. 3. With this method, the connections are made by scribing lines through the copper on the underside of the board using a sharpened piece of hacksaw blade. Four or five scribing cuts are usually sufficient to produce a clean separation of the



(a) Component layout



(b) Underside

Fig. 3 COMPONENT LAYOUT - OSCILLATOR SECTION

### S-Meter Calibration

It is generally accepted that 50 microvolts at the aerial socket corresponds to an S9 reading on the S-meter scale, and that each point on the meter is 6dB higher than the one before. 6dB represents approximately a doubling (or halving) of the signal, so a table can be drawn up; see Table 1.

Accuracy of the output is desirable, but not crucial; an error of 50% in the output voltage corresponds to only half an S-point.

The unit is easy to use — simply connect to the receiver aerial socket and adjust the S-meter potentiometer to give an S9 reading using the low level output, or an S9 + 30dB reading using the high level output.

### Construction

The oscillator and attenuator are built on separate pieces of double-sided copperclad board, 3.5mm. by 2.5mm. Each section is enclosed in a screened box formed using single-sided copperclad board (copper sides inward). These are soldered at the joins during assembly. Both sections are soldered to a double-sided base board, which itself is mounted inside an aluminium alloy project box. The screening is necessary to prevent the RF jumping all over the place and bypassing the attenuator.

required copper lands.

The attenuator is built by soldering the components above the copper ground plane, with the coupling components C7 and R5 passing through 3mm. holes in the screens. The purpose of this form of construction is to minimise stray capacitive coupling which would disturb the action of the attenuator.

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# CLUBS ROUNDUP

By "Club Secretary"

**A**N enormous pile confronts your scribe this month — so maybe we should get stuck in without more ado!

**Abergavenny & Nevill Hall** have a room above Male Ward 2 at Pen-y-Fal Hospital, Abergavenny, every Tuesday evening. They also have an RAE class going at the Seminar Room in Nevill Hall Hospital on Tuesdays; details of all the current goings-on from the Hon. Sec. — see Panel for his details.

**Acton, Brentford & Chiswick** have a discussion set up for May 15, the topic being "The SWR Meter" and the venue the Chiswick Town Hall, High Road, Chiswick, London W4, starting at 7.30 p.m.

Our next offering is a rather nicely-produced newsletter from **Axe Vale**, the careful work of G3YMK; from it we find that they foregather at the Cavalier Hotel, West Street, Axminster, on the first Friday of each month. On May 4, G3GC will be talking on "Aerial Radiation Patterns, How and Why", with the June session titled "The Entertaining Electron".

Over to Ulster now, and **Ballymena**. An old-established club which is to be found every Thursday evening at 70 Nursery Road, Gracehill, Ballymena; and they have Morse and R.A.E. classes in operation as well — all the details from the Hon. Sec., see Panel. Looking forward to August they hope to repeat their commemorative visit to Rathlin Island where Marconi and Kemp did their historic experiments in 1898.

Satellites are the subject at **Bangor** — Gordon Currie, G16ATZ, is the speaker and the venue the Sands Hotel on Bangor's seafront, on the first Friday of the month. We also note they have their own mobile rally, set for June 10.

Back now to the mainland, to **Bath**, where we can't give you too much detail as the last meeting was the AGM. Get the latest details as to what's happening at the "Englishcombe Inn", Englishcombe Lane, Bath, from the Hon. Sec. — see Panel. Of course, you could just haunt the place every Wednesday evening until you hit the right one!

**Biggin Hill** have May 15 down as either operating the club rig at HF or VHF, or just nattering, to choice; and the place is their new Hq. at St. Marks Church Hall, Church Road, Biggin Hill.

**Bishopstortford** have a main meeting at the British Legion Club in Windhill on the third Monday of the month; in addition there is an informal gathering at the "Nag's Head" on the first Monday of the month — find the saloon bar and listen for the radio-type talk. This pub is on the A120 road, on the way eastwards out of town.

If you pass the Stortford lads and their beer, and press on through Dunmow, you will come to **Braintree** where the locals have their Hq. at the Braintree Community Centre, Victoria Street, next to the bus station in the centre of the town; May 7 is down for a talk on receivers old and new, and on May 21 they have the AGM.

GW now, and this time **Bridgend**; they have the second Wednesday of each month at the NCB Hq., Tondy. More gen on what goes on from the Hon. Sec. — see Panel for his statistics.

