RADio COMmunication

April 1985

Journal of the Radio Society of Great Britain

RSGB

Amcomm of London

CALL NOW FOR THE LATEST PRICES

2 YEAR GUARANTEE on MANY PRODUCTS

01-422 9585 FOR FAST DELIVERY

Yaesu

FT1 HF Transceiver	P.O.A.
FT980 HF Transceiver	1475.00
SP980 Speaker	64.40
FT77 Mobile HF Transceiver	479.00
FP700 PSU	145.00
FC700 Tuner	105.00
FT77s 10w. version	449.00
FMU77 FM Board for FT77	28.35
FT757 HF Transceiver	759.00
FC757 Auto A.T.U.	245.00
FP757HD Heavy Duty PSU	179.00
FP757GX Switched Mode PSU	140.00
FL2050 Linear Amplifier	115.00
FT290 2m M/Mode Port/Transceiver	309.00
FT290 With Mutek front end fitted	339.00
FL2010 Linear Amplifier	69.00
MMB11 Mobile Bracket	28.75
NC11 Charger	10.75
CSC1 Carrying Case	4.60
YHA15 2m Helical	5.75
YHA44D 70cm ½wave	9.95
YM49 Speaker Mike	20.30
FT230 2m 25w FM	269.00
FT730 70cm 10w. FM	239.00
MMB15 Mobile Bracket	14.55
FT203R NEW 2m H/Held/C/W FNB3	185.00
FT209R NEW 2m H/Held/C/W FNB3	239.00
FT208 2m H/Held	209.00
FT708 70cm H/Held	189.00
MMB10 Mobile Bracket	8.80
NC9C Charger	9.60
NC8 Base/station Charger	56.75
PA3 Car Adaptor/Charger	16.85
FNB2 Spare Battery Pack	23.00
YM24A Speaker Mike	23.75
FT726R 2m Base Station	839.00
430/726 70cm Module for above	270.00
FRG7700 HF Receiver 15-30MHz	385.00
FRT7700M As above with memory	455.00
FRT7700 A.T.U. for above	48.30
MH1B8 Hand 600 8pin mic	16.85
MD1B8 Desk 600 8pin mic	64.40
MF1A3B Boom mobile mic	19.95
YH77 Lightweight phones	14.95
YH55 Padded phones	14.95
YH1 L/weight Mobile H/set-Boom mic	14.95
SB1 PTT Switch Box 208/708	17.25
SB2 PTT Switch Box 290/790	14.55
QTR24D World Time Clock	34.50
FF501DX Low Pass Filter	29.90
YP150 Wattmeter/Dummy Load 150W	97.75

NEW MODELS

FRG8800 HF Receiver	P.O.A.
FRV8800 Convertor 118-175 for above	P.O.A.
FT703 70cm H/Held	P.O.A.
FT709 70cm H/Held	P.O.A.
FT270R 2m 25W F.M.	P.O.A.
FT270RH 2m 45W F.M.	P.O.A.
FT2700R 2m/70cm/25W/25W	P.O.A.
FRG 9600 60-900Mhz Scanner	P.O.A.
FL 7000 500w HF solid state linear	P.O.A.

AR 2001 Receiver 25/500 MHz

£339:00 inc VAT

add £3:50 carriage

ANTENNA COUPLERS

THP HC200 1.8-30MHz 20w pep	82:95
THP HC400L 1.8-30MHz 350w pep	149:00
THP HC2000 1.8-30MHz 25w pep	T.B.A.
AMTECH 300B 1.8-30MHz 300w pep ★ STAR BUY ★	54:00
ICOM IC AT500 AUTOMATIC	399:00
ICOM IC AT1000 AUTOMATIC	Phone
YAESU FC 757 AUTOMATIC	245:00
YAESU FC 102 WARC 2Kw	Phone
WELZ AC38 1.8 300MHz	73:95

VAT included. Amtech 300B 1.50 others £6 Securicor.

Prices correct going to press, E. & O.E.

Icom

IC751 HF Transceiver	1239.00
IC745 HF Transceiver	898.00
IC730 Mobile HF Transceiver	P.O.A.
PS15 P.S. Unit	135.00
PS30 Systems p.s.u. 25A	259.00
SM6 Base microphone for 751/745	36.50
IC290D 2m 25w M/Mode	469.00
IC290E Low Multi-Mode Mobile	399.00
IC271E 2m 25w M/Mode Base Stn.	699.00
IC271H 100W version of above	889.00
IC25H 2m 45w FM	359.00
IC27E 25W FM mobile	359.00
IC45E 70c 10w FM	345.00
IC47E 25w 70cm FM mobile	449.00
ICBU1 B/U Supply for 25/45/290	24.50
ICR70 General Coverage Receiver	599.00
ICR71 General Coverage Receiver	699.00
IC02E 2m H/Held	259.00
IC2E 2m H/Held	199.00
ML1 2m 10w Linear	69.00
IC4E 70cm H/Held	259.00
IC04E 70cm handheld	269.00
BC30 Base Charger	56.35
HM9 Speaker mic	18.55
IC3 Carry Case	5.50
ICBP3 Std Battery Pack	27.50
BP5 High Power Battery Pack	52.80
CP1 Car Charging Lead	5.50
DC1 12v Adaptor	13.75

Aerial Rotators

9502B 3 core Lighter Duty	69.50
AR40 5 core Medium Duty	115.00
KR400 Med/H Duty	109.95
KR500 6 core Elevation	139.95
KR400RC 6 core Medium Duty	132.50
CD45 8 core Heavy Duty	189.95
KR600RC 8 core Heavy Duty	189.50
HAM1V 8 core Heavier Duty	299.00
T2X 8 core Very Heavy Duty	365.00
Hirschman 250	49.50

EMOTO – all models POA

UNADILLA/REYCO

The world's finest Traps precision moulded coil forms, all stainless hardware, aluminium tube, irridite finish, absolutely weather proof.

KW 10 resonant	at 28.675
KW 15 resonant	at 21.275
KW 20 resonant	at 14.175

£18.99 inc VAT and Carr

VHF CONVERTERS

★ Star Buy ★

The following frequencies from any HF Receiver.
FRV 7700

A 118-150Mhz
B 118-130, 140-150, 50-59Mhz
C 140-170Mhz
D 118-130, 140-150, 70-80Mhz
E 140-150, 150-160, 118-130Mhz
F 150-160, 160-170, 118-130Mhz

£69.00 inc VAT and Carr

UHF LINEAR AMPLIFIERS

MML 432/30L	139:95
MML 432/50	129:95
MML 432/100	245:00
THP HL20U 1-3w in 20w out	77:99
THP HL45U 10w in 45w out	152:77
THP HL9OU 10w in 90w out	268:59
ALINCO ELH250C	114:95

B.N.O.S. complete range also in stock.
VAT included. Add £2 per item carriage.

CLOSED MONDAY
HOURS: 10:00 – 5:30

HEIL ACCESSORIES

HEIL HC3 Microphone Element	22:85
HEIL HC5 Microphone Element (Icom SM5/6)	25:40
HEIL HM 5 Desk Microphone (300Hz-3KHz) cardoid fwd	59:00
HEIL MM5 Hand Held Mic with HC3 Capsule	37.00
HEIL SS2 SPEAKER . . . see page 10	65:00
HEIL EQ300 Mic Equaliser	65:00
HEIL BM10 8OZ HEADSET/BOOM MIC	65.00

Carriage and VAT included.

TELEGRAPH ACCESSORIES

Hi Mound Keys

HK 708 Hand Key with base	13:67
HK 707 Hand Key with base and dust cover	14:48
HK 706 Hand Key with base and dust cover	15:60
HK 702 Key with marble base and dust cover	29:65
MK 704 Dual lever paddle, no base	12:76
MK 705 Dual lever paddle marble base	23:78
COK-2 Practice oscillator	7:99
KENPRO Iambic Electronic Keyer KP100	79:00
KENPRO Iambic Memory Keyer	169:00

Bencher

BY1 Squeeze Key, Black base	53.95
BY2 Squeeze Key, Chrome base	69.95

Auto CW/RTTY

Tono 9100E	799.00
Tono 9000E Reader/Sender	P.O.A.
Tono 550 Reader	299.00
Tono 5000E	899.00

Microwave Modules

MM2001 RTTY to TV converter	189.00
MM4001 RTTY terminal	269.00
MM4001KB RTTY term with keyboard	299.00

VAT included. Add £1 carriage per item.

SWR/POWER METERS

WELZ SP200 1Kw	82:00
WELZ SP300 1Kw	115:00
WELZ SP400 150w	82:00
WELZ SP15M 200w	41:00
WELZ SP250 2Kw	57:75
TOYO TM1X 3.5 150MHz 120w	18:80
TOYO T430 145/430MHz thru line watt meter 120w	44:65
TOYO T435 145/435MHz thru line watt meter 200w	49:35

VAT included. Add £2 per item carriage.

VHF LINEAR AMPLIFIERS

THP HL30V 0.5-3w in 30w out	39:99
THP HL82V 10w in 85w out	144:50
THP HL110V 10w in 110w out	179:95
THP HL160V 10w in 160w out	244:52
THP HL160V 25w in 160w out	209:73
MML 144/30LS	75:00
MML 144/50S	92:00
MML 144/100S	149:95
MML 144/100HS	149:95
MML 144/100LS	169:95
MML 144/200S	245:00

Goods normally despatched by return.

Amcomm SERVICES LTD., 194 NORTHOLT ROAD, SOUTH HARROW, MIDDX. HA2 0EN. ENGLAND. (Opp. South Harrow Underground Station) TEL: 01-422 9585. TELEX: 24263

APRIL 1985

VOLUME 61 No 4

RADio COMmunication

All contributions **(including Members' Ads)** and all correspondence concerning the **content** of *Radio Communication* should be addressed to:

The Editor, RSGB,
88 Broomfield Road,
Chelmsford,
Essex CM1 1SS

Tel 0245 84938

Office hours: 0915 to 1715

ADVERTISING

Advertisements, other than Members' Ads, should be sent to:

M J Hawkins, G3ZNI,
RSGB Advertisement Officer,
PO Box 599,
Cobham,
Surrey KT11 2QE

Tel 037 284 3955
Prestel 0372843955

Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

RSGB Headquarters,
Lambda House,
Cranborne Road,
Potters Bar,
Herts EN6 3JW

Tel 0707 (from London, 77) 59015

Business hours: 1000 to 1600

CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

Radio Communication **is published by The Radio Society of Great Britain as its official journal on the first Friday of each month and is sent free and post paid to all members of the Society**

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS 35,405 copies per issue average circulation in 1984

Closing date for contributions unless otherwise notified: five weeks before publication date

introducing a new **HF** transceiver from TRIO, the **TS940S**,

The TRIO TS940S is a first class competition HF transceiver designed for SSB, CW, AM, FM and FSK operation on all amateur bands from 160 to 10 metres. The transceiver incorporates a 150kHz to 30MHz general coverage receiver having an excellent dynamic range (typically 102dB on 20 metres, 50kHz spacing, 500Hz CW bandwidth). Designed to cope with today's band conditions and with the serious DX'er/contest operator in mind, the TS940S has a comprehensive range of front panel receiver controls;

SSB IF slope tuning; operating in both LSB and USB modes, front panel controls allow the independent adjustment of either the high or low frequency slopes of the IF passband.

CW VBT (variable bandwidth tuning); allows the passband width to be varied within the range of the control without affecting the centre frequency.

IF notch filter; provides in the order of 40dB attenuation to the interfering signal.

AF tune; active filtering reduces interfering signals and white noise whilst operating in the CW mode.

Narrow/wide filter selection; a selection of filters, both 8.83 and 455kHz are available for the operator who requires maximum selectivity control. The TS940S comes with both 2.7kHz SSB filters (8.83 and 455kHz) and the 6kHz AM filter (455kHz) built-in.

CW variable pitch; dual mode noise blanker and separate RIT/XIT controls complete the facilities.

To aid serious operating on both amateur and broadcast frequencies, the TS940S has;

A large heavy diecast knob with a moulded rubber cover which when rotated at normal tuning speeds results in frequency steps of 10Hz. Rotation of the tuning knob in excess of 2 to 3 revolutions per second results in the step size and tuning rate being increased acccordingly.

In addition to instant access to each amateur band using the band select keypad, the same keys can be used to directly enter any frequency within the operating range of the transceiver. Once entered, the VFO can be used to tune away from the selected frequency. Truly flexible operating in the TRIO tradition.

The TS940S has two VFOs, front panel switches enable split frequency operation, both VFOs to be quickly put on the same frequency and the reversal of the transmit and receive frequencies during split frequency operation.

40 memory channels, each of which remembers both frequency and mode are available. Frequencies can be easily transferred from memory to either VFO. Memory information is backed up by an internally fitted lithium battery. The transceiver operating system is held permanently in ROM and is not dependent upon the back-up supply.

The transceiver will scan all memory channels and between user programmed frequency limits as set in memories 9 and 0.

Accurate and quick frequency readout is ensured by the use of a large fluorescent tube digital display combined with an analogue sub-scale. The analogue display can be switched to read a 1MHz or 100kHz span, tuning in either 20kHz or 2kHz steps.

A feature new to HF transceivers is a green back-lit dot matrix LCD which shows graphically VBT and IF slope tuning positions, can be used to review the frequencies stored in the 40 memory channels and other VFO, will provide information on the automatic sequence of operations when using the internal (optional) tuning unit, and when selected, displays both the time and owner programmed on/off switching times.

In addition, break-in keying on CW, a 28 volt solid state final amplifier stage, an RF speech processor coupled to the rig's ability to monitor its own transmitted audio and all mode squelch add up to give the TRIO TS940S even greater versatility of operation.

For those with failing sight or a blind operator the TS940S is a dream come true; not only is the operating mode identified by the appropriate CW letter sent in tone (F for FM, U for upper side band, etc) but, when fitted with the VS1 board (optional), a digitally encoded girl's voice will announce the operating frequency.

Combine the comprehensive receiver controls, advanced operating features and an ergonomically designed front panel and there is little more to say, except that, once again, TRIO have produced the world's finest HF rig, tomorrow's transceiver today, the TS940S!

TS940S HF transceiver..... **£1695.00** inc VAT.

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

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. They're even 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 . . . **£499.00** 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 open spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFOs, up/down frequency shift microphone. IF shift, two priority channels, memory and band scan etc. A superb rig, I have one myself, write for a full enthuse!
TS780 . . . **£981.42** 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 floodlit 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 . . . **£354.92** 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 174MHz 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 . . . **£479.47** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE

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 . . . **£1350** 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 . . . **£270.47** inc VAT.
TR3500 . . . **£291.85** inc VAT.

TS530SP HF AMATEUR BAND TRANSCEIVER

A logical progression from the reliable TS520 series the TS530S 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 worldwide communication, the TRIO TS530SP now with notch filter.
TS530SP . . . **£735.11** inc VAT.

just a part of the range

The following TRIO models although not shown are still current and available.

TS430S	HF T'ceiver	£769.50	TM201A	2M Mobile	£309.95
TS830S	HF T'ceiver	£832.75	TM401A	70cm Mobile	£340.68
TS130S	Mobile HF T'ceiver	£633.06	TM211E	2M Mobile with DCS	£396.08
TR9300	6M Multi-mode	£569.97	TM411E	70cm Mobile with DCS	£452.58
TH21E	2M Micro h'held	£188.46	TW4000A	2M/70cm Mobile	£536.51
TH41E	70cm Micro H'held	£214.50	TS711E	2M Base Station	£831.77
TR2600E	2M H'held with DCS	£295.69	TS811E	70cm Base Station	£964.97
TR3600E	70cm H'held with DCS	£314.87	R600	Gen. Cov. Receiver	£299.52

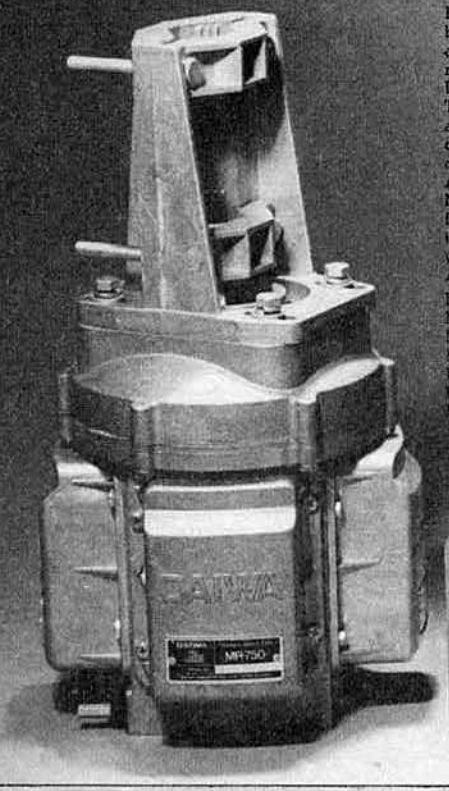
All prices include VAT. Carriage £7.00

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

FOUR WHEEL DRIVE



For as long as amateurs have used directive beams, be it either on the HF, VHF or UHF bands there has always been a need for a means of turning the array. Some have used string, the more fortunate amongst us have used a rotator. When buying a rotator, our advice up to now has always been, buy the largest you can afford. Our reasoning being that your aerial array will undoubtedly grow and sooner or later the overloaded rotator will break. Usually your aerials are also destroyed.

The new range of rotators from DAIWA, the MR series make this advice obsolete. They are designed so that additional motors can be added around a central core, each motor increasing the rotator's turn and braking capacity. The MR series will accept up to four motors being initially supplied with one. As the number and size of aerials increases, additional motors can be added, and both turning capacity and braking effort increased. Additional motors can be added at any time, each adding 700 kg/cm of torque and 5000 kg/cm of brake power. No additional cable runs are required, an internal harness for each motor being included, and, of course the main frame and reduction gear train have been designed to handle extremely large aerial arrays that would require the full set of four motors. There are four models, pre-set and standard and two high speed versions for the operator who can afford to sacrifice a degree of torque in order to increase the speed of rotation.

A full colour leaflet describing the rotators in detail is available on request.

MR750E standard model	£193.00 inc VAT
MR750PE pre-set model	£217.64 inc VAT
MR300E high speed version (39 sec)	£193.00 inc VAT
MR400E high speed version (25 sec)	£193.00 inc VAT
MR750U standard motor unit	£64.64 inc VAT
MR300U high speed motor unit	£64.64 inc VAT
LXC lower mast clamp	£14.00 inc VAT

DAIWA MT20E, true flexibility.....

In describing the equipment let's start with the MT20E. A simple hand-held transceiver covering the entire two metre band (144 to 146MHz in 5KHz steps) and giving 1.5 watts (high) and 150 milliwatts (low). Full repeater facilities are provided including reverse repeater. Making it ideal for "fox hunting", the DAIWA MT20 has an S meter and for easy operation in the dark the frequency dial is illuminated. A quick release nicad battery pack, flexible aerial, belt hanger, earphone and AC charger are included and to extend operation additional BA2 nicad packs can be purchased and kept ready charged in your pocket.

For more effective portable operation add the LP1 carrying case with aerial mounting strap, the LA20 linear amplifier and the BA4 9.6V battery pack (fits neatly inside the linear) and power output is increased to 10 watts. The linear is extremely well designed and shows the care and attention that DAIWA have given to the accessories. The LA20 is the first linear designed for portable operation. The connecting cord between linear and rig not only carries RF but also the DC power for the MT20E. Connecting is easy, removing the BA2 battery pack from bottom of the transceiver reveals a BNC connector which is not only an aerial connection but the power connector. For convenience, when connected to a 13.8 volt DC supply the linear can be switched to recharge its internal nicad pack. When connected to a 13.8 volt supply, as when using the linear mobile (yes, a mobile mount is included with the linear) the output rises to 20 watts.

The LA20 is an extremely good buy on its own for either mobile or especially portable use (self contained batteries). To stop the DC supply to the transceiver, just remove the internal fuse. Simple!

If you own a non DAIWA 2 meter linear and still want the convenience of an external DC supply for the MT20E, then use an SD1 (DC regulator/antenna converter). The SD1 has connections on its front panel for the transceiver (a BNC connector connecting DC voltage and antenna) and an SO239 on the back for connection to a linear.

MT20E	**£197.48**	carr 7.00
LA20	**£79.03**	carr 2.00
LP1	**£23.48**	carr 1.00
BA4	**£33.45**	carr 1.50
SD1	**£25.27**	carr 1.50
BA2	**£16.80**	carr 1.00
LP3	**£5.14**	carr 0.50

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

EMPORIUM NEWS

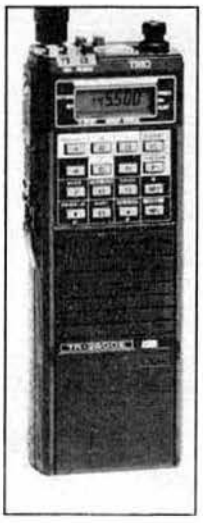
Good Morning

First of all the good news; we are about to open a Lowe Shop on the South Coast of England—in **Bournemouth** to be exact. Why Bournemouth? The answer is quite simple—it's such an easy place to drive to and it's signposted clearly for miles. The shop is also easy to find, being located on the north side of town **just off Wimborne Road.** For the children, buckets and spades are not provided as the shop is about as far from the sea as you can get and still be in Bournemouth! But for the radio amateur who wants to drive and once there **park without fuss or charge,** it has to be perfect!

From the amount of aircraft flying low overhead I would say we weren't far from the flight path for Hurn Airport and, of course, we will have in the shop our range of **professional airband receivers.** (For the boat enthusiast marine equipment as well.) The shop also seems to be nicely situated RF wise, being fairly well above sea level. Indeed, I have worked the locals with ease from the shop's front door with a mere 2.5 watts from the **TR2600E** hand held. As I have said before, **a snip at £295.00,** including VAT, and just the rig for my briefcase or your pocket. The **TH21E,** plus mouse, is available for the operator who has smaller pockets. I mean smaller pockets for his money because the **TH21E** costs only **£188,** including VAT but small also in physical size. Dig out an old copy of RadCom and compare the size of the rig to that of the mouse.

Whilst on site, and again outside the shop, I found myself getting into the local 70 cm repeater. **The rig was a TRIO TH41E, what else!** The TH41E is proving much more popular than I had imagined. I am surprised at the number of people who consider the **TH41E** their first alternative to a Pye pocketfone. It may be its size, it may be its simplicity, or it may be the price—£124.00 including VAT. But I am sure that many new operators will move to 70 cm now it is possible to own a **TRIO TH41E.** Such a small rig, such superb audio, both on receive and transmit.

Back to the shop or, to be more exact, **Mudeford** which is near Christchurch. **On Sunday, 28th April** at "The Avonmouth Hotel", David, G4KFN, and myself, together with the new Shop Manager, will be displaying **the entire TRIO range** or, to be factual, as much as I can get in the boot of the car. From 2.0 p.m. to around 4.30 p.m. in the afternoon on the 28th April we will be taking over the Avon and Forest Rooms to demonstrate what a **pleasure** it can be to deal with **Lowe Electronics.** Those who get there first will enjoy a glass of wine and the odd nut—there will, of course, be soft drinks for those who do not touch alcohol and also for the children, yes, bring along the family. Those who arrive first will get a drink—those who arrive later will, if previous events are repeated be lucky to get a nut. **We will be bringing our wives with us** for this auspicious occasion and are staying overnight so that David, G4KFN that is, can visit, without a red carpet, as many **Lifeboat** installations in the area as possible. I must admit that after driving down in the morning, testing on your behalf the wine, to return to Matlock the same day will be too much. So, as we will stay overnight, it will give me the opportunity to visit again the Christchurch Indian Restaurant with Lorna, Carolyn and David. It is the finest Indian Restaurant I have ever eaten in. The food is superb, the service above all conception. Truly a delight to visit. A standard they achieve and one we strive for!



Sorry, I almost forgot: there are three very good Clubs in the immediate locality of the shop—**Bournemouth, Poole** and **Flight Refuelling.** I have asked them to jointly organise a Talk-in Station, they have agreed and the station callsign **G8LOW/P** will commence transmission on **S22** at **1.30 p.m.** I hope I've arranged an enjoyable afternoon for yourselves. Make it more than a meeting with your friends over a glass of wine in excellent surroundings overlooking the Harbour—make it **an opportunity** to meet **Lowe Electronics** and see how we do business.

On page 1 of our advert you will see the **new HF transceiver from TRIO: the TS940S.** Completely new and an absolute winner. Not being an HF man in the strict sense of the word, I have had my turn with the **TS940S.** Alan, G3MME, has had the transceiver at his home for much longer. I don't know what he's using as an aerial but he seems quite impressed with the rig. If you require any more information may I suggest you **ring Alan direct** and ask him for his observations. I share your feelings that it is always best to talk to someone who has had their hands on a new piece of equipment. **As always, supplies** of the new transceiver will be **limited.** It will be a case of getting your name down quickly. I can still remember those supply problems and waiting lists for the TR930S and TR830S.

A SPECIAL ANNOUNCEMENT.

On **Thursday, 2nd May, 1985 at 7.30 p.m.** John Wilson is giving a Technical Lecture at the **Grimsby College of Technology.** His subject will be the design and construction of two of the latest pieces of TRIO equipment—one HF and the other VHF/UHF. The last time he gave a similar Lecture many people, including David and myself, learnt a lot. A born lecturer, John can be relied on to entertain and not lose his audience. For more information contact: Mr. M. J. Wray, Department of Engineering, Grimsby College of Technology, Nuns Corner, Grimsby, South Humberside. **Just to repeat—7.30 p.m. Grimsby College of Technology on Thursday, 2nd May** (my birthday incidentally). I understand that refreshments are to be laid on at the close of the evening when it will be possible to examine closely the equipment that has been discussed. An unforgettable evening for those who attend—the College is easily found and ample parking abounds.

We here at Matlock consider the Club visits and Lectures a most important part of our business.

In most cases when you buy from Lowe Electronics what you are purchasing is a sophisticated package of electronics. **We** have **always** placed **great emphasis** on our **after-sales service** and a Club talk or Lecture is our chance to show you another side of the Company. Our venture in Bournemouth is typical of the Company; **treat** the customer how you would **like to be treated yourself.**

Debra is still in charge of the second-hand list—compiled each Thursday and comprehensively listing every rig, whether it be in Glasgow or London. The list is available—just send a stamped self-addressed envelope. Better still, send a set of say six and we will send you the list fortnightly or weekly if you prefer—just date the envelopes accordingly.

Take a look at the Daiwa product page. The new 4 motor rotator at the top and featured for the first time a new hand held with many features —just study the pictures on the preceding page. I have selected items for a short price list. The list, together with details of our shops and more on the first class mail order service, can be found on Page 5. If you really want to be informed I would suggest you **send £1** to **obtain** a copy of our **current catalogue and antenna guide;** not just a list of items and short description but a comprehensive tome with features on cable, losses, aerials, SWR meters, SSB, etc. and well worth £1. **Don't forget,** you could also "Join the Family" and become a Lowe Card Holder—send for details.

A special opportunity exists to work **rare DX** from a point in mid Atlantic, 52.25N 30.15W. We have noticed that the route and timing of one of the cargo vessels carrying **a shipment of equipment from Japan** will pass through the exact point where, due to planetary motions and a rare burst of sun spot activity, DX from around the world will be focussed. We have secured several berths and **a full TRIO HF station** will be provided. At the moment we are negotiating for use of the Ship's aerial system. **This is a rare opportunity** only brought about by a long relationship with the shipping company. Costs are not yet to hand but are expected to be more than reasonable. Owing to limited space **booking before 1st April is essential.** For more details ring . . . here at Matlock.

Anyway, that's about it for now.

The Bournemouth shop opens at 9.0 a.m. on Saturday, 4th May. I shall be there and look forward to seeing as many of you as possible.

Gud DXes 73es FBYLS, XYLS, esFBOM, etc.

David G8GIY

MICROWAVE MODULES LTD

2 METRE MULTIMODE TRANSVERTER MMT144/28-R

NEW RELEASE

FEATURES

- **25 Watts Tx Output**
- **GaAsFET RF stage**
- **Transmit ALC Circuit**
- **13.8V DC operated**
- **Repeater Shift (normal, simplex, reverse)**
- **High Level Double Balanced Rx Mixer**
- **LED Bargraph Power Meter**
- **RF VOX — Adjustable Delay and PTT Override**

SPECIFICATION

GENERAL

INPUT FREQUENCY RANGE	:	28 – 30 MHz
OUTPUT FREQUENCY RANGE	:	144 – 146 MHz
MODES OF OPERATION	:	SSB, FM, CW, FSK, AM
REPEATER SHIFT	:	Simplex, Normal (– 600 kHz) Reverse (+ 600 kHz)
INPUT/OUTPUT IMPEDANCE	:	50 ohm
RF CONNECTORS	:	SO239 (PTFE)
POWER CONNECTOR	:	5 pin DIN socket
DC POWER REQUIREMENTS	:	13.8V DC at 6 Amps peak

TRANSMIT SECTION

OUTPUT POWER	:	25 Watts
INPUT LEVEL RANGE	:	¼ mW to 300mW
ALC RANGE	:	20dB
LEVEL OF SPURIOUS OUTPUT	:	– 65dB or better

RECEIVE SECTION

CONVERSION GAIN	:	22dB + / – 1dB
NOISE FIGURE	:	2dB or better
3rd ORDER INTERCEPT	:	+ 19dBm (output)

DESCRIPTION

The MMT144/28-R is a high performance solid-state 2 metre multimode transverter, designed to allow users of existing HF band transceivers to establish a first-class transceive capability on the 144 MHz band.

The transverter incorporates many new and exciting features previously not found on equipment of this nature, which combine to make this product simply superb.

The MMT144/28-R can be used with virtually any 28 – 30 MHz transceiver having a low level output power in the range ¼ mW to 300mW. (An external attenuator can be used to allow a higher power level to be used if necessary.)

A noise-matched NEC GaAsFET preamplifier together with excellent filtering and a double balanced mixer produces a rugged receive converter, which has excellent strong signal handling characteristics and excellent immunity to overload and cross-modulation.

The transmit section produces a highly linear 25 watts output and incorporates an ALC circuit to ensure that a particularly clean signal is produced. This is an important feature which will virtually eliminate compressed signals and the resultant problems caused to local stations. A visual indication of relative output power is displayed by the front panel mounted LED bargraph display.

The unit incorporates the usual repeater features: — simplex, normal repeater (– 600 kHz), and reverse repeater (+ 600 kHz) and is ideally suited for all modes of communication on the 2 metre band.

The MMT144/28-R is housed in an aluminium extruded enclosure, which has both excellent electrical screening and thermal stability characteristics. Connectors are located on the rear panel together with the input level control and the DC supply fuse. Protection against reverse polarity is included. Antenna changeover at 144 MHz is achieved internally by a low-loss PIN diode switch.

This new design utilises 15 transistors, 4 regulator IC's, 3 other IC's and various diodes and PIN diodes.

All plugs are supplied.

PRICE: £215 inc. VAT (p + p £3.50).

ACCESS BARCLAYCARD VISA

HOURS:
MONDAY-FRIDAY
9 – 12.30, 1 – 5.00
E. & O.E.

MICROWAVE MODULES LTD.
Brookfield Drive, Aintree, Liverpool L9 7AN, England.
Telephone: 051-523 4011.
Telex: 628608 MICRO G.

		Inc VAT	Carr
JRC EQUIPMENT			
NRD515	New synthesised HF monitoring receiver	965.00	7.00
NHD518	Multi channel memory unit for NRD515	264.00	7.00
NCM515	Remote frequency controller	169.75	7.00
NVA515	Matching loudspeaker unit	45.41	3.00
JST100	Digitally synthesized 160-10M transceiver	998.00	7.00
NBD500G	Matching PSU for JST100	181.35	7.00
NVA88	Matching speaker for JST100	44.19	3.00
NFG97	ATU/SWR/POWER meter for JST100	150.00	7.00
VHF/UHF MONITOR RECEIVERS AND SCANNERS			
AR2001	NEW VHF/UHF scanning receiver 25-550MHz	378.01	7.00
SR1000E	DAIWA 1000 channel PLL receiver 144-154MHz	96.04	2.50
DAIWA ROTATORS			
MR750E	NEW Multitorque rotator controller	193.00	7.00
MR750PE	As above but with round and preset controller	217.64	7.00
LMC	Lower mast clamps for pole mounting	14.01	3.00
MR750U	Additional motor unit to increase torque and braking	64.64	3.00
DR7500X	For HF 3 element beams. Preset controller. 6 core cable	142.98	7.00
DR7500R	As for DR7500X but using the DAIWA round controller	153.67	7.00
DR7600X	Heavy duty. Up to 2 el 40m beam. Preset control	189.37	7.00
DR7600R	As for DR7600X but using the DAIWA round controller	213.41	7.00
KS065	Deluxe bearing for fixing stays to rotating mast	27.30	3.00
KR500	Elevation rotator (not Daiwa)	144.90	7.00
DAIWA POWER and SWR METERS			
CN410M	3·5-150MHz mobile cross needle power/SWR meter	48.00	1.50
CN460M	140-450MHz mini cross needle power/SWR meter	52.00	1.50
CN520	1·8-60MHz mobile cross needle power/SWR meter	39.50	1.50
CN500	1·8-60MHz mini cross needle power/SWR meter 20W	19.50	1.50
A500	Fixing bracket for CN500 series	2.10	0.30
CN620A	1·8-150MHz cross pointer pwr/SWR meter. Up to 1kW	66.21	2.50
CN630	140-450MHz cross pointer pwr/SWR meter. Up to 200W	98.11	2.50
CN650	1·2-2·5GHz cross pointer pwr/SWR meter. Up to 20W	129.50	2.50
CNW419	1·8-30MHz 200W general coverage tuning unit	159.64	7.00
CNW919	2M Power meter and antenna tuning unit	104.99	3.00
CNW518	3-30MHz 8 band hi power tuner cross needle pointer	233.09	7.00
CL680	1·8-30MHz 200W gen cov ATU (100W at 1·8MHz)	81.50	3.00
DAIWA POWER SUPPLY UNITS			
PS300	DAIWA heavy duty PSU 30A max 22A continuous	176.80	7.00
PS120M	DAIWA AC PSU 3-15V variable 12A maximum	87.33	7.00
PS80M	DAIWA AC PSU 3-15V variable 8A	72.68	3.00
PS50M	DAIWA AC PSU 9-15V variable 5·6A	55.91	3.00
DAIWA LINEAR AMPLIFIERS			
LA2035	DAIWA 2m lin amp, very small. 0·5W/30W at 13·8V	56.00	2.00
LA2035R	As above but with rx preamp	63.20	2.00
LA2065R	2M linear amplifier with rx preamp. 60W o/p	108.71	3.00
LA2155	DAIWA 2M 150W SSB/CW/FM amplifier	198.00	7.00
DATA COMMUNICATIONS EQUIPMENT			
CWR685E	TX/RX unit for RTTY/CW/ASCII with built in monitor	771.64	7.00
CWR670E	RX only unit RTTY/CW/ASCII requires external monitor	392.80	7.00
PK675	Printer kit for above unit	189.00	7.00
CWR610E	RX unit RTTY/CW/ASCII Code practise generator inc.	195.00	3.00
AMTOR10A	Comprehensive AMTOR unit	253.20	3.00
DR100	TRIO DATA-MITTER Modem for transmitting ASCII	148.10	3.00
NOVEX12A	Good quality 12" monitor. Amber phosphor	85.00	7.00
NOVEX12G	As above but with green phosphor	89.00	7.00
DM091G	9" Green monitor. All have metal cabinets	79.50	7.00
KEYS AND KEYERS			
CW3	Self contained morse practice oscillator	9.80	1.50
HK708	Straight key. Ball bearing pivots. Non skid base	16.30	2.50
HK702	Deluxe version of above on marble base	31.03	3.00
MK704	Squeeze paddle	15.40	1.50
EK150	Electronic keyer. Built in sidetone	103.38	3.00
MK1024	Electronic keyer with 1024 bit memory	185.52	3.00
HOKUSHIN MOBILE AERIALS			
2E	2M 5/8, 3·4 dB gain, foldover base	11.26	2.00
2NE	2M 7/8, 4·5 dB gain, foldover base	17.06	2.00
HS430HB	430MHz mobile gain aerial on half wave extension	8.30	2.00
OSCAR430	70cm 5/8+5/8+5/8 supergain mobile aerial	21.45	2.00
320	2M stainless 1/4 wave on PL259 plug	2.62	1.00
OTHER ACCESSORIES			
SWR50	The ever popular twin meter SWR bridge. 1·8-150MHz	14.95	2.00
DL60	60W dummy load with SO239 fitting	7.87	1.00
DL150	150W dummy load SO239 fitting	19.68	1.50
DL600	600W aircooled 50ohm dummy load	39.36	2.50
WA1	AKD wavemeter. 120-450MHz. Absorbtion type	24.95	1.50

LOWE SHOPS

In Glasgow the LOWE ELECTRONICS' shop (the telephone number is 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 (the telephone number is 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 the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (the telephone number is 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1309, past the science park and turn left at the first roundabout, signposted Chesterton. After passing a children's playground on your left turn left again (between the shops) into Green End Road. Very quickly, and without you noticing it, Green End Road becomes High Street. Easy and free street parking is available outside the shop.

For South Wales, the LOWE ELECTRONICS' shop is located in Cardiff. Managed by Richard GW4NAD, who hails from Penarth, the shop (the telephone number is 0222 464154) is within the premises (on the first floor) of South Wales Carpets, Clifton Street, Cardiff. Clifton Street is easily found, being a left turn off Newport Road just before the Infirmary. Once in Clifton Street, South Wales Carpets is the modern red brick building at the end of the street on the right hand side. Enter the shop, follow the arrows past the carpets, up the stairs and the "Emporium" awaits you. Free street parking is available outside the shop.

LOWE ELECTRONICS' London shop is located at 223/225 Field End Road, Eastcote, Middlesex (the telephone number is 01 429 3256). The shop, managed by Andy G4DHQ is easily found, being part of Eastcote tube station buildings and as such being on the Metropolitan and Piccadilly lines (approximately 30 minutes from Baker Street main junction). For the motorist, we are only about 10 minutes' driving time from the M40, A40, North Circular Road (at Hanger Lane) and the new M25 junction at Denham. Immediately behind the shop is a large car park where you can currently park for the day for 20p. There is also free street parking outside the shop.

Although not a shop there is on the South Coast a source of good advice and equipment—John G3JYG. His address is 16 Harvard Road, Ringmer, Lewes, Sussex. (telephone 0273 812071). An evening or weekend telephone call will put you in touch with John.

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 an 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.

MAIL ORDER

You don't need a 1750 Hz tone to gain access to the fastest mail order service for all radio amateurs and short wave listeners. With a copy of the LOWE ELECTRONICS catalogue and antenna book in the shack (send £1 for your copy) the best in amateur radio is quickly available. Comprehensive stock, here at Matlock, means that all orders received are despatched the same day; of course there are exceptions, certain items, usually new products occasionally produce a situation where demand exceeds supply and not even LOWE ELECTRONICS can cope. If this is the case then you can be sure that LOWE ELECTRONICS will not cash your cheque or process your credit card until the goods are available for despatch. **Our secret is simple:** treat the customer how we ourselves would expect to be treated.

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

ICOM AT T

Come and hear the Icom range on stand A68-70 at the RSGB National Amateur Radio Exhibition

This year at the NEC, Thanet Electronics will have demonstration facilities only on our main stand, but the range and scope of these will enable you to appreciate fully the superb specifications and quality of all ICOM Amateur Radio Equipment.

You will be able to try out receivers and transceivers as base stations, mobiles and hand-portables in all the popular frequency ranges.

Buying ICOM equipment at the NEC. will not be a problem as it will be readily available at any of the authorised ICOM dealers exhibiting at the show.

A new exciting set will be seen at this years show, it is the ICOM IC-3200E FM Dual-band transceiver (144-430/440 MHz). This is the smallest transceiver available.

The IC-3200E employs a function key for low-priority operations to simplify the front panel. LCD display is easy to read in bright places, showing frequency, VFO A/B, memory channel duplex mode and S/RF meter information.

New! IC-3200E

Other features include a 10 channel memory able to store operating frequencies, Simplex or Duplex. A memory lock-out function allows the memory scan to skip programmed channels when not required. The IC-3200E has a built-in duplexer and can operate on one antenna for both VHF and UHF. Options include: IC-PS45 DC, power supply, HS-15 mobile mic, SM6 and SM8 desk mics, SP-10 external speaker and UT-23 speech synthesizer.

A great future is predicted for the IC-3200E against its rivals, due to the reasonable price of this model. For more details come and see us on stand A68-70. BCNU.

IC-290D/290E

290D is the state of the art 2 meter mobile, it has 5 memories and VFO's to store your favourite repeaters and a priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5KHz or 1KHz.

The squelch on SSB silently scans for signals, while 2 VFO's with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1 KHz or 100Hz tuning/CW sidetone, AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.

You can scan the whole band between VFO's/scan memories and VFO's. Adjustable scan rate 144 to 146 MHz, remote tuning with optional IC-HM1 microphone. Digital frequency display, Hi/Low power switch. Optional Nicad battery system allows retention of memory.

Soon to be announced!

IC-735 New Compact HF. R7000 VHF/UHF Receiver.

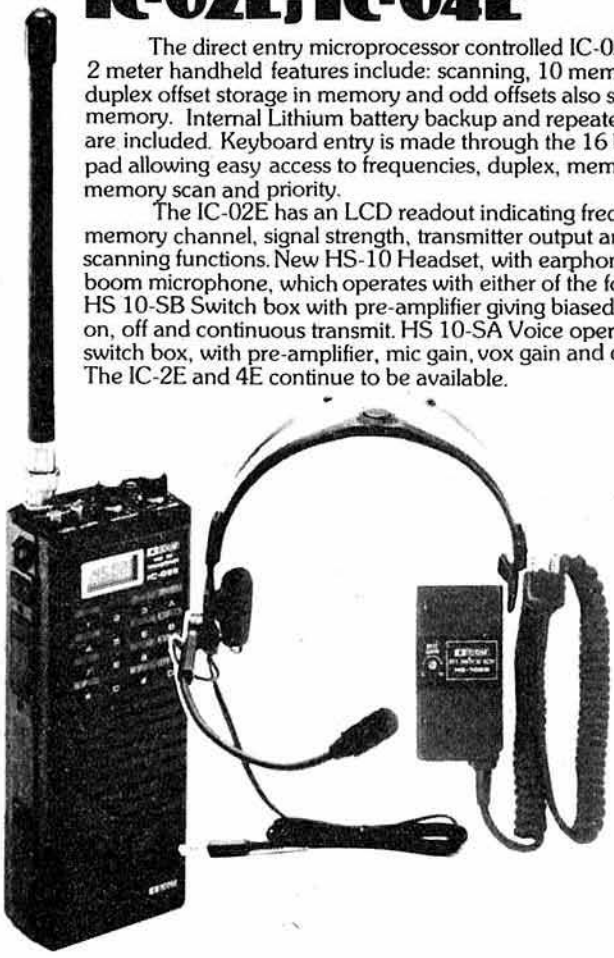
Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Than

THE N.E.C.

IC-02E, IC-04E

The direct entry microprocessor controlled IC-02E is a 2 meter handheld features include: scanning, 10 memories, duplex offset storage in memory and odd offsets also stored in memory. Internal Lithium battery backup and repeater tone are included. Keyboard entry is made through the 16 button pad allowing easy access to frequencies, duplex, memories, memory scan and priority.

The IC-02E has an LCD readout indicating frequency, memory channel, signal strength, transmitter output and scanning functions. New HS-10 Headset, with earphone and boom microphone, which operates with either of the following:- HS 10-SB Switch box with pre-amplifier giving biased toggle on, off and continuous transmit. HS 10-SA Voice operated switch box, with pre-amplifier, mic gain, vox gain and delay. The IC-2E and 4E continue to be available.



Tono Linear Amplifiers

2M – 100W, £79.00.
MR – 150W, £139.00.
Also available, new G-series with GaAs FET pre-amp.
2M – 130G, £159.00.
2M – 90G, £149.00.
2M – 40G, £ 89.00.
4M – 70G, £179.00.
all inc. VAT.

Carriage charge is free for Cue Dee and Tono special offers.