**B.A.R.T.G.** looks after the RTTY buffs; they have a really first-class newsletter, and a well-organised sales section which would be an enormous help to anyone getting going. Well worth a subscription — contact the Hon. Sec., see Panel.

Our previous mention of a **British Telecom/Post Office (Midlands)** club formation seems to have helped, as we now hear they held a first AGM last month. Details of what's what should be obtained from the Hon. Sec. at the address in the Panel.

May 7 for **Bromsgrove (A.R.S.)** sees a special-event station set up at Catshill Village Fete, for Bromsgrove Boys Brigade. May 10 is shown as being the date for the AGM, to be held at the British Legion Club, Birmingham Road, Bromsgrove.

At **Bury** the gang are based on Mosses Community Centre, Cecil Street, Bury, every Tuesday evening, with a 'main' meeting once each month. Thus on May 8 they have the second part of G8XUR's "Confessions of a TV Repairman!"

**Cambridge Repeater Group** looks after the repeaters around the Cambridge and North Herts area, and they put out a very good newsletter in support of the repeaters under their control. More details from the Hon. Sec. — see Panel.

**Cambridge** radio amateurs have their club Hq. at the Visual Aids Room, on the ground floor at Coleridge Community Centre, Radegund Road, which is a turn off the well-known Coleridge Road in the south part of the city. They are to be found every Friday evening during term-time; May 11 and 25 are informals, on May 4 G4FFO will talk about very low frequencies, and May 18 is the Construction Evening.

For some reason this month we have been favoured by several repeater groups to advertise their meetings; the first meeting of the **Cardiff (S.E.W.R.G.)** was to be held on April 4 but the letter didn't reach us in time for last month. Thus all we can do at this late stage is to refer all those interested to the Hon. Sec. for details as to future activities and so forth — his details are in the Panel.

On now to **Cheltenham**, and that means Stanton Room, Charlton Kings Library, Cheltenham. May 4 is a talk on aerial matching by G4CHD and there is an informal on 18th.

There are two natter nights for **Cheshunt** in May, on 9th and 23rd. May 2 is down for a talk on contest operations by G3WFM, and on 16th G3NRW will talk about AMTOR and packet radio as well as simple RTTY. May 30 is the first time this year they will be out on Baas Hill Common, Broxbourne, operating portable. Meetings are at the Church Room, Church Lane, Wormley.

The meetings of the **Chichester** club on May 5 and 17 are both in the Long Room at Fernleigh Centre, 40 North Street, Chichester.

"Nostalgia, Part 2", by Frank Osborne, is the **Colchester** fare on May 3, while on 17th they will be preparing for both NFD and the Anglian rally activities. Hq. is at Colchester Institute, Sheepen Road, Colchester.

For **Cornish** the calendar doesn't go quite far enough ahead this month; but we can say they always have the first Thursday in each month at the Church Hall, Treleigh, on the old Redruth bypass.

A mistake in the letter from **Crawley** was rapidly followed by the correction — which shows another good reason for being a bit ahead of deadline! Thursday, May 17 is the date, and a very special one too, as Mr. H. V. Sims will be doing his famous talk "Aerial Principles". This will be open to members of clubs nearby, and to cope with the larger audience than usual the venue has been shifted to the lecture theatre at Crawley Technical College. If you can get to this one *don't miss it!*

For **Crystal Palace**, the change of venue to All Saints Parish Room, Upper Norwood, has been very beneficial to the club. This spot is at the junction of Beulah Hill and Church Road, opposite the IBA mast, so should be easily located! On May 19, G3IEE will be talking about "World War Two Equipment" — we assume he is talking about radio equipment or we visualise him driving a Churchill tank to the meeting!

May's programme for **Derby** is: May 2 a junk sale, with a talk on microwaves by G6UHF down for 9th, May 16 a visit to a CEBG site organised by G3LGK, to be followed on 23rd by a film show, and on 30th by 'Technical Topics'. All are at 119 Green Lane, Derby, where the club have the whole of the top floor.

A change of Hq. seems to have occurred for **Dudley**, where they now have a place at the Allied Centre, Castle Street, normally on the first, second and fourth Monday of the month. More recent data from the Hon. Sec. — see Panel.