Authorised Icom dealers in the UK

Alexian Electronics Ltd. Edinburgh, 031-554 2591.
Alyntronics, Newcastle, 0632-761002.
Amateur Radio Exchange, London (Ealing), 01-992 5765.
Amcomm, London (S. Harrow), 01-422 9585.
Arrow Electronics Ltd., Chelmsford Essex, 0245-381673/26.
Beamrite, Cardiff, 0222-486884.
Booth Holding (Bath) Ltd., Bristol, 02217-2402.
Bredhurst Electronics Ltd., W. Sussex, 0444-400786.
Dressler (UK) Ltd., London (S. Harrow), 01-558 0854.
D.W. Electronics, Widnes Cheshire, 051-420 2559.
Hobbytronics, Knutsford Cheshire, 0565-4040.
Photo Acoustics Ltd., Buckinghamshire, 0908-610625.
Radcomm Electronics, Co. Cork, Ireland, 01035321-632725.
Radio Shack Ltd., London NW6, 01-624 7174.
Scotcomms, Edinburgh, 031-657 2430.
Tyrone Amateur Electronics, Co. Tyrone, N. Ireland, 0662-2043.
Reg Ward & Co. Ltd., S.W. England, 0297-34918.
Waters & Stanton Electronics, Hockley Essex, 0702-206835.

Listed here are authorised dealers who can demonstrate ICOM equipment all year round. This list covers most areas of the U.K., but if you have difficulty finding a dealer near you, contact Thanet Electronics and we will be able to help you.

Cue Dee Antennas Special Offer!

CUE DEE antennas are designed to last for decades – the best possible aluminium alloy for this purpose is used (SIS 4212-06).

The booms are made of 28mm tubing with 1.5mm wall, with colour marks clearly indicating where to fit the elements. By using tubular boom, and a synthetic guy wire on the long yagis, the windload is reduced by a factor 0.66 compared to using square shaped material for boom and guying.

The driver element is made of 12mm tubing and features a PTFE (Teflon) insulated gamma match which is pre-tuned at the factory and made for 50 ohm feeder with a PL 259 type connector. No further adjustments or power consuming balun needed. This matching system ensures a clean radiation pattern and transfers the power without losses.

The parasitic elements are made of 6mm solid rod and mounted to the boom with the aid of a CUE DEE element washer, boom to element part and a screw. This, together with our intelligible asembly manual, makes an extremely easy and solid assembly which assures the long life of a CUE DEE antenna.

2 metre Yagis.
4144A – 4 element, 8dBd gain £19.00.
10144 – 10 element, 11.4dBd gain £37.00.
15144 – 15 element, 14dBd gain £49.00.
Order now while stocks last.

You can get what you want just by picking up the telephone. Our mail-order dept. offers you: free, same-day despatch whenever possible, instant credit, interest-free H.P., telephone Barclaycard and Access facility and a 24 hour answering service.

Please note that we now have a new retail branch at 95, Mortimer Street, Herne Bay, Kent. Tel: 369464. Give it a visit, BCNU.

ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet Electronics

Dept RC, 143 Reculver Road, Herne Bay, Kent. Tel: (0227) 363859/363850

NEC SHOW SPEC

You haven't shown any TRIO prices, Bernie!

STILL THE BEST

ICOM ICR71
The latest superior grade receiver, with keyboard entry, 32 tunable memories, three rates of tuning + (as options) infra red remote, F.M., voice frequency synthesiser, additional filters.

£669 OR £699 WITH REMOTE UNIT OR FM BD

SUPERB 2 METRE BASE STATION

ICOM IC271E
2m base station for the eighties, 25w O/P, 32 memories, scanning, 10/100Hz auto shift tuning rates + (as options) voice frequency synthesiser, internal 12V psu, GaAS FET preamp.

£659 OR £689 WITH ICSM6 ELECTRET BASE STATION MIC OR AG20 INTERNAL GaAS FET ICOM PREAMP

REACH FOR THE SKY & CATCH A SATELLITE

YAESU FT726R
Multiband base station transceiver.

£799

HOW LOW CAN WE GO!

YAESU FT2700 DUO BANDS
2M & 70cm
Full DUPLEX operation
25 watts on each band

£525 with Antenna Duplexer FREE

EXTRA–SPECIAL OFFER

FT726R WITH 70cm CARD FITTED £1,150 –WITH DUPLEXER/SATELLITE MODULE WORTH £100!

EXTRA VERY SPECIALS

- **MUTEK 6M Transverter 2M to 6M** — **£169**
- **SX400–The Professional Scanner** — **£549**
- **AOR2001 Scanner Rec Gen Coverage 25-525mHz** — **£359**
- **CENTURY Gen Cov HF Rec** — **£169**

Access · BARCLAYCARD VISA

INSTANT HP AVAILABLE
WRITTEN DETAILS ON REQUEST

PRICES CORRECT AT TIME OF GOING TO PRESS
ALL OFFERS SUBJECT TO AVAILABILITY
ALL PRICES INCLUDE V.A.T.

* NEC Special Offers are available to the public only at NEC–and to ARE Club Members at time of publication.

We regret we cannot hold NEC offers advertised last month due to price increases on imported equipment.

IALS* FROM A.R.E.

I'm keeping low on those until the SHOW!

WORLD BEATER

YAESU FT290R
The design team on this one at YAESU definitely deserve full marks–probably the best selling 2m multimode in the world.

£335 WITH MUTEK BOARD OR NICADS & CHARGER

RECEIVE THIS

NEW

YAESU FRG 8800
Receiver with very special features:

- Frequency coverage 500kc to 30mHz
- Memory and scan facilities
- VHF converters available

£519

KENWOOD/TRIO SPECIAL OFFERS

TS930
TS530
TS430
TS2600
TW4000
TS3600
TS830

HURRY!! LIMITED STOCKS ONLY!!

ICOM AT ITS BEST

ICOM IC745
H.F. transceiver/gen. coverage receiver. The IC740 was, and still is, popular–the introduction of the IC745 with its additional features makes it our recommendation for the serious H.F. operator.

£898 WITH FREE ICSM6 BASE STATION MIC AND ICEX242 FM MODULE

THE ULTIMATE

YAESU FT757GX TRANSCEIVER
Compact–dual VFO's–general coverage–100W O/P.
FM/SSB/CW.
All options fitted incl. CW Filter and electronic keyer.

£799 WITH FREE AERIAL TUNING UNIT

CLOSED – MONDAYS
OPEN – TUES, WED, THURS, FRI 9.30-5.30.
SAT 9.30-5.00.

LONDON:
373 UXBRIDGE ROAD,
ACTON,
LONDON W3 9RH.
Tel: 01-992 5765/6

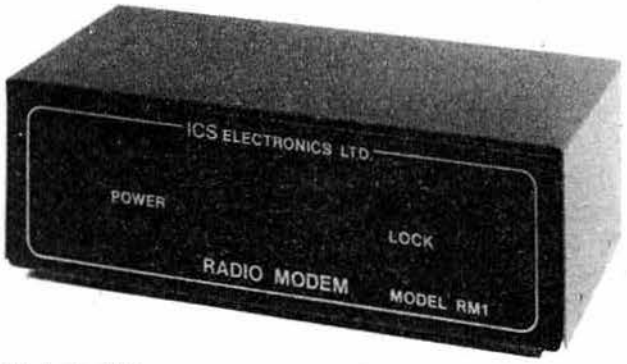
NORTHERN:
38 BRIDGE STREET,
EARLESTOWN, NEWTON LE WILLOWS,
MERSEYSIDE WA12 9BA.
Tel: 092 52 29881

ARE *more on your wavelength*

AMATEUR RADIO EXCHANGE LTD

ICS

RM-1 RADIO MODEM



Made in UK

Price: £89.50 inc VAT
£1.50 P&P

Specification

The RM-1 is a ruggedly built, steel cased unit, capable of use on all standard amateur data communication modes:

RTTY: 170Hz shift transceive (425, 850Hz receive) (IARU tones frequencies) — data rate up to 100 Bauds.
ASCII: 800Hz shift transceive (IARU tones) — data rate up to 1200 Bauds.
CW: Transceive.
AMTOR: 170Hz shift transceive — data rate at 100 Bauds.

Computer interfaces at both TTL and RS232 levels are provided and the front panel lock indicator doubles as a tuning indicator.
Power input is 12V DC at 150mA.
The RM-1 is intended for use with suitable software in your computer — much of which is available from ICS.

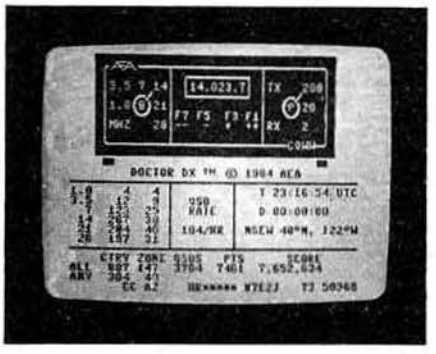
Compatible Software

RM-1/CBM-64	RTTY/ASCII/CW software, cable	**£39.00**
RM-1/VIC-20	RTTY/ASCII/CW software, cable	**£39.00**
RM-1/BBC-B	RTTY/CW software, cable only	**£39.00**
MBA-TOR20	Amtor/RTTY/CW/ASCII software, cable for VIC-20	**£69.00**
MBA-TOR64	As above for CBM-64	**£69.00**

Please add P&P: £1.00 each

ICS ELECTRONICS LTD
PO BOX 2, ARUNDEL, WEST SUSSEX BN18 0NX
Phone: (024 365) 590

ICS



DOCTOR DX™

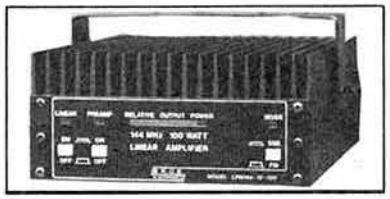
The Ultimate Morse Training Aid.
A module which plugs into a Commodore 64 computer and simulates the CW WW DX contest!
Allows you to send and receive morse with simulated contest exchanges and simulated propagation with a tunable transceiver displayed on the monitor screen.
Completely lifelike, this superb program really does sharpen your CW skills.
Send for copies of rave reviews from every single major American Amateur Radio Journal, together with our comprehensive data sheet.
Owners are eligible for a comprehensive contest awards program.

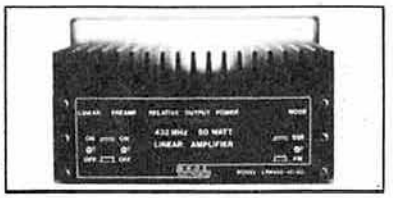
ICS ELECTRONICS LTD
PO BOX 2, ARUNDEL, WEST SUSSEX BN18 0NX
Phone: (024 365) 590
CLOSED ALL DAY WEDNESDAY, CALLERS BY APPOINTMENT ONLY

STAND B59 AND B60.

WHAT NEXT FROM B.N.O.S. ?

...Find out at the N.E.C. !!





? T.B.A.

? T.B.A.

SOME EXCITING NEW PRODUCTS ARE TO BE REVEALED AT STANDS B59 AND B60 ON THE 13TH AND 14TH APRIL AT THE N.E.C. BIRMINGHAM

Come and find out why we have fast built up a reputation for manufacturing high performance products that don't just look good but have performance and reliability designed and built in.

All of our products will be on display and demonstration of any of our equipment will willingly be given either by Howard (G3PGN), Mike (G8VCP) or Andy (G8UYN).

WHY NOT COME AND HAVE A CHAT?

British Designed and Manufactured

B.N.O.S. ELECTRONICS LIMITED

British Technology and Innovation

B.N.O.S. ELECTRONICS, BIGODS HALL, GREAT DUNMOW, ESSEX CM6 3BE, ENGLAND. (0371) 4677

FREE FINANCE

HAMPSHIRE, DERBYSHIRE, LOTHIAN, STAFFORDSHIRE

FULL DUPLEX

TWO-IN-ONE THE ULTIMATE FT2 700RH

Dual Band FM 2M and 70cms
Full Duplex Operation at the touch of a button
Aesthetically pleasing LCD Display/'S' Meter
25W power output both on VHF and UHF!
Opetional Voice Synthesiser
1MHz/25KHz/12½KHz steps (12½ on UHF!)
'+' '−' Repeater shifts with reverse facility
10 Channel Memory
Priority Memory Scan/Programmable Memory Scan
One piece diecast cenre chassis

45W OUTPUT!

Fully synthesised 2M FM Transceiver
45W (RH), 25W (R) Power Output
Dual VFO's
Optional Voice Synthesiser
1MHz/25KHz/12½KHz Steps
10 channel memory
'+' '−' Repeater shifts with reverse facility
Memory Priority and Programmable Memory Scan
17 Function LCD Display, LED 'S' Meter
One piece diecast alloy chassis
(Fan assisted cooling on 45W model)
140mm W x 40mm H x 180mm D

SMALL ON SIZE—LARGE ON OUTPUT FT270R/RH

BRITAINS BEST SELLER

FT-290R

2M MULTIMODE PORTABLE

Multimode 2M Transceiver
Dual VFO's
Microprocessor Control
Selectable Synthesiser Steps
Large LCD Display
Ten memory Channels
'+' & '−' Repeater Function
Nicads for Portable avaiable
2.5W/0.5W RF output
58(H) x 150(W) x 195(D) mm

LEEDS
SMC (Leeds)
257 Otley Road
Leeds 16, Yorkshire
Leeds (0532) 782326
9-5.30 Mon-Sat

CHESTERFIELD
SMC (Jack Tweedy) Ltd
102 High Street
New Whittingdon, Chesterfield
Chesterfield (0246) 453340
9-5 Tues-Sat

BUCKLEY
SMC (TMP)
Unit 27, Pinfold Lane
Buckley, Clwyd
Buckley (0244) 549563
10-5 Tue, Wed, Fri
10-4 Sat

STOKE
SMC (Stoke)
76 High Street
Talke Pits, Stoke
Kidsgrove (07816) 72644
9-5.30 Mon-Sat

GRIMSBY
SMC (Grimsby)
247A Freeman Street
Grimsby, Lincs
Grimsby (0472) 59388
9.30-5.30 Mon-Sat

JERSEY
SMC (Jersey)
1 Balmont Gardens
St Helier, Jersey
Jersey (0534) 77067
9-5.30 Mon-Sat
Closed Wednesday

EDINBURGH
SMC Scotscomm
23 Morton Street
Edinburgh EH15 2HN
Tel: 031-657 2430
10-5 Tues-Fri, 9-4 Sat

BANGOR
SMC (N Ireland)
10 Ward Avenue
Bangor, Co Down
Bangor (0247) 464875

Southampton showroom open 9-5.30 Mon-Fri, 9-1pm Sat

HQ & MAIL ORDER S.M. HOUSE, RUMBRIDGE ST. TOTTON, SOUTHAMPTON,

SMC **South Midlands**

2 YEAR GUARANTEE

YORKSHIRE, HUMBERSIDE, CO. DOWN, CLWYD, JERSEY

HF AT ITS BEST

FT757GX "GEN. COV. HF"

100W Multimode HF Transceiver
Fully Computer Compatible
Dual VFO's
100% Duty Cycle
General Coverage Rx
FM & CW Narrow as Standard
Programmable Memory Scanning
All Mode Squelch
Triple Microprocessor Control
Matching Automatic ATU (Opt)
Full Break-in CW
93(H) × 238(W) × 238(D) mm

FRG8800 YAESU'S LATEST

(See back page)

FT77

100W Output Transceiver
LSB/USB CW Modes Standard
Large LED Display/'S' Meter
Optional CW Narrow Filter
Optional FM (or AM) Unit
2M or 70cms with Matching Transverter
Matching Antenna Tuner available
Matching Scanner VF /Memories
95(H) x 240(W) x 300(D) mm

FT77 SUPERB VALUE HF

FT726R MILTIMODE VHF, UHF & HF

FT726R (2M) **£839** inc

★ COMING SOON ★

FT703R
70cm thumbwheel handheld

FT709R
70cm keyboard handheld

SEE US AT N.E.C. Stand Nos A63 & A64

***FREE FINANCE**
On many regular priced items SMC offers
Free Finance for invoice balance over £120.
20% down and the balance over 6 months or
50% down and the balance over a year.
You pay no more than the cash price!!
Details of eligible items available on request.

SMC SERVICE
Free Securior delivery on major equipment.
Access and Barclaycard over the phone.
Biggest branch agent and dealer network.
Securior 'B' Service contract at £5.00.
Biggest stockist of amateur equipment.
Same day despatch whenever possible.

GUARANTEE
Importer warranty on Yaesu Musen products.
Ably staffed and equipped Service Department.
Daily contact with the Yaesu Musen factory.
Tens of thousands of spares and test equipment.
Twenty five years of professional experience.
● 2 year warranty on regular priced Yaesu products.

Stock Carrying Agent: John Doyle, Transworld Comms, Neath (0639) 52374 Day (0639) 2942 Eve.

SO4 4DP, ENGLAND. Tel: (0703) 867333 Telex: 477351 SMCOMM G

Communications Ltd.

AUTHORISED YAESU

SCANNING RECEIVER

MS-8400

From S.M.C. the MS-8400 VHF/UHF microprocessor controlled scanning receiver with 40 programmable memory channels, keyboard entry of frequency or command; automatic band search, AM and FM selectable, 4 selectable scanning steps, priority channel, connections for external antenna, DC supply and loudspeaker. Supplied c/w telescopic antenna mounting bracket, etc.

SPECIFICATIONS

Frequency Range:	Low VHF 68,000 MHz ~ 88,000 MHz Mid VHF 108,000 MHz ~ 136,000 MHz High VHF 136,005 MHz ~ 174,000 MHz UHF 360,000 MHz ~ 512,000 MHz
Scanning steps:	5, 10, 12.5 and 25 kHz VMF 410, 12.5 and 25 kHz UHF)
Channels:	40 programmable memories
Modes:	AM or FM selectable
Scan rate:	Approximately 18 channels per second
Scan delay:	2 seconds **Priority sampling:** 4 seconds
Audio output:	1.2 Watts
Selectivity:	Better than –60 dB @ ±25 kHz
Power supply:	DC 12V ~ 16V 0.6A max
Memory backup:	9 volt, battery (PP3)
Antenna:	Telescopic antenna or External
Loudspeaker:	2.5" x 4" oval speaker
Size:	190(W) x 250(D) x 85(H) mm
Weight:	1.7kg

£249.00 inc.
Price includes free carriage

POWER METERS

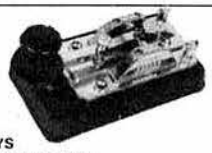
IN LINE POWER/SWR BRIDGES P.E.P., AVERAGE 1·8-440MHz

The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.

				£
		HANSEN		
FS710H	1.8-60 MHz	15/150/1500W	PEP Auto SWR	**P.O.A.**
FS710V	50-150 MHz	15/150W	PEP Auto SWR	**107.80**
FS500V	50-150 MHz	20/200W	PEP	**81.95**
FS300H	1.8-60 MHz	20/200/1000W		**53.50**
FS300V	50-150 MHz	20/200W		**53.50**
FS602M	50-150 MHz	20/200W	PEP	**P.O.A.**
FS210	1.8-150 MHz	20/200W	Auto SWR/ Power Meter	**65.50**
FS301M	2-30 MHz	20/200W		**42.25**
FS301MH	2-30 MHz	200/2000W		**42.25**
FS711H	2-30 MHz	20/200W	Head/ Display	**43.65**
W720S	130-430 MHz	20/200W	Head/ Display	**41.50**
FS5E	3.5-150 MHz	20/200/1000W	(1KW HF only)	**42.75**
SWR3E	3.5-150 MHz	20/200/1000W	(1KW HF only)	**28.75**
SWR50B	3.5-150 MHz	Twin Meter		**30.50**
FS20DL	3-150 MHz	1/10W Dummy/SWR/Power		**43.65**
FS20D	3-150 MHz	5/20W Dummy/SWR/Power		**43.65**
		JD		
JD110	1.5-150 MHz	10/100W		**16.50**
		SMC		
S3-30L	Mini (CB style)			**9.20**
T3-170L	3.5-170 MHz	Relative	Twin Meter	**17.25**
		WELZ		
SP300	1.8-500MHz	20/200/1KW	SWR/ Power	**121.50**

NB: PRICES INCLUDE VAT AT 15%
Carriage free by post

MORSE EQUIPMENT



			p.p.
MORSE KEYS			
HK703	Straight Key	**£29.35**	£1.20
HK704	Straight Key	**£19.95**	£1.20
HK706	Straight Key	**£16.65**	£1.00
HK707	Straight Key	**£15.50**	£1.00
HK710	Straight Key	**£39.95**	£1.75
HK808	Straight Key	**£49.95**	£1.75
HK711	Key Mounting	**£32.75**	£1.50
BK100	Mechanical Bug	**£24.95**	£1.75
MK701	Single Lever Paddle	**£28.50**	£1.60
MK702	Single Lever Paddle	**£29.75**	£1.60
MK703	Squeeze Key	**£28.95**	£1.75
MK705	Squeeze Key	**£25.65**	£1.75
MK706	Squeeze Key	**£23.50**	£1.75
IKP60	Iambic	**£9.95**	FOC
HK802	de Luxe Brass Key	**£86.30**	£2.00
HK803	de Luxe Brass Key	**£82.65**	£2.00
HK804	de Luxe Brass Key	**£78.25**	£2.00
MHK831	Super de Luxe squeeze & straight key	**£189.00**	£3.50
MORSE EQUIPMENT			
KP100	Squeeze 230/13·8V	**£82.50**	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13·8V	**£169.50**	£2.50
D70	Morse Tutor (Datong)	**£56.35**	FOC
MMS1	Morse Tutor (M/M)	**£115.00**	FOC
MMS2	Morse Tutor Advanced	**£169.00**	FOC
MICROWAVE MODULES—RRTY EQUIPMENT			
MM2001	RTTY to Video	**£189.00**	FOC
MM4001	RTTY Transceiver	**£269.00**	FOC
MM4001KB	RTTY Tx/Rx keybd	**£299.00**	FOC
MM1001KB	Morse Keyboard	**£135.00**	FOC
MM1000KB	ASCII CW conv c/w keybd	**£135.00**	FOC

PRICES INCLUDE VAT at 15%
Carriage as shown

10M FM CORNER

Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of approximately 4 watts and a receive sensitivity of better than 0.3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a - 100kHz repeater shift (by using the original panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM.

OSCAR 2 10m FM **£65.00 inc**

ACCESSORIES		**INC**	**P/P**
SMCGP27	½ Wave vertical	**£29.00**	£2.65
SMCVA27	¼ Wave vertical no radials	**£29.00**	£2.65
SMC11V11S	Glass fibre loaded radials	**£32.15**	£2.65
SMC10SE	10M Mobile whip	**£15.95**	£2.00
RSL-28b	Yaesu 10M mobile whip	**£10.65**	£2.00
SMCGCCA	Gutter mount and cable	**£11.50**	£2.00
SMCSOCA	4M cable assembly 10SE	**£5.65**	£1.50
FLEXI 10	G. Whip mobile 10-80M	**£52.33**	£2.35
MULTI-M	G. whip mobile 10/15/20	**£33.92**	£1.85
FLEXIWHIP	G. Whip 10M mobile	**£19.21**	£1.85
GW BASE	Base for all G. Whips	**£6.90**	£1.00
SMTC3170L	Twin meter SWR bridge	**£17.25**	FOC
SMC100LP30	Low pass filter	**£5.30**	FOC
120406	4 Amp DC power unit	**£14.95**	£2.35
SP55	Extension L/S	**£16.50**	FOC

NB. PRICES INCLUDE VAT AT 15%
and carriage by post or Securicor

PUBLICATIONS

	£	p/p
I.P.C. (PRACTICAL WIRELESS)		
Out of Thin Air	1.20	0.75
Passport to Amateur Radio	1.50	0.75
Wires and Waves	3.00	0.90
Are the voltages correct?	1.00	0.50
Introducing R.T.T.Y	1.50	0.50
R.S.G.B.		
Teleprinter Handbook	11.65	1.35
Radio Communications Handbook	8.95	2.05
Test Equipment (Radio Amateurs)	4.70	1.30
Amateur Radio Techniques	4.75	1.35
HF Antennas for all Locations	4.75	1.35
Guide to Amateur Radio (Soft)	2.75	0.75
Radio Amateur Operators Manual	4.25	0.75
1983 Call Book (UK)	1.00	0.80
1984 Call Book (UK)	5.00	0.50
R.A.E. Manual (10th Edition)	2.75	0.75
T.V.I. Manual	1.50	0.50
Morse Code for Radio Amateurs	1.00	0.50
VHF/UHF Manual (3rd Edition)	4.25	2.00
VHF/UHF Manual (4th Edition)	8.50	2.00
Prefix Map	2.25	1.25
Great Circle Map	1.50	1.20
Amateur Radio Logbook	2.30	1.25
S.M.C.		
Countries List	0.35	1.20
O.R.A. Locator Map (Special Coating)	0.50	1.20
Transparent Overlay 50km Rings	1.00	
Maidenhead Locator Map	1.50	1.20
TAB BOOKS		
Hidden Limited Space Antennas	6.95	0.75
Complete Handbook (Transmitters)	8.25	0.75
Secrets of Ham Radio DXing	6.50	0.75
Complete S.W.L. Handbook	9.95	0.85
S.W.L. Antenna Handbook	8.45	0.75
Guide to Scanners and Monitors	9.50	0.85
Radio Communications Receivers	11.75	0.90
Secret Shortwave Spectrum	6.50	0.75
UNIVERSAL ELECTRONICS INC		
Clandestine Confidential S.W.	6.35	0.85
World Press Frequencies (RTTY)	6.35	0.85
RTTY Today, Modern Guide	6.35	0.85
MISCELLANEOUS PUBLISHERS		
Amateur Radio (Stokes/Budd)	8.95	1.30
Log Book (Jaybeam)	2.30	1.25
Maidenhead Locator Map	1.50	

Prices include V.A.T. at 15% (where applicable) Postage extra. U.K. and B.F.P.O. rates for one off items only shown. N.B. For larger orders (any mix) p/p may be much lower than sum of individual charges

ROTATORS

The finest range: be it Kenpro, C.D.E., Channel Master, SMC has over 19 models to choose from. Ask the experts for the right model to suit your requirements—it should save you money. Write, phone or call.

KR600RC

9502B

FU200	Thro'	3 Core	Light Duty	**£49.95**
KR250	Bell	6 Core	Lighter Duty	**£61.95**
9502B	Offset	3 Core	Lighter Duty	**£69.49**
AR40	Bell	5 Core	Medium Duty	**£115.00**
KR400	Bell	6 Core	Matches KR500	**£109.95**
KR500	Thro	6 Core	Elevation	**£139.95**
AR50	Bell	5 Core	5 Position (AR40)	**£139.00**
KR400RC	Bell	6 Core	Medium Duty	**£132.50**
CD45	Bell	8 Core	Heavy Duty	**£189.95**
KR600RC	Bell	8 Core	Heavy Duty	**£189.50**
HAM IV	Bell	8 Core	Heavier Duty	**£299.00**
KR2000RC	Bell	8 Core	Heavier Duty	**£366.50**
T2X	Bell	8 Core	Very Heavy Duty	**£365.00**
HDR300	Bell	8 Core	Digital Readout	**£699.00**

Control Cable			p.p.
RC5W	5 Way	mtr **£0.44**	£1.90
RC6W	6 Way	mtr **£0.59**	£1.90
RC8W	8 Way	mtr **£0.67**	£1.90
9523	Support Bearing for 9502b F4200	**£19.65**	£2.50
KC038	Lower Mast Clamp for KR400 600, etc	**£12.85**	£2.50

Prices including VAT and carriage, but carriage on accessories is extra unless sent with rotators

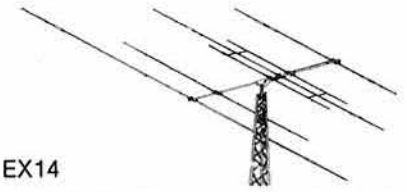
STOCK CARRYING AGENTS WITH DEMONSTRATING FACILITIES

John Doyal GW4FOI
Transworld Communications, Neath
Day (0639) 52374
Eve (0639) 2942

John Stringer GI3KDR
SMC N. Ireland, Bangor
(0247) 464875

HF ANTENNAS

SMC have the greatest range of HF antennas eg. Multi Beams/Quads, over 20 models. Shown below is the sensational new Explorer 14—contact us for full details.



EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	£499.00	£7.50
TH3JNR	3 Ele 10-20m	£298.00	£4.50
TH5Mk2	5 Ele 10-20m	£649.00	£7.70
TH7DXX	7 Ele 10-20m	£755.00	£9.75
TB3	3 Ele 10-20 Jaybeam	£212.75	£5.90
HQ1	Mini Quad 10-20	£199.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GO2E	2 Ele 10-20 Quad	£299.00	£5.90
GO3E	3 Ele 10-20 Quad	£536.00	£9.20
GO4E	4 Ele 10-20 Quad	£745.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£345.00	£8.00
LP1007	Log Periodic 13-20 MHz	£2195.00	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£179.00	£5.95
DB10/15A	3 Ele 10-15m	£209.00	£4.80

TB3

MONO BAND BEAMS			
103BA	3 Ele Yagi 10m	£99.00	£3.95
105BA	5 Ele Yagi 10m	£220.00	£3.95
153BA	3 Eli Yagi 15m	£135.00	£3.90
155BA	5 Ele Yagi 15m	£339.00	£5.90
203BA	3 Ele Yagi 20m	£259.00	£4.90
204BA	4 Ele Yagi 20m	£420.00	£7.30
205BA	5 Ele Yagi 20m	£499.00	£9.40
18TD	Dipole Tape 10-80m	£230.00	£2.80

HF5V

HF5R

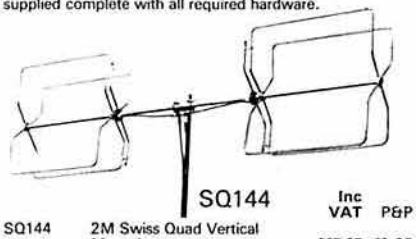
VERTICALS			
12AVQ	Vertical 10-20m	£78.95	£2.75
14AVQ/WB	Vertical 10-40m	£106.00	£2.75
18AVT/WB	Vertical 10-80m	£172.00	£2.75
18V	Vertical 10-80m taped	£38.80	£2.75
C4	Vertical 10-20m	£89.00	£2.50
SMCHF5V	Vertical 10-80m	£66.50	£3.00
SMCHF5R	Radial Kit for above	£41.00	£3.00
TRAP DIPOLE			
SMCTD/HP	High Power 10-80m	£49.00	£2.65
SMC TD/P	Portable inc coax	£69.00	£2.65
MOBILE			
Tribander	10-20m Slide sw.	£29.33	£2.20
Multimobile	10-20m	£33.92	£1.85
Flexiwhip	10m only	£19.21	£2.20
Extra coils	For above to 160m	£7.25	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£52.33	£2.35
Bases	For above	£6.90	£1.00

NB: PRICES INCLUDE VAT AT 15%
Carriage extra. Mainland rate shown.

BASE ANTENNAS

HF, VHF, UHF, BASE STATION ANTENNAS

SMC-HSA range of bse station antennas covers from 80M through to 70cm. All have SO239M connectors and are supplied complete with all required hardware.



SQ144

		Inc VAT	P&P
SQ144	2M Swiss Quad Vertical Mounting	£67.95	£2.85
GP2M	2M½ c/w groung plane 3·4dB ¼	£22.95	£2.85
GG144W	2M2 × ⅝ colinear 6·5dB ¼	£33.95	£2.85
GP23	2m3 × ⅝ colinear 7·8dB ¼	£49.95	£2.85
GP432X	70cm 3 × ⅝ 6·8dB ¼	£36.95	£2.85
70N2V	2M/70cm colinear 2·8dB ¼/5·8dB ¼	£36.80	£2.85
HS770	2M/70cm Duplexer 50W 30dB isolation	£17.65	£1.95
VHFL	65-520MHz Discone Rx only	£19.60	£2.85
GDX1	80-480MHz Discone 3dB ¼	£49.50	£2.85
GDX2	50-480MHz Discone 3dB ¼	£62.85	£2.85
GDXA	100-480MHz Discone 3dB ¼	£41.85	£2.85
LT606	50-500MHz Log Periodic 7-8dB	£159.95	£3.50
HF5V	Trapped Vertical 10-80M 5 bands	£66.50	£3.00
HF5R	Loaded Radial Kit	£41.00	£3.00
3Y1015D20	3 ele 10, 15M dipole 20M	£179.00	£5.95
GP714	70cm 14 step colinear 10dBi	£88.20	£2.85

POWER SPLITTERS

144MHz 2 way N connectors 1kW	£30.65	£1.50
144MHz 4 way N connectors 1kW	£33.75	£1.50
432MHz 2 way N connectors 1KW	£29.15	£1.50
432MHz 4 way N connectors 1kW	£31.80	£1.50
1296MHz 2 way N connectors 1kW	£24.55	£2.00
1296MHz 4 way N connectors 1kW	£25.70	£2.00

JAYBEAM

4 METRES				
4Y/4M	Yagi 4 element	7dBd	£32.78	£2.65
PMH2/4M	Phasing harness 2 way		£17.82	£1.65
2 METRES				
H0/2M	Halo head only	0dBd	£6.53	£1.50
HM/2M	Halo with 24" mast	0dBd	£7.48	£1.65
C5/2M	Colinear omni vert	4·8dBd	£86.25	£2.65
LW5/2M	Yagi 5 element	7·8dBd	£15.53	£2.65
LW8/2M	Yagi 8 element	9·5dBd	£19.56	£2.65
LW10/2M	Yagi 10 element	10·5dBd	£25.30	£2.65
LW16/2M	Yagi 16 element	13·4dBd	£35.07	£3.65
PBM10/2M	10 ele Parabeam	11·7dBd	£49.45	£3.65
PBM14/2M	14 ele Parabeam	13·7dBd	£60.95	£3.65
Q4/2M	Quad 4 element	9·4dBd	£31.63	£2.65
Q6/2M	Quad 6 element	10·9dBd	£41.40	£2.65
Q8/2M	Quad 8 element	11·9dBd	£51.75	£2.65
D5/2M	Yagi 5 over 5 slot	10dBd	£27.60	£2.65
D8/2M	Yagi 8 over 8 slot	11·1dBd	£37.95	£2.65
5XY/2M	Yagi 5 ele crossed	7·8dBd	£29·90	£2.65
8XY/2M	Yagi 8 ele crossed	9·5dBd	£38.53	£2.65
10XY/2M	Yagi 10 ele crossed	10·8dBd	£43.80	£2.65
PMH2/C	Harness cir polarisation		£11.50	£1.65
PMH2/2M	Harness 2 way 144MHz		£13.23	£1.65
PMH4/2M	Harness 4 way 144MHz		£31.62	£1.65
70CMS				
C8/70	Colinear Vertical	6·1dBd	£92.00	£2.65
D8/70	Yagi 8 over 8 slot	12·3dBd	£28.18	£2.65
PBM18/70	18 ele Parabeam	13·5dBd	£34.50	£2.65
PBM24/70	24 ele Parabeam	15·1dBd	£46.00	£2.65
LW24/70	Yagi 24 element	14·8dBd	£31.05	£2.65
MBM28/70	28 ele Multibeam	11·5dBd	£23.00	£2.65
MBM48/70	48 ele Multibeam	14·0dBd	£37.96	£2.65
MBM88/70	88 ele Multibeam	16·3dBd	£51.75	£2.65
8XY/70	Yagi 8 ele crossed	10dBd	£45.85	£2.65
12XY/70	Yagi 12 ele crossed	12dBd	£55.20	£2.65
PMH2/70	Harness 2 way		£12.07	£1.85
PMH4/70	Harness 4 way		£24.73	£1.85
23CM				
CR2/23CM	Corner reflector	13·5dBd	£43.13	£2.65
PMH2/23CM	Harness 2 way		£32.78	£1.65

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

SMC-HS Mobile Elements, tabulated below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal —band changes, comparative test, car wash, anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fitted askew.

SMC 78F

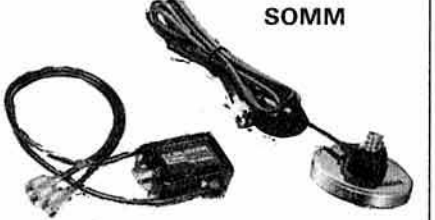
GCD

SMC258

GCD

	SMC-HS MOBILE ANTENNAS	£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting ¼λ	5.75	0.85
SMCT144h	Telescopic 2M ¼ wave BNC	10.35	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting ¼λ	6.90	0.85
SMC2H/PL	Helical 2M PL259 fitting	5.95	0.85
SMC2H/BNC	Helical 2M BNC fitting	6.90	0.85
SMCHS430S	70cm ¼ wave BNC 2.5dB¼	8.75	0.65
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.70	1.85
SMC2NE	2M ¼ wave fold 3.0dB¼ 4.3'	7.95	2.00
SMC2VF	2M ¼ wave fold 3.0dB¼ 3.5'	14.66	2.00
SMC78F	2M ⅜ wave fold 4.5dB¼ 5.7'	14.74	2.50
SMC78B	2M ⅜ wave ball 4.5dB¼ 5.6'	14.74	2.59
SMC78SF	2M ⅜ wave short 4.7'	16.95	2.50
SMC88F	2M ⅝/8 wave 5.2dB¼ 6.5'	22.95	2.50
SMC118M	Colinear 2M 11/8 7dB¼ 9.7'	39.85	2.65
SMC258	70cm 2 × ⅜ fold 5.5dB¼ 3.1'	26.95	2.00
SMC268E	70cm 2 section colinear 6dB¼	29.95	2.00
SMC358	70cm 3 × ⅜ 6.3dB¼ 4.7'	20.95	2.00
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼ (½λ & 2½λ)	20.95	2.00
SMCHS770	144/432 Duplexer 50W	19.55	1.85
SMC20SE	20M 1.72M 100W PEP	21.50	2.50
SMC15SE	15M 1.72M 130W PEP	16.85	2.50
SMC10SE	10M 1.72M 200W PEP	15.95	2.50
SMC17SE	17M 1.915M 200W PEP	18.75	2.50
SMC12SE	12M 1.915M 200W PEP	16.85	2.50
RSL-28b	Yaesu 10M mobile whip	10.65	2.00
SMCGCCA	Gutter clip 4 mtrs cable	11.50	2.00
SMCSOCA	Cable assembly 4M PL259	5.65	1.50
SMCSOCAL	Cable assembly 6M PL259	5.95	1.50
SMC50CALLR	Cable assembly 5M PL259	6.65	1.50
SMCROL	Rollet, 10mm thick (for above)	1.15	0.50
SMCTMCAS	Trunk mount c/w 6M cable	10.65	2.00
HDTMCA	HD trunk mount c/w 5M cable	16.10	2.00
SMCSOMM	Magnetic base c/w 4M cable	11.95	2.00
SMCSOWM	Adjustable wing mount base	4.95	0.90
SMCGCD	Gutter clip deluxe	5.30	1.50
SMCBSD	Bumper strap deluxe	10.95	1.50
HS88BK	Bumper mounted extension for 144 MHz antennae	23.35	2.00

SOMM



HS770

NB: PRICES INCLUDE VAT AT 15%

Head office
Mail orders
Service & Spares

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton
See preceding pages for complete addresses and phone numbers of branches

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee A member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

Headquarters and registered office: **Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW**
Telephone (Dialling code 77 from London, 0707 from outside London) 59015. Telex 25280 (RSGBHQ G)
Secretary and general manager: D A Evans, G3OUF

COUNCIL OF THE SOCIETY

PRESIDENT: J Heathershaw, G4CHH (Mrs)

EXECUTIVE VICE-PRESIDENT
W J McClintock, MSc, G3VPK

IMMEDIATE PAST-PRESIDENT
R G Barrett, GW8HEZ

HONORARY TREASURER
P F D Cornish, FCA, G3COR

ORDINARY MEMBERS OF COUNCIL

E J Allaway, MB, ChB, MRCS, LRCP, G3FKM
D S Evans, PhD, FIM, CEng, G3RPE
H M Holmden, G4KCC
G R Jessop, CEng, MIERE, G6JP
B O'Brien, G2AMV
D M Pratt, BEng, CEng, MIEE, MIERE, G4DMP
G R Smith, BSc, MBIM, G4AJJ
K E V Willis, BSc, ARCS, CEng, MIEE, G8VR

ZONAL MEMBERS OF COUNCIL

Zone A	*(Regions 1, 2 and 18)*	D S Smith, G4DAX	**Zone E**	*(Regions 10 and 11)*	*(Post vacant)*
Zone B	*(Regions 3, 4 and 5)*	H S Pinchin, BSc, MBIM, G3VPE	**Zone F**	*(Region 15)*	J T Barnes, GI3USS
Zone C	*(Regions 7, 8, 16 and 19)*	W J McClintock, MSc, G3VPK	**Zone G**	*(Regions 12, 13 and 14)*	F Hall, GM8BZX
Zone D	*(Regions 6, 9, 17 and 20)*	J N Gannaway, G3YGF			

REGIONAL REPRESENTATIVES

Region 1	*(Cheshire, Cumbria, Gtr Manchester, Isle of Man, Lancashire, Merseyside)*	B Donn, G3XSN.
Region 2	*(Humberside N of Humber, North, South, West Yorkshire)*	*(Post vacant)*
Region 3	*(Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands)*	G Ross, G8MWR.
Region 4	*(Derbyshire, Humberside S of Humber, Leicestershire, Lincolnshire, Nottinghamshire)*	M Shardlow, G3SZJ. Tel 0332 556875.
Region 5	*(Bedfordshire, Cambridgeshire, Northamptonshire)*	J S Allen, G3DOT. Tel 0582 21151.
Region 6	*(Berkshire, Buckinghamshire, Oxfordshire)*	F S G Rose, G2DRT. Tel 0494 814240.
Region 7	*(Gtr London S of Thames, Surrey including part of London N of Thames administered by Surrey)*	R Sykes, G3NFV. Tel 0372 372587.
Region 8	*(Kent, East Sussex, West Sussex)*	M Elliott, G4VEC. Tel 0795 70132.
Region 9	*(Cornwall, Devon)*	A H Hammett, G3VWK
Region 10	*(Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan)*	E J Case, GW4HWR. Tel 0222 810368.
Region 11	*(Clwyd, Gwynedd)*	B H Green, GW2FLZ. Tel 0492 49288.
Region 12	*(Grampian, Highland, Island Authorities, Tayside)*	M R Hobson, GM8KPH. Tel 0796 2140.
Region 13	*(Borders, Fife, Lothian)*	A Givens, GM3YOR.
Region 14	*(Central, Dumfries and Galloway, Strathclyde)*	T G Wylie, GM4FDM. Tel 0505 22749.
Region 15	*(Northern Ireland)*	R R Parsons, GI3HXV
Region 16	*(Essex, Norfolk, Suffolk)*	A Owen, G4HMF.
Region 17	*(Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire)*	T M Emery, G3KWU.
Region 18	*(Cleveland, Durham, Northumberland, Tyne & Wear)*	I Gibbs, G4GWB
Region 19	*(Greater London N of Thames, Hertfordshire)*	R J Broadbent, G3AAJ.
Region 20	*(Avon, Gloucester, Somerset)*	N F O'Brien, G3LP.

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)
Audio Visual Library co-ordinator: R G Auckland, G2PA
Awards managers. HF: P Miles, G3KDB; **VHF:** Jack Hum, G5UM
HF manager: E J Allaway, G3FKM
Microwave manager: D S Evans, G3RPE
Observation Service organizer: R J Osborne, G4FJN
Slow morse practice transmissions organizer: *(Post vacant)*
VHF manager: K A M Fisher, G3WSN

Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

ANNUAL SUBSCRIPTION RATES

Corporate member: UK and overseas (*Radio Communication* by surface mail): **£16.50 UK associate member under 18: £6.20 Family member: £6.60**
UK students over 18 and under 25: £9.30 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £16.50 (including *Radio Communication*); **£9.90** (excluding *Radio Communication*)
(Subscriptions include VAT)

RSGB QSL BUREAU

QSL cards for distribution should be sent to:
Mr E G Allen, G3DRN, QSL Bureau manager,
30 Bodnant Gardens, London SW20 0UD

A list of QSL Bureau sub-managers is obtainable from RSGB headquarters.

RSGB NEWS SERVICES

Headline News
Telephone 0707 (77 from London) 59312 for a recording of the latest amateur radio news.

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands. Details of frequencies, locations and times can be obtained from RSGB headquarters.

EDITORIAL

The RSGB National Convention 1985

The 1985 convention will soon be with us. It will, of course, include the main RSGB stand, together with the RSGB committee stands which deal with their own specialized aspects of amateur radio. The committee stands will be set up and manned by the voluntary committee members, who dedicate some of their free time to enhance a wide range of amateur radio matters. These committee members will be available to talk to each and every visitor. In addition, there will be stands set up by national organizations which are affiliated to the RSGB and which cater for specific needs, such as AMSAT-UK, the G-QRP Club, RNARS etc. Indeed, with the various lecture streams, trade and committee stands, there should be much to interest **every** visitor to this year's national convention, from the raw beginner to the seasoned expert in amateur radio.