The first and third Thursday of the month are set aside for **East Kent** meetings at "The Cabin", Kings Road, Herne Bay, Kent. We don't have the details of the May goings-on, for which you should refer to the Hon. Sec. — see Panel.

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- YORK: K. R. Cass, G3WVO, 4 Heworth Village, York. 308: D. Davis, G6YQD, 13 Maple Road, Surbiton, Surrey KT6 4AA.

East London RSGB has now moved to quarterly meetings with the next one not scheduled until July, owing to increased costs for the room. Details from the Hon. Sec. — see Panel.

Now to Edgware where they have May 10 for a talk on ferrite

materials by the Neosid people, and on May 24 a Constructors' Evening, to be followed by NFD briefing. The Hq. is at 145 Orange Hill Road, Burnt Oak.

In the west we find Exeter, where they have a junk sale on May

14, at the Community Centre, St. Davids Hill, Exeter.

Alternate Wednesdays are the days to find the **Exmouth** group at their Hq. at the 6th Exmouth Scout Hut, Marpool Hill, Exmouth, Devon. More details can be obtained from the Hon. Sec. — see Panel.

Somebody at **Fareham** has been working hard on the programme — something for every Wednesday evening till the year-end! May 2 and 30 are both on the air and natter nights; May 9 they will be planning for an arts and crafts exhibition, which is itself on 16th. That leaves May 23 for a talk on basic computing techniques by Mr. Sinclair. Club Hq. is at Portchester Community Centre, Wheatlands Grove, Fareham.

At **Farnborough** there is a talk on May 9 by AMSAT-UK members on latest developments. May 23 is of course the last chance before NFD for the experts to give a preview — doubtless to include the fate of the chap who one year forgot to bring the rig! The execution would be at the Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough, Hants.

Turning back to EI, we have a note about **Fingal** who are on the air every Monday evening, monitoring EI1DK on R0 and on Forty, too. More details of the club's activities from the Hon. Sec. — see Panel.

Now **Fylde**, where their very low subscription includes full membership of the Kite Club, Blackpool Airport, where they foregather. Thus members can, when not at a club evening, sit there of an evening, watch the aircraft and enjoy a pint in the bar too. On May 1 they will visit *HMS Inskip*, and on 15th they have a surplus equipment sale.

**Glenrothes** will be visiting Fife Police Hq. on May 2, and on May 20 have demonstrations of 6-metre and 23cm. operations by a couple of acknowledged dab hands. The venue is Provosts Land, Leslie, Fife.

On to **Halifax** which has the third Tuesday in each month at the "Running Man" in Pellon Lane, Halifax. On May 22, they have a demonstration of equipment by *Lowe Electronics*.

If you think of **Harrow** in 'our' context, you think of Harrow Arts Centre, and every Friday evening, either in the Belmont Room for the formal stuff such as talks, or the Roxeth Room for the informal natter sessions.

Now to **Hastings**, where the main meeting — always the third Wednesday in the month, whence May 16 — is at West Hill Community Centre. Other Wednesdays, and on Tuesdays and Fridays, you can find them at Ashdown Farm Community Centre; and in particular on May 26 at that Centre's Spring Fair.

The weekly meetings of the **Havering** club continue to be on Wednesdays at Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex. May 2 is down for a talk on Top Band DX working by G4AKY, and on 9th they have a pre-contest briefing followed by an informal. May 16 features a talk by Sheila, G3HCQ, on the RSGB EMC sub-committee. May 23 is another pre-contest briefing, for NFD, and on May 30 the G4MYO D/F Hunt.

It is a quite a while since we heard from **Haverhill**; they have a talk on the design of simple test equipment on May 11, and the construction of a GDO is the topic on May 25. However, for the venue and the other details we must refer you to the Hon. Sec. — see Panel for his details.

After a long stint in office, the Hon. Sec. of **Hereford** steps down to concentrate on the DX. . . . His successor will have his work cut out with such predecessors as G4CNY and G3RJB. May 4 is down for a talk on procedure and band plans, while on May 18 it is all arrangements for NFD. The Hq. is at County Control, Civil Defence Hq., Gaol Street, Hereford.