The national convention is the **only** event in the amateur radio calendar where the Society aims to bring together under one roof **all** aspects of amateur radio. I think most would agree that, while previous conventions have been pretty successful in this respect, there is always room for improvement. To do this we need information. We need to know, for example, how many people visit the convention on more than one day, and how many more would do so if the range of interests were expanded, if "season tickets" were available and if there were facilities for caravans and camping. We would like to know if an expanded lecture programme would be of interest, or of any other suggestions to improve the major amateur radio event of the year.

The response of members to our survey made several years ago, and more recently to the questionnaire on computing and the User Test Reports, has provided invaluable information. We would like to think that a similar questionnaire on the national convention would be equally effective in helping those interested in amateur radio to help themselves. To this end, we shall be asking visitors to the convention to fill in a questionnaire reporting their reactions to the convention and seeking **their** ideas on possible change. In the May issue of *Rad Com*, we shall ask those who did not visit the convention for their comments. The results are bound to be interesting!

The national convention is there for **your** benefit and as a show-case for amateur radio. The prestigious setting of the National Exhibition Centre must help enhance the status of our activity in many ways. Support from Society members is essential to ensure that this event is a success. RSGB will see you there . . .

David Evans, G3OUF

Amateur Radio News

Royal visit

HRH the Prince of Wales showed a keen interest in amateur radio during a visit to West Cumbria on 19 February 1985. In the course of a "walkabout" in Whitehaven the Prince spotted Philip Park, G4XSR, wearing a headset and boom microphone: G4XSR is Britain's youngest licensed radio amateur. The Prince apparently enquired "It isn't cb, is it?" as he shook hands with Mr Park. G4XSR explained that it was amateur radio and that he was at that moment in contact with his father, G6PIW.

HRH Prince Charles, Prince of Wales, meeting 14-year-old Philip Park, G4XSR. Photo: *Whitehaven News*

Region 2 election

Nominations for the position of Region 2 representative have been received in respect of Messrs P R Sheppard, G4EJP, and C J Thomas, G3PSM.

Not later than 13 May 1985, members residing in Region 2 (Humberside north of the Humber, North, South and West Yorkshire) may vote for one candidate in the form prescribed below. Completed ballot forms, which must reach RSGB headquarters by the above date, should be enclosed in a sealed envelope marked "Region 2 election", and addressed to "The Secretary".

FORM OF BALLOT PAPER

I, ...
being a fully-paid-up corporate member of the RSGB residing in Region 2 wish to record my vote in favour of
Mr.....
as representative for Region 2
Signed.....
Callsign or BRS No.....
Address.....
.....

Region 9 representative

The result of the ballot to elect a Region 9 representative was:

A H Hammett, G3VWK.....42 votes
E D P Pether, G4VEZ.....36 votes
(Invalid vote....1)

Mr A H Hammett, G3VWK, was thereby elected.

BBC fails to get site clearance

The Foreign & Commonwealth Office and the External Services of the BBC have had an application for planning permission for a new transmitter site at Bearley, Warwickshire, rejected by the Environment Secretary, Mr Patrick Jenkin. The £19m proposal was for an installation with six transmitters and 29 hf antenna arrays up to 90m high. Bearley is some three miles from Stratford-upon-Avon, and the inspector who dismissed the original application said that the site was a poor choice ". . . due to its proximity to Stratford and large villages, given the likelihood of widespread and severe rf interference with electronic equipment and the prominence of the site in a particularly important tourist area".

The proposed installation was, in effect, a second choice for the BBC: a few years ago an application for a similar transmitter site on an airfield at Henstridge, Dorset, was rejected. It is understood that the BBC is now likely to investigate the feasibility of re-activating and expanding one of its earlier sites at Orfordness on the Suffolk coast.

The implications of the latest decision are somewhat worrying for radio amateurs, since ". . . the likelihood of widespread and severe rf interference . . ." has been cited as a factor in the refusal. The Society is currently studying the text of the Bearley decision.

New syllabus for the RAE

The City & Guilds of London Institute has published the syllabus for the Radio Amateurs' Examination which will come into effect from May 1986. Members will recall that City & Guilds invited comments on the RAE last year: the C & G Syllabus Working Group welcomed these, and the revised syllabus takes them into account.

The main differences between the present syllabus and the one which will be introduced in 1986 are in the area of a reduction in the content of the electrical theory section and an increase in the emphasis placed on practical applications. By way of response to changing needs in amateur radio, more attention is given to operating practice and topics, such as the reason for band planning, and the number of questions on operating procedures has been doubled.

From May 1986 the number of questions set on each section of the syllabus will be:

Paper 01 (1h)

Licensing conditions	20
Transmitter interference	15

Paper 02 (1·5h)

Operating procedures	10
Electrical theory	6
Solidstate devices	7
Receivers	8
Transmitters	8
Propagation and antennas	8
Measurement	8

Copies of the 1986/88 syllabus, costing £1.50, may be obtained from Sales Section, City & Guilds of London Institute, 76 Portland Place, London W1N 4AA, quoting Subject 765. The price includes postage and packing and a set of sample questions from past papers.

From 1986, examinations will be held in May and December only—the examination in March has now been discontinued. The Society will continue to offer facilities to take the RAE at its London and Derby centres.

Amateur Radio Observation Service

It is in the very best interests of amateur Radio that we all operate to the highest standards, and in this respect the Society has a duty to help. The co-ordinator of the Amateur Radio Observation Service, Mr R J Osborne, G4FJN, QTHR, can always be approached directly on matters concerning interference, amateur licence and Telecommunications Act offences, serious instances of bad operating practice and spectrum abuse generally. It is, however, important that complaints are put in writing, even if in urgent cases there has been a preliminary telephone call. The report must contain all relevant information —callsigns of offenders and any other witnesses, dates, times, frequencies, suspicious circumstances etc. The co-ordinator will acknowledge immediately, request detailed information, and then proceed with further action according to circumstances.

If it is either appropriate or specifically requested, all correspondence will be treated in complete confidence.

Amateur radio in Turkey

After almost two years' work by the national society of Turkey, TRAC, the first Turkish amateur radio licence was issued on 30 January 1985. It was issued to the

Dr Unal Akbal, TA1A

general secretary of TRAC, Dr Unal Akbal, and his callsign is TA1A (he was previously known as TA1UA). There is one class of licence, and its privileges relate to all bands including 10, 18 and 24MHz. The power limit is 400W p.e.p.

Dr Akbal's provisional operating schedule is 0500-1800 each Saturday and Sunday. He operates cw on 14,015-14,035kHz and 21,015-21,035kHz, and ssb on 14,185-14,205kHz and 21,200-21,300kHz.

QSL Bureau closure

Members are asked to note that the RSGB QSL Bureau will be closed between 10 and 24 May. Cards must **not** be sent to G3DRN between those dates.

Raised in the House

January 1985 seemed to be "radio month" in the House of Commons, with various matters being raised.

On 9 January Oonagh McDonald, MP for Thurrock, asked whether the Department of Trade & Industry had put out to tender a feasibility study of the privatization of the radio spectrum. In his reply Mr John Butcher stated that this had not been done: however, following a recommendation in the Merriman report, it was the Government's intention to commission a feasibility study on the possibility of introducing in the future some form of pricing for the spectrum in place of, or in addition to, the present licence fee basis.

On 14 January a lengthy debate took place in the House of Lords on pirate radio. Lord Aylestone questioned whether the DTI was doing enough: he noted that one well-known pirate broadcasting station was even registered for VAT and found that "amazing". He preferred the description "radio thief" to "pirate radio station".

Lord Willis felt that there were "no checks on them whatsoever". He quoted publicity from "Laser 558" in which it was said "The station operates on the principle that the airwaves are free and beyond regulation. Its powerful 25,000W signal covers more than 150 million listeners in nine Western European countries". Lord Willis felt that it was imperative to do something about the situation.

Lord Mulley felt that the problem was not that there were insufficient legal powers: it was that the Government had not seen fit to exercise the powers which it had. He added that if the Government felt that there were still "powers which they felt they ought to have and which they did not have", he was sure that both Houses of Parliament would be happy to support a Private Member's Bill or to permit the Government to put through a short Bill to give the necessary powers.

Baroness Stedman said that the London-based "Radio Jackie" never appeared to be the target of shutdown operations, and she could not understand why. She outlined points made in correspondence between the managing director of the ILR station "Radio Mercury" and the DTI, and asked why the DTI had failed to act against "Radio Jackie" and what the Government was proposing to do about it. (Radio Investigation Service officers did, in fact, take action against "Radio Jackie" on 1 February 1985 —Ed.)

In reply to the points which had been made, the Parliamentary Under-Secretary of State for the Department of Trade & Industry, Lord Lucas, said that unlicensed broadcasting was only one of a number of problems caused to radio and television users of all kinds. Problems also arose from the growth of other forms of illicit radio, whether it was broadcasting equipment, cb radio, mobile radio, high-power cordless telephones or amateur radio equipment. All illicit use caused interference and annoyance, and calls had been made for the Government to take urgent action. Lord Lucas said that the task of investigating the illicit use of radio fell to the Radio Investigation Service: he added that there had been a "fairly major" review of the activities of the RIS since it came under the control of the DTI, in order to see what could be done to improve them. He said: "No pirate station, even if it has so far escaped attention, can consider itself immune from the attentions of the Radio Investigation Service." Lord Lucas concluded by saying that he had given an assurance that the work of the Radio Investigation Service would be stepped up. Referring to illegal broadcasting, he said: "If allowed to go unchecked it would soon result in anarchy on the airwaves, and this we cannot allow".

On 28 January Mr Moynihan, MP for Lewisham East, asked the Secretary of State for Trade & Industry what conclusions he had reached on the future of Bands 1 and 3 in the light of the response received to the consultative document, Cmnd 9241, and whether he would make a statement. In reply Mr Geoffrey Pattie said that a considerable number of replies had been received, and he referred to proposals relating to commercial applications such as cellular radio and other national radiotelephone systems. He said that further consideration was being given to a number of other issues raised in connection with the future use of Band 1.

On 30 January Mr Campbell-Savours, MP for Workington, asked the Secretary of State for Trade & Industry how many prosecutions had been brought against persons who had been the subject of citizens' band radio interference investigations during the previous 12 months. In reply Mr Butcher stated that during the 12 months between 1 October 1983 and 30 September 1984, 1,260 people were prosecuted under the Wireless Telegraphy Act 1949 for the unlicensed use of cb radio equipment or for non-compliance with licence conditions. He added that the great majority of these cases had arisen out of investigations by the Radio Investigation Service of interference experienced by authorized radio users.

On 30 January Mr Barron, MP for Rother Valley, asked the Secretary of State for Trade & industry what representations he had had from the Radio Society of Great Britain in relation to the introduction of a novice amateur radio licence. In reply, Mr Butcher said that the RSGB, which represented the interests of UK radio amateurs, had put forward proposals for a provisional or novice licence in the past but had not done so in recent times: he understood that this was because doubts had been expressed as to whether a novice facility was in the best interests of amateur radio. Mr Butcher said that his department required radio amateurs to achieve a minimum standard of proficiency, and there were fears that introducing a lower standard for novices would cause interference to other services. He added that officials in the radio regulatory division of his department had regular meetings with the Society and, although no formal proposals had been put forward recently on the topic of novice licensing, it remained under discussion.

RSGB NATIONAL CONVENTION 12-13 April 1985

See the *RSGB News Bulletin* enclosed with this issue for details of this event

The Isle of Man Repeater, GB3GD

GB3GD was recently reduced in power on the instructions of the Repeater Management Group, who have responsibility for the co-ordination of the repeater networks. The power reduction was necessary because the new repeater had caused severe interference at times to users of the co-channel Stoke-on-Trent repeater, 140 miles away.

The RMG is continuing to advise on suitable antennas which are expected to give better coverage of the island than the original antenna but without the interference to the rest of the network.

7MHz intruders

Last year the Society took up with the DTI the matter of broadcast station "intruders" in the 7MHz amateur band. In a recent reply, the DTI said: "The present state of affairs in hf broadcasting can best be described as semi-regulated anarchy, successive attempts to plan . . . over the years having failed." The DTI continued: "It would be tempting providence to express confidence

RAYNET SYMPOSIUM
Strathspey Hotel, Aviemore
4 May 1985
Theme: Communications

1000 Coffee
1030 Amateur radio and the EPO (AEPO Highland Region)
1145 Humberside emergency communications (EPO Humberside)
1245 Lunch
1345 Search & rescue (Controller: RAF Rescue Co-ordination Centre, Pitreavie)
1445 Open forum, Raynet and user services
1545 Coffee followed by informal chat.

More space and easy parking this year, with bar facilities and bar meals.
Further details from GM3FRA, tel Fort William (0397) 3833.

that the latest attempt, the 1984/87 Conference, will succeed where the others failed but . . . there are some grounds for optimism. If a satisfactory regulatory regime can be achieved it should reduce the need, which many administrations currently perceive, to broadcast out-of-band at hf. Thus there may be some grounds for optimism in the longer term: in the short term (we) doubt whether anything effective can be done."

Raynet election
Because of his appointment on the Raynet Committee as Zonal Co-ordinator, Mr David Lankshear, G3TPJ, has had to resign his position as Zone 9 Raynet representative. This now creates a vacancy for Zone 9, which comprises the counties of Hereford & Worcester, Shropshire, Staffordshire, Warwickshire and West Midlands.

Members of Raynet who are resident in Zone 9 may forward nominations for the post to "The secretary (Raynet)" at RSGB headquarters. Nominations should be supported by five currently-registered Raynet members who are resident within the zone, and they must be received no later than 5.15 pm on 1 May 1985. They should be accompanied by a declaration that the nominee is: normally resident within the zone, a currently registered Raynet member, a member of RSGB and willing to serve. The period of appointment is normally three years.

Where more than one valid nomination is received by the due date, an election will be held during the month of July 1985.

Round Britain trip
Five radio amateurs from Goole, Yorkshire, are hoping to complete a unique trip on 3, 4 and 5 May from their home town to the most northerly, southerly, easterly and westerly points of mainland Britain. And, as if the driving and navigating are not enough to keep them busy, they intend to operate a 144/145MHz station throughout their journey to Dunnet Head (the most northerly), Ardnamurchan (W), the Lizard (S) and Lowestoft (E). Special QSL cards will be issued, hopefully with charitable donations sent in return, and all the proceeds of the exercise will go towards a £100,000 restoration appeal at Goole Parish Church and the NSPCC.

Organized by the Goole Radio & Electronics' Society, G8HSG, the trip, in a "donated" Renault 5, is intended to publicise amateur radio and to help the two worthy causes.

"Volunteered" for the trip are the GRES chairman Ray Thornton, G6KCE; treasurer Geoff Cowling, G8ERX; secretary Richard Sugden, G8IOH; committee member Dennis Lockwood, G6REL; and public relations officer, Steve Anderson, G6VBU.

Talk-in at NEC
The Solihull & Chelmsley Wood Raynet Group will be providing the talk-in station at the RSGB National Convention at the NEC, Birmingham, on 13–14 April 1985. Using the callsign GB8NEC, the station will use 145·55MHz (S22) and 433·20MHz (SU8).

Although it will not be open to general visitors, Raynet controllers are invited to visit the station to see the operational use of remotes and the standard interface system. Arrangements should be made at the Raynet stand. Further details can be obtained from G4WMH, tel 021-705 0488 (evenings).

50MHz England/Wales
In the list of 50MHz permit holders (*Rad Com* January 1985, p20), Mr P J S Turner, G4IIL/GW4IIL/A, is shown as resident in Brighton. We would point out that the DTI has kindly allowed him to operate from Brighton from October to May, and from May to October to continue to operate as GW4IIL/A from Tregaron, Dyfed, on 50MHz.

SARUG software information
As is well known, GM4IHJ has developed a good deal of satellite and propagation-related software for the Sinclair Spectrum microcomputer: these, together with other amateur radio software, are obtainable from the Sinclair Amateur Radio User's Group (SARUG). A list of available software is obtainable from Paul Newman, G4INP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ. An sae **must** be supplied.

30 years at GB2SM
Geoff Voller, G3JUL, celebrated his 30th anniversary as chief operator at the Science Museum station GB2SM recently—he has introduced many thousands of people to amateur radio, and congratulations are firmly in order. GB2SM and GB3RS had a contact in February, and Geoff Voller was congratulated on his achievement by the Society's President, Mrs Joan Heathershaw. G3JUL is one of the group pictured on this page.

North Trafford Open Days
The North Trafford College of Further Education, Talbot Road, Stretford, Manchester, will be holding three Open Days on 23–25 April, during which the college radio station, G4FXP, will be operational on 14 and 144MHz, and on S22 for talk-in.

Former RAE students (there are about 500) are invited back to the college for a "get-together" and a chat, by G3NGD. The college will be open at the following times: 23 April, 1400–2000; 24 April, 1000–2000; 25 April, 1000–2000.

Mobile Rallies Calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

8 April
Wakefield Amateur Radio & Computer Fair, Bretton Hall College, Bretton, Wakefield, organized by North Wakefield RC. From 11am (10.30am for disabled visitors). One mile from junction 38 and four miles from juction 39 on M1. Talk-in on S22 and GB3WU (RB15). Details G4RCH, tel 0532 536633.

21 April
Lough Erne ARC Mobile Rally. Killyhevlin Hotel, Enniskillen. Details GI4CZW, tel 0365 24500.

21 April
East Cleveland ARC Rally, Marske Leisure Centre, Marske-by-the-Sea, Cleveland. Talk-in on S22, G4CRS. Details G1GMF, tel 0642 474769.

28 April
Humberside Radio Rendezvous, Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. From 11am to 5pm. Talk-in on S22 from 10am. Details Ida G4ZGJ, tel Scunthorpe 732268.

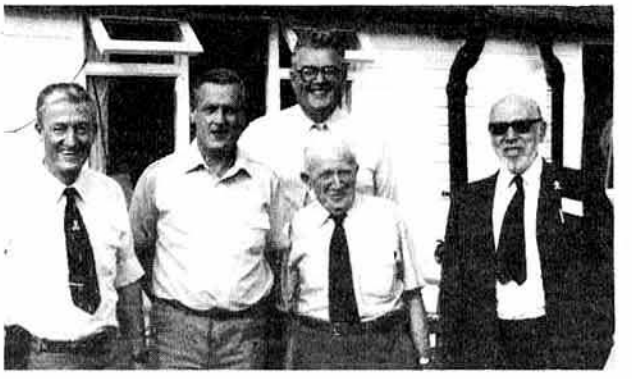
28 April
Southend & DRS Mobile Rally, Rocheway Centre, Rochford, Essex. Talk-in on S22, 145·550MHz fm. Details from G4DEZ, tel 0702 617749; or G4RDS, tel 03745 50494.

5 May
Swansea ARS Mobile Rally, Patti Pavilion; adjoining St Helen's CC Ground on Swansea-Mumbles road A4067. Open 10.30am–5pm. Talk-in on S22, GB2SWR. Morse tests. Details GW4HSH, QTHR, tel 0792 404422.

5 May
Second Anglo-Scottish Rally, Kelso's Tait Hall, 11am–5pm. Talk-in on S22. Entrance £1. Organized by Kelso, Borders and Galashiels ARSs. Details André Saunders, GM3VLB, Physics dept, Kelso High School, or GM4UIB, QTHR, tel 0573 24664 and 24654, evenings only.

5 May
BATC Rally, Post House Hotel, Crick, close by junction 18 on M1, from 10am. Details G8CJS, QTHR, tel 0532 670115.

6 May
Mid-Cheshire ARS Mobile Rally, Winsford Civic Hall, High Street, Winsford, Cheshire. On A54 eight miles from M6 junction 18. Details G4VOH, QTHR, tel 06065 4719.



Some well-known faces who met at G2MI's anniversary "do" last year. L to r: Geoff Voller, G3JUL, of GB2SM and an ex-QSL Bureau sub-manager: Doug Kay, G3AAE, a top dxer; Peter Poole, G4EVY, then secretary of the Medway ARTS; and, in front, Eric Trebilcock, BERS195; and John Heys, G3BDQ

12 May
Swindon Radio & Electronics Rally. Oakfield School, Marlowe Avenue, Swindon, Wilts. Open 10am. Talk-in on 144MHz (S22) and 432MHz (SU8/GB3TD). Morse tests available. Details G8SFM, QTHR, tel 066689 307.

12 May
Drayton Manor Mobile Rally, Drayton Manor Park, near Tamworth, Staffs, on A4091 one mile south of A5/A4091 junction. Open from 11am to 5pm. Talk-in on 144 and 432MHz, callsign G3MAR/A. Details G8BHE, QTHR, tel 021-422 9787.

19 May
Mid-Ulster Mobile Rally, Parkenaur, Co Tyrone. From 12 noon. Details GI1CFS, QTHR.

19 May
Northern Mobile Rally. Great Yorkshire Showground, Wetherby Road, Harrogate. Open 11am. Caravan site at showground. Details H. Moore, 269 Leeds Road, Ilkley, West Yorks LS29 8LL.

26 May
Plymouth Mobile Rally, Devonport High School, Devonport, Plymouth. Opens 10am. Talk-in on S22. Details G8XTE or G6XZG, PO Box 46, Plymouth, tel Cornwall 319.

26 May
East Suffolk Wireless Revival. Civil Service Sportsground, Bucklesham, Nr Ipswich. Talk-in by GB4SWR. Details G4IFF, tel 0473 44047.

26 May
Maidstone YMCA ARS Biennial Mobile Rally. Y Sports Centre, Melrose Close, Cripple Street, Maidstone. From 11am. Details G3ISD, tel 0795 77431.

2 June
Spalding & DARS Mobile Rally. Talk-in from 10am. Details Betty Whitley, G4ZGT, 45 Exeter Drive, Spalding, Lincs.

9 June
Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles SE of Derby on B5010. Organized by the Nunsfield House ARG. Open 10am. Talk-in GB2ECR on 144 and 432MHz. Details G4PZY, tel Derby (0332) 767994; G4CTZ, tel Derby (0332) 799452; or club hq tel 0332 755900.

16 June
Denby Dale Mobile Rally, Shelley High School, Nr Skelmanthorpe, Huddersfield. Talk-in on S22 and SU8. Open 11am. Details G3FQH, QTHR, tel 0484 862390.

16 June
RNARS 25th Anniversary Mobile Rally, *HMS Mercury*, Leydene, near Petersfield, Hants. From 10am to 5.30pm. Talk-in on 144 and 432MHz. Details G3WAO, 3 Humber Close, Stubbington, Fareham, Hants, tel 0329 665757.

30 June
Rolls Royce ARC Mobile Rally. **This rally has been cancelled.**

30 June
Buxton Mobile Rally. Pavilion Gardens, Buxton. Talk-in on 144MHz. Open 10.30am-5pm. Admission 50p. Details G6MIF, tel 0298 6174.

30 June
28th Longleat Amateur Radio Rally, Longleat Park, Warminster. Details G4FRG, QTHR, tel 0272 848140.

14 July
Sussex Mobile Rally, Brighton Racecourse. From 10am. Talk-in on 145·50 and 3·5MHz. Details G6YPY, QTHR, tel 07918 5103.

14 July
Droitwich Mobile Rally, Droitwich High School. Details G4ASO, tel 0905 351565.

21 July
Cornish RAC Rally, Cornwall Technical College, Redruth. 10am-5pm. Talk-in on S22. Details G4RVP, tel Penzance 763549.

21 July
McMichael ARS Mobile Rally, Bells Hill, Stoke Poges, Nr Slough. Talk-in on S22 and SU8. Open 11am. Details G8IHF, c/o McMichael Ltd, Wrexham Road, Slough, Berks.

21 July
Anglian Mobile Rally, Stanway School, Colchester, Essex. Talk-in on 144MHz. Open 10am-5pm. Details G6HQI, 26 Pondfield Road, Colchester, tel 0206 860403.

28 July
Scarborough ARS Rally. The Spa, Scarborough. Open 11am. Talk-in on 144MHz (S22), 432MHz (SU8), and RB0, GB3NY. Details G4YWR, QTHR, ex-G6CXK, tel 0723 360587.

11 August
Derby Mobile Rally, Lower Bemrose School, St Albans Road, Derby (off Derby ring road). Open 10.30am. Talk-in GB3ERD. Details G4EYM or G3SZJ, tel 0332 556875.

25 August
18th Preston Annual Rally, Lancaster University. Leave M6 at junction 33 and proceed N on A6 for two miles. Talk-in on 144MHz fm. Entry 50p. Opens 11am. Details G3DWQ, tel 0772 53810.

8 September
Lincoln Hamfest, Lincolnshire Showground, on A15 four miles north of Lincoln. From 10.30am to 5.30pm. Talk-in on 144 and 432MHz (S22 and SU8). Details G4STO, QTHR.

15 September
Vange Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. From 10am to 5pm. Talk-in on 144MHz, GB4VMR. Details G4OJN, QTHR.

15 September
Peterborough Mobile Rally, Wirrina Sports Stadium, Bishops Road, Peterborough. 10.30am-5pm. Details G3EEL, tel Peterborough 62881 after 6pm.

Special Event Stations

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

7, 9, 25 April, GB2GWR
Operated from the main entrance of Temple Meads Station, Bristol, to celebrate 150 years of the Great Western Railway. From 10am to late, on 144 and 432MHz ssb, and 3·5, 7 and 14MHz ssb. Some cw may be included. Details G4ZCK, tel 0272 712675.

21 April-18 May, GB0SGD
To celebrate St George's Day, this station will be manned by members and friends of the Wisbech & D AR&EC on most bands. A special award will be issued. Sec *MOTA* in April issue for details. Further details G4KHF QTHR.

27/28 April, GB0MRS
Operated from Mansfield Leisure Centre in connection with "Expo '85". Details G4AAH.

1 May, GB2UUJ
Operated by the University of Ulster ARC at Jordanstown Campus to highlight the University Rag Week. On 14, 21, 28MHz, and 144MHz ssb/fm, from 10am to 10pm. Special QSL cards. Details GI4FZU.

4-5 May, GB2OH
The RAFARS Cleveland, Durham, Tyne & Wear Area Group will operate from the National Trust's Ormsby Hall, three miles southwest of Middlesbrough, from 10am to 6pm on both days, on 3·5-28MHz and 144MHz. Special QSL card. Details G6DSN.

8-12 May, GB4VE
To commemorate the 40th anniversary of VE-Day, this station will be operational on ssb and cw on the 3·5 to 28MHz bands. Special QSL card and RSARS Aff No 40. QSL manager G4KIE, RSARS QSL bureau manager. Details G4OHX, tel 01-302 1955 evngs only.

11-18 May, GB4LI
During an expedition to Lundy Island organized by the Nine Valley RC, this station will be operated on 1·8 to 28MHz, and 144 and 432MHz. Special QSL card. Details G4NWZ/G6GWZ, please enclose sae.

18 May-2 June, GB4GWR
The Vale of White Horse ARC will operate this station at the Didcot Railway Centre, to celebrate the 150th anniversary of the Great-Western Railway, from 11am to 5pm daily. Details from, and offers of help to G4PFY, tel 0235 812565.

22 June, GB0PGD
This station will be operated by the Plessey (Beeston) ARC, as part of the Plessey Gala Day, on hf and 144MHz. Special QSL card. Details C Archer, G4VFK, 3 Alexandra Crescent, Beeston, Notts NG9 2BS, tel 0602 226321.

13-14 July, GB2SMR
Operational as talk-in station on 144 and 432MHz at the Sussex Mobile Rally by the Brighton RC, it will also be active on the hf bands. Details G4IIL.

27 July-3 August, GB2SGC
To celebrate "Peak '85", the Scout and Guide international camp at Chatsworth Park, Derbyshire, this station will be operational on hf, vhf, uhf and Oscar 10. Special QSL card. Offers of help from the Notts/Derby area to, and details from G6NED.

4-7 July, 12-13 August, 1-8 September, GB1GWR and GB0IKB
These stations will be operated from the Weston-super-Mare Railway Station by Weston-super-Mare RS to commemorate the 150th anniversary of the Great Western Railway on 31 August. The July and September operations will coincide with special steam excursion trains which will call at the station; and the August operation will mark the visit of the Brunel Exhibition Train; Izambard Kingdom Brunel built the railway. Details G4/KA0NGP.

August, GB2BR
Swindon & D ARC will operate this station during August from the railway workshops at Swindon, during an exhibition to celebrate the 150th anniversary of the GWR. Details G8SFM, tel 066 689 307.

17-18 August, GB2TC
To celebrate the 500th anniversary of Henry Tudor's visit to Tamworth prior to the Battle of Bosworth, the Tamworth ARC will operate the station on 3·5 and 144MHz from 10am to 8pm on 17 August, and from 10am to 5pm on 18 August. Special QSL card. Details G4SRI.

Other Events

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

4-6 June
Scotelex '85, the 16th Annual Electronics Exhibition & Convention, organized by the Institution of Electronics. To be held in the Exhibition Hall, Royal Highland Society, Ingliston, Edinburgh EH28 8NF. Details from Exhibition Organizer, Institution of Electronics, 659 Oldham Road, Rochdale, Lancs OL16 4IE, tel 0706 43661.

6 October
Welsh Amateur Radio Convention. Details later.

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr K J Clarke, G6IIQ
Kevin Clarke died on 27 July 1984, aged 19. He became licensed in May 1982, both he and his father passed their radio exams together.

Mr M Earland, GW8RSZ
Mark Earland died on 16 February, aged 40. Mark was a highly respected member of West Glamorgan Raynet.

Mr D Garbutt, G4BYH/GM4BYH
Dennis Garbutt died on 25 January. He was a member of Hartlepool RC and also Glenrothes & District ARC. Dennis had only recently become licensed after several years of inactivity.

Mr R Fowler, G6SWM
Dick Fowler died on 27 December 1984, at the age of 64. A former post office engineer, he was active daily on 144MHz after gaining his licence in February 1983.

Mr G W F Lewis, G3EMF
G Lewis died on 14 February. He was a 'radio man' for many years, and one who preferred glowing filaments to silicon.

Mr S Morimoto, JA1NET
Shigetake Morimoto contributed a great deal to furthering the interests of amateur radio in Japan.

Mr C D Oliver, G4GVH
C Oliver died on 8 February, aged 75. He enjoyed seven years of ham radio following retirement, after 50 years' service in radio communication in the RN, trade and Civil Service. Active on the HF bands and in QRP, he was also an avid experimenter.

Mr G Sutherland, G3FUF
Geoff Sutherland died on 15 December 1984. He was a very active member of the Bury Radio Club, before moving to Cornwall where he became a member of the Cornish Club.

Mr A Waters, G2DMT
Arthur Waters died on 30 January. He was a member of the Old Bristol and District ARS and encouraged many SWL to obtain their licences.

Mrs A Whitaker, G4IQY
Alice Whitaker died on 29 October 1984. She was first licensed in 1979 and though housebound through illness, Alice derived great pleasure from amateur radio, and was a keen dx operator.

Mr D F Wilson, G4TVM
Don Wilson died on 20 January. His interest spanned many years in radio from steam to solid state. Having served in the Royal Signals for 22 years, he was a life member of RSARS and also belonged to Raynet.

Mr G Woolner, G4BC
George Woolner died on 18 February. He was a keen cw operator and during the war, acted as a civilian listening station for the Government.

Also:

Mr L G Bolton, G3AMB;
Mr R F Bond, RS50056, on 15 February;
Mr N Chadwick, G3GZG, on 21 February;
Mr T Edgar, G3BZZ, in May 1984;
Mr W M Egan, G4JQC, on 14 September 1984;
Mr J A R Finlay, GM3EUM, on 10 May 1984;
Mr M A Flannigan, G4SZB, on 4 February;
Mr S W Forman, G4GJZ, on 4 January;
Mr C J Ginger, G3SWX;
Mr L S Gossop, G4MA, in 1984;
Mr J Greenhow, G3PEY;
Mr F N Hitchcock, G5HC;
Mr E W Hall, G4FQY, on 4 February;
Mr L K Kemp, G8EYI;
Mr J D G Owen, RS41158; on 19 December 1984;
Mr J Peters, G4YXD, on 10 September 1984;
Mr T Rushworth, G4MYP, on 30 May 1984;
Mr I B Saunders, G6KYY, on 17 July 1984;
Mr A R Seddon, RS38310, on 21 December 1984;
Mr H E G Watts, G8GBT, in June 1984;

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 19 January 1985

Present: Mrs J Heathershaw (President in the chair), Dr E J Allaway, Messrs J T Barnes, R G Barrett, Dr D S Evans, Dr J N Gannaway, Messrs F D Hall, H M Holmden, W J McClintock, B O'Brien, H S Pinchin, D M Pratt, D S Smith, G R Smith (members of Council), D A Evans (secretary/general manager), A W Hutchinson (editor), Ms H M Norman (minutes secretary).

Mrs Heathershaw welcomed those present to the first Council meeting of 1985. A special welcome was extended to the newly-elected members (Dr Gannaway and D S Smith) and also those who were returning for a new term of office (Dr Allaway and Mr McClintock).

Apologies for absence had been received from Messrs Cornish, Jessop and Willis.

Election of executive vice-President
Mr McClintock was proposed by Mr Pratt and seconded by Dr Evans.

Mr Willis was proposed by Mr G R Smith and seconded by Mr Holmden. In Mr Willis' absence, Mr G R Smith had a letter from Mr Willis indicating his agreement to accept a nomination if it were made.

A secret ballot was then held, after which the secretary announced that Mr McClintock had been elected.

Minutes of the previous two meetings
The following amendments affecting "Council Proceedings" *Rad Com* January 1985 were made:

Page 24, "Reduced/waived descriptions", para 2, last line: after the word "proposal" read "therefore no vote was taken". In para 3, line 4, delete "new members" and substitute "applicants".

Arising from the item "Censure on Mr Holmden" (*Rad Com* March 1985, p176), Mr Barrett referred to the release by Mr G R Smith of his letter of 8 September 1984 to non-Council members, which he felt was totally wrong. He urged Council to consider what disciplinary action they should take in future, bearing in mind the confidentiality of Council business and minutes.

Mr G R Smith requested an opportunity to comment at the next meeting. He did not feel it was appropriate to discuss the matter at the present meeting.

The President felt that an important issue was being raised and that Council members had little personal defence if their personal correspondence was copied outside Council. She also emphasized the confidentiality of Council meetings and minutes.

After further debate it was decided to include the matter as an agenda item for the next meeting.

Content of the *RSGB Amateur Radio Callbook*
There was some discussion on the continued publication of a *callsign* in the case of a licensee wishing details of his *address* to be withheld. Council recognized that this practice may encourage the pirating of callsigns, and Mr Evans said that there must be a central contact where the authenticity of such callsigns could be established. The Radio Amateur Licensing Unit seemed unable to provide this service at present.

Secretary's report
Mr Evans presented the three monthly report on publications, went through the sales figures for each of the main RSGB publications, and reviewed progress on the new publications presently in the pipeline.

The secretary reported:

(*a*) The latest membership statistics which showed a drop in net membership from December to January of approximately 200. Clearly, it would be necessary to look in detail at what was happening. He would report back to Council with the results.

(*b*) Well over 500 applications for the notice of variation to permit Class B licensees to use morse had already been received. This meant that the Class B experiment had attracted more correspondence than any other single issue or item in the past.

(*c*) On the current situation regarding spectrum abuse, Council expresed concern over this continuing problem and asked the secretary to write again to the DTI on the subject. Mrs Heathershaw said she was pleased to hear the discussion on spectrum abuse, as she wished Council to spend more time discussing specific amateur radio matters at its future meetings.

(*d*) The draft minutes of the 1984 agm, egm and question & answer session had been prepared. He had taken legal advice with regard to a question raised by Mr Crosland, who had access to the correspondence which had been exchanged between Mr Holmden and the Society's secretary. The advice which he had given to Mr Crosland at the agm had been comfirmed by the Society's solicitors, but it would take some time to prepare an article which would set out the exact way in which members could raise resolutions and the various associated procedures. Council felt that it would be best to delay the publication of the minutes so that the proposed article could be published at the same time.

(*e*) Approximately 90 orders had so far been received for the "Morseman" kit and an additional 70 enquiries from members who wished either to make their own artwork or program their own eprom.

Mr Evans completed his report by describing the RSGB facility which would enable members to acquire data from RSGB HQ by means of a home computer.

Committee recommendations
Membership & Representation
"That contest groups wishing to affiliate to the RSGB shall be exempt from the requirement to include the words 'amateur radio' in their title. The effective date to be 1 January 1985."

Mr Pinchin explained that the intention was to avoid delays in obtaining Council's agreement to an exemption in each individual case. In discussing this recommendation, it was noted that there could be no doubt as to the amateur radio interest of contest groups, unlike other groups without "amateur radio" in their title.

This was approved. Zonal members would thus apply this ruling on Council's behalf.

VHF Contests
"That the Thorogood Trophy be awarded to G Brown, GJ41CD, as leading single-operator fixed station in the 144MHz Trophy Contest, and that the Mitchell Milling Trophy be awarded to the Parallel Lines Contest Group as winners of the multi-operator section of the 144MHz Trophy contest."

"That the VHF Manager's Trophy be awarded to the Parallel Lines Contest Group (GM4LIP/P) as winners of the open section of the 1984 70MHz Trophy Contest."

Both recommendations were approved.

Membership and representation
Following agreement at the egm to amend the Articles of Association with regard to waived subscriptions, Mr Evans drew Council's attention to the proposed draft procedures for handling future applications. Council accepted the proposed procedure, which would be adopted in respect of 10 applications which had been received.

The granting of reduced subscriptions to 12 members was noted. The new procedures for reducing subscriptions for those over state-pension age were also agreed.

The granting of affiliation to the following was noted:
Atherstone Amateur Radio Club, Nuneaton, Warks;
Escom Club Oakdale Radio Amateur Section, Bellville, S Africa;
Three As Contest Group.

Mr Evans announced that one nomination had been received for the Region 15 vacancy. Mr R R Parsons, GI3HXV, had been duly appointed.

The following area representatives had been appointed:

G J Barker, G4PPM	Worksop
R Bray, GW4ESV	Port Talbot
A Capel, G4ROX	Bristol
J Chapman, GI4LVC	Magherafelt
C J T Corderoy, GI4CZW	Enniskillen & district
D M Henley, G30QO	Rugby
B A Jones, G8ASO	Worcester
C J G Laws, GW6ZHP	Cardiff
N K Read, G8CXL	Leamington & Warwick

IARU HF Working Group
Dr Allaway reported on a Region 1 HF Managers' conference to be held in North Germany on 9 March and asked if Council wished the Society to be represented at this meeting.

Council unanimously approved the attendance of Mr Atherton, G3ZAY, chairman of the HF Committee.

Use of J3E mode on 10, 18 and 24MHz bands
Mr G R Smith introduced a paper on the low usage of these bands. He asked that his proposals be referred to the HF Committee.

Dr Allaway replied that 10MHz was the prime band for long-distance communication. He added that there was no possibility of phone activity being allowed on 18 and 20MHz. The use of these bands had recently been discussed by the Administrative Council of IARU, and it was to be further considered at three forthcoming regional conferences. Dr Allaway urged that no further steps be taken by the Society at this time.

In agreeing with Dr Allaway, the secretary emphasized that there was probably a greater risk of losing the bands if, through increased usage, interference was caused to other services prior to the completion of the proper transfer procedures in 1989. He noted that the balance was a fine one, but if the amateur service wished to seek additional spectrum space in the future there was much to lose by the risks involved with short-term expansion. Council accepted that there was a lack of activity on 10MHz, but that there was no practical way of increasing this at the present time, and it was unanimously agreed to abide by the IARU's decision.

Raynet Limited
The President asked the chairman of the Finance & Staff Committee to submit to Council a committee recommendation on this subject as soon as possible.

The secretary stressed the need to bring this matter to a conclusion. He reported that staff and legal costs were already in excess of £5,000 during the 1984-5 financial year, and he was anxious that there be no further unnecessary expenditure.

Zone E Council vacancy
After some discussion it was agreed that Mr Barrett would circulate to Council particulars of several possible candidates for co-option.

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
88 BROOMFIELD ROAD,
CHELMSFORD, ESSEX
CM1 1SS

NOVICE LICENCES

Sir—Re comments made by G3IJU and G4XIV in your December issue. I echo their feelings about Novice licences.

I suggest anyone, including BRS46598, should visit an RAIBC member who has a licence: some members cannot walk, some are blind, some have both problems, some operate with their feet only, others with suck-and-blow machines. All have passed the RAE.

I was carried up and down the stairs at a Derby college to take the RAE. I studied at home with a friend from November until May and passed with two credits. I did not even know what amateur radio was until I became an swl a few months before studying for the RAE. Shame on anyone even thinking of a Novice licence. If the disabled can pass the RAE and morse test, then anyone who wants a Novice licence does not want a licence very much or at all.

About the GU station Ron Grove, I would dearly like to have a GU QSL card (I have only a third returned of those sent) and a QSO with a GU station (a rare breed). I would write the event in the log in red. So try getting on the air, I have wanted a GU location for my WAB effort for a long time.

W Guy, G4ZSD

Sir—I have read much in *Radio Communication* concerning the much-maligned Novice-licence issue. However, I am most surprised by your correspondents' "failure to see the obvious" when it comes to that tricky question: "what qualification requirements should a Novice licensee possess?". My opinion (for what it's worth!) is that the present C&G RAE grading system should be utilized to its full potential—by the DTI/RSGB—with the objective of separating and defining the Novice standard from the Class A/B standard: *eg* "pass' = Novice licence, and "Credit" (or above) = a "full" pass (for A/B licence). Such a Novice licensee could then be permitted to operate under the following conditions: on 144MHz only, using F3E only; with power not exceeding 10W at output; and with no antenna restrictions (neighbour politics permitting!). And, of course, a special callsign allocation would also be required.

Needless to say, the above proposal is, at best, a compromise. It partly satisfies those amateurs who would like to see a return (?) to higher RAE standards (pass-rates, etc) for Class A/B licences, while, on the other hand, it satisfies the aspirations of the Novice licence lobby . . . at least, to a certain degree!

Anthony Mayers, GW6ZHY

Sir—After eight months of watching how the battle for a Novice licence unfolds, I feel compelled to comment on this issue. I have been in amateur radio now for 25 years, though not for all this time under my present callsign.

A Novice licence is really needed, but not for the reasons advocated by those who want to swell our ranks by using short-cuts. It is needed in the interest of increasing the quality of amateur radio. Although I know a few ex-cb operators who have become members of high standing in the amateur radio fraternity, this is rather an exception rather than a standard development. Unfortunately, the majority of newcomers lack the roots, the feeling and the sense of amateur radio, something that can be acquired only by direct involvement for some time. And it is at this point that the Novice licence becomes justified, not only for ex-cb operators but for everyone who suddenly decides that amateur radio might be for him or her. However, introducing a Novice licence requires a bold approach and total commitment at grass roots level.

Here is my proposal. A Novice licence examination should be performed at local club level. The examination would consist of the following tests: basic knowledge of electronics; general licensing requirements; morse code test, minimum 40 characters/min; basic knowledge of Q-code and international abbreviations; and practical demonstration of a cw QSO.

A Novice licence should permit unsupervised operation on the 1·8 and 28MHz bands with maximum power output of 10W, cw only. Under supervision a Novice operator could operate on all bands and all modes, thus enabling him/her to participate in local club activities. This should bring them up to the RAE level within one to two years, and if they still like it, they could take the official RAE. The Novice prefix should be GN with numbers indicating the nation, English, Scots, Welsh, etc. The licence should run for three years and be renewable. However, it could be revoked by the licensing authority or a club's chief examiner if the novice continuously misbehaves or abuses his/her privileges. Also morse tests, currently administered by a few centres at exorbitant fees, should be performed in local clubs, and this should be done free of charge for RSGB members, and at, say, £3 for non-members.

In my opinion this is the best way to reintroduce high standards to amateur radio, because this system will be self-governing, offering gradual improvement, and aiming for a high quality of debutants. Similar systems have been tried in other countries and proved to be a great success. Roughly, on these lines, we are bringing up new radio amateurs in the West Kent ARS quite successfully.

A Korda, G4FDC

PACKET RADIO

Sir—I would like to record that packet radio communications were successfully achieved between myself and G3WRI on the 144MHz band on 3 December 1984. The transmission rate was 1,200Baud and Amtext system software was employed running on BBC microcomputers.

Also, I can record successful packet communications between myself and G3WRI on the 3·5MHz band on 16 December 1984. The transmission rate was 300Baud, and again the Amtext packet radio program, developed by Paul, G3WRI, was utilized. The mode employed was ssb, with the BBC cassette port tones (1,200/2,400Hz) providing the modulating components.

The Westmorland Packet Radio Group is actively engaged in further experiments with regard to hf band packet applications. Tests are to be conducted each Sunday at approximately 10am on 3,650kHz ± QRM, and anyone wishing to join in these tests would be most welcome and should send a large sae for further details to myself or G3WRI, QTHR.

W A Wilkinson, G3XJI

GIVING IT UP

Sir—In your January issue I read with sadness the letter from G6HPQ in which he declares that he is in the process of giving up ham radio. Assuming that his experience of ham radio to date has been on 144 and/or 432MHz phone, I can assure him that this is only the "tip of the iceberg", and that ham radio has much more to offer than that. Were this not the case, I would never have taken the trouble to sit the RAE in 1983 and take the morse test while waiting for the exam result, in order to get my callsign out of the mothballs and become active again—on hf cw. Admittedly I'm stuck for the moment on 28MHz with a modified Hy-Gain 5 cb rig (change the crystals, build a phase-shift oscillator and away we go) with a dipole antenna, but 10W of cw can do amazing things, believe me! I'm looking forward to getting on to the other hf bands in the near future, and with retirement looming up this year, plus a steady improvement in conditions, I'm rubbing my hands in anticipation!

It's a pity that the morse test has such a bogey-man effect nowadays—it used to be a normal part of the ham radio exam and nobody complained! So, G6HPQ, give it second thoughts, take the morse test, get your backside down-frequency and meet a whole new bunch of hams—the cw operators—where you'll experience a worldwide camaraderie you'll never find waffling away on 144MHz. Then you'll know the true meaning of ham radio.

As for cbers, don't knock them. Their snappy break-in style of operating is quite different to the windbaggers on 144MHz, besides which I know quite a few cbers who now have ham licences, and two of them are yls. Personally I'm quite active on cb—it's the only time I handle a mic!

C E Teesdale, G2BUV, ex ON4KT

Sir—Having read the egotistical letter of A D Smith, G6HPQ, I feel I must reply. The reason for him giving up amateur radio as stated in his letter does not tally with the reason given in his advertisement on page 61. I am not wasting space with the comparison—just look it up and form your own opinion as to whether his letter has any meaningful comment.

i was tinkering with radios in 1929 as a hobby, and have a Mullard Master Three in my shack now. In 1950 I became a serious swl, commencing with a one-valve Globe King, and by 1980 an Eddystone 940 and EA12. At the age of 67 I took the RAE. I was and am not conversant with the modern technology of black boxes, thus finding Part 2 rather difficult. There were no classes and I was self-taught from books, obtaining my licence in March 1981. This preamble is to show that I was lucky to have a long period as an swl, which I consider a great help in learning correct procedures when licensed.

Of course there are discourteous idiots and wallies in amateur radio. There are also the same ilk in every hobby, profession and industry in the land. It is not peculiar to our hobby. Does G6HPQ consider himself a "genuine amateur", whatever that means. Is he so perfect as to never make a mistake? I know I have.

It was not the cb fraternity which in December 1983 were trying to contact the shuttle on the downlink, causing chaos. Must have been "ungenuine amateurs" I suppose.

I can only say that since being licensed and retired with plenty of time, I have only found the odd amateur wanting. The others were very friendly and helpful when I commenced transmitting, and today after 450 confirmed contacts at home and abroad and many, many others both near and far, some of whom I have visited, have opened my world of retirement in a very pleasant and friendly way.

R Middleton, G6BJP

EARLY BROADCASTING

Sir—I was most interested to read the report in your November 1984 issue on the special event station GB0LMC with its reference to 2MT, the station which the Marconi Company started in 1921. It was early in that year that as a boy of 12 in Wallington, Surrey, I built my first crystal set. Having obtained my Experimental Wireless Licence, the first speech I heard was from nearby Croydon Aerodrome, in contact with aircraft on, I think, 900m. Apart from that there was only ships' traffic on 600m and a daily time signal from the Eiffel Tower on 1,600m.

But then I stumbled on 2MT, Writtle, working on medium wave with 2OM Bournemouth. "Emma Toc" at that time was run by the legendary Peter Eckersley, later chief engineer of the BBC who was a great humorist. I recall that when the BBC started up in November 1922, the station announcer signed off by beating out a tune on a number of suspended tubular metal gongs. Peter, not to be outdone, concluded his next contact with 2OM by bashing metal saucepans together.

Frank Templeton

In his book The Power Behind the Microphone, *P P Eckersley described how a great Italian tenor of the day came to 2MT to sing. Eckersley related that "his first note shattered the microphone, pulled out the breakers and shut down the transmitter".*

Using resonance to measure capacitance

J A EWEN, CEng, MIMechE, G3HGM*

G3HGM was first licensed in 1947, as D2HN, while serving in Royal Signals in the British Zone of occupied Germany. After demobilization he returned to his native Scotland and obtained the callsign GM3HGM. He worked for the North British Locomotive Company in Glasgow until 1954 when he moved south of the border, changing his callsign to G3HGM. Since then he has worked in engineering with, first, Vauxhall Motors Ltd at Luton; and then in the National Health Service. He hopes that imminent early retirement will provide more time for operating, as opposed to construction and measurement which have been his predominant interests.

Introduction

One of the difficulties which has always attended the activities of the experimentally-minded radio amateur is that of obtaining access to reliable standards, so that measurements, to a reasonable degree of accuracy, of the various quantities with which he is involved (V, I, R, F, L etc) become possible. Few experimenters would be happy if it were revealed to them how many hours in aggregate in their constructional career they had spent fruitlessly pursuing a course of trial and error, when the ability to perform a few simple measurements would have permitted a much quicker and surer solution to their problems. The measurement of voltage, current, and resistance is no longer a problem to any serious experimenter, having been facilitated by the availability of Japanese and Russian multimeters at very reasonable cost. Frequency measurement, provided high precision is not required, has usually succumbed to wavemeters (absorption or heterodyne) or calibrated receiver dials. Those with more exotic tastes and deeper pockets have usually graduated to the use of a digital frequency meter, home-constructed or purchased.

Inductance and capacitance are rather more difficult to measure without considerable outlay, being generally supposed to require the use of rf bridges of one sort or another. The ability to measure either one or the other is valuable, since the other can always be calculated by determining the resonant frequency of a combination of the two. I can remember very few articles in the last 30 years describing the construction, at low cost, of equipment for measurement of radio frequency inductors. More information has been available about the measurement of capacitance, but all equipment described seems to have suffered from some fairly serious limitations, eg:

(1) Inability to measure very low capacitance;
(2) Lack of long term stability;
(3) Reliance on accurately maintained supply voltage;
(4) High cost.

Accuracy in capacitance measurement is, in the amateur field at least, most desirable below about 1,000pF, and this article describes a capacitance measuring device which, I believe, overcomes the above limitations, has a measuring range of 0pF–980pF, and is, moreover, simple to construct and

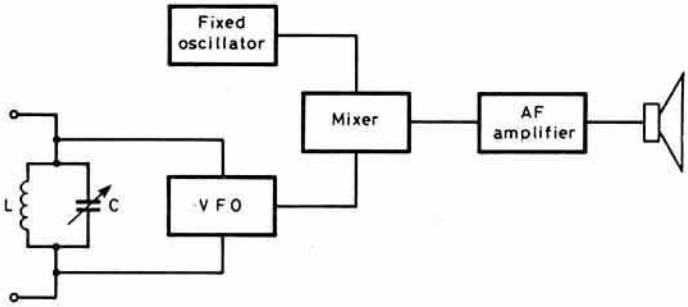


Fig 1. Block diagram

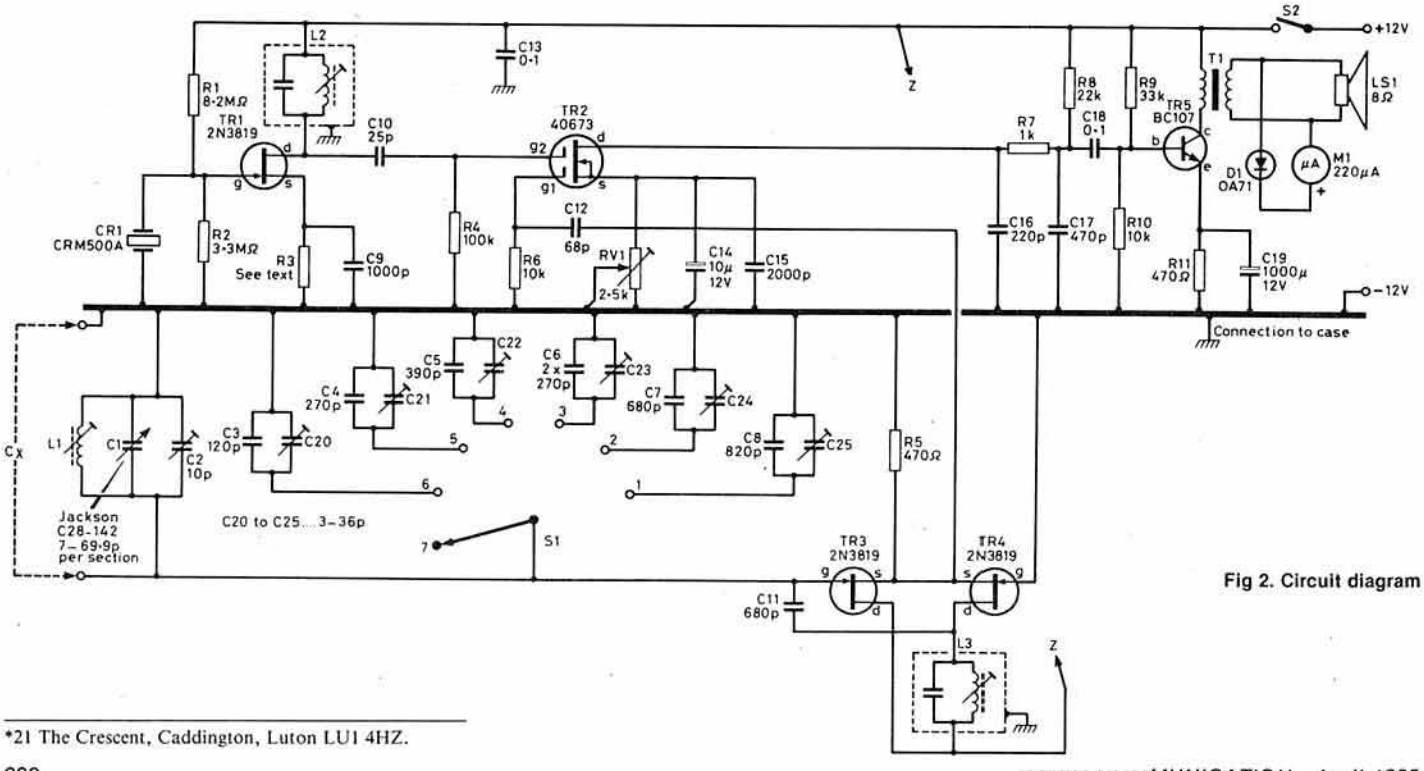


Fig 2. Circuit diagram

*21 The Crescent, Caddington, Luton LU1 4HZ.

Components list

R1	8·2MΩ
R2	3·3MΩ
R3	see text (setting up)
R4	100kΩ
R5, 11	470Ω
R6, 10	10kΩ
R7	1k Ω
R8	22k Ω
R9	33k Ω
RV1	2·5kΩ skeleton potentiometer
All resistors 0·25W 5%	
L1	Toko YRCS 18576 AQ
L2, 3	Toko YHCS 11100 AC2
TR1, 3, 4	2N3819
TR2	40673
TR5	BC107
C1	Jackson C28-142 7-69·9pF per section
C2	Approx 10pF panel mounting trimmer with 0·25in dia spindle
C3	120pF sm 1%
C4	270pF sm 1%
C5	390pF sm 1%
C6	2 × 270pF sm 1%
C7	680pF sm 1%
C8	820pF sm 1%
C9	1,000pF ceramic
C10	25pF ceramic
C11	680pF ceramic
C12	68pF ceramic
C13, C18	0·1μF polyester
C14	10μF 12VW
C15	2,000pF ceramic
C16	220pF ceramic
C17	470pF ceramic
C19	1,000μF 12VW
Capacitors for calibration: 8 × 560pF sm 1%	
C20-25,	3-36pF miniature foil trimmers
CR1	Ceramic resonator type CRM500A
LS1	Loudspeaker—miniature 8Ω
M1	Recorder vu meter (220μA fsd in prototype)
D1	OA71 or select from junk box for good sensitivity
S1	Miniature wafer switch 1-pole 12-way
S2	Miniature on/off toggle switch
Ball-drive	6:1 reduction Jackson type F or equal
Dial plate	3·5in dia with grub screw type centre bush
T1	Output transformer type LT700
Knobs	1 plain, 1 pointer type
Case	Steel or aluminium, dimensions unimportant. Prototype is 7in high by 4·125in wide by 4·75in deep.

use. The prototype, using valves, retained its calibration unchanged over a period of 20 years. Most of the components will be found in practically every junk-box except, perhaps, the main tuning capacitor specified, but even this need not be employed provided that the constructor does not object to a rather longer calibration procedure.

Principle of operation

The principle of operation is shown in the block diagram, Fig 1, and Fig 2 shows the actual circuit. L and C represent the combination of a fixed inductor and variable capacitance which determine the operating frequency of the VFO. The output from this, and the output from the fixed oscillator, are fed to the mixer. The output from the mixer is the difference between the two frequencies; as the capacitance is varied, the signal passed to the audio amplifier and speaker passes through the audio range, dropping to "zero-beat", and then rising again and passing out of the audible frequency range.

At zero-beat, the two oscillators are on exactly the same frequency. At this point, since the frequency is always the same—being determined by the fixed oscillator—and L is fixed, the total capacitance which is determining the vfo frequency must always be the same. If, therefore, a capacitor of, say, 20pF, is connected across the terminals marked Cx, the frequency of the vfo will drop, and in order to return to the zero-beat condition it will be necessary to back off the capacitor in the LC circuit by 20pF, thereby restoring the former total tuning capacitance. The amount of rotation of the capacitor necessary to achieve this can therefore be calibrated as representing 20pF, and by using a capacitor with straight line capacitance (slc) vanes, the full range of its swing can be calibrated after determining a few key points.

Components

The components required are completely uncritical, and in order that constructors have maximum scope for using materials they may already possess, the following notes are provided to help fill gaps in specification, or allow alternatives to be substituted for the specified articles.

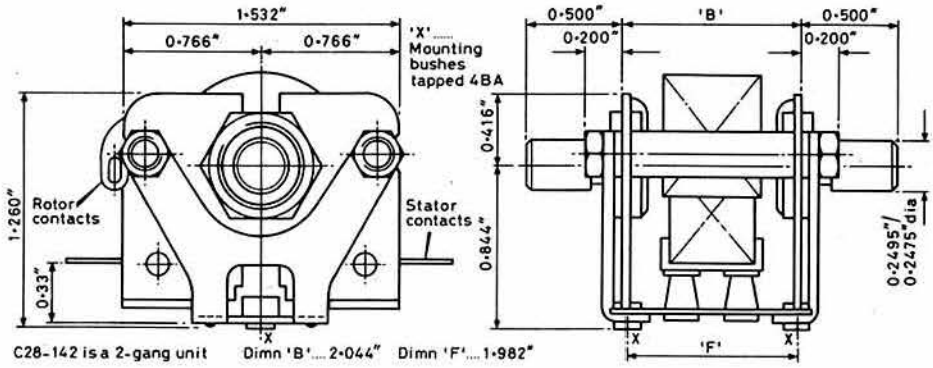


Fig 3. Details of C1

Ceramic resonator

These devices do not appear to be too widely available, Cirkit Holdings being the only source known to me. They are vastly cheaper than crystals, and offer stability which is entirely adequate for the present purpose. The unit used has a resonant frequency of 500kHz (nominal), but 455kHz or 470kHz would be equally suitable, and would not require any of the coils to be altered. Suitable devices of the latter frequencies may be abstracted from Toko combined ift/ceramic filters types CFT455 or 470 or CFU050, which will be present in many scrapped transistor radios.

VFO inductance L1

This inductance is required to resonate at the chosen frequency with the sum of C1, fully meshed, C2 half meshed, C8, and a 10pF allowance for "strays". In the prototype this amounts to 1,014pF, and the required inductance is therefore 99·92μH, calculated by the formula

$$L(\mu H) = \frac{25{,}330}{f^2 C}$$

where f is in megahertz and C is in picofarads. Toko coil type YRCS18576AQ is variable +30 per cent and −20 per cent around its nominal inductance of 100μH, which will cover any of the above mentioned frequencies.

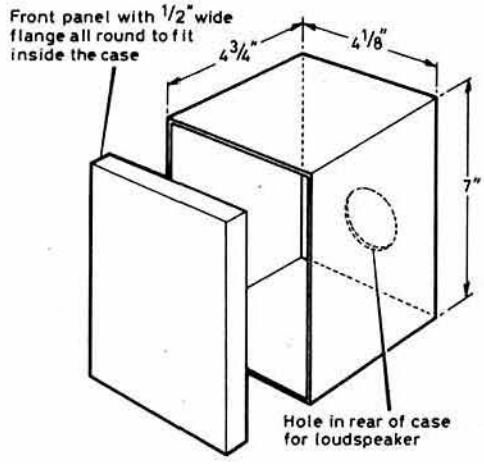
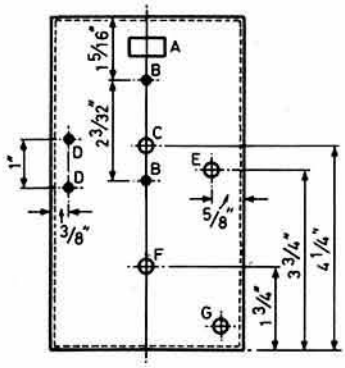


Fig 4. Details of case



Mounting holes....
A .... Suitable for meter
B .... 2 x PCB mounting pillars
C C2
D .... 2 x terminals
E .... Range switch
F C1
G .... S2 on-off switch

Fig 5. Front-panel layout

Capacitor C1

The calibration and coverage of the instrument are dependent on the use of a specific capacitor. This is made by Jackson Brothers of Croydon, and is type C28-142 which has a minimum capacitance of 7pF and a swing of 69·9pF per section. For the purposes of the project, each section is taken as being 7–77pF. With the two sections connected in parallel, therefore, 14–154pF is available, giving the possibility of measuring 0–140pF on the basic range. This is an expensive capacitor, but this need not deter impecunious constructors. It has been around for quite a few years, and has been observed in many surplus shops, besides being contained in very many ex-Government units. Fig 3 will enable the correct capacitor to be identified —dimensions B and F are 2·044 and 1·982in respectively on the two-gang unit required. Each section has 10 moving and 9 fixed vanes, and the air gaps are 0·015in. The vanes are semi-circular (straight line capacitance law) with matching tabs on the outer moving vanes. Some units may be found of "Polar" manufacture, having no shaft extension, and different mounting arrangements. These are otherwise the same as the Jackson unit and are perfectly satisfactory for this project.

If you are unsuccessful in finding the required component, any good-quality unit may be used, but it will be necessary to calibrate, as described later. It is not advisable to choose a unit having a capacitance swing of much more that 150pF, otherwise the scale becomes somewhat cramped. If the specified capacitor is used, or any substitute having 360° rotation, it will be necessary to devise and fit stops to limit the rotation and enable the fully-meshed and unmeshed positions to be reliably returned to.

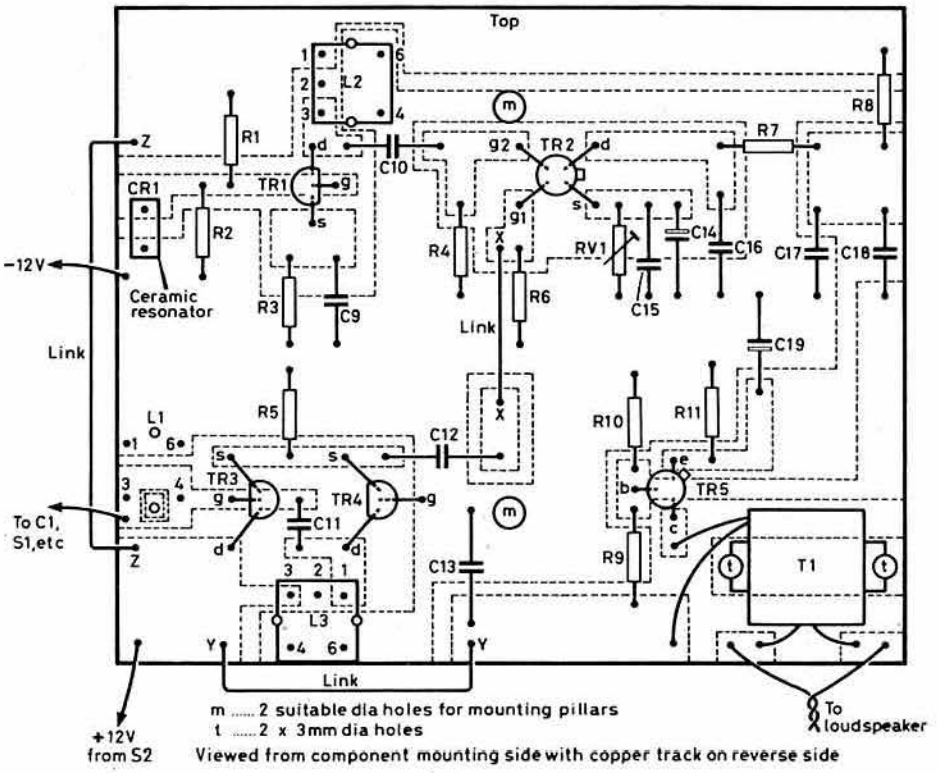


Fig 6. Printed circuit board

Dial and drive

Control is via the usual 6:1 reduction ball-type drive, with a flange to carry a dial plate. The dial calibration is prepared for the Jackson C28-142 capacitor, and may be affixed directly to a 3·5in diameter metal plate fitted to the flange of the ball-drive.

Output transformer and meter

These components are uncritical. The prototype uses the ubiquitous Japanese output transformer type LT700. The meter, which simply backs up the audible zero-beat with a visible indication, is a 220μA fsd level meter from a cassette recorder. The reason for fitting it is that the hearing of many people does not extend downwards far enough in frequency to enable zero-beat to be accurately set. It should not be thought that *anno domini* is the sole reason for this defect—disco disease has much to answer for.

Range switch

This is a midget (about 1in diameter) single-pole 12-way wafer switch. It will be necessary to move the end-stop to give the seven-position switch needed. Some makes include an adjustable end-stop.

Power supply

Although the instrument does operate with a power supply of 9V, it has generally been used on 12V. No extended trials have been carried out with the lower voltage, and it may be that some difficulty might be experienced in achieving reliable starting of the oscillators. The current consumption is so low (9·5mA at zero-beat on 9V, or 12mA at zero-beat on 12V) that the cost of a mains supply does not seem justified. Batteries are therefore employed.

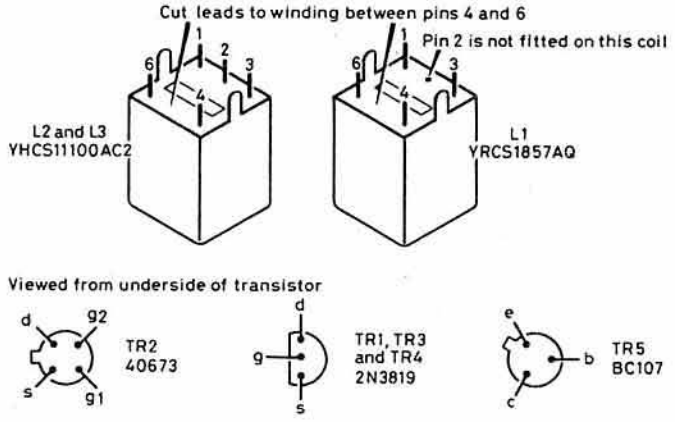


Fig 7. Connections to coils and transistors

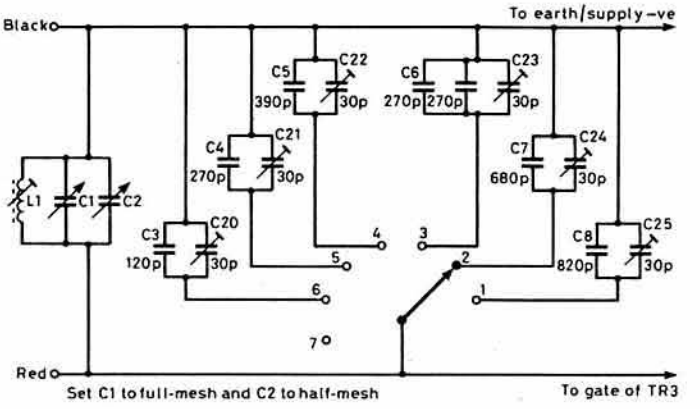
Construction

Case

Any available case may be used, but for those who wish to repeat the original design, Fig 4 shows suitable dimensions, and Fig 5 the front-panel layout.

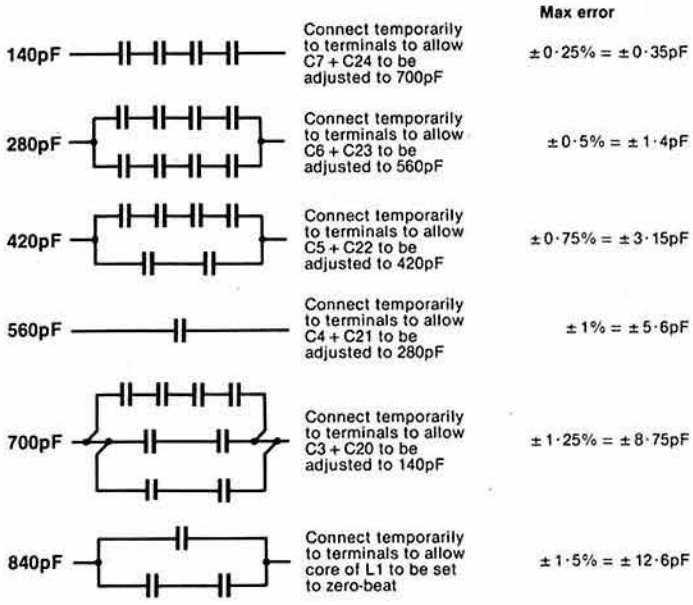
Printed circuit board

A simple pcb layout is shown in Fig 6. This is full size and easily reproduced by the usual Dalo pen and ferric chloride method. Note the three wire links



1 Range switch setting	2 Connect to terminals	3 Adjust	4 Measurement range
Range 7	840pF	L1 core for zero-beat	840-980pF
Range 6	700pF	C20 for zero-beat	700-840pF
Range 5	560pF	C21 for zero-beat	560-700pF
Range 4	420pF	C22 for zero-beat	420-560pF
Range 3	280pF	C23 for zero-beat	280-420pF
Range 2	140pF	C24 for zero-beat	140-280pF
Range 1	Nil	C25 for zero-beat	0-140pF

Fig 8. Calibration procedure



All capacitors are 560pF ±1% silvered mica

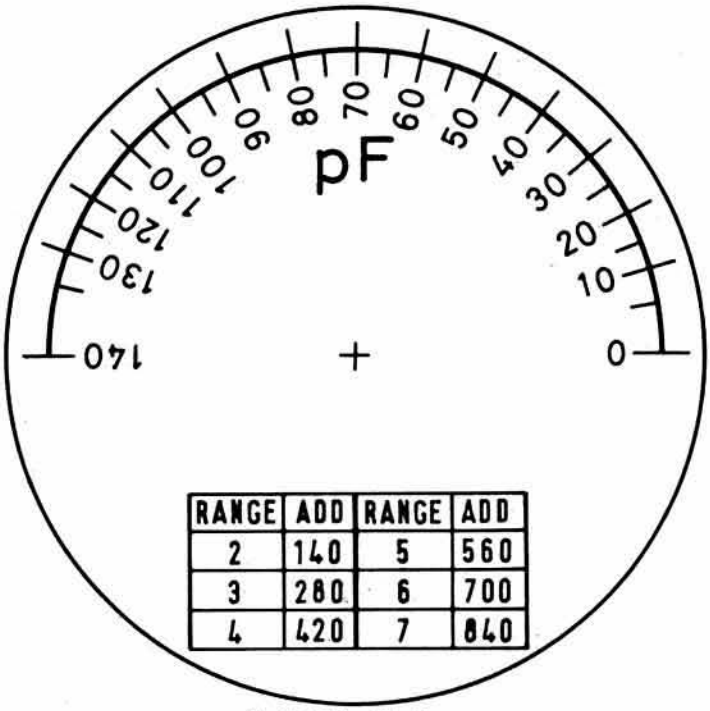
The accuracy of the instrument on Ranges 2-7 obviously depends on the accuracy of the capacitor combinations used in setting the adjustments shown in Fig 8. The combinations shown above depend on not more than 8 × 560pF 1% sm capacitors. Obviously, higher accuracy can be obtained if the constructor is willing to purchase more than 8 × 1% capacitors, or can have his standards selected, or can obtain components of closer tolerances.

Fig 9. Arrangements of 1% sm capacitors to produce values for calibrating

x-x, y-y and z-z. The pcb is supported on two 2·5in long pillars, from the front panel, and the use of fibre washers is advised to prevent short-circuits. The foil side of the pcb is towards the front panel. C1, likewise, is supported from the panel, which allows the position of the capacitor to be chosen to give enough space for the ball drive.

Rigidity is essential, and tuned circuit wiring should be stiff (18swg enamelled copper wire) if adequate stability of the vfo (and therefore constancy of calibration) is to be achieved. The loudspeaker is mounted on the rear wall of the case.

Capacitors C3 to C8, with their associated trimmers, are simply soldered between the tags of the range switch and the earthplane of the pcb, ensuring that their final positions are such that the trimmers are easily accessible by screwdriver.



RANGE	ADD	RANGE	ADD
2	140	5	560
3	280	6	700
4	420	7	840

Fig 10. Dial calibration

Setting up

Preliminary

(1) Disconnect the ceramic resonator. Insert a 1,000Ω potentiometer in parallel with C9. Insert a 10mA meter in series with the drain supply to TR1. Switch on, and adjust the potentiometer for a drain current of 5mA. Remove the supply. Measure the resistance used, and substitute a fixed source resistor of this value. Remove the meter and reinstate the ceramic resonator. Switch on again, and adjust the core of L2 until the oscillator starts reliably at switch-on, as judged by listening for it on a receiver.

(2) Set RV1 to half travel. Set C1 to the fully-meshed position and clamp the dial to the spindle of C1 so that the scale reads 0pF. Set C2 to half mesh and clamp the pointer knob to the spindle so as to point to a suitably-placed mark on the front panel.

(3) Switch to Range 7 and connect 840pF of the highest affordable accuracy to the terminals. Adjust the core of L1 until a loud whistle is heard. Some spurious responses will be present, so be sure that the loudest whistle is identified. Set the core to zero-beat. Adjust the core of L3 until the current drawn by the instrument is at a minimum. Recheck the setting of L1 core. Switch on and off a few times to ensure that the oscillators are starting reliably.

(4) Readjust RV1 to give a good audio output, together with a low current consumption. This can only be done with the vfo offset from zero-beat, of course.

Calibration

(1) Leaving the controls set as at the end of (3) above, proceed to ranges 6, 5, 4 etc, making the adjustments shown in the table of Fig 8. Fig 9 shows how the necessary calibration capacitors between 840pF and 140pF, required to be connected across the terminals, can be made up using the 8 × 560pF one per cent silvered-mica capacitors shown in the components list. If better standards are available they should, of course, be used.

The accuracy of zero-beat settings can be checked by means of C2. Movement of this in either direction will produce a rising note if the setting is correct.

The instrument is now calibrated to a standard dependent upon the accuracy of the one per cent capacitors used.

Using the instrument

1. Before making a measurement, set C1 to full mesh, C2 to half mesh and S1 to Range 1.
2. Switch on and check that the oscillators are zero-beat. If this is the case, a rising note will be heard whichever way C2 is turned. Leave C2 set to the position of zero beat.
3. Connect the unknown capacitor to the terminals and proceed through the ranges of S1 and C1, until the correct beat-note is found. Read the scale, and for ranges other than Range 1 add the figure shown in the table on the main dial.

Alternative capacitor C1

If it is desired to use an alternative to the Jackson capacitor specified, it will be necessary to obtain, from the maker, information about its maximum and minimum capacitances. Armed with this it will be possible to determine what "dentistry" is necessary to reduce its capacitance swing to something close to the 140pF swing of the Jackson unit. When the modification has been carried out, it will be greatly preferable to have the resulting capacitance measured, if much trial and error is to be avoided. Local electronics firms, or even a well-equipped dealer, may be able to help.

Knowing this swing, C8 + C25 may be determined, being six times the swing of C1, and C7 + C24, C6 + C23, C5 + C22, C4 + C21, C3 + C20 may now be calculated, being respectively 5/6, 2/3, 1/2, 1/3 and 1/6 of the calculated value of C8 + C25. C3 to C8, plus their associated trimmers C20 to C25 may now be selected and installed. With C1 fully meshed, and C2 half meshed, the instrument should now be switched to Range 7 and a capacitor equal to the calculated value of C8 + C25 (to the highest available accuracy) connected to the terminals. L1 core should now be set to zero-beat.

A blank cartridge-paper disc should now be fixed to the dial plate and, using a selection of silvered-mica capacitors of not less than one per cent accuracy, a reasonable number of calibration points should be determined. If these are now transferred to graph paper, a line of best fit can be drawn relating capacitance measured and degrees of rotation of C1 from the fully-meshed position, which represents 0pF. The remainder of the scale may now be calibrated from the graph.

(Continued on page 268)

MODERN VHF/UHF FRONT-END DESIGN

Ian White, G3SEK*

Ian White is a self-confessed vhf/uhf dxer. There is no known cure for this condition, a side-effect of which is an interest in any related technical aspect of amateur radio. When the bands are closed and the moon is not up, he enjoys writing (hence this article), being secretary of the Vale of White Horse ARS, and being musician for the Abingdon Traditional Morris Dancers.

INTRODUCTION

VHF/UHF DX OPERATING is unique to amateur radio. Unlike any other users of those frequencies, we communicate over long distances using ssb and cw, with continuous tuning and not fixed channels. In other words, we treat the low-frequency ends of our vhf, uhf and even microwave bands just like hf. So it is hardly surprising that our standards for vhf, uhf and microwave dx receivers are strongly based on the kind of performance we expect from hf dx receivers. In particular we want to be able to copy weak dx signals, even if there are plenty of strong local signals on the band at the same time. The extra dimension on our bands above 50MHz is that the background noise is much lower. An hf signal of a few microvolts is often down in the noise, but at vhf and above we can communicate with signal levels down to a few *nano*volts—if the other strong signals will let us, that is!

What makes a receiver good (or bad) at handling both weak and strong signals is its "front-end", the stages between the antenna and the selective i. f. filter. Your receiver's front-end has to amplify and frequency-change the weak wanted signal without introducing too much extra noise, yet it also has to cope with an enormous number of unwanted signals. Fortunately, you never hear most of these other signals, because they are eliminated once they reach the selective i.f. filter. But very strong signals may already have overloaded the front-end before they get that far. And front-end overload can seriously interfere with the weak dx signals that you most want to hear.

A certain amount of front-end gain is essential in a sensitive receiver. Yet too much gain will make strong signals build up to levels that overload the front-end. To achieve the optimum *overall* performance, you have to make a very careful trade-off between sensitivity and strong-signal handling.

This article is about front-end *design*. Starting from basics I will explain what we amateurs need from modern vhf/uhf front-ends, and how to go about getting it. We certainly *won't* get what we need by patching together a few off-the-peg circuits featuring this year's fashionable devices. In the 'eighties that approach is outdated and—in the worst sense—amateurish. These days we can use the power of scientific calculators and home computers to predict the performance of our designs *before* we build them. Having shown you how the calculations work, I will describe a program that lets you experiment with different designs until you have just what you need. And then, knowing exactly how your new front-end should perform, you can go ahead confidently and build it.

Since vhf/uhf dxing is unique to amateur radio, the people at the leading edge in front-end design are all radio amateurs, even if some of them (not me) also do it for a living! I hope this article will bring a few more people up towards that leading edge. More than that, I want the article to tell *every* vhf/uhf dxer what to expect from a modern front-end. And if the developments are taken up by the big transceiver manufacturers, then maybe one day we can *all* enjoy the benefits of modern vhf/uhf front-end design.

*52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP

PART 1. WEAK-SIGNAL PERFORMANCE

THERE ARE many ways to specify the weak-signal performance of a receiver, but underlying them all is the basic concept of noise and temperature. Although you may have heard the term before, you may not realize how useful noise temperature can be in drawing together many different aspects of receiver design. This part of the article will explain what noise temperature means, and relate it to some other ways of specifying receiver sensitivity. Armed with these basic ideas, we can decide on some reasonable targets for receiver sensitivity on the various vhf/uhf bands. Then we can see if the front-ends of commercial transceivers measure up to our requirements (no prizes for guessing the answer!). Finally I will describe how to analyse system noise performance.

Noise temperature

Any electrical conductor contains electrons which are free to move around. At normal temperatures, electrons in a conductor are in random motion, rushing back and forth but, on average, getting nowhere. This random thermal movement of electrons constitutes a fluctuating current, which can be detected as random noise. Converted to audio frequencies, random noise is the rushing sound your receiver makes when tuned to an unoccupied frequency. (You may also hear man-made noise which is obviously not random; eg, ignition noise with its regular repetition rate.) All random thermal movement ceases at a temperature of absolute zero (−273·16°C), so no thermal noise is produced. At any temperature above absolute zero, the thermal noise power generated in a conductor is proportional to its physical temperature, measured on the "absolute" temperature scale in units of kelvins (K). Thermal noise is spread evenly over the entire electromagnetic spectrum, so the noise power detected by a receiver is proportional to the spectral bandwidth from which the noise is "collected". The basic formula relating noise power P_N (Watts) to noise temperature T (K) and bandwidth B (Hz) is simply:

$$P_N = kTB \quad \ldots\ldots (1)$$

where k is called Boltzmann's constant and has the value $1{\cdot}38 \times 10^{-23}$ J/K (joules/kelvin). For example, the thermal noise power generated in a resistor at a temperature of 290K (around room temperature) is:

$$1{\cdot}38 \times 10^{-23} \times 290 \times B \text{ watts;}$$

ie, $4{\cdot}00 \times 10^{-21}$W in every hertz of bandwidth B, across the entire spectrum. Two things to note: the noise power is independent of the ohmic value of the resistor, and the value calculated in equation (1) is the power that would be delivered into a matched load having the same impedance as the resistor.

Another example: if a 50Ω resistor at 290K was connected to the input terminals of a noise-free receiver, with a 50Ω input impedance and a bandwidth of 2·5kHz (Fig 1), what would be the noise voltage? The noise power from (1) is $1{\cdot}38 \times 10^{-23} \times 290 \times 2{,}500 = 1{\cdot}00 \times 10^{-17}$W. The voltage across 50Ω is obtained simply from $P = V^2/R$, and is $(1{\cdot}035 \times 10^{-17} \times 50) = 22{\cdot}7$nV.

Resistors are not the only electronic devices which generate noise [1]. Imagine an rf preamplifier (Fig 2) connected between the 50Ω resistor and the noise-free receiver. The noise power delivered to the receiver now has

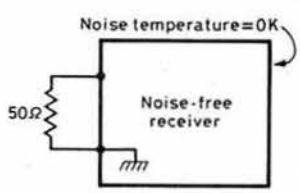


Fig 1. Even a 50Ω resistor generates some noise

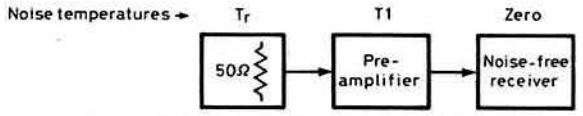


Fig 2. The effect of adding a preamplifier

two components: one is the amplified thermal noise from the resistive noise source, and the other is noise generated in the preamplifier itself. The noise contribution from the preamplifier can be expressed simply as a power in watts; or more subtly in terms of an imaginary increase in the temperature of the source resistor that would be needed to produce the same noise power. This imaginary temperature increase is known as the equivalent noise temperature of the preamplifier (T1 in Fig 2). A perfect device would have a noise temperature of zero K so it would contribute no extra noise. All real devices have a positive noise temperature, and the higher their equivalent noise temperature, the more noise they contribute.

The practical advantage from thinking in terms of equivalent noise temperature is that we have a common basis for measuring random noise arising from just about anything from a GaAsfet to a galaxy. The noise does not even have to be truly thermal in origin. The equivalent noise temperature of an electronic device is rarely the same as its physical temperature (unless the device is a resistor). For example, a modern mosfet amplifier at room temperature (around 290K) may have a noise temperature as low as 50K at 144MHz, while a very noisy device can have a noise temperature well above 1,000K without glowing white-hot! Noise from an active device like a transistor (or a galaxy) is also frequency-dependent, unlike true thermal noise, so although the noise temperature may be taken as constant within an amateur band, it will probably be different on another band.

Compared with other ways of measuring noise, noise temperature has some very useful properties. It is independent of bandwidth (unlike noise power, which is proportional to bandwidth), and it is independent of the gain or loss of the device generating the noise. Most useful of all, the noise temperatures of different components in a total system can be added directly to give a system noise temperature.

input. The excess noise temperature is simply T2/G1, where G1 is the power gain of the first stage, so the system noise temperature T_{SYS} is given by:

$$T_{SYS} = t_R + T1 + T2/G1 \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Dividing T2 by G1 is called "referring T2 to the input". And we can continue in this way, adding on extra stages (Fig 4a) and referring their noise contributions back to the input, so that:

$$T_{SYS} = T_R + T1 + T2/G1 + T3/(G1 \times G2) + T4/(G1 \times G2 \times G3) \ldots (3)$$

The noise temperature T3 of the third stage is referred back to the input by dividing it by the cumulative gain up to that point (G1 × G2 of the two previous stages), and so on. Notice how simply the noise temperatures add up. Notice also that the power gains G1, G2 etc are pure ratios (eg, "a power gain of 15 times") and are not in decibels.

Let's go back to the simplest two-stage system (Fig 3) and look at equation (2) in more detail. There are limits to how low the system noise temperature can be. For a start, it cannot be less than T_R, the noise temperature of the source from which the system gets its signals. The noise temperature T1 of the first stage also adds directly to the system total. The situation is different for the later stages, though. T_{SYS} can be brought close to its lower limit of (T_R + T1) if T2 is made small, or G1 large, since either will tend to make the last term (T2/G1) smaller. The same applies to the multi-stage system in Fig 4(a) and equation (3), for the cumulative effect of G1, G2 etc on the bottom lines of the fractions can quickly make the contributions of later stages negligible. To show this effect in practice, let's put some typical performance figures into the system of Fig 4(a), to give Fig 4(b). In a real multistage system we can say that the last stage is "the rest of the system", so we no longer need that fictional noise-free receiver in Figs 1-4(a). Then using equation (3) we have:

$$T_{SYS} = 300K + 170K + 250K/10 + 500K/(10\times 10) + 1{,}000K/(10\times 10\times 10)$$
$$= 300K + 170K + 25K + 5K + 1K$$
$$= 501K$$

The cumulative gain makes the noise contributions of the later stages very small, even though the individual noise temperatures of those stages are quite high. Mixers behave in exactly the same way as far as these equations are concerned, and even lossy mixers such as diode rings can be treated in the same way (see later).