At **Ipswich** the group has a berth at the "Rose & Crown" which lies on the A45 Norwich Road at the junction of Bramford Road, where they are booked for second and last Wednesdays; they are often there on other Wednesdays, too. May 9 sees a D/F Hunt finishing at the clubroom of the group, as above; May 23 is planning for their East Suffolk Wireless Revival, and the event itself is at Bucklesham (Suffolk Showground) on May 27. May 30 is a bring-and-buy sale, at Barrack Corner Church Hall.

Back to EI again, and **I.R.T.S.** This is the place to look no



Guest judge at Chesham & District A.R.S.'s very successful recent Construction Contest was Reg Newman, G6XO. Here, G6XO holds the winning project, a 20/80m. Tx/Rx built by Robin Caine, G4IWS.

photo: G4UXA

matter what you want to know about radio clubs in Eire; Details from the Hon. Sec. — see Panel for his details.

In the **Isle of Man** the club is based on the Keppel Hotel, Cregny-Baa, every Monday evening. The Hon. Sec. says that they have received permission to run an expedition to the Calf of Man — a bird sanctuary — both on HF and VHF, between June 15 and 17.

**Kent Repeater Group** has its AGM on May 18 at the Electronics Building, University of Kent, Canterbury, 7.30 for 8 p.m.

Yet another repeater group now, this one being **Leicester**; they seem to be on a membership drive, so we suggest that if you are a regular user of their repeaters, you join — for details, the contact is G4MGG who is at 565 Uppingham Road, Leicester.

On May 11 the lucky members of the **Medway** club will be receiving all the inside information on RSGB from John Nelson, G4FRX. However, you can find them on any Friday evening from around 7.30 at St. Luke's Church Hall, King William Road, Gillingham.

The **Midland** club have their own place at 294A Broad Street, opposite the Birmingham Repertory Theatre. For the rest we must refer you to the Hon. Sec. — see Panel for his address.

The **Mid-Ulster** crowd foregather at the home of GI4BAC at 3 p.m. on the second Sunday in the month, for talks, demonstrations and all the other things a club does; in addition this month they have their Rally at Parkanaur House — last year they raised a large sum of money for their GI3VFW fund, proceeds of which are put to making life a bit better for the handicapped people in training at Parkanaur.

**Mid-Warwickshire** now; May 8 sees G3OOQ on the electron microscope, and on May 22 G4WAJ talks about the electro-magnetic pulse. Both are at 61 Emscote Road, Warwick.

At **Nene Valley**, May 2 is a ladies' night, followed on 9th by a natter. Building and operating the HW-8 is the subject chosen by G3DOT on May 16, while on 23rd there is another natter session. May 30 is no meeting.

The **Newquay** group gathers at the Drill Hall in Crantock Street, Newquay on alternate Wednesdays. Details on the latest programme from the Hon. Sec. — see Panel.

Valley Drive Community Centre, Plumstead Road, Norwich,

is now the home of the **Norfolk** club; they will be pleased to see you on any Wednesday evening. The change of Hq. has unsettled the programme a bit, but we should have more details before long.

At **Northallerton** there are proposals to start a club; contact G3MAE — see Secretaries' Panel — if you are keen.

**North Devon** writes once in a blue moon — and there was a blue moon locally a couple of weeks ago! On the fourth Wednesday of the even months they are at Pilton Community Centre, Chaddiford Lane, Barnstaple; on the fourth Wednesday of the odd months, they head for Bideford Community College, Abbotsham Road, Bideford. Your scribe attended a meeting of this club, years ago, and received a very friendly welcome.

Yet another new repeater group — **North Norfolk**, which wants to set up a 'box' just south of Wells-next-the-Sea. Details from the Hon. Sec. — see Panel.

Our data from **Pontefract** is a bit outdated, but we can say they are to be found every Thursday evening at Carleton Community Centre, Pontefract.

**R.A.I.B.C.** have their Romsey picnic on June 3, at the Fairground, Broadlands Estate, by kind permission of Lord Romsey, with G4COM, G4DIW, and their helpers from the Southampton group. This is the Big One for RAIBC, the club for the invalid and blind radio amateurs and SWLs. Details on the club from the Hon. Sec. — see Panel — and from G4COM/G4DIW on the Picnic.

**Reigate** members will be found at the Constitutional and Conservative Centre, Warwick Road, Redhill, Surrey; May 15 is the date for a junk sale.