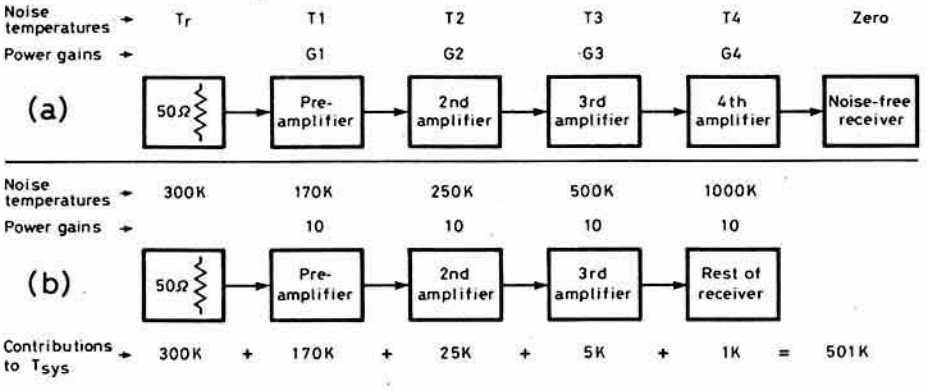


Fig 4. Noise analysis of more stages: (a) in symbols; (b) with some typical numbers

System noise temperature

We have seen that the noise temperature of a simple rf preamplifier fed from a 50Ω resistor (Fig 2), is the sum of the noise temperature of the resistor T_R (equal to its physical temperature because it is a resistor) plus the equivalent noise temperature T1 of the preamplifier. This sum is a simple form of system noise temperature. Now let us add to the system another stage whose noise temperature is T2 (Fig 3). We can calculate the noise temperature of this new system by finding out what excess noise the second stage contributes, in terms of excess equivalent noise temperature at the

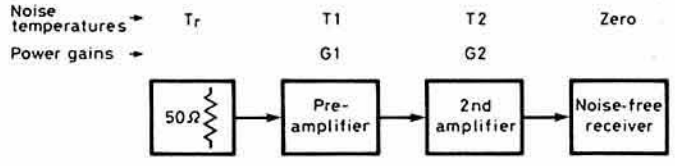


Fig 3. A simple noise analysis

We also need to know how to deal with such loss-introducing devices as cables, attenuators and filters. These degrade the system noise temperature, mainly by attenuating the wanted signal. There is also another less obvious source of degradation, due to the additional thermal noise generated in the resistive part of the losses. This second effect is little known and often neglected, but it can be important in the ultra-low-noise systems we are dealing with here. The complete formula for the effect of lossy components on system noise temperature is:

$$T = T_F L + (L - 1)T_P \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where:

T is the noise temperature at the input of the lossy component;

L is the loss expressed as a power ratio (ie, L = 1 for a loss-less system, going up to infinity for infinite loss);

T_F is the cumulative noise temperature of all following stages, referred to the output of the lossy device; and

T_P is the physical temperature of the lossy device.

The first term in equation (4) is the attenuation term, and the second is the term for extra thermal noise, which depends on the physical temperature of the lossy device. Note that we have been assuming that the losses are resistive and occur in a matched system. If the losses are due to a reactive mismatch, only the first term in equation (4) is relevant.

Noise factor and noise figure

Noise temperature is the fundamental concept underlying every aspect of noise in receiving systems. So how are the more familiar-sounding terms "noise factor" and "noise figure" related to noise temperature?

Noise factor F is related to noise temperature T by a standard definition [2]:

$$F = 1 + T/290$$

290K is close to room temperature, so noise factor is a measure of how the device or system noise compares with thermal noise under typical conditions of use. From this definition the perfect system has a noise factor of 1, and all real noise factors are greater than 1. Even more familiar than noise factor is noise figure N, which is simply noise factor expressed in decibels.

$$N = 10 \log_{10}(1 + T/290) \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

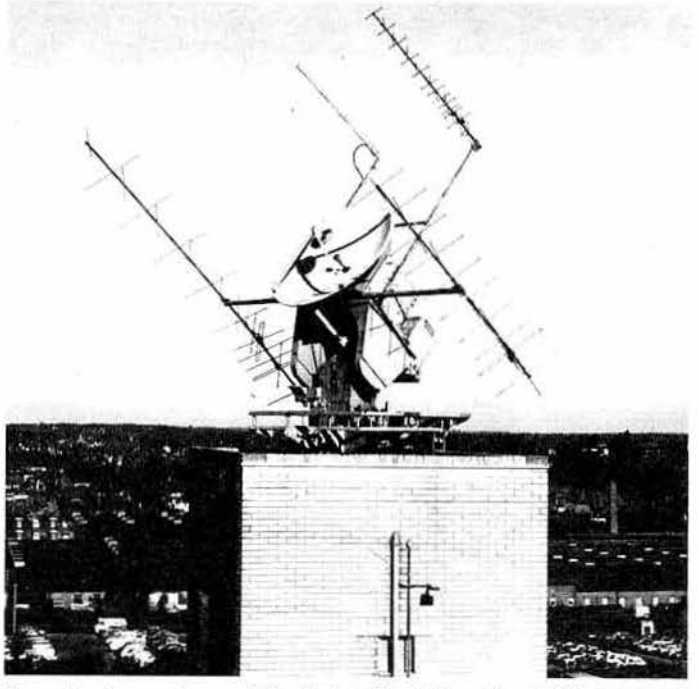
Since the minimum possible noise factor is 1, the minimum possible noise figure is 0dB. Unfortunately, noise factor and noise figure are easily confused, and there is little need to become familiar with both. In this series I will be using either noise temperature (and always with its units of kelvins) or noise figure (and always with its units of decibels).

Noise figure (nf) and noise temperature each have their advantages. The attenuation of a lossy component (in decibels) can be added to the nf of the following amplifier or mixer stage (also in decibels) to give a new, larger nf for the two stages combined [3]. But nfs of cascaded amplifier or mixer stages do *not* add up in the same simple way as noise temperatures do. And there is another more serious problem about nf: it can only deal with noise in receivers, and receivers are not the whole story.

Antenna noise temperatures

The receiver is only part of the receiving system as a whole. An equally important contributor to the complete system noise temperature T_{SYS} is the antenna, which can be brought into the common framework by giving it an equivalent noise temperature.

The noise temperature of an antenna is determined by the rf environment that it can "see", and not by its physical temperature. For example, a 144MHz beam pointed at the sky for satellite work may be picking up only a very small amount of galactic noise, which can be represented by an equivalent noise temperature as low as 150–200K [4]. On the other hand, if the antenna is picking up thermal noise from its earthly surroundings at physical temperatures of 270–300K or whatever, that will also be its noise temperature. The usual situation is somewhere in between: at 144MHz flat ground is a fairly good reflector of radiation and a correspondingly poor emitter; ie, the ground acts mostly like a mirror. So a horizontal antenna sees either "cold" sky above the horizon or the sky image reflected by the ground, and the warm ground itself makes only a small contribution to the antenna's equivalent noise temperature. Pick-up of man-made noise may be much more important than thermal or galactic noise, but, so long as the man-made noise is virtually random, this too can be expressed as an equivalent noise temperature. (See what I meant about the advantages of thinking about lots of different things in the same equivalent terms?) The noise temperature of a 144MHz antenna can thus vary between less than 250K in satellite work to 1,000K or more in an urban environment full of man-made noise.



The noise temperatures of the University of Surrey's satellite command station antennas would be much higher if they were aimed at the horizon across the city of Guildford

For terrestrial working on 144MHz, 200K is a reasonable minimum estimate for the antenna noise temperature. At higher frequencies, galactic and man-made noise tend to decrease, but the ground and nearby objects become poorer reflectors and better emitters of thermal noise. At 1·3GHz and above, an antenna pointed at the ground will have a noise temperature corresponding closely to the physical ground temperature, while a normal horizontal antenna will see approximately half warm ground and half cold sky, so its noise temperature will be about 150K. The same noise temperature can also be assumed for 432MHz antennas aimed at the horizon.

Usable sensitivity

Knowing that system noise temperature can be divided into two contributions, from the antenna and from the receiver, we can now tackle the question: how much sensitivity do we *really* need at vhf/uhf? In olden days, when rf devices were noisy and the vhf/uhf bands were empty, the answer was simple: we always needed more sensitivity, simply to improve the chances of ever hearing a signal at all! Times change; and in more ways than one. The low-noise rf devices that we dreamed of a decade ago are here, but so too are crowded bands full of strong signals. On today's vhf/uhf bands, receiver overload due to too much front-end gain can be a worse problem than lack of sensitivity.

Modern front-end design calls for a deliberate trade-off between sensitivity and strong-signal handling, to achieve the optimum *overall* balance of performance. In an optimized front-end, system noise temperature becomes something to be decided upon and designed for, instead of naively being "as low as possible". But what noise temperature should we choose?

First of all, remember that the system noise temperature cannot possibly be lower than the antenna noise temperature, even with a perfectly noiseless receiver. Noise from any practical receiver must degrade the signal-to-noise ratio of a weak signal to some extent, and the choice of receiver noise temperature can be framed in terms of how much degradation is allowable.

Let's try a few numbers. Consider a 144MHz receiver connected to an antenna with a noise temperature of 200K, the "typical" figure suggested earlier. If the receiver noise temperature is also 200K (nf = 2·28dB), the system noise temperature is 400K, and the noise power is doubled. Thus the signal : noise ratio of an incoming signal would be degraded by 3dB, compared with the unachievable noiseless receiver. To reduce the degradation to 2dB would mean reducing the system noise temperature to 317·7K. The antenna noise temperature is 200K and cannot be changed, so the receiver noise temperature must come down to 117·7K (nf = 1·48dB). To reduce the signal : noise degradation to only 1dB would call for a receiver noise temperature of 52·4K (nf = 0·72dB); such low noise temperatures can of course be achieved, but only by sacrificing other aspects of receiver performance, particularly strong-signal handling.

From these trial calculations, it seems that if we begin with a receiver noise temperature which is equal to the antenna noise temperature, the real scope for further improving the signal : noise ratio is only a decibel or two. Such a small difference may scarcely be noticeable on the air. And any such improvement may involve unacceptable sacrifices in the receiver's ability to handle strong signals. In other words, *if the receiver noise temperature is as low as the noise temperature of the antenna to which it is connected, the receiver is as sensitive as it really needs to be.*

Referring back to the typical antenna noise temperatures, the design-target receiver noise temperatures (nfs in brackets) for ordinary terrestrial dx-chasing would thus be 200K (say, 2·2dB) at 144MHz, and 150K (1·8dB) at 432MHz and above. These are not hard-and-fast rules, merely recommendations in round figures, given the current state of the art of vhf/uhf front-end design. The optimum balance between sensitivity and strong-signal handling may change as techniques improve, though the lower limit of system noise temperature will not: that limit is set by the antenna and its environment, and not by the receiver.

Sensitivity of commercial equipment

How does commercial equipment measure up to these standards of sensitivity? Not particularly well. Commercial transceivers often seem rather deaf, and their sensitivity to weak signals can be noticeably improved by a preamp or a replacement front-end.

In order to compare the published sensitivity specifications of

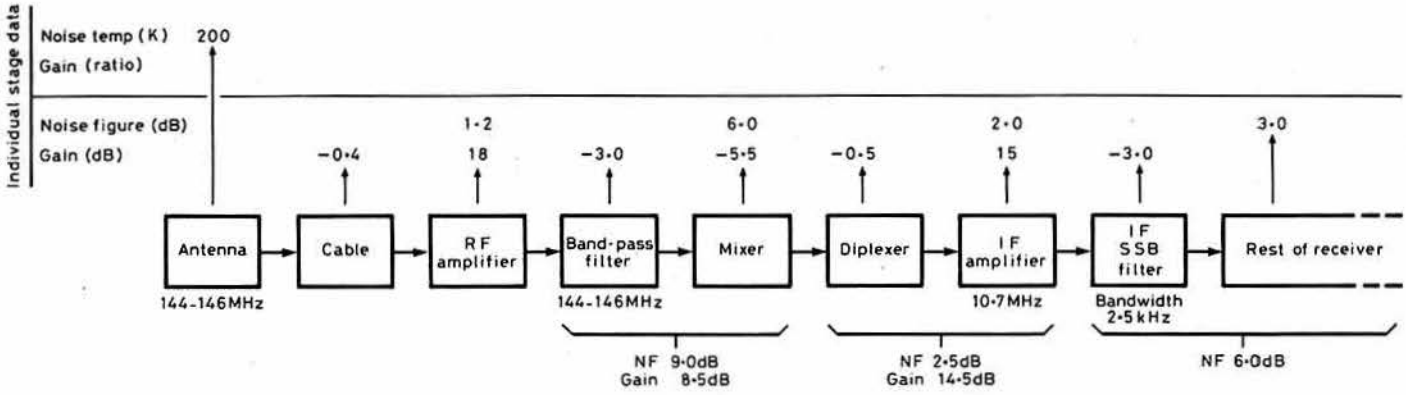


Fig 5. Block diagram of 144MHz front-end, showing input data for individual stages, and how some pairs of stages can be combined for analysis

commercial transceivers with the design targets recommended above, we first need to understand the way those specifications are worded. The most common way of expressing receiver sensitivity at hf is in terms of "$x\mu$V for a signal : noise ratio of ydB". Regrettably, the big transceiver manufacturers specify the sensitivity of their vhf and uhf equipment in that way too: regrettably, because out of all the possible ways of doing it, that one is probably the worst!

One criticism of the "microvolt" method is that it offers several possible grounds for misunderstandings, for getting the measurement wrong, or for presenting the figures so that they look good. For example, the signal level can be expressed either as a potential difference (pd) in a 50Ω system or as an open-circuit emf; there is a 6dB difference. "Signal : noise ratio" may really mean "(signal + noise) : noise ratio", which may differ by a decibel or so. Also, receiver noise is proportional to the bandwidth, so the sensitivity defined by the microvolt method will be better when using a narrow cw bandwidth than when the ssb filter is selected. It is extremely difficult to make measurements on ultra-sensitive vhf and uhf front-ends using traditional signal-generator methods. The possibilities for mistakes are enormous, and usually lead to over-optimistic results.

But the most serious criticism of the microvolt specifications for vhf/uhf equipment is that they are often almost worthless! For example, the manual for my 144MHz transceiver says the sensitivity should be "better than 0·5μV for 10dB s : n". This specification can be translated into noise temperature or nf by the method given in note [5]. Making the most favourable assumptions, the translated specification would read "noise temperature better than 3,000K" or "better than 11dB nf". Having just read that the design target for a 144MHz front-end should be a noise temperature around 200K (2·2dB nf), you can see how little the manufacturer is really promising.

While the sensitivity of the average commercial transceiver is often much better than the specification implies, most vhf and uhf transceivers *are* distinctly hard-of-hearing—hence the brisk trade in preamps, or even complete replacement front-ends! We still buy the transceivers for their other good points, but until consumers are given meaningful sensitivity specifications, the manufacturers have little incentive to get to grips with the problems of front-end design.

Final examples

Having, I hope, provoked a few thoughts about what receiver sensitivity really means, I will round off this part of the article with a complete example of noise-temperature analysis. The system we will consider is a 144MHz single-conversion front-end, all the way back from the i. f. filter to the antenna. In a later article I will return to this example to analyse its strong-signal performance too.

We start by drawing a block diagram of all the separate stages of the front-end, with the signal flowing from left to right (Fig 5). Don't worry about what kind of circuitry goes inside the blocks; what we are concerned with at present is simply the performance of each block in terms of noise temperature and power gain. The performance of the system as a whole will be calculated from the data on the individual stages, so we begin by writing what we know about each stage in the space above it. The data come from such sources as manufacturers' data sheets, magazine articles, or measurements on prototypes, and are generally given in decibel units of noise figure and gain. These will have to be converted to noise temperature and gain ratio.

We can simplify the calculations before we even start. In Fig 5 there are four places where an amplifier or mixer has a lossy stage ahead of it, and in each case the two could be combined [3] to save effort. The "rest of receiver" has an nf of 3dB, and ahead of it is the i. f. filter with a loss of 3dB, so these two can be combined into a single stage with an nf of 6dB. The first i. f. amplifier can be combined with the diplexer, and the mixer with the bandpass filter. The rf amplifier *could* be combined with the cable, though it is better to keep these two stages separate.

The simplified block diagram is in the middle of Fig 6, with the individual-stage data above. Below the block diagram will go the results for the system. If you want to follow through this worked example, draw up a similar worksheet for yourself. The input data from Fig 5 were mostly in decibel form, so check that you can do the conversions into noise temperatures and gain ratios. The relevant formulas are:

$$T = 290\ (\text{antilog}_{10}(N/10) - 1) \quad \ldots\ldots\ldots \text{(from equation 5)}$$

for converting nf (N) to noise temperature (T); and the familiar decibel-to-ratio conversions [6] for power gains and losses [7].

To calculate the system performance, start at the i. f. filter at the right-hand end of the block diagram, and work stage by stage towards the antenna. To avoid getting confused, work right through in terms of noise temperature alone, and then go back and convert all your system results to nf; similarly, calculate the cumulative front-end gain first in ratio terms, and then go back and convert all the results to decibels.

To set you going, the noise temperature at the input of the diplexer stage is given by [8]:

$$T = 225{\cdot}7K + 864{\cdot}5K/28{\cdot}2 = 256{\cdot}4K$$

This result is entered below the block diagram as shown in Fig 6. Now try calculating the noise temperatures at the inputs of all the rest of the stages

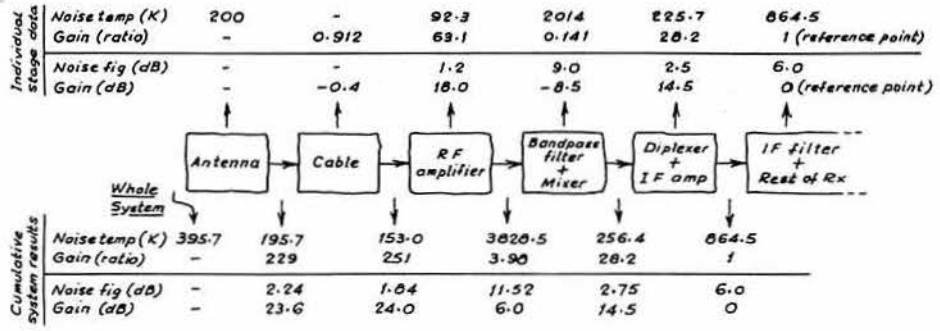


Fig 6. Work sheet for noise temperature and gain analysis of front-end simplified from Fig 5

as far as the rf amplifier, and see that you get the same results as Fig 6. The noise temperature at the input of the rf amplifier is of course the noise temperature of the whole receiver.

To account for the loss in the cable, assume its physical temperature is 290K and use equation (4). Once again, write the result in the appropriate place below the block diagram, and check your answer against Fig 6. Finally, add on the antenna noise temperature of 200K to give the noise temperature of the entire system.

Having once worked through the system analysis, you can try changing the gains or noise temperatures of individual stages, or even the order of the stages, and see how the system responds. The computer program to be described later in the series makes it very easy to do a range of trial calculations, to obtain the desired noise temperature while using a minimum of gain. That is how I arrived at the system of Figs 5 and 6, in which the noise temperature at the top of the feeder cable almost exactly equals the assumed noise temperature of the antenna, meeting the design target recommended earlier.

For this month, I will leave you with two problems which do not need a computer program; in fact you will learn more about doing the calculations if you use a pocket calculator. You can solve the second problem by trial-and-error; the wrong answers are at least as informative as the right one!

1. If the rf amplifier in Fig 6 was at the masthead; ie, the rf amplifier and the cable are interchanged, what would be the new receiver noise temperature? *(Answer: 159·3K).*

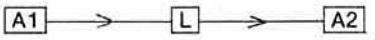
2. This new noise temperature is now rather lower than we really need, and gives us the chance to get rid of some unnecessary rf gain. If we move the rf stage to the masthead, by how much can its gain be reduced? *(Answer: almost 2dB).*

Notes and references

[1] Thermal noise is not the only kind of noise in resistors; eg, additional noise arises if the resistor carries an externally-imposed current.

[2] *IEEE Standard Dictionary of Electrical and Electronic Engineering Terms*, 2nd edition. Wiley-Interscience.

[3] Imagine a system consisting of a lossy component between two amplifiers.



When calculating the nf of this combination, it is correct to add L (in decibels) to the nf of amplifier A2 (also in decibels), because this gives exactly the right answer for the nf of the combination, when checked against noise temperature using equations (4) and (5). But it is incorrect to regard L as simply reducing the gain of amplifier A1: this does not give quite the right answer for the nf of the combination, the error being due to having omitted the thermal noise generated in L itself.

[4] "136MHz/400MHz radio-sky maps", R E Taylor, *Proc IEEE* April 1973, p469.

[5] To relate microvolt sensitivity measurements to noise temperature:

(i) If the signal voltage is expressed as an emf, divide by 2 to obtain the equivalent pd in an impedance-matched system.

(ii) Calculate the signal power using $P = V^2/R$ where R is the nominal impedance of the measurement system (usually 50Ω).

(iii) Convert the signal : noise ratio from decibels into a power ratio. If the ratio is actually (signal + noise) : noise, convert it and subtract 1 to obtain the true s : n ratio.

(iv) Divide the signal power by the signal : noise ratio to obtain the *apparent* receiver noise power, referred to its input. Convert this to *apparent* noise temperature using equation (2) and assuming that the noise bandwidth B is the same as the −6dB i. f. bandwidth; this is usually a good approximation for ssb filters.

(v) To make the measurement, the receiver would have been connected to the signal generator via a resistive attenuator, which itself has a noise temperature of about 290K (ie room temperature). Subtract the attenuator's noise temperature from the apparent receiver noise temperature, to leave the *true* result. This correction is often forgotten, because it is unimportant when carrying out measurements on hf receivers which are not very sensitive; but it is vital for ultra-low-noise vhf and uhf receivers.

[6] If this is the first time you have ever found any use for decibels, the formulas for converting power gains or losses from ratios to decibels are:

$$G(dB) = 10 \log_{10} G \text{ (ratio)}$$

$$G \text{ (ratio)} = \text{antilog}_{10} (G(dB)/10)$$

Gains are ratios greater than 1, and are positive in decibels; losses are power ratios less than 1 (but always greater than 0), and are negative in decibels.

[7] Power transfers between stages are assumed to be in an impedance-matched system (conventionally 50Ω). If the system is not perfectly matched, the power gains should be replaced by "available gains" which allow for the mismatch losses.

[8] All the results in Fig 6 are quoted to several significant figures, so that you can be sure whether they agree with your own calculations. Normally you would round the answers off before writing them down.

TO BE CONTINUED IN THREE MORE PARTS

USING RESONANCE TO MEASURE CAPACITANCE

(Continued from page 263)

Ranges 6 to 1 should now be set-up (with C1 fully meshed and C2 half meshed) in that order, as shown in Fig 8, but substituting the new figures in column 2, ie 6 × swing of C1 on Range 7, 5 × swing of C1 on Range 6, 4 × swing of C1 on Range 5, and so on.

Extension of range

Although the upper limit of measurement is 980pF, it is perfectly feasible to measure much larger capacitors to a high degree of accuracy, by connecting the unknown in series with an accurately known standard, and measuring the capacitance of the series pair. The unknown may then be determined by use of the formula

$$Cx = \frac{C \times Ck}{Ck - C}$$

where Cx = capacitance of unknown capacitor
C = capacitance of series pair
Ck = capacitance of known standard

For example, an accurate 980pF capacitor might be selected (or made) by use of the instrument, and kept for use in this type of measurement. Suppose an unknown were connected in series with this, and the capacitance of the pair was measured and found to be, say, 892pF, then

$$Cx = \frac{892 \times 980}{980 - 892} = \frac{874,160}{88} = 9,933\text{pF}$$

There is a practical limitation to the use of this method for high-value unknowns, and this lies in the effect of inaccurate reading of the scale when measuring the capacitance of series pairs.

Uses

Many uses have been found for this instrument over the years. Experience has shown that the incidence of mismarked capacitors is higher than generally believed, and at my station all are tested before incorporation in a circuit.

Difficulty in achieving adequate temperature compensation in a vfo led me, some years ago, to investigate the characteristics of negative and zero temperature coefficient capacitors, by the use of a hair dryer. Several of the alleged ntc capacitors were found to have positive coefficients, and none of the zero coefficient capacitors had that characteristic. This was confirmed by changing the temperature in the opposite direction by means of a "freezer" aerosol.

An unfortunate attempt by an inexperienced listener to improve the ganging in his communications receiver by bending the adjusting vanes on the tuning capacitor, set a nasty problem. By the use of this instrument, and the expenditure of many hours, the four-gang capacitor was eventually returned to the maker's capacitance/rotation law.

The equipment has also been used successfully to locate the position of breaks in headphone and microphone leads, coaxial cables etc, by measuring the capacitance of the faulty core to screen or another conductor, from each end, and dividing the length *pro rata*.

Acknowledgement is made to the Jackson Brothers catalogue, for details of C28-142.

A HOME-CONSTRUCTED TELESCOPIC MAST

John A Tubbritt, G1JAT*

John Tubbritt was born in Ireland in 1960, and has lived in England since 1969. He first became interested in amateur radio while working with G8TAZ, but it was only after moving to Warrington and joining the local amateur radio club that he started to study for the RAE. Three months after joining the club he entered the mast he describes in this article in the club's home-brew competition and won the Home-brew Award. He became licensed last year after passing the May RAE.

Introduction

Every amateur has to solve the problem of how to get his antenna aloft, and there are many ways by which this can be achieved. There is no doubt that one of the most elegant solutions is a telescopic mast, but for many the cost is often rather prohibitive.

The mast described in this article should cost about a quarter of the price of a commercial model; there is no welding to be done, and it can be constructed using tools normally available to the amateur. Guying should not normally be required, depending on wind-exposure of the site and the mass and wind-loading of the antenna(s). I use my mast unguyed to carry two 10-element Jaybeams and a colinear which are placed on top of a rotator, in a fairly exposed position; and it survived without damage very strong winds which demolished a power station cooling tower a few miles away early last year. However, if you are going to use it to support anything like a three-element tri-band beam—which the mast will support—I would recommend guying.

General description

The mast consists basically of two pieces of aluminium, the lower being of 3in (75mm) square box section, and the upper piece of 2·5in (63mm) outside diameter tube. The round tube slides inside the square section, and is raised by means of a winch to the required height.

The general arrangement of the mast is shown in Fig 1. The mast is supported by a ground post 5–6ft (1·5–2m) by 3in (75mm) square section of 3–3·5mm wall thickness, which is cast into a concrete base. The mast pivots around the upper bracket on the ground post, and the lower bracket provides a fixing when the mast is raised. The winch performs the double duty of raising and lowering the top section as well as luffing the mast. A locking device takes the strain from the winch rope when the mast is raised.

*17 Talbot Close, Oakwood, Birchwood, Warrington, Cheshire.

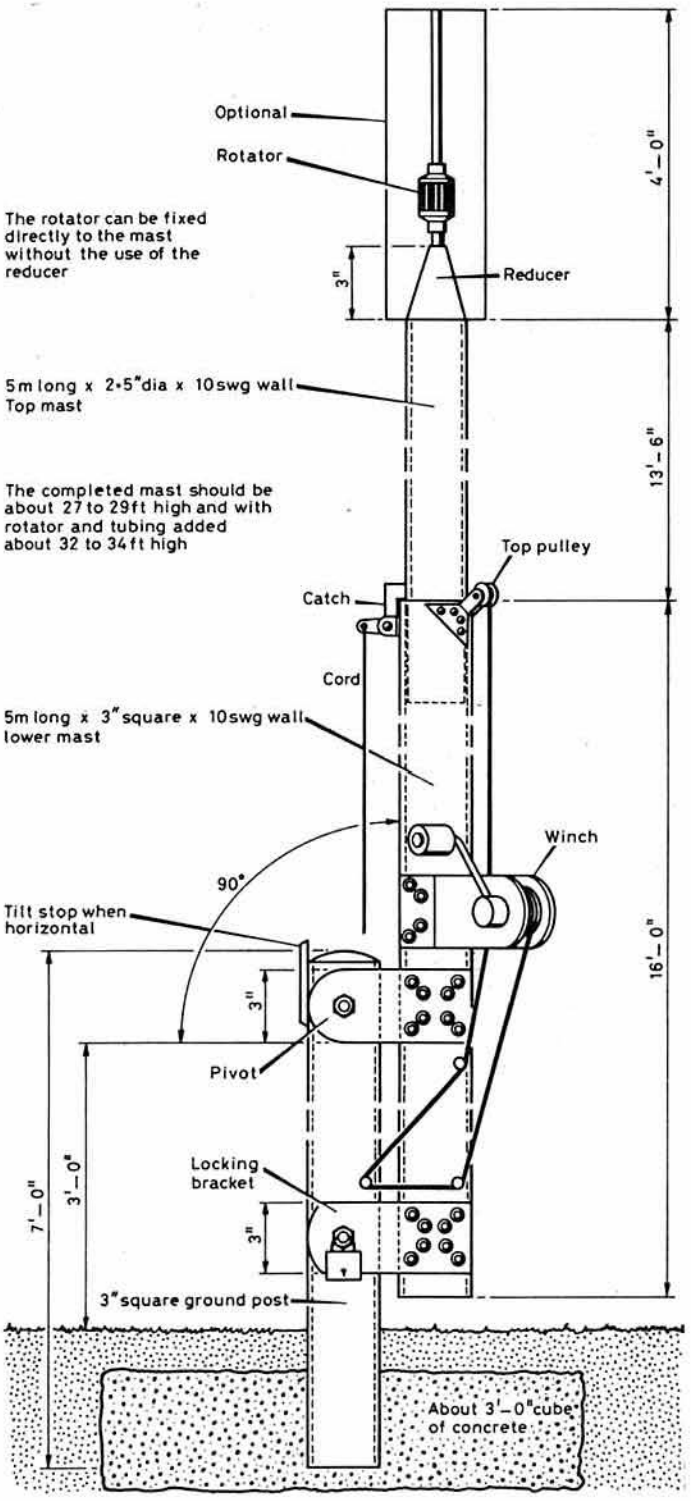


Fig 1. General arrangement of the mast

Construction

Construction should be carried out in sections as described below.

Lower mast winch

The first thing you need is some means of supporting the mast while you are working on it. A pair of trestles is ideal but, lacking these, I used a chair and a garden fence.

Mark out on the square tube the positions of the components. (At this stage, you can ignore the top pulley and locking device, which will come later.) After marking out the positions, the best place to start is on the winch, which I found to be the hardest part of the project. If you think that

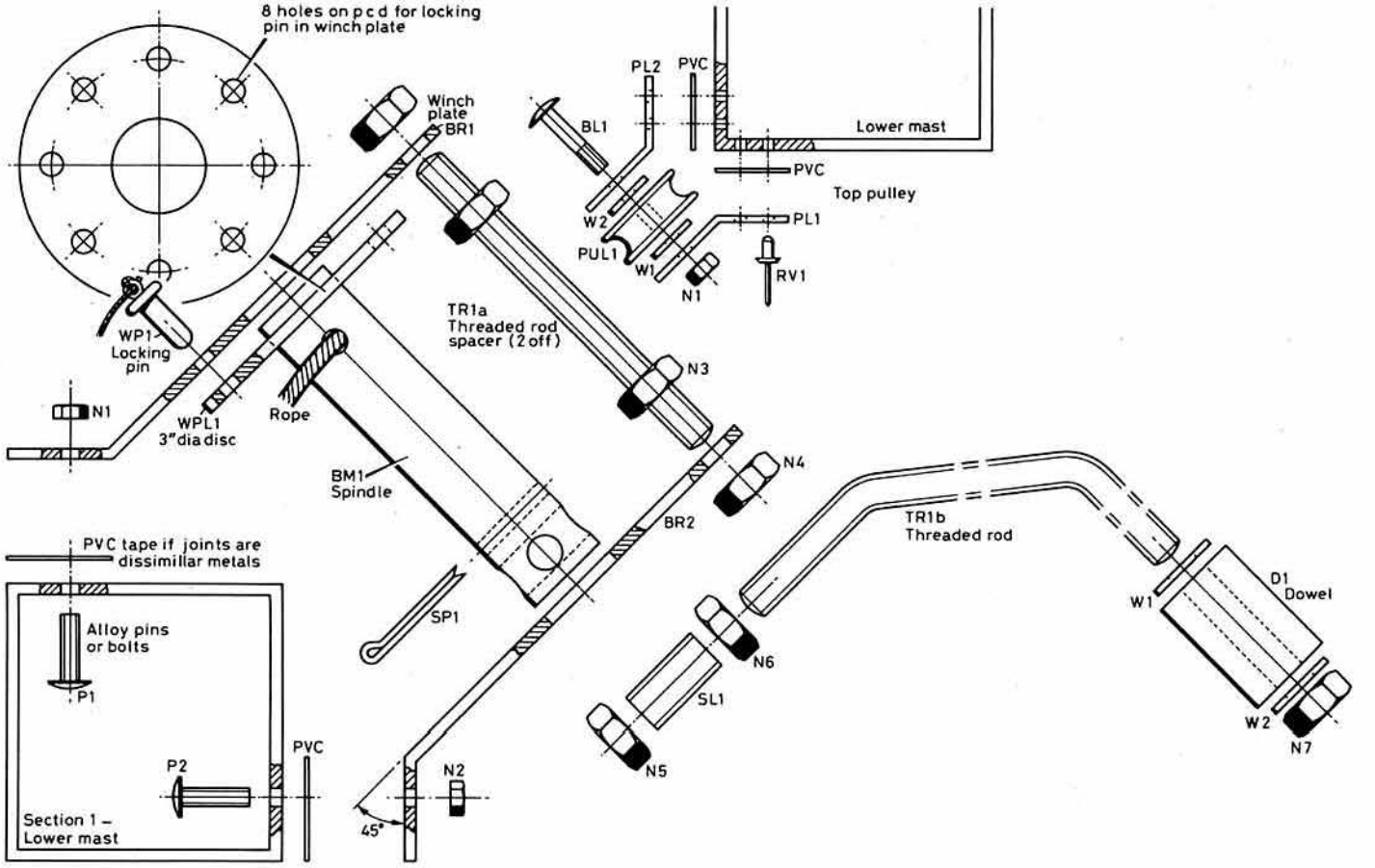


Fig 2. Winch components and exploded view of top pulley

the job of making the winch is beyond you, a commercial winch can be obtained from most yacht chandlers and a bracket fabricated to suit.

The winch is detailed in Figs 2 and 3. First, construct the two side-plates BR1 and BR2. These are fabricated from 3 by 6·5 by 0·25in (75 by 165 by 6mm) aluminium. Before bending, clamp the plates together, mark out and drill the required holes. If you haven't got a drill large enough for the winch spindle, a smaller hole can be drilled, and the hole slowly enlarged in size by using a bullet shaped grinding stone obtainable from most hardware shops. Lacking a clamp, the plates can be held together by placing them one on top of the other on a flat piece of wood and fixing them in position by means of nails driven into the wood and bent over the plates. The hole for the locking pin (WP1) should not be drilled until the winch is assembled.

The drilled plates should then be bent to the angle shown, using a vice. Bend the plates slowly and check the angle frequently to ensure that they are not over-bent.

The next piece to fabricate is the winch plate (WPL1). This consists of a 3in (75mm) diameter disc 0·25in (6mm) thick. The centre hole for the spindle is drilled slightly smaller than the diameter of the spindle, as this will later be "shrunk fitted". Six 0·25in (6mm) diameter holes are bored equidistantly about 0·375in (10mm) from the edge of the disc to take the locking pin.

The spindle consists of a 1in (25mm) diameter steel tube or rod, and after cutting to length, is drilled for the handle, split pin and winch rope. The winch plate is fitted onto the spindle by heating the plate on a gas stove until it has expanded enough to allow the spindle to pass through the centre hole. Position the plate and allow it to cool down, preferably overnight. After the assembly has cooled down, it should be fitted to one of the side plates and a hole drilled through the side plate for the locking pin, using one of the holes in the winch plate as a guide.

The next step is to mount the winch on the lower mast. Place the side plates in the positions on the mast which you marked out earlier, and centre punch for the mounting holes. Drill the mast for the fixing bolts. Fixing of the bolts requires a bit of ingenuity as these are mounted about 3ft (900mm) from the end of the tube. I used a piece of wood about 1in (25mm) square with a piece of putty or plasticine on one end: a bolt is stuck to this at right angles to the wood, and the stick is slid up inside the lower section until the bolt can be fed through the hole from the inside.

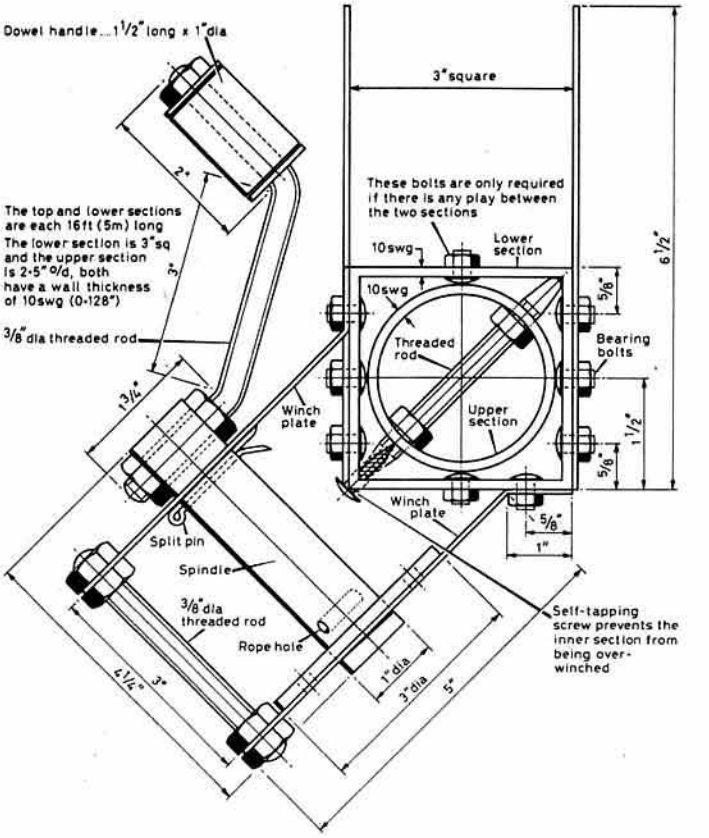


Fig 3. Top view of the winch

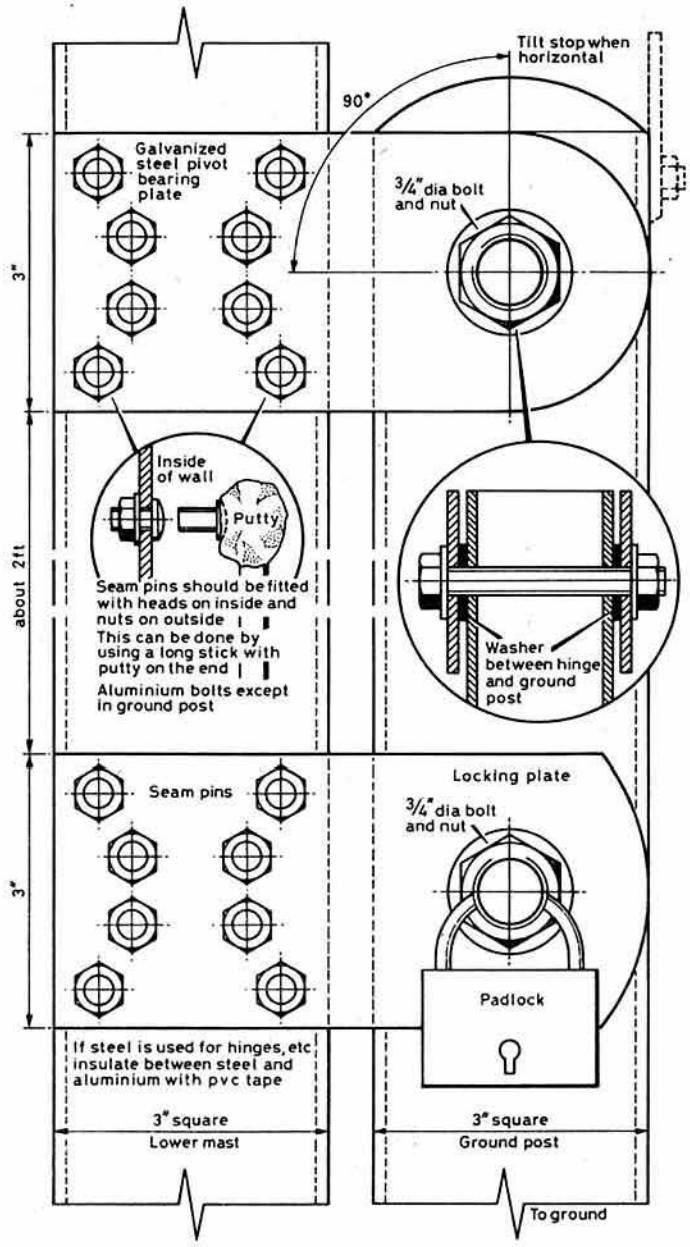


Fig 4. Pivot bearing and locking plate

The side plate that will have the winching handle is fixed first. If you are using mild-steel bolts it is a good idea to wrap the bolts with pvc tape before assembly to avoid electrolytic action. When the first plate is fixed, push the spindle through the hole and then fix the second plate. The spindle can then be pulled back and fitted in the hole in the second plate. When you are sure it fits properly, insert the split pin to prevent the spindle from falling out. Make sure the spindle rotates freely before tightening the fixing bolts.

The winch handle is a length of tube or rod bent and threaded. If you cannot do this, a local plumber will no doubt oblige. The grip is made from a piece of wooden dowel or a piece of plastic tube. Insert a spacer, consisting of a short length of tube, inside the spindle to prevent distortion of the spindle when the handle fixing nuts are tightened. If you are bending the handle yourself, use a vice with a piece of wood on each side to prevent damage to the threads. If you are using threaded rod, it is wise to put a nut on it first, cut the rod to length and then unscrew the nut. This will rethread the cut end. The nut holding the grip should be a Nylock, or other locking, nut.

Having finished the winch, the worst is over and the remainder of the construction is comparatively easy.

Pivot bearing, locking bracket and top pulley

The pivot bearing and locking bracket are mounted on the lower mast in the positions shown (Fig 4). The four plates, which are all identical, are preferably made from galvanized steel, although aluminium can be used if it is at least 10swg thick; they are made in the same fashion as the winch side plates to ensure that the holes line up.

Fix the pivot bearing plates first, using a piece of wood with putty to position the bolts in the same manner as was used to fix the winch. Ensure that the pivot holes are horizontal by pushing a long stick through the holes and, when satisfied, finally tighten the bolts. If you are using galvanized steel, use a piece of plastic sheet, or pvc tape, between the galvanized steel and the aluminium.

The locking brackets were fixed on the original by means of seam pins, although bolts can, of course, be used for this. The top pulley is mounted on brackets, and two types are shown; one using thin metal and the other using thick metal, depending on the material to hand (Fig 5). First of all, slide the top section of the mast inside the lower section. Cut the two brackets and drill the required holes. Temporarily assemble the pulley on its spindle through the brackets, and hand-fit the assembly to the top of the lower section above the winch.

Make sure that, when fixed, the fixings will not obstruct the movement of the inner section. When this is done, fix the plates in position with pop rivets.

Materials required and approximate cost

	£
15ft (5m) of 2·5in (63mm) round section for top mast	30·00
15ft (5m) of 3in (75mm) square section for lower mast	40·00
6ft (2m) of 3in (75mm) square section for ground post	3·00
3ft (1m) threaded rod	1·50
14 nuts, preferably self-locking, for threaded rod, and 4 washers	1·80
4 pulleys with bolts, nuts and washers	2·40
2 bolts 5in (126mm) by 0·5in (12mm) with nuts and washers, for hinge	1·50
36 roofing bolts and nuts	1·50
2ft (60mm) square sheet metal	1·00
6in (15mm) square 0·25 (6mm) gauge metal	·80
35ft (10·66m) of 0·25in (6mm) pre-stretched rope	3·00
Clothes line, preferably non-rotting, for top lock	1·00
Self-tapping screws 1in (25mm) by 0.19in (5mm)	·60
Spring 1·5in (38mm) by 0·19 (5mm)	·20
PVC tape	·40
	88·70

Bottom pulleys

The position of the three pulleys is shown in Fig 1. The first pulley to be fixed should be the one directly under the pivot bracket. Try to get this pulley as close to the bracket as possible. Drill the hole for the pulley bolt and, using the puttied stick again, insert the bolt from the inside of the tube. Fit a nut over the bolt and tighten it up. The pulley is then fitted, with washers on both sides, and secured with a locking nut. If using steel bolts, don't forget to wrap them in pvc tape and grease thoroughly.

The next pulley to be fixed is the one nearest the locking plate. This is easier to fix, as you should be able to insert the bolt by hand.

The next step is to fit the lower mast to the ground post. Line them up side by side, with the pivot bearing and locking brackets extending over the

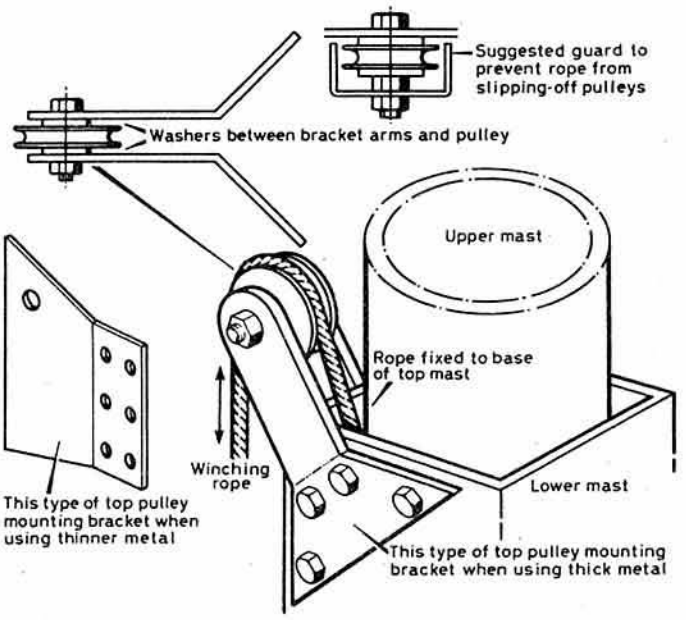


Fig 5. Top pulley details

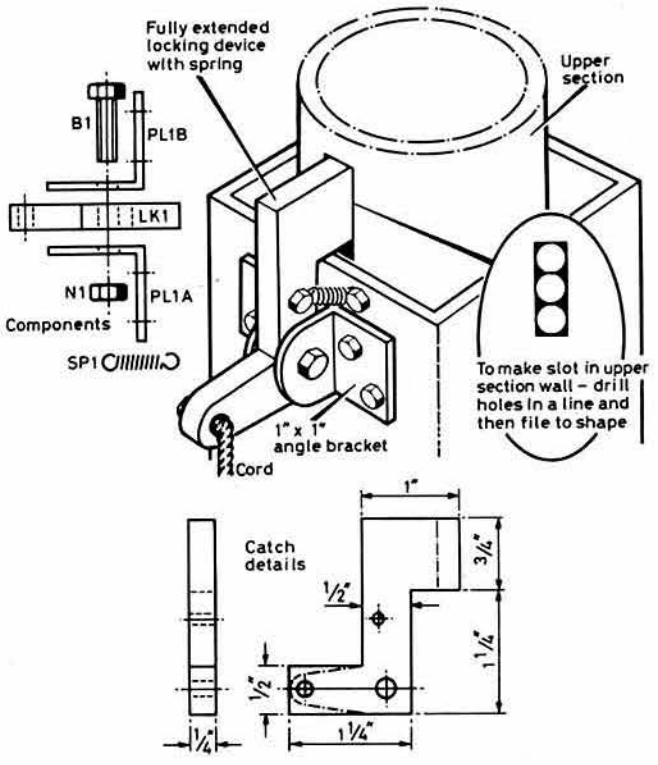


Fig 6. Details of locking catch

ground post. Use a piece of wood to space them apart, and clamp them together with G clamps. (I used a very large truck valve remover.) After clamping, drill the pivot bolt hole first, then the locking pin and finally the hole for the pulley. Do one side at a time, and if your measurements are correct the bolts will fit through nicely. With the pivot bolt in place, remove the locking pin and lift the ground post up from the lower section to an angle of 90° and make sure it moves freely. If so, remove the ground post and fit the final pulley. The locking device only comes into operation when the mast is raised to its full height. At anything below this, the winch locking pin can be used.

With the mast lying on its side, extend the inner section until there is 30ins (750mm) left inside the lower section. Don't forget to support the extended section so that both sections form a straight line. Mark a line at the top of the lower section at one corner and extend this line onto the round section. This will be a centre line to work from.

The catch (Fig 6) consists of a Z-shaped piece of metal pivoted on two brackets. The locking piece should be made from 0.25in (6mm) steel. When the pieces are cut, shaped, drilled and filed, assemble them with your hands and place over the line you marked on the lower mast. Withdraw the inner section and, with the lock in place, push the locking piece forward until it is resting on top of the lower section. When it is positioned, mark out the bracket mounting holes. The reason why we want the locking piece to rest on the top section is because it acts like a wedge between the masts so that too much strain is not imposed on the brackets. The spring should be fitted later, as it gets in the way when you are moving the inner section in and out for other jobs. The rope which operates the lock can be just threaded through the hole and a thumb knot tied on the end or, preferably, a key ring may be used and the rope tied to that. A small weight should be tied to the other end of the rope to prevent it blowing in the wind.

Upper mast

Slide the tube inside the lower section until it is flush with the bottom end of the lower section. Fit a length of threaded rod from corner to corner as shown in Fig 3. Cut to length and round off each end so that there are no sharp edges. Try the rod inside the square section, and if it fits mark the tube about 4in (100mm) from the bottom. Remove the tube from the lower section, drill and fit the threaded rod. Fit the tube back in the lower section and make sure it moves freely. Withdraw the tube to the 30in mark you made before, and mark where you are going to put the slot for the locking plate. The slot should be about twice the length of the plate and about 0.125in (3mm) wider. Make sure that the locking plate easily slides in and out of the slot.

Slide the tube back down the lower section until the top projects about 12in (300mm). Drill a hole about the size of the locking pin through both the lower section and the tube, positioned between the pivot bearing and locking plate. This is used to lock the sections together when luffing the mast.

The next part of the project is to fit the winch rope. Withdraw the top section and drill a hole about 3in (75mm) above the cross-pin. After drilling, round off the edges of the hole to prevent chafing of the rope. Thread the rope through the hole and tie it to the cross-pin. Slide the top section into the bottom section, keeping some tension on the rope. Make sure the rope is on the same side as the top pulley. Run the rope over the top pulley and pass it between the winch spindle and the lower mast. Insert the winch lock-pin. A stop-pin, consisting of a self-tapping screw, should be fitted to the lower section as shown in Fig 3. This pin should be positioned so that the top section cannot be over-extended.

If you find there is some play between the upper mast and the top of the lower mast, four bolts should be inserted in the lower mast, as shown in Fig 3, in the centre of each side.

Erection

The ground post is cast into a concrete base. Dig a hole about 3ft (900mm) cube, and place the ground post in the hole. Prop the post with four pieces of wood which are hammered into the ground. Clamp the props to the post or tie securely with wire.

Ensure that the ground post is vertical by using a plumb bob or spirit level. Spend some time over this as any error is magnified when the mast is erected. After plumbing the post, make sure that all is solid, to avoid displacement when pouring the concrete. The concrete can be purchased from a ready-mixed concrete firm or can be mixed by hand. If mixing by hand, use one part cement, two parts sand and four parts 10mm gravel, measured by volume. Water should be added until the concrete flows freely, turning the ingredients over twice dry and twice wet. When pouring, use a dowel or metal rod to poke the mixture to ensure that no voids are left. Leave the concrete to set for about three days. After the concrete is set, remove the props.

As the mast is quite light, it is easy to erect. First, remove the pivot pin and lock bolt and stand the mast up vertically. Line up the pivot and lock plates and insert the pivot and lock bolts. Fit a nut on the pivot bolt just hand-tight, and then fit a locking nut.

Thread the winch rope through the pulleys as shown in Fig 1 and, after leaving about 5ft (1,500mm) of slack, pass through the winch spindle and take up the slack.

Operation

To elevate the upper mast, remove the pin between the winch and brackets at the bottom of the mast (ie, the bolt which locks the two pieces of metal together) which will free the two sections. Winch up the upper section and ensure that it is fully extended. The winch can then be reversed and the winch locking pin inserted, thus taking the strain from the winch rope.

To lower the mast, winch the top mast up slightly and pull on the catch rope to disengage the catch. The top mast can then be winched down.

To luff the mast, first winch the top mast down, take out the locking pin and push it in the hole above to lock the two masts together. Take out the winch locking pin and, holding the winch handle with one hand, give the mast a push to start it luffing. The winch is then used to lower it to the required position. The mast can be held in the desired position by inserting the winch locking pin.

Conclusion

Suppliers for the aluminium sections can be found in the Yellow Pages of your telephone directory, and there should be no difficulty in obtaining the sections required as they are standard size.

Stainless steel nuts and bolts are recommended and can be obtained from yacht chandlers. All bolts should be mushroomed-headed, approximately 5mm stem diameter by 2in long.

The pulleys have no means of keeping the cord on them, so check that the cord is always on before use. You can fit your own pulley guards as shown in Fig 5.

Always service your tower every six months, and check for rope frays etc.

The stop screw to prevent over winching (Fig 3) should be inserted on the corner in which the cross-pin is sliding.

The handle, cross-pins etc can be made from a length of threaded rod about 6ft by 0.25in and will serve all your needs.

Finally, attention to the prevention of electrolytic action by separating dissimilar metals by plastic tape or sheet will be repaid by many years of trouble free service. □

Technical Topics

by Pat Hawker, G3VA

ONE OF THE PROBLEMS facing any columnist writing over a period of years is trying to keep abreast of the changing interests of his readers. When *TT* began 27 years ago in April 1958, ssb was still a minority mode with amplitude-modulation far in the lead; fm operation was confined to a tiny minority; 144MHz and above almost exclusively bands for home-construction; the Japanese had not yet set up amateur radio production lines; rtty, mobile operation, sstv, atv and the whole gamut of solidstate were in their infancy; home-computers, integrated circuits and surface-mounted assemblies not even on the distant horizon.

THIS MONTH

The 200Ω vertical
How high the antenna?
More on the W3EDP antenna
ATU round-up
AGC on a BC348 hybrid receiver
Radio equipment in cars
Electric shock
Dank u weel en tot horrens

This is not to say that the bc (before computer) years of amateur radio were any less interesting, less fun or less rewarding. Indeed some old-timers would echo the remark of the cross-channel passenger when asked if he had eaten on the voyage: *"au contraire"*.

Be that as it may, a general column must recognize the changing pattern of interests and be steered gently towards majority present-day practices (or hopefully sometimes lead the way in introducing them) while leaving the more exotic developments mainly to the specialist columns.

It is not easy to discover the current interests of those many, many thousands who now hold UK amateur radio licences. Have we become, as sometimes alleged, "an international conversational club", a crowd of QSL-card collectors and "square" workers, contest or computer buffs? Is manual cw going the way of a.m.? Are current licensees interested in the technical side of radio communication only to the extent of scraping through the RAE and the "need to know" of how to connect up a transceiver? Or regard cw as an obsolete mode forced down their throats by an absurd international regulation—rather than a highly effective and enjoyable craft skill based on a digital non-return-to-zero code?

The latest issue of the *IARU Region 1 News* reports an illuminating survey carried out by the Austrian national society, ÖVSV, based on a questionnaire sent to 300–400 hf band users and resulting in 152 completed forms (a very high proportion for this form of market research). The survey, unfortunately, was confined to hf bands only, and operating rather than technical usage, but some of the results seem pertinent.

Preferred mode: 53 per cent cw; 36 per cent ssb; 10 per cent rtty; 1 per cent sstv or fax; 69 per cent do not or only seldom take part in contests; 79 per cent are not yet using computers for communication purposes, but 34 per cent are thinking of doing so in the future.

Hans Berg, DK6TJ, chairman of the Region 1 HF Working Group, points out that there can be very wide variations in band usage between different parts of the world and even between different countries in the same continent. He suggests that African countries now show nearly 100 per cent usage of ssb, while amateurs in his part of West Germany split roughly 30 per cent cw, 60 per cent ssb and 10 per cent rtty. On the other hand one suspects that in Eastern Europe the percentage using mainly cw would be even higher than in Austria. Such wide variations do indeed make life difficult for columnists and editors alike!

The 200Ω vertical

Traditionally, radio amateurs have tended to think of hf antennas in terms of resonant half-wave dipoles or quarter-wave monopoles, and then either accepting these as single-band systems or alternatively taking advantage of the harmonic relationship of the pre-WARC bands. Admittedly, on 144MHz the 5λ/8 element has achieved some popularity as a mobile whip despite the tendency for the longer elements to flex during motion.

Yet, for military and professional communication, a single hf vertical whip antenna is normally used over a wide range of frequencies, emphasising once again that there is nothing magical about element resonance other than that it tends to make it easier to feed in rf energy without having to worry about a reactive feed impedance.

Over 20 years ago in *TT* I included some items based on the experiences of George Barratt (ex-G8IP, 5B4IP and ZD7IP) and later F. Regier (ex-OD5CG, who made the news media last year when he was kidnapped and held hostage for several weeks in Beirut). These reports showed how a 22ft vertical element (about 1.13° physical, 110° electrical on 14MHz) could be used effectively with horizontal radials or an earth mat, with the aid of quite simple matching networks, indeed on 14MHz all that is necessary is to insert a series capacitor between the element and the inner conductor of a 75Ω coaxial feeder. OD5CG provided information on a matching network for 14, 21 and 28MHz. ZD7IP quoted the classic antenna textbook by Laporte to show that at electrical lengths of 110° and 220° the resistive component of the feed impedance passes through 75Ω, with 110° having a series inductive reactance and 220° a series capacitive reactance.

John Share, GW3OKA, revives interest in this work in writing: "Last summer I was messing around with my antenna and came to the conclusion that the mast might prove more effective than some of the wires it was supporting. The mast is 25ft high and made from 1·5in aluminium tubing —my immediate impression was that this would not prove of much use for 14 or 21MHz, though I decided to work out the feed impedances. Here comes the surprise! On both 14 and 21MHz it proves to be about 200Ω (see Table 1 and Fig 1).

"These feedpoint impedances are of course reactive, but I remembered the comments on the 5B4IP vertical and also the 4:1 ferrite transformer and it proved all too easy. Connect the transformer to the 50Ω feeder and *voila* 50Ω becomes 200Ω! Series connect a capacitor to the antenna and tune for minimum swr. For the other band replace capacitor with an old roller-coaster and again adjust for minimum swr. Band change? A lead and a crocodile clip.

"When fed against an earth mat comprising lots of odd-length radials the system performed very well, working as a 3λ/8 vertical on 14MHz and 5λ/8

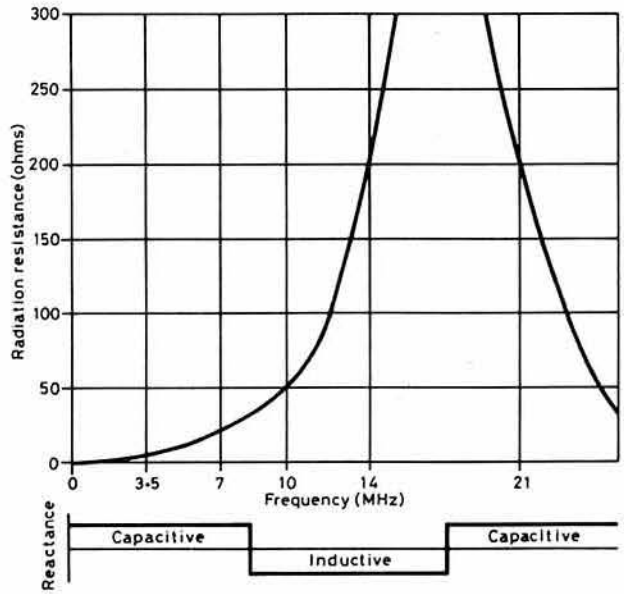


Fig 1. Feedpoint values for a 25·5ft vertical as plotted by GW3OKA

Table 1—Feedpoint values of 25·5ft vertical

MHz	a(°)	b(Ω)	c(X) (pF)	Feed	SWR
3·5	34·37	4		4:1 down	High
3·7	37·31	5			
7·0	68·74	18	120	4:1 down	1·5:1
10·0	98·20	46		1:1	2:1
10·2	100·16	50	75	1:1	1:1
14·0	137·48	200	300	1:4 up	1:1
14·3	140·00	208			
21·0	206·22	198		1:4 up	1:1
21·5	211·13	190		1:4 up	—
28·0	274·90	Much too long		Not suitable	—

SWR readings may vary from those indicated according to individual circumstances

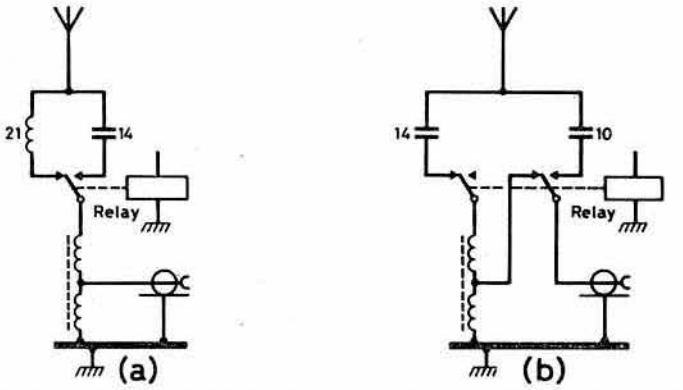


Fig 2. Dual-band operation of a 25·5ft vertical using a remotely-controlled relay rather than crocodile clips

(well almost) on 21MHz, on both bands giving good low angle radiation and all round coverage: Fig 2. The arrival of winter stopped me 'messing around' further with the design for other bands: Fig 3. Later, the arrival of planning permission and a new tower to support an hf beam stopped work on this promising 200Ω vertical altogether. By the way, my definition of 'messing around' is what I do for free: 'research' is much the same, but done for payment!"

How high the antenna?

When it comes to horizontally-polarized antenna systems there is an old adage that says "if it stays up it's too low"—at least for the dyed-in-the-

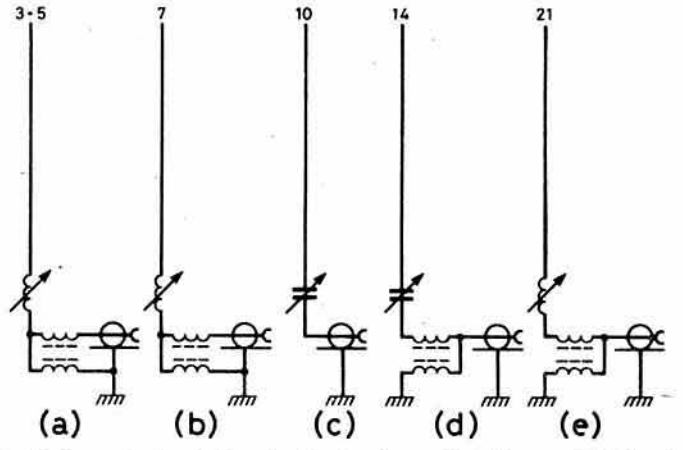


Fig 3. Suggested matching for five-band operation. Use on 28MHz not recommended

wool dx operator. On several occasions it has been pointed out in *TT* that it may be preferable to use a lightweight two-element hf Yagi rather than a heavier three-element beam if this means that the bigger array has to be lower. Similarly, because the "average height above ground level" of a quad is lower than its top wire, this form of antenna is at a *disadvantage* to a Yagi. Believe it or not, there is no real basis for the long-standing myth of superior performance of quad antennas at low heights. It has, conversely, been stressed that in good propagation conditions, chordal-hop and grey-line dx is entirely possible on simple antennas only a few feet above ground. It is for *consistent* dx performance that height really comes into its own.

Yet it has to be recognized that the provision of really high masts or towers is usually expensive and can involve difficult neighbour/local-authority problems. It is for these reasons that the question of "how high is high enough?" arises, even for those whose bank manager does not blanche at the idea of 60ft-plus tiltover towers etc.

First one must stress the general truth of "the higher the better" and attempt to kill the myth that certain critical heights (multiples of λ/2) significantly improve matters by reducing the vertical radiation angle.

It is, unfortunately, extremely difficult to measure "height gain" on hf, though rather more straightforward on vhf/uhf, since so much depends on site factors, ground conductivity etc. There is also the problem, when making measurements or contacts, of the constantly-changing band conditions and the tendency of all hf signals to fade quite rapidly.

An attempt to obtain meaningful results based on the reception of 14, 21 and 28MHz signals over paths exceeding 5,000km, and 145 and 435MHz signals over a path of about 20km, was made several years ago by a German antenna manufacturer, H. A. Rohrbacher, DJ2NN, from a reasonably good and uncluttered site. His results were published initially in *QRV* and then in English (translation by H. M. Lillienthal, F6DYG/DL7AH) in *Short Wave Magazine* (December 1981) and more recently in *Break-in* (June 1984). His measurement techniques and instrumentation are set out fully in his article and show that he went to considerable trouble to eliminate most of the usual problems, though it could be argued that any receiver measurements assume the "reciprocity theory" that equates the receiving and transmitting characteristics of a given antenna. This is by no means always true where radiation resistance is involved. Compare, for example, the performance of a small frame or ferrite-rod antenna on 1·8MHz for reception to that achievable when it is used for transmitting. Nevertheless this would not have been a problem in DJ2NN's project. He indicates once again, how misleading can be any attempt to access hf antenna performance on the basis of near-field signal-strength measurements.

DJ2NN measured incoming dx signals on an hf array which could be rapidly raised from about 2·5 to some 20m above ground, recognizing the problems of element detuning at very low heights.

His measurements (Fig 4) show that received signal strength increases continuously with height; but the increase is, as might be expected, greater at the lower levels above ground. On 14MHz, lowering the height of an array from, say, 25 to 12·5m reduces incoming signals by only one genuine S-point (6dB), Yet curiously, there is much less flattening of the height gain as the frequency increases.

DL2NN concludes on the basis of cost-effectiveness that an overall height for an hf array of about 17m (56ft) is about optimum, any additional height

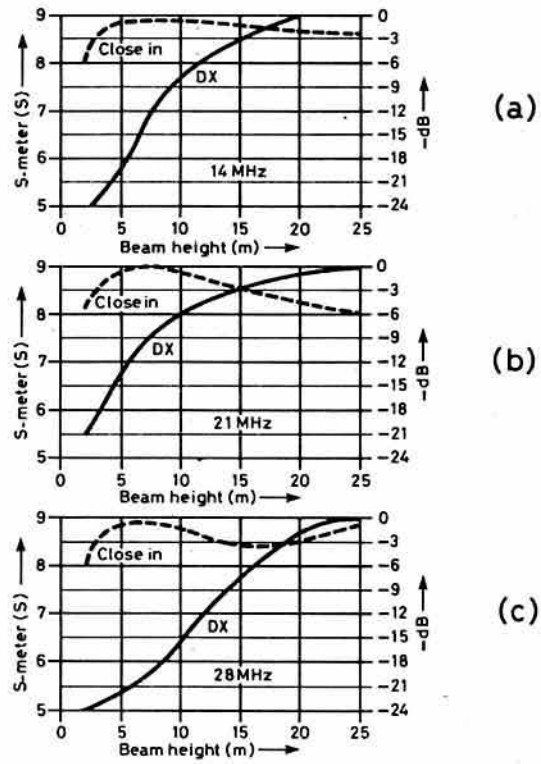


Fig 4. DJ2NN's antenna height-gain measurements. (a) 14MHz; (b) 21MHz; and (c) 28MHz. Note that increasing the height above about 15m shows relatively little improvement on 14 and 21MHz

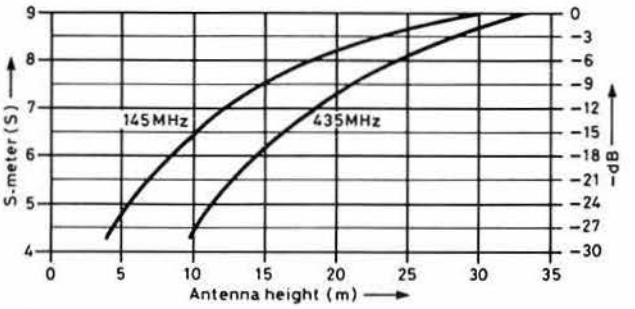


Fig 5. Antenna height-gain measurements on 145 and 435MHz

adding much more to cost than to performance. For many of us, 17m is an impossible dream, and perhaps the more important finding is that between 2·5 and 10m an almost logarithmic increase of signal voltage occurs. An array height of less than 10m above ground, even on a clear site, is definitely disadvantageous. At 10m an array should be capable of putting up a good performance on 14, 21 and 28MHz, at least when the site is reasonably uncluttered, though the presence of trees usually has relatively little effect on a horizontally-polarized array.

On vhf/uhf, useful height-gain continues to be obtained even above 25m, and DJ2NN recommends that on a shared tower the vhf/uhf antennas should always be mounted *above* the hf array: Fig 5. He admits that his investigation left open some questions, including vertical radiation patterns (which really require an aircraft as a measuring tool). Nevertheless his results do appear to provide some useful practical guidance, including the unanticipated conclusion that extreme height is less valuable on 14MHz than on higher-frequency bands.

More on the W3EDP antenna

The January *TT* (p35) item on "the ageless W3EDP antenna" brought comments from readers with long memories. Brian Bower, G3COJ, recalls, while operating the BBC club station G3AYC in 1975, having a contact with W4AG in Florida who mentioned that it was he who had been W3EDP and had devised this simple multiband antenna. As W4AG is not listed in the 1985 Callbook, and as Florida is the retirement centre of the USA, it may well be that he is now operating only from that great shack in the sky. G3COJ also mentions that another antenna man from the 'fifties—"Dickie" Bird, G4ZU, of Mini-Beam fame—now hides under the callsign F6IDC, having retired to southwest France where he has been busy working on a new form of miniature beam.

Charles Bryant, G3SB, comments on the suggestion in *TT*, quoting the current *Radio Communication Handbook*, that it is unnecessary to inductively couple the W3EDP loading coil directly to the pa tank coil, as it can be link coupled—directly or via a lowpass filter, swr meter etc—to the normal low-impedance output socket of a transmitter. He recalls that early descriptions of the W3EDP suggested that direct inductive coupling was necessary in order to provide also a degree of capacitive coupling.

G3SB's memory is good. A check with the first (pre-war) edition of the RSGB's *The Amateur Radio Handbook* shows the counterpoise end of the coupling coil coupled to the "hot" (anode) end of the tank coil with the following text note: "The counterpoise, which is 17ft or 6·5ft long according to frequency, is taken away at right angles to the aerial, and may also be bent to fit the space available. The counterpoise is connected to the end of the coupling coil nearest the pa coil, because a certain amount of capacitance coupling to this part is necessary for correct working. For the same reason it is necessary to have the coupling coil proportioned correctly. The coupling coils should be made of the plug-in type, arranged to swing against the pa tank. It should be possible to tune up the coupler and then swing up until the pa is fully loaded. If the aerial current falls off, before what is considered correct load is obtained, the balance between capacitive and inductive coupling is not quite right, and this is best adjusted by trimming the length of the aerial a few inches at a time, up to a possible total of 2ft."

I cannot help feeling that this procedure is based on what W3EDP actually did in the 'thirties, rather than theoretical considerations. Such a procedure would be ruled out today except at the very lowest powers, since it would appear to be an almost ideal way of ensuring maximum harmonic radiation. I suspect that W3EDP's procedure was based on the problem that (except on 7MHz) both ends of the coupling/loading coil are "hot" to rf, and this can complicate the use of a link winding. It would, of course, be possible to incorporate an additional "tank" circuit, link coupling this to the transmitter, but I would expect the reassuring comment in the current edition of *RCH* to be valid.

A problem with any form of coupling to this antenna, as with most long-wire antennas operated in an upstairs shack with a long earth-lead, is the tendency for the transmitter chassis to become "hot" to rf. G3SB experiences a form of this problem when using 66 or 132ft antennas with a pi-coupler on mains-operated transmitters, finding that rf is injected into the mains earth-lead, causing various difficulties. In my experience an almost sure-fire cure for a "hot" chassis is to attach to it a quarter-wave wire (or several for different bands), and there would seem to be no reason why this should not be done when using a W3EDP provided that no direct connection is made to the short counterpoise.

ATU round-up

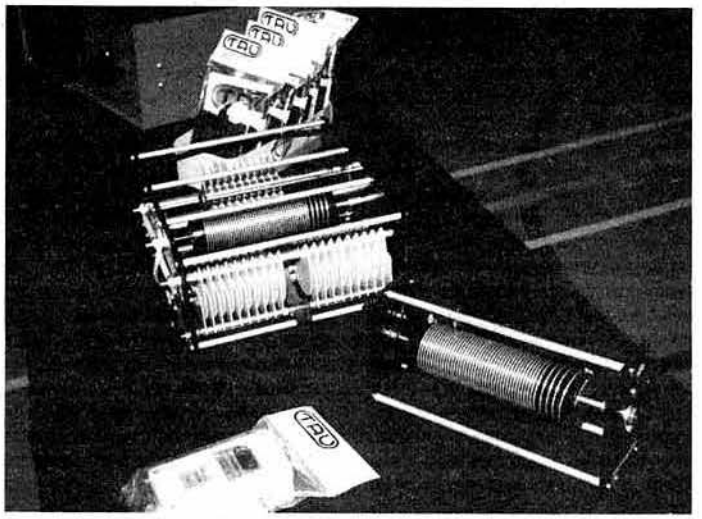
Several comments have been received in connection with items on antenna tuning units in the December 1984 *TT*.

Alan Royle, G3FQE, reminds us that the original notes on the Z-match unit modified by the Australians appeared in the *RSGB Bulletin* December 1956, stemming from Vic Scott, GD3UB, and influenced by a design including an swr meter in *QST* May 1955 by Allen W King, W1CJL.

George Clarkson, G3RHM, is a firm believer in the Z-match atu but believes that when 50Ω cable is used the link windings should be reduced by two or three turns. He praises the Z-match for effective harmonic suppression, superior to that usually achieved with the conventional lowpass filter that does not take into account the multiband, multi-reactance, multi-impedance requirements of amateur hf operation (absorption type lpf designs tackle this problem—*G3VA*). He also notes that the Z-match atu is entirely suitable for use with balanced feeders without a balun.

Brian Sandall, G3LGK, reflects on the great difficulty these days of finding suitable high-quality components for a high-power atu. It is relatively simple, he points out, to punch out capacitor plates in aluminium sheet and assemble them with lengths of studding and spacing rings, washers (or even drilled-out nuts). Yet he finds very few amateurs who are prepared to tackle such an approach. A high-voltage capacitor of even relatively modest maximum capacitance can set one back £50 or more if bought new, and if a source can be located. He greatly welcomes the efforts of G4OGP of Tau in introducing a range of well-made British components and complete units (mentioned in the December *TT*). While they may appear "pricey" to those with memories of the components of the 'fifties, they appear to be excellently designed and made, including the roller-coasters. He enclosed a couple of the photographs he took at the Leicester exhibition as an enthusiastic but disinterested observer.

G4OCP holding one of the new Tau atus on the company's stand at the Leicester exhibition. *(Photo:* G3LGK)



Some of the British-built components being designed and marketed by Tau to overcome the growing gap in the supply of components suitable for rf applications at high power. *(Photo:* G3LGK)

AGC on a BC348 hybrid receiver

I.M. Waters, G8ADE, still uses a ruggedly-built American wartime BC348 receiver, bought for £8 in 1954, as his main station receiver, though this has been subject to some drastic modifications over the years. It is used for hf, vhf and uhf bands, the latter with the aid of converters. Currently, the hf "front-end" retains the use of valves, but all subsequent stages are solidstate. The receiver caters for the original a.m. mode (10kHz bandwidth) but incorporates a 2·4kHz ssb filter and product detector as well as a quadrature fm detector with squelch—it is wonderful what you can do with sets built before new technology came on the scene!

One problem proved to be to devise a flexible agc system controlling valves and solidstate i.f. amplifier. Fig 6 shows the arrangement adopted, which G8ADE feels may be of general interest to those who still like to keep the old warhorses in harness rather than confining them to collectors' corner.

Audio derived ssb agc at 0 to +4Vdc from the SL1621 agc generator controls the ssb i.f. amplifier (SL1612) directly. This is also fed to a 741 op-amp functioning as a "valve agc inverter" to give 0 to −6Vdc to feed forward to the valve stages. SWA1 selects the agc feed to the valve stages depending on the mode in use. On ssb an S-meter is driven from the SL1621 directly via a set-fsd potentiometer. To allow the S-meter to work on a.m. and fm, the original agc is also inverted by a second 741 op-amp shown as the "S-meter inverter". This has adjustments for setting the fsd and for setting zero. S16 selects the S-meter feed.

Radio equipment in cars

In "Mobile operating—safe not sorry" (*TT* July 1984, p579) I referred briefly to a RoSPA article that had drawn attention to EEC regulations in respect of radio equipment fitted in cars. I wrote then: "(These are) intended to ensure that a driver will not be cut by any part of a radio, will not get his hands stuck nor receive any electric shocks. Equipment must be reasonably easy to operate and with rounded, recessed controls—though I am uncertain to what extent these EEC regulations apply to amateur radio equipment or to the extent to which they are enforced in the UK."

Dr Bryan Roe, G4LVR, who is in the automative industry, has recently explained the situation. He reports that every significantly different model of any vehicle intended for retail in the UK and Europe must have type approval. The approval regulations include a number relating to "interior projections" and "external protrusions" which refer respectively to anything which sticks out inside and outside the vehicle. He continues:

"The test for the interior projection part of the regulations is carried out by placing a hemisphere of a specific dimension—this represents a small child's head—anywhere around the interior and exterior of the vehicle. Any surface contactible by this hemisphere must have a certain minimum radius. Such surfaces are not confined to radio equipment, they can be anything, ie heater controls, steering wheel, sunvisor, door handles, headrests/restraints etc. The test is basically to ensure there are no sharp objects around which in normal use or in an accident could cause injury or death.

"Manufacturers normally carry out these checks before submitting a vehicle to the Department of Transport. Where items represent a risk to obtaining the type approval, they are normally redesigned or often, in the case of equipment such as radios, recessed into their mounting positions, such that sharp areas like the edges of switches, knobs etc are not contactible by the test hemisphere.

"Now for the 'crunch'. While these regulations apply to the original vehicle manufacturer, they do not apply to the purchaser or user. So once you have bought your vehicle, you could install any amount of equipment

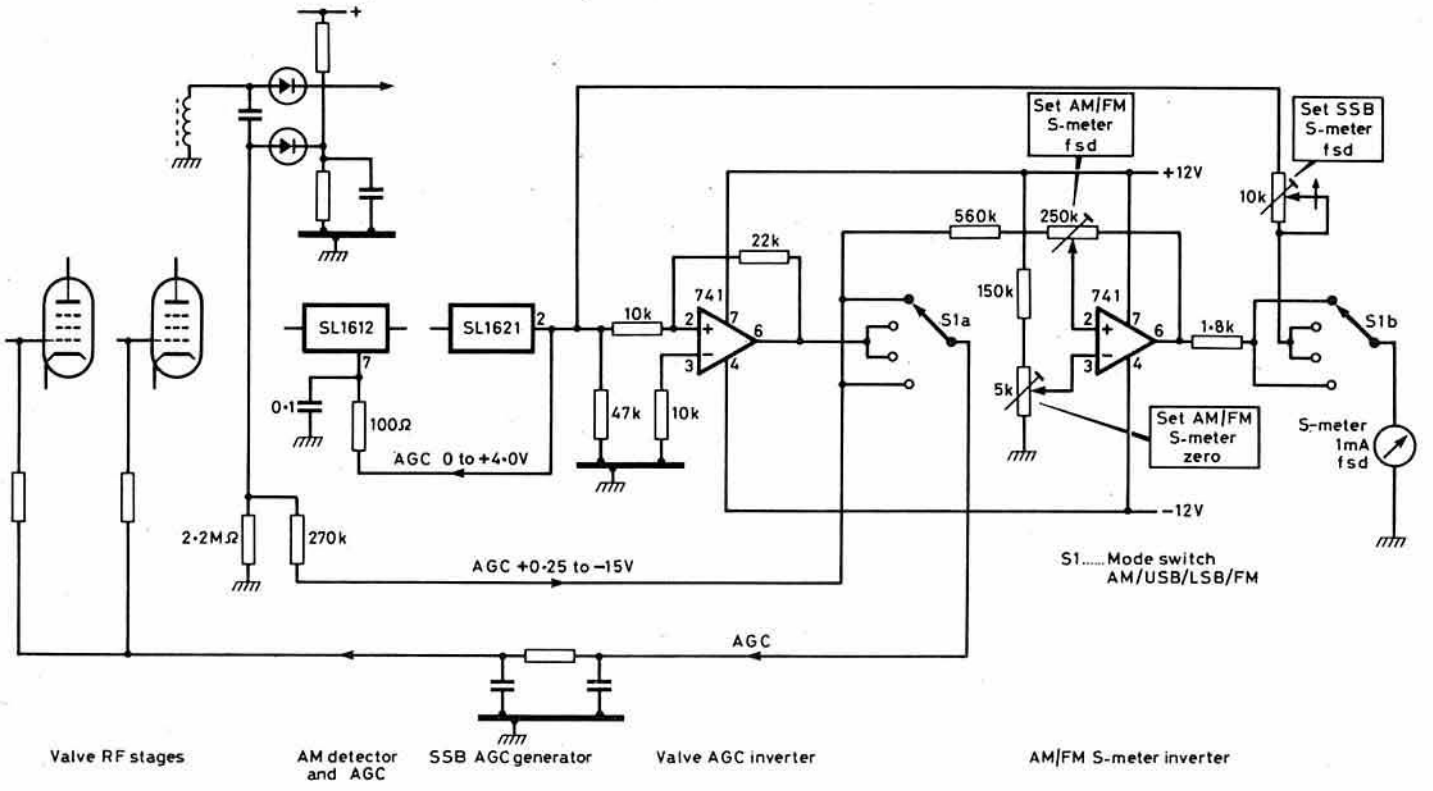


Fig 6. G8ADE's essentials of the agc/S-meter arrangements used with a hybrid valve/solidstate receiver

with sharp edges. All the manufacturer is required to do is to ensure that the vehicle is safe to sell. How you kill yourself or your pasengers is your problem!"

For those who have no wish to add to the slaughter on the roads, it would clearly be wise voluntarily to take heed of these recommendations and at least reduce to a minimum the addition of sharp edges in interior projections or external protrusions in the form of radio equipment that transgresses the spirit of the EEC recommendations.

Electric shock

The January *TT* described the dangers of electric shock in some detail, but there was one omission that needs to be put on record: the extra risk when the power supply is ac rather than dc. According to the informative if terrifying paper "Death by lightning" by Dr R H Golde and Professor W R Lee (*Proc IEE*, Vol 123, No 10R, October 1976, *IEE Reviews*): "The effects of electric shock from direct current are less severe than from power-frequency current of the same rms magnitude. Direct currents and alternating currents producing similar effects (including fibrillation) are generally in the ratio 5:1." By this token, 240V ac mains should be considered as potentially dangerous as about 1,000V dc. Lightning is of course ac at a high (rf) frequency.

Harry Ashcroft, G4CCM, also makes this point in his reply to criticisms of his body resistance tests. It was his letter in "Members Mailbag" that sparked off this debate. He notes the "animated response" to his megger measurements, but remains unrepentent, and comments: "The megger reading was based on memory from 60 years ago when I was an apprentice and tester, but I assure you that I knew how to use a megger. Before writing the letter I took a rough check with a 3V multimeter and have since taken further tests with the multimeter and with a Mullard CR bridge energized at 6V 50MHz. Electrodes were similar to those of early 'shocking coils': 0·6in (16mm) diameter by 3in (76mm) long of polished copper, gripped as firmly as possible:

Condition	Multimeter	Bridge
Dry	45kΩ	22kΩ
Wet (tap water)	6kΩ	6kΩ
Wet (salt water)	3·5kΩ	2kΩ

"Using the same electrodes, the hand-to-hand current on 12V 50Hz was 1mA dry and 3·5mA with tap water. Gripping the electrodes hard at 3·5mA is beginning to feel unpleasant, and at my age I am not prepared to go further. I agree that people are non-linear resistors and that the resistance will fall with increasing voltage. The IEC body resistance is taken out of context. If it were specified for the assessment of safety transformers for portable equipment it should be set near the bottom range. A 'standard' body resistance of assessing shock protecting equipment should be set near the top of the range. Very few shocks occur with such perfect contact conditions as in my test.

"All the contributors to the debate exept G3JJR ignored the most important feature—the let-go current, which he quotes as 10mA. Between 10 and 30mA on the IEC curve is a zone where people could be killed if there is nobody to pull them off or break the circuit. The rccb is an excellent device for earth-leakage protection but it gives only partial protection against shock in a range that could be fatal.

"The advantage of dc over ac is that muscular contraction usually breaks the circuit."

The Golde & Lee paper includes some fascinating descriptions of the early attempts, over 200 years ago, to investigate the effects of electricity on the human body. Benjamin Franklin, after taking a discharge from two "six-gallon" Leyden jars wrote: "It seem'd an univeral Blow from head to foot through the Body, and followed by a violent quick Trembling in the Trunk . . . It was some Minutes before I could recollect my Thoughts . . . . I afterwards found it had rais'd a Swelling there (back of the hand) of the Bigness of half a Swan Shot or Pistol Bullet. My Arms and the Back of my Neck felt somewhat numb the remainder of the Evening, and my Brest Bone was sore, for a Week after."

At the French Court of Louis XV, spectacles of 180 soldiers of the guard and subsequently 800 monks, leaping simultaneously in the air with "a precision out-rivalling the timing of the most perfect corps de ballet" were staged by Abbé Nollet (the official court electrician). Highly diverting it must have been—and at least less horrifying than some of the ways in which the use of electric shock is put by torturers in this more enlightened (?) age!

Tips and topics

Gerald Stancey, G3MCK, noted the hints on simplifying tuned circuit formulas from G3NXM (*TT*, February 1985) and recalled another useful approximation that came to him from a Belgian old-timer: "Take the wavelengths in metres at which you require resonance. divide it by two and this gives the inductance in microhenries and the capacitance in picofarads. Then scale to get the correct LC ratio. For example: 10MHz = 30m. Then $L(\mu H) = 30/2 = 15$. $C(pF) = 30/2 = 15$. Scale by, say, three to give more practical values: $L = 5\mu H$, $C = 45pF$".

Although RSGB publications changed from "aerial" to "antenna" almost a decade ago, the British public and even some electronics publications have yet to follow suit. David Pratt, G3KEP, notes that the IEE's *Electronic Group News* has attacked the present confused situation in which British antenna engineers are "antenna engineers" at work but "aerial designers" at home, adding: "Both antenna and aerial are technical terms whose original meaning was quite different. Antenna is a noun and comes from 'biological sensor'. Aerial is strictly an adjective and means 'in or belonging to the air' . . . . Both appear to have been conceived at about the same time. Marconi, in the IEE journal in 1899, wrote: 'a vertical conductor wire which I shall call the aerial conductor' . . . . J. A. Fleming in 1902 wrote: 'the great improvement introduced by Marconi was the employment of this vertical air-wire, aerial, antenna or elevated conductor'."

But at least the IEE confirms that dictionaries are largely agreed that while the plural of a biological antenna is *antennae*, the correct plural of radio antenna is *antennas*.

Dank u weel en tot horrens!

The ceremonies last summer commemorating the 40th anniversary of the Normandy D-Day landings were unfortunately something of a political jamboree and tended to give the impression that the second world war in Europe was as good as over once the assault forces were ashore and the beach-head established. This was far from the case: the Normandy campaign lasted three bloody months; then the euphoric liberation of France and Belgium, halted by the "bridge too far" disaster at Arnhem; followed by that long, bitterly cold winter of 1944-5—and for the Dutch in the northern, still occupied half of their unhappy land, near famine hunger. Also throughout the period: the heavy losses of the tactical and strategic air forces; the assaults across the Rhine; and, what should never be forgotten, the all-important Eastern Front moving ever closer to Berlin. Tragic days that should be recalled in humility, not military jingoism.

Among my personal recollections of that winter, there stands out the work of the various Dutch "underground" organizations, and in particular the internal clandestine radio networks set up by the RVV and OD resistance groups. Whereas most western Europe secret radio links were largely run by, supplied by, and with training facilities in, the UK, the internal Dutch radio service was set up, run and equipped by the Dutch themselves, using radio operators drawn from pre-war PA0 radio amateurs, KLM and merchant navy radio officers, and former Service telegraphists. By chance I was one of two English operators loaned to the Netherlands Intelligence Bureau from 1 January 1945 until the end of the war in Europe to help out at the Eindhoven control stations, and I recall, all too vividly, the experience of having one after another of the stations in the north go permanently off the air as the result of enemy raids. The frequencies used for these short-distance links were between 2·7 and 2·9MHz and 3·0 to 3·3MHz particularly vulnerable to df.

The two networks sprang into action after the "Mad Tuesday" of 5 September 1944, but the heaviest losses were suffered in the weeks following Christmas 1944. In the network with which I was concerned, only one clandestine station survived on-air right through until VE Day—at Alkmaar, just north of Amsterdam, manned by two highly-proficient operators who sent literally hundreds of cipher messages to Eindhoven (and also, I believe, ran a link with my former colleagues in the UK control station for Special Communications); perfect cw at more than 25 groups per minute.