At **Rhyl**, May 7 is an activity night, and on 21st G3LEQ gives the second part of his "Propagation" talk, both dates being taken at the 1st Rhyl Scouts Hq.

On to **Salisbury**, where the gang are based on Grosvenor House, Churchfields Road, every Tuesday evening. Details from the Hon. Sec. at the address in the Panel.

The premises of the Royal British Legion, Netley, Southampton, will be the site for the special-event station being run by the **Southampton Private Amateur Radio Club** (SPARK for short!) on June 4-5-7-8 evenings, when they will use GB4BLC to commemorate the D-Day landings. The actual anniversary of the 1944 events will be celebrated from Saturday, June 2 starting at 1000, right through to 2200 on the following day, and the event will be rounded off by an all-day (1000-2200) session. There will be a special QSL card for this operation, of course — details from G4VNK at 57 Newtown Road, Woolston, Southampton.

For **South Bristol** you head for the Whitchurch Folk House, East Dundry Road, Whitchurch; May 2 is a talk on 1296 MHz operation, and on 9th a QSL cards and awards rally. May 16 is the Fox Hunt briefing, and on 23rd they have a VHF SSB night; May 30 is down for ATV.

Turning now to **Southdown**, we note they have a place at the Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, on the first Monday of the month. Unfortunately, the programme details we have are a bit outdated, but we know they have something of interest on each month.

**South-East Derbyshire** is the name of the club based on the S.E. Derbyshire College, Ilkeston Road, Heanor, where they meet on Tuesday evenings during term time; there is usually a talk or discussion arranged.

**South East Kent YMCA** is the name of what is in effect the Dover Amateur Radio Club; they are at Godwynehurst, Leyburne Road, Dover, on May 2 for natter and films, with May 9 down for a limited-numbers visit to GNF, North Foreland Radio. On May 13 they have their "Dover Spring Cleaning Rally" which seems to be an open-to-all bring-and-buy with something for wives and kids as well.

Many years ago, your scribe was a member of the **Southgate** club and so it is nice to hear from them again; nowadays they have a place at St. Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. They will be gathering there on May 10 for a talk by a *Marconi* representative. June's meeting is brought forward from June 14 to June 7 due to the Euro-Elections. The

talk on that night will be by G4AEZ and will be on receiver techniques.

Friday evenings are the ones for **South Manchester**, at Sale Moor Community Centre, Norris Road, Sale; May 4 is a discussion evening, and preparation for the contest; May 11 sees G3CSG's talk about receiving Japanese Morse during the war, and on 18th there is the AGM. That leaves May 25 for a talk by the winners of the home-brew contest. In addition they have natter evenings every Monday.

**South-West Herts. UHF Group** are responsible for the provision and maintenance of the three local repeaters, namely HR, SWH, and BH; they would like contributions, and are prepared to give talks to clubs about their activities — contact the Hon. Sec. at the address in the Panel.

On May 11 the **Spalding** crowd has an evening of "Any Questions" at the White Hart Hotel, Spalding.

Next we head for **Stevenage**, and *TS Andromeda*, Fairlands Valley Park, Shephall View, Stevenage; they always have the first and third Tuesday of each month for their sessions. More details on the programme from the Hon. Sec. — see Panel.

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#### Deadlines for "Clubs" for the next three months—

June issue—April 27th

July issue—May 25th

August issue—June 29th

September issue—July 27th

*Please be sure to note these dates!*

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On to the **Stourbridge** crowd, where they now have their Hq. at the Robin Woods Centre, School Street; May 7 is an informal with the club station on the air, and on May 21 they have the main meeting — details of the latter had not been finalised at the time of their letter.

**Surrey** has been at *TS Terra Nova*, 34 The Waldrons, South Croydon, for a long while now; we don't have programme data but we can say they are to be found on the first and third Monday of each month.

May 4 is the AGM of the **Sutton & Cheam** crowd at Sutton College of Liberal Arts; on May 18 they move to the Downs Tennis Club, Holland Avenue, for a talk by Ron Broadbent, G3AAJ, on satellites and broadcasting.

Since their previous premises were damaged by fire, the **Swale** crowd has been foregathering at the Ivy Leaf Club, Dover Street, Sittingbourne, every Monday evening.