In 1983, thanks to Dick Rollema, PA0SE, I finally discovered the identity of the surviving member of that successful team: Jan Zandbergen, PA0ZY, an aeronautical Civil Service ground operator, and still an active radio amateur; his colleague Jack, a merchant navy operator, died some years ago.

Since the recent BBC series on SOE, which featured the disastrous and shame-making (but from the German viewpoint very skilful) North Pole operation, British viewers may have been left with the feeling that secret radio in Holland was an unmitigated disaster. The full story of the Internal Radio Service has never been told in the UK; with all of its hazards, not just to the operators but also the young cipher clerks, couriers etc, many of them young Dutch girls. May I be excused for taking this 40th anniversary opportunity of paying a long overdue tribute to one of the most remarkable and most prolific Underground intelligence and sabotage operations of the second world war; to the skill of those who survived, and in memory of the many who lost their lives. An operation in which Dutch radio amateurs played a significant role. □

4-2-70

*by Ken Willis, G8VR**

OVER THE PAST TWO OR THREE MONTHS there have been relatively few letters from readers dealing with vhf openings or events of various sorts, reflecting the somewhat poor conditions on the bands of late. There has, of course, been the odd tropo opening or aurora, but little to get very excited about. Hopefully summer conditions will change all that, but it is very encouraging that despite moderate conditions, the post-bag remains as heavy as ever. I think few of us want to see *4-2-70* as simply a listing of "who worked what", so input from readers on any topic related to our hobby is welcome, especially if it adds to the knowledge of vhf/uhf propagation which is, after all, fundamental to what we are all trying to do—ie communicate in one way or another.

50MHz

LA9DL has sent a list of the 27 Norwegian amateurs who have been authorized to use 50MHz outside tv hours. They are: LA1JQ, LA1K, LA1NRS, LA2AB, LA2RZ, LA3EQ, LA3ZO, LA4TE, LA5MK, LA5UBA, LA6CU, LA6HL, LA6LCA, LA6QBA, LA6OP, LA6PV, LA8AK, LA8AE, LA8EW, LA8RB, LA9BM, LA9CY, LA9DI, LA9DL, LA9T, LA9UX, and LA9ZV. Stations already QRV: LA6PV, (JO59), LA8AK (JO38), LA9DL (JO59), (see "Meteor scatter" for details of G4IJE-LA8AK 50MHz ms contact).

Norwegian tv hours are such that 50MHz operation in that country will normally be confined to 2200 to 0730 weekdays and 2300 to 0730 weekends. Maximum output power is 25W in the band 50 to 54MHz.

The vhf manager, G3WSN, says that there may have been some unauthorized 50MHz operation in the UK. No new permits have been issued since the recent 60 listed on page 20 of the January 1985 issue of *Radio Communication*, so anyone noting any form of unauthorized use of this band should notify G3WSN.

Old-timers will recall John Letts, G8IL, Winterslow, near Salisbury, who was very much a regular in the early days of "two metres". John has written concerning the comments in the February *4-2-70* about VK2NO being heard in the UK on 56MHz in 1937. John spoke with VK2NO on 14MHz in 1937 (16 August) and was asked to pass a message to a Mr Mellanby of Pwllheli, North Wales to the effect that he (VK2NO) confirmed a Mr Mellanby's report of R5 S6 for reception of VK2NO's 56MHz signals on cw. John recalls that at that time there was little or no interest outside the USA in 50MHz, as opposed to 56MHz which was then an authorized allocation. He also points out that for F2 propagation there is a very considerable difference between 50 and 56MHz. There were few good 56MHz receivers around in 1937, yet by 1946–48, another sunspot "high" when receivers were much improved (6AK5 and 6J6 valves in the front-ends!), no further reports of such "five metre" dx seem to have been reported. He thinks that no-one was on the look out for it, as interest was turning towards the use of the "six metre" band, 50MHz. Possibly some others active at the time could scan their logs to see what was happening in those days.

Meteor scatter

The first 50MHz ms contact between the UK and Norway is reported to have taken place when G4IJE (Essex) worked LA8AK on cw ms on 50·146MHz. Paul received 17 bursts and 20 pings from Jan-Martin, who was using 25W into a four-element Band I tv antenna. Reports were 26 both ways, and for the record books the contact was completed at 0002gmt on 5 February, the sked having started at 2330gmt on 4 February. LA8AK received his 50MHz permit on 1 February and telephoned Paul for the sked, apparently being desperate for someone to work on the new band as at that date other LA permit-holders were still in the process of getting equipment for the band. G4IJE is using a modified MM2 144MHz amplifier for 50MHz, and finds it works very well after fitting a trap to eliminate all traces of 100MHz second harmonic in the output.

John Harper, G0AHQ (Stoke on Trent), proposes being QRV on the 144·200MHz random ms ssb channel each day between 0600 and 0700gmt, right through until 30 September this year to encourage more activity on the random channel. He will beam northeast Monday, Wednesday and Friday, southeast on Tuesday, Thursday, and Saturday, and east on Sundays. Power will be 300W and the locator is IO83UB. This is a venture with which I am very much in sympathy. Meteor scatter is nowadays a conventional means of vhf communication, limited only by lack of activity on the calling channels which forces operators to resort to schedules. If John can keep up his marathon task, maybe more stations will join in, and "breakfast ms" will rival breakfast tv in popularity. European operators please note these operating times and listen at the far end whenever possible. (0500 to 0600 or even 0400 to 0500 might be better for the UK early-risers in view of the time difference between Europe and the UK, plus the need for mere mortals to go off to their daily work after breakfast in their respective locations.)

Expeditions

The well-known team comprising GW3NYY, GW4LXO, G8TFI and GW8TVX, all vhf-dx fanatics who have in the past given so many operators new squares from their dxpeditions, this year plan to go to the Lizard (old XJ square) during the Perseids in August. Other operators will be joining them to operate on 144, 432, 1,296, 2,320 and "70MHz plus some other microwave bands, homebrew permitting". They have adopted the name The Square Bashers Expedition Group, and this time the call may be GB2XJ or similar. More details nearer the date.

Past and present members of the Havering & District ARC plan to activate squares and counties in North Wales in June. Operation will primarily be on 70MHz, but they will also be QRV on 144MHz and possibly 432MHz. Dave Bartlett, G4VIX, who normally lives in Hornchurch, supplied this information but under a /A call, GM4VIX, from Tayside since he is working 500 miles from home at present. Dave would like to hear from readers which squares/counties in North Wales they would like to see activated. Write to him, QTHR, or telephone 04024 55870 (Hornchurch) or 0382-453459 (Dundee), both numbers during evenings only. All modes will be used on the expedition, except cw ms for which the group has no equipment.

Auroral monitoring

John Wilson, G3UUT (Cambs), is well known for the work he undertakes with Brian Bowyer, G3COJ, in the provision of a UK beacon service in the vhf/uhf bands. John has been giving some thought to the matter of monitoring for auroras now that the Band I tv transmitters have closed down. As many readers will know, the 50MHz signals from these transmitters would frequently go auroral before any evidence of such an event became obvious on 144MHz, so in the past many stations used receivers tuned to more northerly tv stations to provide an early-warning system. Last month *4-2-70* mentioned the signal source provided by Wick radar which GM4IHJ uses for this purpose (153·213MHz), while in the January issue, the VHF Committee's plans for a 50MHz beacon in the north for auroral monitoring were noted. John Wilson has been considering what might fill the gap until the new beacon is authorized and installed, especially for stations too far south to take advantage of Wick radar, which would probably only be heard in the extreme south of the UK if a really major auroral event was in progress (southern stations who have heard Wick please write to *4-2-70* and give details). By scanning the lists of frequencies of some possible Continental tv frequencies which might be used, John came up with 53·750MHz which is in the range of most 50MHz commercial transceivers. On this channel are video carriers from Southern Ireland and Italy, plus wideband fm tv sound from Norway, Sweden, Finland, Austria, Belgium, Germany, Spain and Switzerland. John comments that since tv sound transmissions tend to be about one-tenth the *erp* of the accompanying vision signal, and because wideband fm is difficult to resolve on a narrowband receiver, the most useful transmitter for auroral warning in this part of the spectrum is likely to be the Irish video on 53·7578MHz. As he says: "Note the exact frequency; most tv signals, vision and sound, are off-set by a small amount (multiples of one-twelfth the line frequency) from the nominal centre of the channel". Maghera in Galway radiates some 100kW *erp*, and is usually just audible by tropo propagation in Cambridge on G3UUT's system, but remember he is licensed for 50MHz operation and has a beam antenna on this frequency, so monitoring on a dipole might not be so successful, but well worth trying.

On 53·7396 and 53·7604MHz, Italian video carriers give very strong

*11 Old Downs, Hartley, Kent DA3 7AA

meteor bursts most of the time, while the wideband fm sound signals also give such bursts but are "swishy" in sound due to the combined effect of frequency modulation and doppler shift. John says that it may be that during an aurora, fm sound from Norway or Sweden would appear before the signal from Maghera goes auroral, since the Irish transmitter is really too far south to be a good auroral indicator. In fact, since so many of the signals on 53MHz come from southerly locations, G3UUT considered as an alternative 48·250MHz, which is the video carrier frequency of all the previously-mentioned fm sound signals on 53·750MHz. John says that the meteor pings on this frequency are "really amazing". He estimates that some 1·5MW of *erp* is being transmitted on this frequency by stations in the countries mentioned. During an aurora on 28 January he copied particularly strong auroral signals from (mainly) Swedish transmitters on 48·2396, 48·2500 and 48·2604MHz, these persisting until 2300gmt but unfortunately not as late as 2330gmt when the 50MHz permit-holders were able to come on the air. John sums up by strongly recommending anyone interested in auroras to build a converter for 48·250MHz rather than 53·750MHz, supporting his view by saying that on 28 January, when all auroral signals from the Irish video and fm sound had disappeared, video carriers on 48·250MHz were still strongly auroral.

I have been privileged to see some of the work of John Branegan, GM4IHJ, associated with auroral modelling programs for microcomputers. This work is not yet ready for general dissemination, so please do not write to John asking for further information. When it is in an appropriate state, further details will be given in *4-2-70*. John observed auroras at his Fife location on 8, 28 and 29 January and 6 February. The event on 28 January was a large-scale affair "right down to Central France". It started at 1212gmt and continued on 144MHz until 1850gmt (2135gmt on lower frequencies), and GM4IHJ noted no evidence of auroral Es on this occasion. Wick radar gave him excellent warning of the 28/29 January events. GM4IHJ believes that the new Greenland beacons (*4-2-70* March 1985) will prove to be most useful for Au monitoring.

Another Scot who is never far away when an aurora breaks is our regular contributor John Dunlop, GM6LNM (Port Glasgow). He caught the same auroras mentioned by GM4IHJ, and has some interesting comments on the event of 28 January. He noticed it first on 14MHz during the morning of that day, GB3LER going auroral later at 1255gmt. Between 1342 and 1725 he copied some very interesting beacon signals, all with auroral tone, on beam headings varying between 020° and 050°; beacons heard were LA1VHF, DL0PR, GB3LER, GB3VHF, Y41B, OY6VHF, OH6VHF, GB3CTC and FX0THF. John is uncertain of the identification of Y41B and OH6VHF, since both were very weak with him. He reports that USSR and Polish stations were worked by UK amateurs during this event. He moved to 432MHz and worked PA0RDY and G8ECI. Who said auroral contacts on 432MHz were not possible?

Mike Robertson, GM6WIX (Dumfriesshire) lives in a valley and therefore has to ascend nearby Keir Hill (IO85CE) to work the dx. On 28 January between 1535 and 1747gmt he worked nine countries and at least 20 squares, all on 144MHz ssb via the aurora. This "portable" location is 1,200ft asl and has a clear take-of in all directions. At this site Mike uses a Trio 9000 plus 100W amplifier into a 13-element Tonna on 144MHz, and an FT780R plus 50W amplifier and 88-element multibeam on 432MHz.

Any newcomer to auroras (and some old-timers too) could do worse than read an article entitled "Radio Aurora" by Richard Miller, VE3CIE, in *QST* January 1985. As well as describing how auroras develop, he mentions information transmitted by the National Bureau of Standards station WWV on 2·5, 5, 10, 15 and 20MHz at 18 min past each hour, in voice, giving figures for solar activity and other relevant data which may indicate the likelihood of a radio auroral event occurring.

Just Qvigstad, LA9DL, who is one of the Norwegian stations holding a 50MHz permit, will be keeping a look-out for G stations on that band during auroral conditions. He also comments that he has worked 54 squares on 432MHz via aurora, but never a G or GM station on that band by that mode, so he would be very interested to attempt this. His phone number is 472-742344 (presumably dialled from the UK as 010-47-2-742344, since he is located in Skjetten).

We do not often have lady operators reporting auroral activities, but Cilla Bell, G4KVR (Harlow), noticed a signal with auroral properties on 144·300MHz on 28 January and went on to work some GM, OZ, DL and SM stations using her six element quad. She used both cw and ssb, and commented on it being a hard life for the workers, since when husband Allan, G6AXO, came home from his toil at 1730gmt everything then faded away! Cilla is not one of the idle rich, however; she works from home and can keep the rig on during the day to catch anything unusual which occurs.

John Palfrey, G4XEN (Northants), also had a good time during the 28 January event with GM, DL, SM, LA and UQ2 which gave him three new squares (SM1BSA JO97, UQ2GMD KO17 and LA9BM JP40), the UQ2 also being a new country. He heard GMs calling into SP, OK and Y22, none of which were audible at his QTH. John is now using a transverter into his FT902DM, which with a 3SK88 preamplifier gives markedly better performance than his old FT48OR. He says that the advantages of filters plus i.f. shift are enormous, and recommends the use of transverters or converters for reception instead of the transceiver. Anyone who has worked meteor scatter cw will also appreciate the value of i.f. shift. Using a receiving converter, however, does require careful setting of the transmitter to achieve co-channel send/receive characteristics, especially important on ms.

Dave Bartlett, GM4VIX/A (Dundee), heard SM0FMT and SM3AKW between 1600 and 1800gmt in an aurora on 17 February, but said his 144MHz equipment at that location is poor, and GM4IPK seemed to be doing much better.

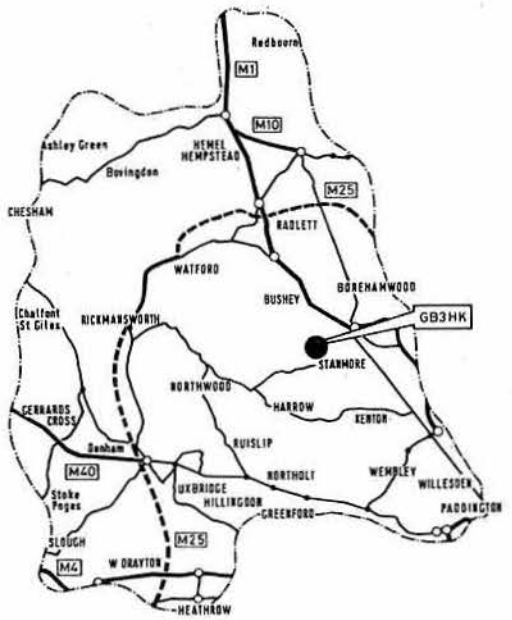
Repeater news

Peter Morgan, G6VKM, who is secretary of the South Coast RTTY Repeater Group, reports that the group now has a growing number of members, and John G3XJG, is busy designing the hardware/software combination to permit rtty operation. The group needs funds urgently to meet site rental costs and to buy cavities, so new members are required. Anyone wanting more information should write to G6VKM, QTHR, enclosing an sae.

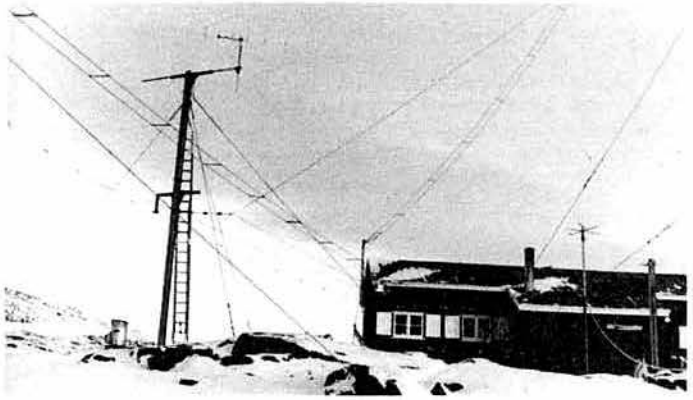
The South West Herts UHF Group, which looks after GB3HR (RB14), faced several problems which had to be overcome before HR (known locally as the Happy Repeater) could become operational. On its original site, rate demands—including one for water rate!—plus objections to the mast forced a move to a commercial pmr site near Stanmore Hill, but after moving there in September 1983 two faulty antenna systems and interference from another uhf base station resulted in a further year of delays, but now all is well and a much improved service area over Bushey Heath is available from this repeater. Peter Marcham, G3YXZ, secretary of the group says that much of the necessary backing for this installation comes from the Radio Society of Harrow and the Watford Radio Club, whose members support the repeater both financially and as users. Much of the traffic through the repeater comes from mobiles using the M1, M4, M25 and M40 motorways. Donations to the group would be gratefully acknowledged by Brian Greenaway, G3THQ, QTHR, while further details of the group and its activities can be obtained by writing to Dave John, G3WCB, 41A Chequers Orchard, Iver, Bucks.

It may interest some repeater buffs to know that in France the management of repeater operations and beacon systems are combined, the manager being currently Pierre L Cachon, F9UP, 52 rue Henri Gerard, 21121, Fontaine-les-Dijon. Pierre is in touch with RSGB headquarters to provide information on beacon status on a regular basis, so maybe he would be willing to answer specific questions related to French repeaters if so requested.

The current issue (No 129) of *CQ-TV Magazine*, the journal of the Biritish Amateur Television Club, contains an article by Jack Darby,



The coverage area of GB3HR on RB14, which enbraces parts of the M1, M4, M25 and M40



The beacon site of OX3VHF in Greenland. The six-element 144MHz array has now been joined by a groundplane antenna for 50MHz on the same mast

G4TVC, on the Crawley & District Video Repeater Group's 1·3GHz atv repeater, GB3CT, which was built for less than £150. They are aiming for a working radius of 10 miles, since within this area the club has some 20 active atvers on 432MHz, most of whom have stated their intention of trying 1·3GHz if information and hardware were available to them. The site planned for this repeater is at the highest point in Crawley, 325ft asl, the site owner being a group member. Circuit details for the repeater are available from G4TVC, QTHR, provided an sae is sent. Though Jack has not requested them, a few extra stamps would probably be appreciated from non-BATC members requesting such information.

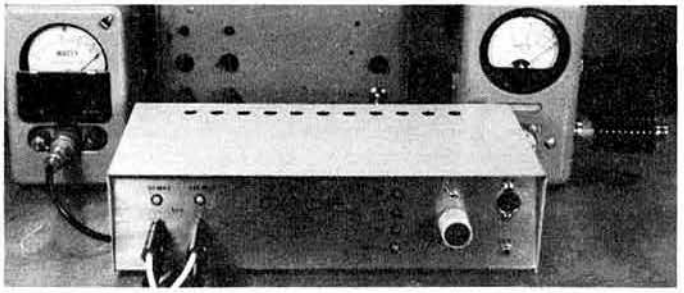
The South Dorset Repeater Group, which is responsible for GB3SD (Weymouth) (RB14) lost its GPV7 colinear antennas in a southwesterly gale last November. More specifically, one GPV7 plus a dipole and some heliax were written off, so a temporary installation of one GPV7 for transmit and a dipole for reception held the fort until a new antenna system could be erected. This has now been accomplished in the shape of a Jaybeam C8 colinear on transmit and a full-wave dipole on receive, each fed by FHJ4 heliax. The system appears to work better than the old array, since most users have reported better coverage for the repeater. A new transmitter/receiver installed almost a year ago has proved quite reliable after initial problems, except for some drift in the tone-decoder due to the very cold weather, and this caused some users to have difficulty in accessing the machine. Plans are afoot to refurbish the old equipment taken out of service last year so that a stand-by rig is available. Users of GB3SD are much troubled by interference from Syledis, stations being identified using this system in Torquay, Beer Head, Swyre, and Portland, with at least two ships being involved. The company using the system was apparently operating on 432·094MHz, whereas signals from previous users in the area were on 432·50MHz. More recently, signals from this source have seemed to come from east of the Isle of Wight. Write to Edward Harland, G3VPF, QTHR, for further information about this group, enclosing an sae.

The UK FM Group (Western) put its thirteenth amateur radio repeater station, GB3MT, on the air on Tuesday 5 February. It is an rtty/data repeater, operating on RB12 from Winter Hill, near Bolton in Lancashire. Operation is currently on 50 baud Murray code, but Ascii operation, probably at 1,200 baud, will be implemented shortly. If permission can be obtained it is hoped to add a mailbox to allow amateurs to leave messages for one another for collection later. The unit was built and funded by the UKFMG(W), membership of which costs £4 per annum—write to G4NYP, QTHR.

As reported on GB2RS newcasts, GB3ND, the North Devon 432MHz repeater on RB14, became operational on 14 February from Barnstaple.

4-2-70 February 1985 commented on the fact that some antenna tilting might be required at GB3GD to prevent co-channel interference. RSGB news now reports that the power output of GB3GD has been reduced to diminish interference with GB3VT, the Stoke on Trent repeater, hopefully a temporary arrangement while a more acceptable solution can be worked out. The RMG is said to be convinced that the answer lies in tailoring the coverage of GB3GD by antenna modifications. Their ultimate success in this might provide valuable data for other repeater operators who encounter similar co-channel problems.

The "Kennemerland Repeater Group" in Harlem has built and put into service a new repeater, PI2RGK, in the 432MHz band. It is located at Zandvoort and looks out over the North Sea from a tower 55m high. Output power is 20W erp from an omni-directional antenna. Callsign is transmitted every 2 min on 433·225MHz, the input frequency being 434·825MHz. Thanks to PA0QHN for this information.



The hardware at beacon OX3VHF, which operates from IQ06PS (see *4-2-70* March 1985)

From here and there

If you plan to take a vacation in Denmark this year, note that the Annual Nordic VHF-UHF-SHF Meeting is scheduled for 14, 15 and 16 June at Freeslev, Denmark. Write to OZ7IS, Ivan Stauning, Bartholinstraede 20, DK-2360 Taasstrup, for further details.

GM6WIX says he heard RU3EWT on ms ssb on 3 January on the random channel. The signal was S8 for about 8s, so he is fairly sure of the callsign. He asks is anyone knows the location of this station.

The 11th Eastern VHF/UHF Conference (USA) will be held at Rivier College, Nashua, NH on 17, 18 and 19 May. Details from Bob Reif, W1XP, 20 Flavell Road, Groton, Mass 01450.

G4XBF, G8MIK and G6CMK are contemplating an attempt to work through every repeater in the UK in the shortest possible time, involving much travel of course. I wish them luck in trying to access certain repeaters not 100 miles from my QTH!

Bob McHenry, G3NSM QTHR, is the UK distributor of the true vhf addict's journal *Dubus* which comes out four times a year. He has a few subscriptions open for the 1985 issues at £6.50, so those wishing to sign up for this journal should drop him a line as soon as possible.

Bill Pasternak, WA6ITF, writing from Saugus, California, says he is a regular reader of *4-2-70*, and is also network director of Westlink Radio Network Inc. This organization, staffed by volunteers who are mainly professionals in radio or tv production, publishes a weekly vhf-uhf newsletter which is also fed into Oscar 10 over Europe by WA2LQQ. Some 250,000 amateurs are estimated to hear the newscast every week. Bill says he is amazed at how far the UK and Europe are ahead of the USA in vhf/uhf matters generally. He says he knows we have our problems, but they are as nothing compared with "the 2 metre mayhem" which one finds in any US major city.

Having lived for some years in the USA myself, I fully appreciate what he means, but to the dedicated vhfer (as our American cousins would call us), what is even more sad is the great lack of vhf/uhf weak-signal work in the USA compared with Europe, save only for a relative few who achieve great things "off the moon" and through similar pursuits. Bob Atkins, KA1GT, who writes the microwave column *New Frontier* for *QST* is himself a "limey", with UK call G8EKB. Anyway, we know that the USA has many dedicated operators on 50MHz, which is perhaps the only vhf band which might support transatlantic contacts in the foreseeable future, but it seems a pity that the great land mass of the USA, with its stable weather patterns and excellent sporadic-E paths, does not boast a greater vhf contingent, such as we enjoy throughout Europe.

Pete Weller, GM3XOQ (Shetland), hopes to be active again by mid-April after the winter recess—their winters make it difficult to keep up even a simple antenna—using a 13-element Tonna on 144MHz. He says other Shetland stations should start to appear around the same time. Going back to 1982, Pete says that he has now received a QSL card from OH0NC/OJ0 for a contact with him on Market Reef (a separate country in the listings) made via aurora at 1704gmt using 144MHz cw on 11 August 1982. He thinks this is an all-time first on the band for a GM-OJ0 contact. The path, using the old squares notation, was from ZT04j to JU56c.

Consternation in Kent when the Fire Service came up on fm around 146MHz, deviation taking the signal well into the satellite band, and saying that this was the frequency allocated to them. G6JHR (Northfleet) told one of the officials in the service that this was a satellite band frequency likely to be irradiated with rather more erp than the Fire Service mobiles could generate. At the time of going to press, the matter was being investigated by RSGB headquarters.

Stop press. The G4AFF expedition to Foula (*4-2-70* February) will now operate as follows: 10–15 April, YU square; 17–18 April, ZU square; 19–20 April, ZT square; ms overnight 2000–1000gmt, rest of day on 144·095MHz (cw) or 144·190MHz (ssb). □

Computing

*by John Morris, GM4ANB**

Duplicate checking

Writing a duplicate checking program looks dead easy. Just set up a big string array, INPUT a callsign, search the array for a match, report it if one is found or add the callsign to the list if not. In practice this approach is not workable because of the time it takes to search the array when the number of entries gets large.

As an experiment I wrote a simple duplicate checker for the ZX Spectrum and did some timings. With 500 callsigns it took over 6s to search the table for each entry. In a simple table the search time goes up in proportion to the number of entries, so to check 750 callsigns could take 1h, over and above the typing time.

The alternative is to move away from a simple array to a more complex data structure. Fortunately, storing long lists and retrieving items from them quickly is of great interest to the business world, so there are plenty of techniques already in existence.

One method is to use several lists, choosing the one to add a callsign to according to the callsign itself. For example, the normal manual check-log method, based on the last letter of the callsign, can easily be adapted to computer use. Instead of a single big array, use 26 smaller ones. As each callsign is entered extract the last letter and select the array to be searched accordingly. This method produces quite a fast duplicate checker, but does mean messing around with the callsign to get rid of any suffixes.

After trying a few different algorithms, the one I like best is called hashing. Hashing is a widely-used technique on large computers. The way it works sounds a bit weird at first, but it is very effective.

The idea is that a single array is used, but instead of callsigns being added one after the other—gradually filling up the array—they are instead scattered through the array in an apparently random manner. Each callsign is used as the input to the hash function. This is a carefully-crafted function (every application will have a different hash function) which produces a table position based on the callsign. The cunning thing is that there is no obvious relationship between the callsign given as input to the hash function and the corresponding table position it produces as output. With an ideal hash function the output should seem, to all but the most detailed analysis, to be completely random. It should not actually *be* random, just *seem* like it.

The characteristics of an ideal hash function are as follows: It must take a wide range of inputs (there are many possible callsigns) and produce one of a small set of values (the table size is limited); there must be no obvious relationship between the input and the output; similar inputs should give completely different outputs; outputs should be scattered evenly through the range of possible values; and it must be reproducible. For example, with a table size of 1,000 then inputting GM4ANB might produce 426. Entering something similar, such as GM4ANC, should give a completely different result, maybe 811.

Having defined how the hash function should perform, how do we go about writing one on? It has already been said that hash functions should look random, and most dialects of Basic come with a random number function. Better still, it is usually possible to "seed" the random number generator from a known start point, so that its sequence is reproducible. Here we have all the makings of an ideal hash function.

The program below may make all of this a bit clearer. It is a simple but effective duplicate checker for the ZX Spectrum, and uses the RND function to generate hash values.

```
 10 LET as=2500: DIM c$(as,6): DIM n(as): LET cn=1
 20 INPUT "Call for QSO no ";(cn);"? ";t$
 30 LET t$=(t$+"      ")( TO 6): PRINT t$;: LET h=0
 40 FOR j=1 TO 6: LET h=h+j*CODE t$(j): NEXT j
 50 RANDOMIZE h: LET h=0*(RND+RND)+1+INT (as*RND)
 60 IF n(h)=0 THEN GO TO 90
 70 IF c$(h)()t$ THEN GO TO 80
 75 PRINT " dup of QSO ";n(h): BEEP 0.3,40: GO TO 20
 80 LET h=h+1 OR h)=as: GO TO 60
 90 PRINT " wanted";: INPUT (cn);"/";(t$);" ok? ";y$
100 IF LEN y$(1 THEN GO TO 120
110 IF y$(1)="n" THEN PRINT " missed it": GO TO 20
120 PRINT " QSO ";cn: LET n(h)=cn: LET c$(h)=t$
130 LET cn=cn+1: GO TO 20
```

At the start of the program two large arrays are set up. Callsigns will be held in the string array c$, which has 2,500 entries, each six characters long. (In Spectrum Basic the elements of string arrays are fixed length, as given by the last dimension of the DIM statement.) Contact numbers will be held in array n. The contact number is cn, which starts off as one.

Line 20 gets the next callsign. Line 30 adds spaces then chops the string to six characters, catering to the fixed length Spectrum string array elements. (This could remove all or part of any callsign suffix, which is not normally a problem. If it is, extend the string lengths to eight or nine.)

The hash function occupies lines 40 and 50. First an input value is generated by scanning the callsign, taking the character codes and combining them to give a seed value, h. By itself h is not a bad hash value, as it can be anywhere between 200 and 2,000 or so. Unfortunately the values tend to be clustered around the middle of the range, so the spread is improved using h as the seed for the random number generator (RANDOMIZE h). In other Basics this operation takes different forms. "RND(−h)" is common.

It happens that after seeding the random number generator of the Spectrum the first "random" value generated afterwards is related quite simply to the seed. This is no use, so "0*(RND+RND)" is used to invoke the generator twice and discard the results. The third use of RND produces a lovely hash value. The Spectrum RND gives a value in the range zero to one, so multiplying by the table size and adding one gives a valid table index.

Now we can look at the table entry. If n(h) is zero then all is well, the callsign is not a duplicate. If n(h) contains a contact number then we must examine the callsign, because it is possible for different callsigns to have the same hash value. This is done by line 70. If they match, a duplicate has been found, and line 75 takes appropriate action. Otherwise line 80 moves h on to the next table entry, making sure that it does not go beyond the end of the table, and the check is repeated. The sequence "h+1 OR h>=as" is a bit of Spectrumese which produces h+1 if h is less than as, or one otherwise.

The little loop of lines 60 to 80 is repeated until either a match or an empty entry is found. In the latter case the contact is not a duplicate, and line 90 PRINTS a "wanted" message. Note that the way callsigns are scattered by the hashing operation means that usually only a very few entries will have to be examined before an empty one is found. This is what gives hashing its speed. If the operator says that the contact has been completed, lines 120 and 130 insert the callsign and contact number into the tables and increment the contact number ready for the next one.

The performance of this program exceeded my expectations. Even with 1,500 callsigns in the table the search time was well under 0·5s. As the number of entries grows, the speed of a hashed table gradually falls to that of a linear one. A rule of thumb is to aim to keep it less than two-thirds full.

There are all sorts of things that can be done to improve this program. One is to do a bit of dissection on the callsign, eliminating any suffixes. The user interface is very primitive, and can be greatly improved.

The Spectrum was deliberately chosen to illustrate this principle because of the way it stores strings. The program can be converted to Basics that use variable length string elements, such as Microsoft, but other problems start to raise their ugly heads. In particular, the use of variable-length strings means dynamic memory allocation, which is slow, and a little beastie called a garbage collector, which can make the computer hang for many seconds once there are lots of callsigns sitting around. How to get round this problem will be a topic for next time.

Oddbits

BARTG has inaugurated a new net for anyone interested in any aspect of data communications, including rtty, Amtor and packet radio. It is called "Datanet", and meets at 1000gmt on Sundays on a nominal frequency of 3·660MHz. Whenever possible, BARTG committee members will participate.

AX25 Amateur Packet-Radio Link-Layer protocol, Version 2·0, October 1984 has been published in the USA by the ARRL. Copies are available from RSGB Ltd at £4 incl p&p.

On the subject of packet radio, G3ZPF wonders if anyone has thought of using it with sstv? High-definition pictures of many seconds duration could be transferred error free and stored and retrieved as "digital slides" from tape or disc.

Several readers noticed that the simple example main program given with the grey line calulator in February's *Computing* can produce bearings of less than zero or greater than 360°. The easiest way to get rid of these is to define a function as follows:

DEF FNA(X)=360*(x/360-INT(X/360))

Then instead of AR-90 and so on the PRINT statements use FNA(AR-90) etc.

*6A Morlich Grove, Dalgety Bay, Near Dunfermline, Fife KY11 5UX.

David Reynolds, G3ZPF, has been experimenting with a more comprehensive grey line program that calculates not only the directions and times of sunrise and sunset, but also the width of the twilight zone. He gives two references which may be of interest: *NAD Technical Note 46*, by Dr Yallop of the Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex BN27 1RP; and *Astronomy* magazine April 1984, for an article and program by William Bell. □

SWL News

*by Bob Treacher, BRS 32525**

THE FINAL LISTINGS for the 1984 HF Countries Table appear this month. Congratulations to Robert Small, BRS8841, who came top again. His score was quite close to my guess in March 1984 that the winning score would be around 850. The 1984 average of 456 was well down on the 612 average of 1983, and poor propagation on 14, 21 and 28MHz largely accounted for this, but a number of entrants failed to update their scores. This year will not be any better, but my winning score prediction is again 850. Best band in 1985?—look for scores on 1·8MHz to be higher than ever before. Good luck to all entrants this year. The first table will appear next month. Remember that there is no starting score this year.

HF COUNTRIES TABLE
1984 FINAL SCORES

Station	DXCC	28	21	14	7	3·5	1·8	Total
			G-listings					
BRS8841	247	96	200	224	164	151	48	883
BRS48909	232	95	162	200	166	140	59	822
BRS52543	230	106	165	200	154	143	54	822
BRS25429	223	111	152	186	139	137	62	787
BRS44395	189	98	164	154	114	70	52	652
BRS31879	187	106	124	148	113	99	45	635
BRS10906	215	73	141	189	101	98	11	613
BRS1066	180	69	141	141	95	59	63	568
RS44984	131	44	67	98	57	50	0	316
BRS18529	132	1	59	56	71	89	16	292
BRS40705	120	47	51	77	56	48	21	279
BRS50134	149	4	8	13	106	103	36	270
BRS20249	110	21	63	66	33	60	7	250
ARS53844	—	0	0	0	88	96	30	214
BRS40292	—	27	70	51	33	30	2	213
BRS44083	131	28	60	84	20	17	3	212
RS49875	94	31	50	42	28	20	3	174
BRS85124	84	10	26	45	29	47	10	167
G average for 1984	166	54	95	110	87	81	29	456
			DX-listings					
ORS45992	239	125	151	214	113	83	5	691
ORS53635	106	0	32	74	27	46	2	181

All time countries list
(Entry score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	279	313	335	256	231	93	1,507	ssb
BRS32525	267	305	318	260	257	83	1,490	ssb
BRS8841	255	292	316	226	208	58	1,355	ssb/cw
BRS48909	216	253	291	198	165	63	1,166	ssb
BRS52543	193	237	247	187	177	63	1,104	ssb
BRS1066	193	210	268	167	111	78	1,037	ssb/cw
BRS50134	177	212	231	176	161	73	1,030	ssb/cw
BRS18529	155	210	263	177	139	50	994	ssb
ORS45992/7Q7	212	250	266	136	113	12	989	ssb
BRS44395	168	221	236	143	82	64	914	cw
FE8957	203	197	232	75	98	33	838	ssb
ARS53844	127	180	165	128	116	45	761	ssb
ARS85951	122	181	234	119	103	0	759	ssb
Average	197	235	262	173	151	55	1,073	

More on QSLs

G3SB puts forward a further view on what constitutes a useful report. With the present state of the sunspot cycle, any station might call CQ on an empty 28MHz band and be surprised to receive several replies. Clearly, the band is open even when no-one else is calling or responding to CQs, but more often a station puts out a CQ call lasting 10min and obtains no response. If an swl hears someone calling CQ and obtaining no answer, it would be helpful to have a report. G3SB suggests that it could be quite brief; eg "1200-1210gmt, your CQ call RST569. No reply heard. Only other station on the band at same time I2XXX, RST539".

The 18 and 24MHz bands pose not only the above question, but because there are so few stations using the bands, there is also the question: is the rig/antenna working? G3SB would certainly value a report on his unanswered CQ calls on those bands, and feels sure that others would appreciate one too. Some interesting thoughts, which I hope are heeded.

G6VS reports another "worst QSL". This one from YU4RS-1616. The report to G6VS was on his signals working a UA3 who had given a 599 report. However, the QSL gave no callsign of the station worked, and although the card was sent direct, enclosed no irc for a reply. Two points to note here: first, always include the callsign of at least one station being worked in your report: second, if sending your report direct, always enclose an irc. If you don't, it is unlikely that you will receive a card in return.

GW8TBG has sent a report from BRS32388 which he felt should qualify for the *best* QSL. This is not the first time I have seen BRS32388's work, nor is it the first time it has been commented on, but it is always pleasing when items praising the swl come to light.

Communication

Douglas Johnstone, BRS54163, reported some interesting dx, including A99A—special event station operating from the Middle East communications exhibition. He has also obtained QSL cards from GB2MRI and FV6PAX, while his latest constructional project is a "demi-quad" for 14-28MHz.

Stan Porter, ORS45992, who has been rather inactive since moving his QTH, has purchased a Sony 2002/7600D which is very portable and provides good service. Stan's 14AVQ has still not been re-erected; there are many large trees surrounding his new QTH, and it is not a simple job to find a site for the vertical. At the time he wrote, lower frequency conditions were very poor and this persuaded him and John Lord, 7Q7-002, not to take up my LF Challenge.

David Whitaker, BRS25429, reflected on a recent visit to the QTH of G3ZBA when conditions were quite poor. K3WGR/VP2M was heard on 7MHz with the 402BA aimed at JA. However, rotating the beam to the Caribbean the VP2M became inaudible! Lower frequency conditions, according to David, have been very poor. Turning to QSL matters, he reported 144MHz verifications from F6GRA/P (YG10e), SK6HD (GS68j) and CT1WW (WB63b).

DX report

The expedition to 3C1 was the high-spot of January's dx loggings. Good signals were copied from 3C1BC on 21 and 14, and on 3·8MHz where on ssb they were transmitting below 3·6MHz. There was no 7MHz operation.

The 1·8MHz band once again seemed to take the honours, with much dx available on both ssb and cw up to the end of February. At the beginning of the month, with sunrise between 0715 and 0740, dx from the Caribbean was on offer nearly every day until half-an-hour after sunrise. Later in the month, with sunrise at 0700, dx was copied at my QTH until 0715, while an opening was also occurring at around 0130. Away from the Caribbean, VS6DO, 3C1BC, 3B9CD and 5Z4ED were the pick of the dx logged after 2200 on cw. Some of the Caribbean and South American dx reported in February included, on ssb, HC1BI, HH7PV, HK0HEU, J73EH, J87UEE, KV4FZ, PJ7A, PT7BZ, VP9IJ, WB0MIV/V4 and YV4TI. On cw were FG5AM, K4LTA/J7, LU2FFA, VP2EAG and VP5GEX.

The higher frequency bands have been quite poor, but conditions on 3·5 and 7MHz improved to the point where some interesting long-haul dx livened up an unusually mundane season. The 7MHz band produced H44IA, TI9J, YI1BGD, YJ8RG, ZK1RE and ZK2IK. While 3·5MHz came up with TZ2XN, T2ADE, TI9J, FT8XB, 3C1BC, 9M2RT and VK0GC.

Brad Bradbury, BRS1066, mentioned LU5DJO, DL2GG/YV5 and ZS5BH on 18MHz.

This month's dx section was compiled with the help of contibutions from BRSs 25429, 8841, 48909, 84664, 52543 and your scribe.

Newcomers

Marjorie Pullen, BRS41471, is particularly interested in the history of the swl movement, and is involved in a project to find out about the first listening member of the Society. Apart from this, she has an FRG7000 and hopes to obtain equipment for 144MHz in readiness for the summer dx season.

Welcome to an overseas newcomer, J Burrows, ORS87099, who resides in Belgium.

Bev West, BRS86845, and Malcolm Priddy, BRS87105, wrote from Pontypool, South Wales. Each use an FRG7 receiver with different lengths of wire. They are active on all bands and prefer 14MHz during the day and

*79 Granby Road, Eltham, London SE9 1EH.

7 and 3·5MHz when there is dx on offer. Bev has purchased a ZX Spectrum and hopes to use it in conjunction with cw and rtty reception.

Here and there

Robert Small, BRS8841, reported QSL returns from 1S1CK, A61AA, BV0JA, DX1A, D68WB, TU73 and 5T23RY.

Philip Lancaster, BRS85124, sends his grateful thanks to the kind reader who sent him the instruction manual for his cw/rtty reader.

Henry Driffield, BRS35408, has provided an interesting insight into his operating habits, being particularly active on 3·5 and 1·8MHz.

Brad Bradbury, BRS1066, has had QSLs from A24PF, 1A0KM and VQ9AC.

Mick Toms, BRS31976, has been considering replacing the 70MHz converter in his FR101DD with a 50MHz or 432MHz converter in time for the summer.

Martin Parry, BRS52543, received a very acceptable Christmas present —a Drake 2C, and he has constructed a preamp for 432MHz, using a 3SK97, from a design published in *Radio Communication*.

Finale

News, views, reports and band scores for inclusion in the June issue should reach your scribe by 13 April. □

Microwaves

*by Mike Dixon, G3PFR**

The 1985 Cumulatives

Taking into consideration several comments received from participants in the 1984 Cumulatives, the format of the 1985 events will be as follows: six events running from 0900 to 2000gmt on 21 April, 12 May, 16 June (coincides with the DARC shf event), 14 July, 11 August and 15 September.

In order to encourage 24GHz activity, the April, May, July and September, 10GHz Cumulatives will be combined with the option of operation on 24GHz. The June Cumulative will be combined with 3·4GHz and the August Cumulative with 5·7GHz.

From another publication

Dubus 4/84 contains the following microwave articles: a 10GHz GaAsfet preamplifier of simple construction (SMA input/output), a 1·3GHz valve pa giving 100W output for 6·5W input or 86W for 2·3W, and a wide-band (dc to 13GHz) power meter based on a rather expensive professional thermistor mount. Subscriptions are now due for the 1985 series and will be at a rate of £6.50, including postage. These should be sent to Bob McHenry (cheques made payable to R. McHenry), G3NSM, 26 Charlbury Road, Oxford OX2 6UU. Bob indicates that there will be "spare" subscriptions available for new readers but that, as usual, back-numbers are not available.

Component service

Steve, G4KNZ, QTHR, has indicated that in addition to the component list given in *Microwaves* December 1984, he now has available the following components: BXY28 varactors, £24; 0·08in by 0·05in chip capacitors 4·7pF, 10pF and 22pF at 8p each; 100pF and 1,000pF chips are still available at 6p each, as are the trapezoidal capacitors for the driver board. He indicates that he is temporarily out of stock of the 10GHz mixers, but hopes they will be back in stock by the time this appears. The WG22 and flanges are still available, but Steve reports low sales of these items and wonders why, with the "freeing" of the bottom 50MHz of the band, more constructors are not building for "24"?

From here and there

My apologies to the "real" beacon keeper of GB3SWH (who is Dave, G3WCB, QTHR): Les, G3BNL, is a keen monitor and helper with the beacon, but is not its official keeper. My thanks to Peter Marcham, G3YXZ, for this correction. Peter points out that the beacon was constructed and is maintained by members of the SW Herts UHF Group, together with the 432MHz repeater, GB3HR. Remember, please, that repeaters and beacons are built, sited, operated and maintained for the use of **all** amateurs, with no financial support other than that afforded by the group or individuals concerned: thus, donations towards such projects will be gratefully received, in this case by Brian, G3THQ, QTHR.