**Thanet's** May calendar looks like: May 8 a talk on printed circuits by G3DWR, May 13 a Fox Hunt, May 15 a visit to HM Coastguard, Dover; and on May 22 'something' as yet to be finalised as we write. Venue? Grosvenor Club, Grosvenor Place, Margate, second and fourth Tuesdays.

**Todmorden** have a demo evening on the HF bands plus a natter on May 7, at the Queen Hotel, Todmorden.

Turning to the **Vale of White Horse** they have first and third Tuesdays at the Landsdowne Club, Milton Trading Estate, Abingdon.

May 22 is the day for **Verulam**, and the place the R.A.F. Association Hq., St. Albans, the talk being provided by G3RJV — the topic therefore will be "Amateur Radio on a Shoestring".

May 1 is an on-the-air night for **Wakefield**, and on 15th they have a junk sale, followed on May 29 by G4KLN's slide show of Yugoslavia. All are at Holmfild House Community Centre, Denby Dale Road, Wakefield.

The formal dates for **West Kent** are May 4 for an AGM and May 18 for the Construction Contest; informals are on May 8 and 22. The main meetings are at the Adult Education Centre, Monson Road, Tunbridge Wells, and the informals round the corner at the Drill Hall in Victoria Road.

May 8 is AGM time for **Westmorland**, at the "Strickland

Arms", Sizergh, near Kendal, starting at 8 p.m.

Club nights for the **Wirral** (West Kirby) crowd are at Irby Cricket Club on second and fourth Wednesday evenings; May 8 they are 'out' on a visit to Chester club for a Quiz, and on 23rd G3LEQ does an equipment demonstration. May 13, we note, is the first of the Sunday D/F contests.

May 21 is down for the informal evening at the "Old Pheasant Inn", New Street, **Worcester**; and of course they also note their rally at Droitwich High School, Ombersley Road, on July 1. For June the formal is at the Oddfellows Club in New Street, and is about AMTOR, RTTY, and the BBC micro, by G3WHO.

**Worthing** foregatherers every Tuesday evening and are based on Pond Lane Community Centre, Durrington, Sussex, where they would like to see visitors.

At **Yeovil**, May 3 is a "Q and A" evening, while on 10th G3MYM will explain about HF propagation. May 17 tells all about what determines HF signal strength — again G3MYM; and on 24th there will be a discussion on current 'black boxes'. May 31 rounds things off with a natter. All are at the Recreation Centre, Chilton Grove, Yeovil.

**York** will put GB3YCS on at the Cub Scouts Hq. Camp at Snowball Plantation; in addition they can be found at the United Services Club, 61 Micklegate, York, on every Friday evening.

Finally, **308 Radio Club**; they are based at the Church Hall, Church Hill Road, Surbiton, Surrey, and are to be found there every Tuesday evening.

### More Mobile Rallies, 1984

**May 13, Northern Mobile Rally** (Otley A.R.S.), Flower Show Hall, Great Yorkshire Showground, Harrowgate, doors open 10.30 a.m. Full details from H. Moore, 269 Leeds Road, Ilkley LS29 8LL. **May 13, South East Kent** (YMCA) A.R.C. "Spring Cleaning" Rally, Dover YMCA Centre, Leyburne Road, Dover, 10.30 to 4 p.m., bring-and-buy, talk-in by G3YMD on GB3KS and G8YMD on S22 (145.550 MHz), refreshments. Details from Alan Moore G3VSU (tel: 0304-822738), and Jeffrey Davies G6AGK (tel: 022778-601). **May 20, Drayton Manor Mobile Rally**, Drayton Manor Park, Tamworth, Staffs. Full details from N. Gutteridge, G8BHE, QTHR (tel: 021-422 9787). **June 3, R.A.I.B.C.** Romsey Picnic, Broadlands, Romsey, Hants. Contact G4COM, QTHR (tel: Southampton 693017) for details. **June 3, Spalding & District A.R.S.** "Tulip Time" Rally, Springfields, Spalding, talk-in on S22 and SU8, trade stands, licensed bar, restaurant. Details from Mrs. B. Whitley, G6YBL, 45 Exeter Drive, Spalding, Lincs. PE11 2DY (tel: 0775-2781). **June 10, Elvaston Castle Mobile Rally**, Elvaston Castle Country Park, five miles south-east of Derby on B5010, doors open 10 a.m., talk-in on 144 and 432 MHz by GB2ECR, many trade stands, bring-and-buy, flea market, family attractions including helicopter rides, full on-site catering. Further details from John Robson, G4PZY (tel: Derby 767994), or Les Jackson, G3OZ (tel: Derby 71694). **June 10, Bangor Rally**; more details later. Contact S. Mackay, G1AOCK, tel: Bangor 54059. **July 1, Worcester & District A.R.C.** Mobile Rally, Droitwich High School, Ombersley Road, Droitwich, 11 a.m. to 5 p.m., children's attractions. Details from B. Jones, G8ASO, QTHR (tel: Worcester 351565). **July 15, Cornish Mobile Rally**, Camborne Technical College, Pool, opens 10 a.m. Details from J. Vinton, G6GKZ, 1 Gill-an-Creet, St. Ives, Cornwall (tel: Penzance 795860). **July 22, Home Counties Mobile Rally** (McMichael A.R.S. in conjunction with Burnham Beeches A.R.S., Home Counties ATV Group and Maidenhead A.R.C.), McMichael Sports and Social Club, Bells Hill, Stoke Poges, Bucks, doors open 11 a.m., trade stands, flea market, ATV and satellite demonstrations, vintage wireless, family attractions, refreshments including CAMRA beer tent. **July 29, Abergavenny, Brecon and Pontypool radio clubs' joint Rally**, Market Hall, Abergavenny. Details from W. Browning, GW4ISF, 64 St. Teilos Road, Abergavenny, Gwent NP7 6EY (tel: 0873-6723). **August 19** is the revised date for **East Kent Mobile Rally**, other details as last month's issue.

### B.A.T.C. Get-Together

This year, the **British Amateur Television Club** is meeting at The Post House, Crick (just off junction 18 of the M1) on **May 13th**, with an informal chat in the hotel bar on the previous evening. There will be lectures and trade stands and a chance to see amateur television in action; the club's own outside-broadcast truck will be there, plus a demonstration of satellite television. If you want to get an AT station on the air, this is the ideal opportunity to pick up all the necessary hardware. Admission is free and non-members are welcome. For more information contact Trevor Brown, G8CJS, on 0532-670115.

### Special-Event Station

**Bournemouth & District R.A.I.B.C.** will be operating GB2WEC for the Wedgwood Electrical Collection, located in the Old Generating Station, Bargates, Christchurch, Dorset. The Collection is devoted to the display of electricity supply equipment from its beginnings through to the present day. GB2WEC will be operating on 80m. SSB and 2m. FM on **5/12/19/26th May** from 10 a.m. to 5 p.m. and the Collection will be open to the public on May 26th. A special QSL card will be available via RSGB, or direct from G6DUN, QTHR, if applications are sent with an *s.a.e.* Alternatively, QSL cards can be collected on the open day.

### Finish

That's all for this month: a heavy clip indeed. Arrival deadline dates for your letters are in the 'box', and should be addressed to your conductor, **SHORT WAVE MAGAZINE**, 34 High Street, Welwyn, Herts. AL6 9EQ.

### K.W. 'Stub' Dipole for 10, 18 and 24.5 MHz

An original design by K.W. of a 3-Band Dipole for the new bands is now available. The aerial has an 11.6 metre 'top' centred and is supplied complete with 'stubs', balun, 20 metres of coaxial cable terminated with a UHF connector, all wire and insulators, and comes ready-made for immediate erection. SWR on all three bands averages 1.25:1 depending upon height above ground. Details from **K.W. Communications Ltd.**, Vanguard Works, Jenkins Dale, Chatham, Kent ME4 5RT (tel: 0634-815173).

### Reg. Ward & Co. Ltd. move

The well-known Devon firm **Reg Ward & Co. Ltd.** recently moved from their previous Axminster address to 1 Western Parade, Axminster, Devon (tel: 0297-34918). As well as being official Trio, Icom and Yaesu agents, they are also stockists of a wide range of ancillary amateur radio equipment.

### Corrections

With regard to the "Mini-Monitor" described on page 26 of the March issue, G3RJV has written to us to point out that the pin-out given for TR1 (see Fig. 1) is actually for the alternative 2N3819; for the specified J304 the gate and drain leads should be transposed. Also, although specified in the table of values as a tantalum type, C18 is not shown as such in Fig. 1, and it should be connected positive side to pin 7 of IC1.

In "Logic Controlled P-T-T with Toneburst" (page 90, April issue), there is a significant spelling error in line 4 of the right-hand column: the word "preset" should have been "present". We apologise to readers and G1CHK, the author, for our mistake.

# BEARCAT 200FB — LIMITED NUMBER AVAILABLE AT THE OLD PRICE £184.95

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 Scan at either 5 or 15 channels each second.

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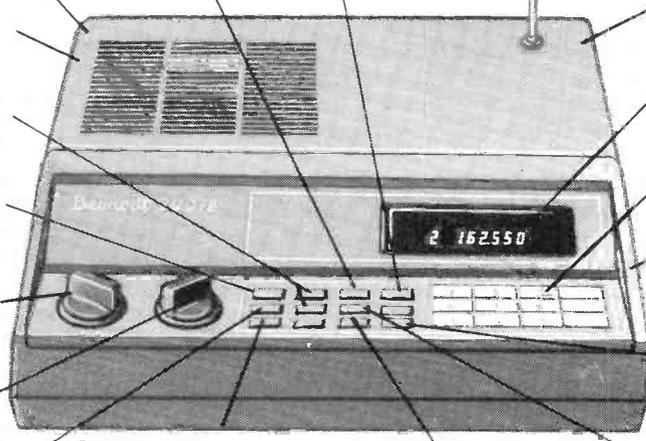
**Decimal display.**  
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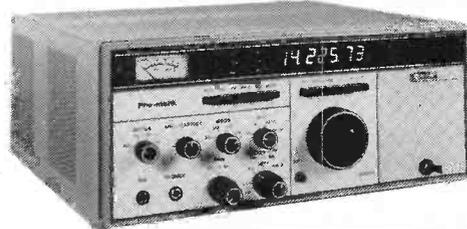
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All prices include delivery (UK only) and VAT at 15%. Independent reviews shown in (brackets).

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**SRB2** Automatic Woodpecker Blanker (as seen on a well-known TV science programme. (SWM Sept. 83, Ham Radio Feb. 84, World Radio TV Handbook 84). **£86.25**

**ANF** Advanced stand-alone automatic **whistle removal** filter for SSB, plus CW filter. (SWM July 83, Ham Radio Oct. 83, R&EW July 83). **£67.85**

**FL2** SSB/CW/RTTY **Variable audio filter**. (Rad Com, Aug. 80) **£89.70**

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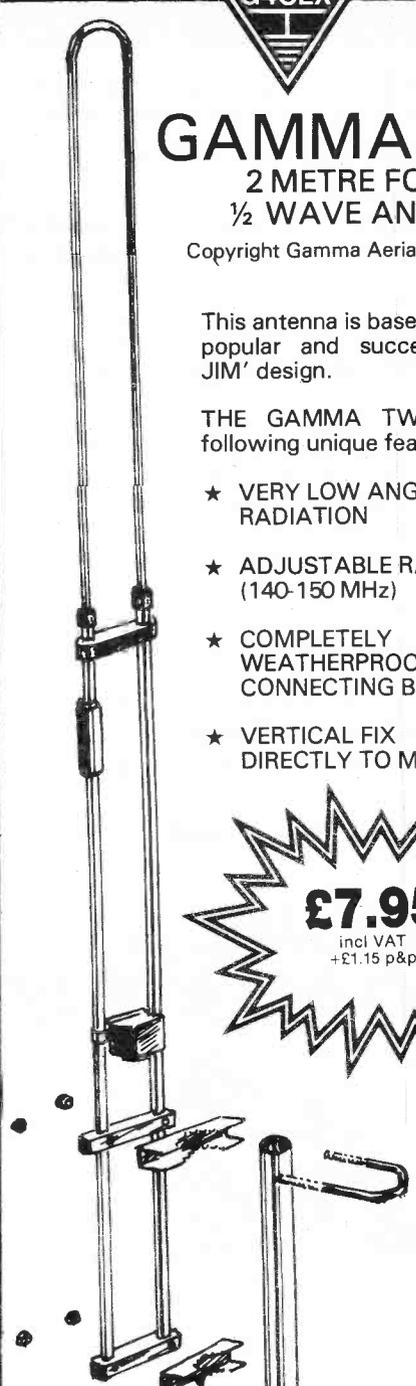
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