News has been received of two new French 1·3GHz beacons, details of which are as follows:

Call	Freq (MHz)	Locator	ERP (W)	Antenna	Mode
FZ4UHY	1,296·886	JN06BX	15	Alford, cardioid, (min 270°)	F1A, +400Hz shift
FX4UHZ	1,296·823	JN06WD	100	Alford, omni	F1A, +500Hz shift

Fundamentals (7)

Some time ago I acquired a 10·6GHz circulator, and have recently carried out a few simple experiments with Gunn locking, along the lines mentioned in *Dubus* 3/84 (*Microwaves* January 1985). The results lead me to the conclusion that this is a simple technique worth further investigation. While the more elaborate techniques outlined by G3BNL in both the *Microwave* Newsletter and at round tables are technically very commendable, these simpler techniques can be of use to the comparative beginner.

Fig 1 is a schematic of the system. My circulator, without retuning, offers a port-to-port loss of a fraction of a decibel and a reverse isolation between ports of around 20dB. The "in-line" mixer-oscillator is attached to one port and a low-Q oscillator (ie, one with an "open" end, such as the Plessey CL 8630 or a home-made version) attached to the adjacent "forward" port. The third port is the antenna port. As configured, incoming receive signal is transferred from the antenna to the mixer with little loss, but the local oscillator output (also the transmit output) is transferred to the second Gunn rather than to the antenna port.

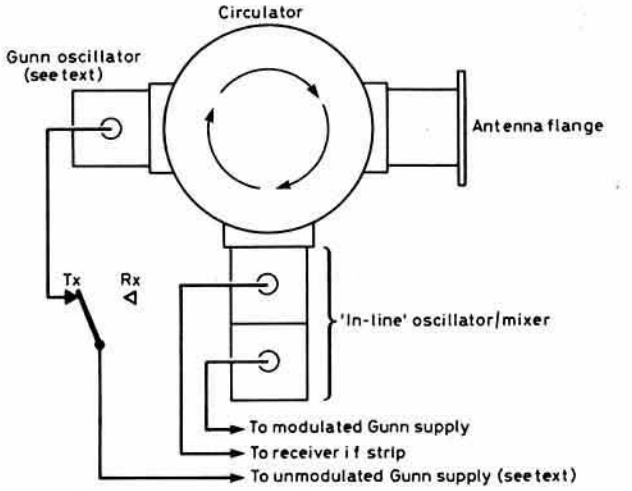


Fig 1. Schematic diagram for simple Gunn-locking experiments

The outcome of this is that the second Gunn will, over a certain frequency range, lock onto the "in-line" oscillator's frequency. The power output transferred to the antenna port approximates to the sum of the outputs of the two oscillators. It would appear from my simple experiments that about 10dB (maybe more) "gain" is available from the system; ie, about 1mW output from the in-line will successfully lock a 10mW Gunn. Some of the attractive features of such a system are, first, only the "master" oscillator needs fm modulation; second, as a consequence the "slave" oscillator supply can be a simple Zener-regulated supply; third, transmit/receive switching consists of switching the "slave" on and off (inevitably some of the extra output may find its way into the mixer and tend to overdrive it); fourth, tuning the "master" over a range of typically 20MHz will cause the "slave" to follow—within the locking range, the slave thus does not need to be tuned mechanically.

I would be very interested to hear of other peoples' experiences with this technique: a source of circulators (at amateur prices!) would also be of interest. It would appear that here is a simple technique well worthy of exploration, enabling the potential of the in-line receiver to be combined with enhanced transmit output for a minimum of complication. The technique might also be useful as a beacon transmitter, the in-line device being replaced with a crystal controlled source yielding only 1 to 2mW output for locking. □

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL

The Month on The Air

*by John Allaway, G3FKM**

AN INTERESTING SUGGESTION from John Morris, GM4ANB, prime mover in the introduction of the Maidenhead locator system—which is probably associated in most people's minds with vhf activities—is that locator "fields" are quite collectable items on hf, as there are only 324 of them for the whole world. Two SMs have been checking, and SM3CWE has 218 fields and SM7WT 185. A good idea for a new award with no political "country" decisions to be made? Full details of locator fields were given in *Rad Com* October 1984, p862.

Apologies from G4XRJ, QSL manager for the recent VP2MW expedition. Jean says that a few problems have been experienced with the QSLs but that everybody will receive a confirmation as soon as possible.

Break-In, the journal of the NZART, has announced that amateurs in New Zealand now have use of 18,068-18,168kHz on a basis of non-interference. It is not likely that the 24MHz band will be released yet.

G3DQL, QTHR, is planning a visit to The Gambia this summer and would like to hear from anyone who has made a similar trip who might be able to advise on lightweight antennas etc.

Still confusion over 5A1TK! The picture in March *MOTA* was not of G4FPM—it was of K1HDO—and in fact the real ex-5A1TK is David Keeler, G3KXI. Apologies to all concerned.

G4VUB, communications manager of G8FC, is looking for the present whereabouts of the former VS9ART, VS9APW and VS9AD. John has also been CT1BOL and DA2LW and has had each call pirated. He wonders if this is a record!

Overseas news

Dave, KX6DS, has written to say that the first year of operation from KX6DS is now history. In that time he made 30,000 QSOs: 70 per cent on cw and 30 per cent ssb. Percentage by band was 3·5MHz, 5; 7MHz, 29; 14MHz, 25; 21MHz, 35; and 28MHz, 6. Forty-three per cent of QSOs were with JA, 32 per cent with N America, 14 per cent with Europe, two per cent with S America, less than 0·1 per cent with Africa, and the rest nine per cent. He is very grateful to QSL managers N4NO and N4CWL at the N Alabama DX Club, and asks that no QSLs are sent to any other address than the one given in "QTH Corner". 1985 is not expected to be as good a year, but 1·8MHz is now available in KX6 and Dave will concentrate on the lf bands using 1,831, 3,502, and 7,005kHz.

Ham Robinson, W4ZR, in a circular letter sent to GM3CIX, points out that he has absolutely no connection with N4BP/C6A and cannot help with QSLs.

Hal Perkins, G3NMH, (r) was entertained by Mr Sayer A Al-Mawdan, 9K2SA, during a recent visit to Kuwait

Ampil, site of most XU1SS activity, is now over-run. One of the most active operators was Keo Kimson, who speaks good English

Graham Mott, G4KLP, visited Jordan last October and would like to record his gratitude to the local amateurs in the Royal Jordanian ARS (including JY9CL, who is G3MUL). He was given the callsign JY8KL and operated from the club station, and from the JY9CL QTH in the evenings with both ssb and cw. About 40 countries were worked in four days in spite of the QRM from eastern Europe.

G4RCG will be VK4FFB during May and June and working on all bands from the home of VK4BRC and VK4VMB. John is awards manager for the N Wakefield Award (see January *MOTA*) and while in VK will be worth 25 points. G3SPX will be 9H3EJ at the same time and will also be worth the same score. If both are worked, the award will be issued by sending log details of the two QSOs.

G4YIM is operating from Georgetown, Grand Cayman, for the next year or more as ZF1JC. Listen for him near 21,360kHz from 2100 on Fridays or near 14,155kHz from 1200 on Sundays. Jamie says that there are only 12 active amateurs on the island at the moment.

DX news

VK9XJ (ex-VK6KRD) is living on Christmas Is and has been heard on 14,145kHz around 1300. He is also active on 10 and 21MHz and may also be on 3·5 and 7MHz by now. Another Chinese station on the air is BY5RF, located at the Association of Science & Technology in Fuzhou. It came on the air on 4 January at 0900 from Fujian, when an opening ceremony attended by JA1UT and JK1KHT took place. It has Oscar capabilities. BY4AA has been reported on 7,084 at 1430, and on 3,794kHz from 1620; neither time being favourable for QSOs with Europe.

Tim Chen, BV2A/B, reports that he now has another call, BV2C, and it seems that this may be a club station, as many of the recently-qualified amateurs will be operating it.

"EP2KKM" recently worked is a pirate, according to EP2FM who is reporting this on behalf of the ARC of Iran.

YI1BGD now has permission for operation on 18 and 24MHz, and may also have a keyboard for rtty.

FT8XB may often be found just below 14,200kHz in the early evening, and has also been working Europe on 3,795kHz at 2000 on Sundays. It seems that there will not after all be an amateur in the relief crew going to Marion Is, so an early reappearance of ZS2MI is now unlikely. Activity from Mozambique by AB4Y as C90A seems to have been brief—no details were available at the time of writing. SM0DQE/C9 has also been on and is reported to take part in a list operation on Saturdays at 1700 on 14,205kHz. According to *DX-NL* they have "provisional licences with the hope of written permission within a few weeks".

J5WAD, who is otherwise UB5WAD, should remain in Guinea-Bissau

*10 Knightlow Road, Birmingham B17 8QB

until November. He is on almost daily at 1815 near 14,175kHz, except on Mondays and Tuesdays when he prefers 14,240kHz.

TZ2XN has been very active, particularly on lf, and he is hoping to come on 1·8MHz in the near future. D44BC wishes everyone to know that DJ6QT is not his QSL manager, and requests cards to be sent to him direct. QSLs sent out by DJ6QT are said to be not valid for DXCC.

A group of Jamaican and US amateurs are hoping to visit Navassa Is between 4 and 9 April. Callsigns will probably be the operators own/KP1.

KC4USV is reported by the *Long Island DX Bulletin* to be near 14,250kHz from 0600 to 0739 each Saturday. The same source mentions the German expedition to Antarctica which has an amateur station DP0GVN. The two operators are DJ6TN and DG5SL and they are using all the hf bands (plus the new "WARC" bands) as well as Oscar; 14,015kHz at 2200 and 7,015kHz at the same time seem to be favoured.

An expedition to Shetland will take place during the period 9 to 20 April by G4AFF. The period 9 to 11 will be from Yell and Unst, 13 to 18 from Foula, and then from mainland Shetland. Stewart will use the WAB net frequencies of 3,760 and 7,060kHz. Schedules may be arranged by telephoning 0305 775456.

NCDXF beacon system

G3DME advises that in late January the beacons for the two vacant slots were being tested ready for shipping when the respective radio societies were ready to receive them. They will be LU4AA and HK3LR/B and they will be in the 0008 and 0009 time slots following ZS6DN/B. 4U1UN/B will follow immediately after the "SK" from HK3LR/B. This will then complete the 10min cycle. Either station may be on the air by now. Reports are still being sought of the reception of the beacon system signals, and copies of report forms are available from G3FKM (sae please).

A system on 21MHz is now under consideration, and this may be organized along similar lines. More news of this when available.

Radio Amateur Prefix-Country-Zone List

Published by Geoff Watts, 62 Belmore Road, Norwich NR7 0PU, this is a 15-page list of normal and special prefixes for each country, plus details of continent, ITU block allocation, DXCC status, and ITU and CQ zones. It also gives full information on Antarctic stations and obsolete prefixes used in the past 10 years. All is arranged in alphabetical order, with space allowed for additions, and the whole publication is a most useful operating aid. It costs £1 (UK) or US $2 or six ircs overseas by air-mail.

Welcome . . .

. . . to the following from outside the UK who joined the Society during January: DH9MAG, F3LP, LA1YC, SP5NE, VE5BQ, VP9LE, WB6BPA, ZS1AAQ and 9K2MQ, and C Pedersen (OZ), J De Renzi (HZ), D Binding (VE7), F Slim (W4), and Thiam Chee Ming (9M2).

Datanet

BARTG has announced the inauguration of a Sunday ssb net on a nominal frequency of 3,660kHz at 1000. This is intended to be an informal meeting for anyone interested in any aspect of data communications—rtty, Amtor, and packet radio. BARTG committee members will participate where possible and will be able to advise on BARTG matters. Anyone is invited to join in, and listener reports are also welcome—please send these to BARTG chairman Stuart Dodson, G3PPD, 63 Malvern Avenue, South Harrow, Middlesex HA2 9EU. BARTG also transmits news bulletins on Sundays on 3·5, 14 and 144MHz, and information on these and other services provided is contained in *BARTG in the Eighties* and *BARTG and Data Communication*—both free from John Beedie, GW6MOK, PO Box 3, Llandeilo, Dyfed, tel 0558 822286.

Awards

Islands on the Air Awards

The details given in February issue of the charges for the *IOTA Directory* did not take account of a price rise which took place on 1 January. Please note that the 15-page directory now costs £1, US $2, or six ircs.

Diplom Slovensko

Available to licensed amateurs for QSOs with okreses (counties) of the Slovak Republic (OK3). There are 38 of these, and on hf the award requires European applicants (other than from HA, OE, SP and UB) to work 20 counties, and others 10. It is issued for hf, vhf or Oscar operation regardless of modes used. The award measures 450 by 330mm, and applicants should send a list of QSLs (certified by an award manager or two licensed amateurs) and five ircs to: Award Manager, Jaromir Slezak, OK3CAU, 925 09 Kosuty 27, Slovak Socialist Republic, Czechoslovakia. Note that the satellite award requires Europeans to have made 10 OK3 QSOs, and others five—regardless of county.

West Kent ARS Award

Available to licensed amateurs and listeners for confirmed QSOs with WKARS members and others within a radius of 20km of Tunbridge Wells. UK applicants need 20 points, others 10. QSOs with present and past club members count three, with G1WKS, G3WKS, GB2WKS or GB0WKS (one only) count five, and with others one point. CW, phone or mixed modes—all hf, vhf or mixed allowed. Mobile QSOs do not count. Send list of QSOs with full data (including QTH if non-club member) plus a 14p postage stamp or one irc. Apply to A Korda, G4FDC, 5 Windmill Court, North Street, Tunbridge Wells, Kent TN2 4SU.

Victory 40 Award

For confirmed QSOs (or listener reports) with (or from) veterans of the second world war and special USSR stations between 1 January and 9 May 1985. During this period Moscow stations will use the ER prefix, other "hero towns" EW, capitals of Union republics EU, of autonomous republics EV, centres of partisan warfare EM, and towns with special distinction EO. Veterans of the war will use their own calls/R. Each QSO is worth one point (for Europeans) and 40 points are required. Send log extracts, verified by national society or two licensed amateurs, to the E T Krenkel CRC of the USSR, PO Box 88, Moscow, USSR, to arrive no later than 1 January 1986. There is no charge.

Contests

First, an amendment to the date of the **Worked All Britain LF Contest** as given in February issue. It seems that this has had to be changed as the Drayton Rally would otherwise clash with it—a problem as the WAB organization holds its agm there! G4EOF advises that the new date will be Sunday 5 May.

CARF Commonwealth Phone Contest

1200 13 April to 1200 14 April

Open to all amateurs who may work stations in the Commonwealth. Single-operator only in single- or multi-band classes. Exchange RS and serial number (from 001). J3E only in the segments 3,600, 3,760, 7,080, 14,130, 21,200 and 28,480kHz—all ±20kHz. QSOs should be with amateurs outside own call area, and each station may be worked once per band. Each QSO counts five points, and a bonus of 20 points is gained for the first, second and third QSOs with each Commonwealth call area on each band. A valid entry must include log sheets, dupe sheets, a check list of Commonwealth call areas worked, and a summary sheet showing claimed QSO and bonus points and final claimed score calculations. Summary and call area check lists are available (please send sae and ircs to the organizers —not G3FKM). Entries must be mailed within one month of the contest to: Mr N Waltho, VE6VW, Box 1890, 9714 94 St, Morinville, Alta, T0G 1P0, Canada.

During a memorable visit to Malta last year, Connie and Mike Baker, G4WUV and G4WUW respectively, were very warmly received by members of MARL, and are shown here with a few of them. L to r: Carmel, 9H1AQ; yl of Mark, 9H1GP, who took the photograph; Tony, 9H1FG; Peter, 9H1GI; Connie, G4WUV; Wayne, a visitor from the USA; Mike, G4WUW; Charles, 9H1I; George, 9H1B; and, in foreground, Carmel's son Johann, swl

QTH CORNER

BY5RF	PO Box 209, Fuzhou, Fujian, PR of China.
D44BC	PO Box 36, Mindelo, Republic of Cape Verde.
DJ6SI/5V etc	B Drobnica, Zedernweg 9, D-5010 Bergheim, FR of Germany.
DP0GVN	via DJ4SO, K D Behrndt, in der Huuk 15, D-2150 Buxtehude, FR Germany.
FO0XX	(Clipperton) via Yasme Foundation, PO Box 2025, Castro Valley, Calif, USA.
IS0LYN	M Lumbau, Via San Nicola 23, 07036 Sennori, Sassari, Sardinia.
JY8KL	W G Mott, G4KLP, 7 Farm Way, Elm Park, Hornchurch, Essex, RM12 5SR.
KX6DS	N Alabama DX Club, PO Box 4563, Huntsville, Ala, 35815-4563, USA.
TA1A	Dr Unal Akbal, c/o Box 787, Istanbul, Turkey.
TZ2XN	via DK3HK, F Barzyk Dammhauserstr, 8, D-2150 Buxterhude, FR Germany.
VK4FFB	J Muzyka, G4RCG, 43 Pippins Green Av, Kirkhamgate, Wakefield, W Yorks WF2 0RX.
VP8BDO	via K Cheetham, G4RWD, Callingwood Hall, Tatenhill, Burton-on-Trent, Staffs DE13 9SH.
XF4MD	via XE1MDX, Mexico DX Club, PO Box 21-167, Mexico DF, 04000, Mexico.
ZC4MR	(from Europe) via G4ZZN, 167 Earlshall Road, Eltham Park, London SE9 1PJ.
ZC4MR	(from outside Europe) G4SDJ, 2 Erriefield Close, Broadstone, Dorset.
ZF1JC	PO Box 1108, Grand Cayman Is.
3C1BC	R. Smith, K4PHE, 549 Southwind Drive, Lilburn, Ga, 30247, USA.
3C1YL	W. Barr, N4NX, 305 Alpine Drive, Roswell, Ga, 30075, USA.

GARTG-SSTV Contest 1985
1200 6 April to 1200 7 April and
1200 5 October to 1200 6 October.
Photocopies of rules from G3FKM—sae please.

GARTG-RTTY Contest 1985
In five sections on 16 February, 14 April, 8 June, 25 August and 12 October. Rules from G3FKM (as above).

Helvetia Contest
1300 27 April—1300 28 April.
CW and phone. 1·8 to 28MHz—following IARU band plans. Entrants work Swiss stations and exchange RS/T plus serial QSO number (from 001). HB stations will also give two letters indicating their canton: AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG or ZH. Each Swiss station may be worked once per band either on cw or phone, and each QSO counts three points. The multiplier is the number of different cantons worked on each band added together. If there is more than one log sheet QSOs should be separated by band, and a multiplier check list (written on the back of the summary sheet) should be submitted. Include name and callsign, address, if single- or multi-operator, number of QSOs, multipliers and points per band and total with final score. A signed declaration that "rules of the contest and licence conditions have been observed, duplicate QSOs have been eliminated, ham spirit and sportsmanship have been respected and decisions of the committee are final" must be enclosed, and the entry posted within 30 days of the contest to: W Schmutz, Gantrischweg 1, CH-3114 Oberwichtrach, Switzerland.

Results of the **1984 CQ WW WPX Sideband Contest** have arrived from W1WY and are as follows:

		SINGLE-OPERATOR			
Callsign	**Band**	**Points**	**Callsign**	**Band**	**Points**
GM4GPN	All	295,331	G3GUP	All	23,364
GM4RFE	All	190,800	**GW4BXG**	**21MHz**	538,798
G4UPS	All	125,255	**G3XWZ**	21MHz	400,862
GJ5AGA	All	86,912	G3NT	21MHz	26,199
GD4GWO	All	80,012	**G3FXB**	**14MHz**	2,339,337
G2AJB	All	53,978			

In the multi-operator, single-transmitter section **GB0WAS** was European 12th with 3,103, 912 points. G8JC scored 1,593,417, GB0WPX 1,014,244, GB2WAA 864,512, and GB4TVI 503,644. **G3FXB**'s 14MHz total was world second.

Results of the **1984 European DX Contest (CW)** have been published. UK scores are as follows: **G3PDL** (399,280 points), G3ESF (97,500), G4BUO (60,672), **GW3JI** (26,467), G3SXW (17,182), G6QQ (11,284), G3TXF (5,883) and G3PSM (2520). In the **multi-operator** category **G4XFB** is listed with 114,138 points.

SP DX Contest
1500 6 April to 2400 7 April
CW only. 1·8 to 28MHz (NB: 1·8MHz now included). Exchange RST and serial QSO number (from 001). Polish stations will RST plus two letters which indicate their province. Each QSO with SP counts three points, and the multiplier is the number of different provinces worked—each counts once only. There are single-operator single- and multi-band, multi-operator multi-band and listener sections. Post logs before 30 April to PZK, SP DX Contest Committee, PO Box 320, 00-950 Warszawa, Poland.

Around the bands

The G8KG report for the period under review reads as follows: "It is now possible to look back at 1984 with a little perspective. Seen in simple terms it was a year of declining solar activity, as was to be expected with a cycle which was eight years old at the middle of the year. The annual sunspot number was 45·5 (annual mean solar flux 101 sfu) representing moderate activity—just below half-way down the "average" cycle. On a closer look, however, it was dominated not by the slow decline but the major short-term swing above and below the average. The mean sunspot number for February to April was 79 (solar flux 131 sfu) and that for September to November only 17 (74 sfu) which represents a very steep fall with a slope more than three times the mean expectation.

"Geomagnetic activity continued high during the year, with an annual mean A-index of 19, not all that much below the peak of around 22 in mid-1982 to mid-1983.

Jack Miller, G4MM, (right) visited Ken Collins, VS6FI, during a recent holiday in Hong Kong

"Steep falls like that in 1984 are usually followed by quite steep recoveries and this was the basis of the cautious forecast made some months ago of a rise in activity in the spring of 1985. The three-month averages have indeed risen slightly since the October trough, but a detailed examination reveals that so far we have seen no more than a levelling off. At the end of February the 27-day average of the solar flux figures had oscillated gently between 72 and 79 sfu for the past 140 days, with daily values only once rising above 90. Regrettably the odds would now seem to favour the continuation of this level of behaviour for perhaps another month or so, and then the resumption of a slow decline towards the minimum."

The result of the above can be seen in the increased lower frequency activity noted in the loggings below, contributed by G2HKU, G3YY, G5ML, G3s GIQ, GVV, KSH, URA, VMW, YRM, GW4BLE, G4s EHQ, NXG/M, OBK, SFU, UOL, UYR, UZN, WAD, XKR and RS 10906.

Stations listed in italics were using A1A.

1·8MHz. 0000 *CT2CB, JW0EQ, OH0BA, UL7MAN, UT5UBW/UM, UO5OB.* 0100 C31OF, *TF3KG.* 0200 *FG5AM.* 0300 *WB0DIV/V4, EU0G* (= UG). 0500 *EA9EU, SV0AA* 0600 EA9EU, HH7PW, *K5NA/KP2, J87UEE,* T77V, *W1-5, 8, 9, W0s HW (Minn.) ZV (Colo), YV1AD, 9Y4VU.* 0700 *W5TZC(Ark), W8AH, W9, ZL3GQ.* 0800 *W0ZV (Colo),* WA0TKJ (*Kans*). 2000 OY6FRA. 2100 *W2ZZ/CT3, HZ1AB.* 2200 *HB0CZS, 4X4NJ, 9M2AX.* 2300 *PY1RO, K1MM/SV5, UH8DC, RT5U/UJ.*

3·5MHz. 0000 D44BS. 0100 A71AD. 0200*KC7UU/5N8.* 0600 *KV4AM, N7CW (Ariz), PY1ZAE.* 0700 CE0DPD, *CT3ET, K4LTA/J7,* KL7U, TI9J, *VP5GEX, UA0BCS,* ZF2DR, ZL, ZL7's OY, PO. 0800 JA2VPO, ZL. 1700 VK0GC, 9M2RT. 1900 *UA0YAN.* 2100 TZ2XN, W1. 2200 CN2AQ, FM5WS, JH6JOR, VK6LK, W1-W4. 2300 NP4A, PP7HS, VP2MDQ, VP5LA, 3C1BC, 5N8AFE, 7X2AX.

7MHz. 0000 *TI4BGA, KA2DIV/V2A, 5T5RY.* 0300 *W2BBK/PJ7, UI8OAA.* 0600 *ZL1-3* (to 0900). 0700 *CO, FM,* H44IR, *LU, PY, YV, Z23JU,* ZK2IK, ZL2AAG, *DJ6SI/5V7,* 6W1CK. 0800 *JA,* VK, *W6-W7,* 3D2NW. 0900 *FM5WD, ZL2UV.* 1500 *UA9CVT, UH8EAA, UL7LWZ.* 1700 *ZL2LI.* 1800 *W1-5, 8-0* (to 0200), 5X5GK. 1900 *5Z4MX.* 2000 *VK3VJ,* ZS3KC, *8Q7BL.* 2100 CN8CX, HH7PV. 2300 *TU2MA, UH8EAA.*

10MHz. 0800 *VK2, 5.* 0900 *DL7AD/EA8, JA1IFP, VK2, 3, 7, W3, 4, 7, 8, ZL2-4.* 1500 *5B4OG.* 1600 *VK9XZ.* 1700 *6W1BL.* 1900 *ZS3E, 5B4DN.* 2000 *W2ZZ/CT3, J73D, VE1, W1, 2.* 2100 *K4LTA/J7, KA2DIV/V2A, WS4I.* 2200 *TI2LK, DK8CX/YV, DJ6SI/5V.*

14MHz. 0700 P29JS. 0800 KC6HA, VK9NI, VS6AW, ZL. 0900 A99A, *JA,* JD1AMA, JT1AO, *OX3UD,* V85GA, VK, *W7,* ZL, 9M2DF. 1000 WA7LQE/DV1, H44IA, ZD7BW, 3C1YL. 1200 C6AAA, J87BV, P29JS, TA1NA. 1300 KB6DAW/KH2, *VK6WT,* VQ9CK. 1400 DU1REX, *VU2BK.* 1500 *JW0EQ,* JY9RL. 1600 HV2VO, VQ9s CK, DG, 5H3AN, F6DKZ/6W3. 1700 KH6WU, *T77C,* W6, *W7RK, ZS,* 3C1BC, YL, 8Q7CG. 1800 SM0DQE/C9, D68WB, K4LTA/J7. 1900 D44BC, FY5BO, VE1CHG/4U. 2000 FT8XB, TI9J, VP2EZ, VP8BDC, ZL4JO. 2200 C53AL, J87GL, TR8DR. 2300 CE, HC, LU, PY, PZ, VP8, XE, 3C1BC.

18MHz. 0900 Europeans. *SM6LQC/MM* (nr. SU), *VU2LO, ZL3BJ, ZSs 5BH, 6DN.* 1100 *EL2FJ.* 1200 *CT1BSN, VU2LO, 3B8FA.* 1300 *J37AE.* 1400 *LU1DOW, DL2GG/YV5, ZS1IM.* 1600 *C6ABA.* 1700 *LU5DJO.*

21MHz. 0900 *J28EI,* VQ9CK, *5H3QM.* 1000 A22MR, VE3FXT/H5, *TA1MX,* UI9BWF, YI1BGD, 7P8BE. 1100 PY1BVY/PY0T, VK9XJ, 7Q7LW, 9K2JF. 1200 OD5IZ, TA1A, *VU2BK, 3C1BC.* 1300 A71BJ, TR8DR, VQ9YR, W1-4, 3C1YL, 5X5GK. 1400 FM5WD, *K4LTA/J7, TR8DM, K8CV/VP2E,* VP8DM, *3D6BU,* 8Q7CG. 1500 F6/W0RLX/FS, TL8CK, V3MU. 1600 A22DG, C53EK, *CP6IB,* K1CK/TU, N8II/VP2E, VP8s BDA, BDO, JR8BUU/5N, 5X5GK. 1700 W6, 3X4EX, 6V1A. 1800 ZD9CC, 5N0HAS. 1900 CX, LU, PY, W1-4, 8, 9, ZS.

24MHz. No reports.

28MHz. 1000 ZC4HA, 5B4BS. 1100 J28EB.

Many thanks to those who sent in information this month, and to the authors of the following for items extracted: the *EX-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3XN), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), and *DX News Sheet* (G4DYO).

All reports for the **May** issue should **reach G3FKM** no later than **25 April** please. □

HF propagation predictions for April 1985

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie 0 = 0000, 2 = 0200, 4 = 0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in BLACK, lower probability in RED and lowest probability in GREEN type.

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow						1	111	1		466	667	74	114	555	456	785	764	322	223	588	†42			25†
Malta						11	112	2		566	677	871	434	755	556	896	987	432	223	689	††4	2		3††
Gibraltar								1		155	556	86	111	576	556	895	876	643	333	689	†††	3		3††
Iceland										13	334	54		155	556	784	633	543	333	567	†††	3		245
ASIA																								
Osaka										244	331	1		132	112	351			1	351				2
Hong Kong						11	11			244	344	42		12	113	572			1	364				3
Bangkok						112	22		1	234	443	42	1		1	673	2		1	366				43
Singapore						123	223	1	1	234	446	74	1		1	684	1		1	366				43
New Delhi						123	222		1	223	446	42	211		1	675	51		1	367	2			45
Teheran						223	334	2	3	433	446	751	533	1	113	687	841		1	368	5			45
Colombo						223	333		1	223	446	351	21		1	587	51		1	368	2			45
Bahrain						234	445	2	1	322	446	752	643	1	113	688	841		1	368	†2			45
Cyprus				1		345	555	51	214	666	667	884	866	433	334	798	974	11	112	478	†4			24†
Aden		1	111			234	566	4	212	322	346	864	864	1	13	688	861		1	368	†3			45
OCEANIA																								
Suva (S)										12	231	42		332	112	52		21		3				
Suva (L)								4	1	531	11	261	12	531	111	531		2		21				
Wellington (S)										133	232	21	1	432	113	54	1	21	1	32				
Wellington (L)									1	31		42	122	531		142	1	31		22				
Sydney (S)						12			1	554	213	42	1	332	113	561		1	1	351				2
Sydney (L)										3		34	1 1	231		63		11		141				
Perth						234	2		1	354	311	11	211	131	112	562	1		1	365				42
Honolulu										11	3	42		122	113	31	1	21						
AFRICA																								
Seychelles		1	111			235	566	51	212	322	446	874	853		113	688	851		1	368	†2			45
Mauritius		1	222	1		245	667	61	3 2	423	346	884	833	1	113	688	851		1	368	†2			45
Nairobi		1	233	2		245	677	71	411	422	246	885	875	2	13	688	883			368	†5			45
Harare		1	344	3		245	678	82	421	533	346	885	885	3	13	688	884			368	††2			35
Capetown		1	355	1		145	778	6	21	653	346	852	761	521	113	588	885	2		368	††3			35
Lagos			355	5		44	678	94	33	553	235	894	883	52	2	588	886	2		368	5†3			35
Ascension Is			124	51		44	467	85	12	64	224	794	783	131	1	488	886	21		268	††3			35
Dakar			123	41		33	567	86	121	264	223	694	775	531	1	378	886	31		158	5†3			25
Las Palmas				2		33	445	75	11	376	666	895	776	654	334	689	997	421	111	368	††4	2		3†
S AMERICA																								
South Shetland			123	1			567	73	1	13	345	774	654	322	112	457	786	31		235	4†3			2
Falkland Is			22	31		1	467	86	111	214	345	674	765	522	112	357	886	31		25	††3			2
Rio de Janeiro			12	31		3	455	76	111	124	322	575	675	432	1	258	886	31		27	††3			5
Buenos Aires			11	21		3	355	76	11	1 5	333	465	775	422	11	147	886	31		15	††3			2
Lima							122	44	1	21	332	245	643	331	11	14	786	31		2	4†3			
Bogota							122	33	1	13	332	235	642	222	1	14	686	31		2	4†3			
N AMERICA																								
Barbados						2	122	44	1	15	322	356	743	222	1	26	886	31		3	††3			
Jamaica							111	23	1	1	332	234	631	112	11	14	585	31		1	2†3			
Bermuda							111	23	1	4	332	355	621	112	11	25	685	31		2	4†3			
New York							1	12	1	2	333	354	51	2	111	124	574	21		2	2†3			
Mexico							11	11	1		233	223	31	1	11	1	254	21			33			
Montreal							1	11	1	2	333	354	51	12	111	124	574	21		2	2†3			
Denver											22	222	21		112	112	244	2			23			
Los Angeles											12	221	1		12	1 1	134	2			3			
Vancouver											1	111	1	1	12	112	123	21			2			
Fairbanks										111	1			221	112	221	12	21		1				

No new sunspot information for this issue has been received from SIDC.

EPHEMERIS
Satellite news and views
*by R. O. Phillips, G4IQQ**

RS satellites

There has been no change to the operational status of the three remaining satellites at the time of writing. The critical element in each case remains the on-board battery, which in the case of RS5 is reported to be almost "ruined"; RS7 fairs slightly better with a mediocre battery; while that of RS8 remains in excellent health. Both RS5 and RS8 will continue to operate in transponder mode, and the Robot on RS7 will alternate with the short bulletin transmissions. I have mentioned before that the satellites are not available on Wednesdays, but it should be noted that this is Moscow time and not gmt. There is usually two or three hours' difference, so don't be too surprised if the satellites are not to be found towards the end of Tuesday evenings.

The usual operating schedule, when the satellites are active, is as follows: RS5 Monday, Friday; RS7 Tuesday, Saturday; RS8 Thursday, Sunday. Assuming all is still well by 30 June, an activity period has been planned for the satellites. Details are likely to be carried on the RS7 bulletin board.

Quite a lot more information has become available concerning the proposed new offerings from the Soviet amateurs, though there remain a number of confusing aspects. It now seems that the two satellites, referred to as RS9 and RS10, will be launched as independent packages and perhaps by different launch vehicles. The orbits are likely to be circular, polar, with altitudes in the range 1,000 to 2,000km, with a preference for the upper end. Rather than being too specific about the capabilities of each satellite, I have listed below the characteristics of equipment which should be flown on one or other mission.

Transponder	Up-link (MHz)	Down-link (MHz)
Mode A	145·96–146	29·46–29·5
Mode K	21·26–21·3	29·46–29·5
Robot	21·14	29·457 or 29·503

There is also a possibility of an additional transponder using a new mode of working, the frequencies for which would be 21·26–21·3MHz for the up-link, and 145·96–146MHz for the down-link, with a beacon at 145·997MHz. As for all previous satellites, the Russian designers have tried to make life easy for us with their choice of frequency plans. Each transponder will use a relatively simple translation frequency so as to ease calculation of up-link and down-link frequencies.

It is expected that the telemetry systems for the new satellites will be similar to those used very successfully on the RS3–8 series, though the parameter equations will of course be slightly different depending on the performance of the individual sensors.

Oscar 10

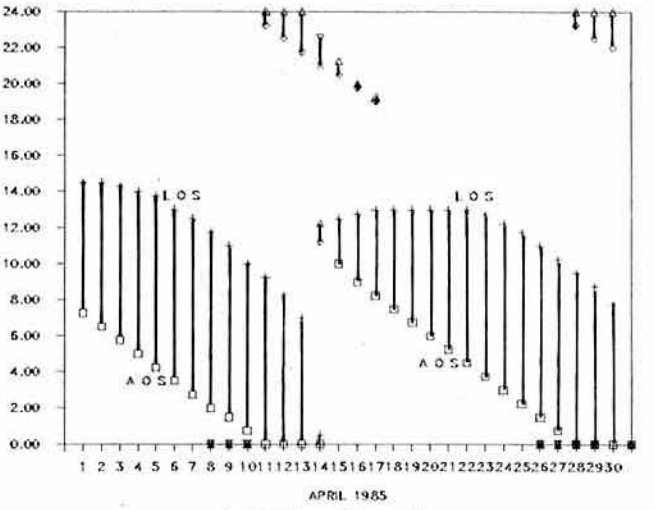
The satellite continues to operate in accordance with the schedule given in *Ephemeris* January 1985, despite periods of eclipse of around half-an-hour. The availability of the satellite during April for a location in the southeast of England is given in Fig 1. The satellite will have a fairly high elevation angle for much of the month, starting at about 36° on the 1st, rising to 51° on the 6/7th and then falling to 13° on the 16th. The value will then continue to rise to 50° again towards the end of the month. These values apply to the maximum elevation occurring during the day, and for some of the secondary periods much lower angles will prevail.

Uosat

There was a slight interruption in the operations of Uosat 1 during February, but all is well again and the schedule given last month still holds true. A few slight changes to the format of the 1200bps bulletin have been made to try to squeeze a little more information into the available space.

Activity through Uosat 2 has been at a very high level, with further tests on the particle wave experiment and the CCD camera. In the case of the camera, it was planned to attempt to obtain images of locations remote from the UK and store them on-board the spacecraft to be down-loaded to the Surrey command station when in range.

Much of the effort at the University of Surrey, and on the other side of the Atlantic, is directed towards evaluating equipment performance and communication protocols for the future Packet communications satellite (Pacsat) systems. A meeting was held in Washington DC on 9/11 March to discuss proposals for such a mission, and also to address the problems of funding the project. Since a lot of the activity on the satellite uses the 435MHz down-link, there may be periods when the 145MHz signals will not be heard. It may well be worth listening for the transmissions on the higher frequency, which are usually very strong. However, it may not be possible to make much sense of the signals, as different bit rates to those normally employed are used.



Availability of Oscar 10

Phase 3C

Further to the news reported last month that a contract has been signed with the European Space Agency for the launch of the Phase 3C satellite, more details of the payload have been released. The information available at the end of February can best be summarized by the following table:

Transponder type	Bandwidth	Comments
1. Mode B	180kHz	As Oscar 10.
2. Mode J/L	50kHz	Up-link switchable between 145MHz or 1,260MHz. Down-link 435MHz
3. Mode L		Packet comms
4. New	25kHz	Single-channel fm up-link either 1,260 or 435MHz, down-link 2,450MHz

As always, details are subject to further consideration, and what is actually carried on the satellite depends on how much effort can be made available over the next 12 months or so.

Other news

The annual general meeting of AMSAT-UK will be held in London House, London WC1, on 20 April starting at 1pm. One of the items for discussion will be to decide what action, if any, should be taken towards the development of a new UK amateur satellite project. □

*170 Shirehall Road, Hawley, Dartford, Kent DA2 7SN

Contest News

Region Round-up CW Contest rules

TRANSMITTING SECTION

1. The general rules for RSGB hf contests published in the supplement to the January 1985 issue of *Radio Communication* will apply.
2. **Eligible entrants.** All paid-up members of the RSGB resident in the British Isles (G, GD, GI, GJ, GM, GU and GW) holding a Class A licence. Single operator entries only.
3. **When.** 0700-1200 Sunday 19 May.
4. **Contacts.** CW only in the 3·5 and 7MHz bands. Entrants are requested to confine their 3·5MHz operation within the IARU Region 1 contest-preferred segment 3,510-3,560kHz. RST and serial number (starting from 001) must be exchanged, followed by R and the number indicating the operator's RSGB region—eg 579001 R03.
5. **Sections.** (a) Up to 150W input, (b) QRP—up to 10W input.
6. **Scoring.** Three points for each contact with a station within the British Isles. Each station may be contacted for points only once on each band. The final score is the total points on each band, added together and then multiplied by the total number of RSGB regions worked on each band added together.
7. **Entries.** Separate log sheets must be used for each band. It would greatly help the adjudicator if standard log sheets (form HFC1) were used. A cover sheet and signed declaration (Form HFC2) must accompany the logs, which must be sent to RSGB HF Contests Committee, c/o John Allaway, G3FKM, 10 Knightlow Road, Birmingham B17 8QB, and postmarked no later than 3 June 1985.
8. **Awards.** Certificates of merit will be awarded to each of the three leading stations in each section.

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 6 and 7 will apply, with the addition that holders of British Class B licences may enter.
2. A station may only appear once in the column headed "Station heard". The callsign of the station being worked may only repeat once in every three contacts logged, except when the station is a new multiplier. Entrants should log the time, callsign of the station heard, RST, serial number and region given by that station, and the callsign of the station being worked.
3. **Awards.** Certificates of merit will be awarded to the leading three receiving stations.

VHF NFD 1985 rules

Stations wishing to take part in this year's VHF NFD must register their site by **3 June 1985** at the latest, see rule 2. SWL entries will be very welcome and will count towards the VHF Listeners Championships.

Figures in square brackets refer to the general rules for vhf/uhf contests published in the "Operating Guide" supplement, *Rad Com* January 1985.

1. **Duration.** From 1400gmt 6 July 1985 to 1400gmt 7 July 1985.
2. **Site notification.** Each group intending to compete must send details of the site to be used to: VHF Contests Committee, c/o J H Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED, to arrive not later than Monday 3 June 1985. The details required are: the name and address of the person responsible for the entry, the name of the group, the callsigns to be used on each band, the section (open or restricted), the locator and national grid reference of the site, and sufficient access information for an inspector to locate the site. Groups requiring confirmation that their registration has been received should include a stamped addressed postcard.
3. **Bands.** Up to four separate stations can be used, operating on the 70, 144, 432 and 1,296MHz bands. Only one station can score or give points on each band. Single-band entries on 144MHz will not be accepted. Stations operating on 70MHz must use cw only during the period 1400-2200gmt, phone only during the period 0600-1400gmt, and should close down between 2200 and 0600gmt.
4. **Operators.** Any RSGB member or group of members operating from the British Isles (excluding Eire) may enter. Two groups operating from the same site may combine their scores subject to rules 3 and 5.
5. **Stations.** All the stations forming one entry must operate from within a circle of 1km radius centred on the operating position of any of the stations. Proof of permission to use a site may be required. All equipment, including antennas, must be installed on the site during the 24h preceding the contest, or during the contest. Only portable accommodation can be used to house the stations. The site may not be used for any transmitting activities by the group or member during the five days before this time. Stations may not use the public mains supply. Power for all equipment must be derived from an on-site generator or battery.
6. **Scoring.** Contacts will be scored by the radial ring system [7a]. Scores from the two 70MHz sessions will be added to give the final 70MHz score.
7. **Contest exchanges.**
   - (a) Contestants must exchange both callsigns, signal reports, serial numbers and locator [12b]. On 70MHz the QTH must also be exchanged [12a], given in a different form in each session.
   - (b) On 70MHz one scoring contact with a given station can be made in each session. Serial numbers start at 001 in each session, and advance by one for each contact.
   - (c) On 144, 432 and 1,296MHz only one scoring contact can be made with a given station [11a]. Serial numbers start at 001 and advance by one for each contact.
   - (d) The 1·3GHz station may operate on any other band for the purposes of arranging a contact, but the exchange of contest information must take place on 1·3GHz only, and may not be interrupted by recourse to another band. CQ calls on another band should clearly be "for 1·3GHz only".
   - (e) No points will be lost if a non-competing station is unable to supply a QTH, locator, or serial number, but the receiving operator must obtain enough information to calculate the distance and claimed score.
   - (f) Contacts with stations whose callsigns appear on any of the group's cover sheets will not count for points.
8. **Sections.** There will be two sections:
   - **(R) Restricted Section:**
   - *(i)* The Power output on any band may not exceed 25W p.e.p. at the transmitter.
   - *(ii)* The height of any antenna may not exceed 35ft above ground level.
   - *(iii)* Only one antenna per band may be used (eg no stacked bayed or colinear arrays, or switching between two or more antennas). A slot-fed Yagi or quad antenna is permitted. Dish and back-fire antennas must not exceed 2m diameter.
   - **(O) Open section:** as per licence.
9. **Inspections.** All stations are subject to inspection by members of the VHF Contests Committee or nominated representatives. Should the inspector be unable to locate the site due to inadequate or incorrect information, the entry will be disallowed.

   In the event of a last-minute change of site it is the responsibility of the group to make suitable arrangements for the inspector to find the new site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and the ability to return at any time during the contest.
10. **Entries**
    - (a) All entries must be postmarked not later than 29 July 1985.
    - (b) Separate log sheets and 427 cover sheets are required for each band.
    - (c) A summary sheet 4422 must also be completed, otherwise the entry will not appear in the overall results table. Any comments of a general nature may be made on this form.
    - (d) Entries must be addressed to: VHF Contests Committee, c/o J H Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.
11. **Other rules.** The following general rules will also apply: 3, 5a, 8b, 9, 10a, 14-24.
12. **Awards.** The Surrey Trophy will be awarded to the overall winner in the Open section, the Arthur Watts Trophy to the overall winner of the Restricted section, and the Tartan Trophy to the leading Scottish entry. Certificates of merit will be awarded to winners and runners-up in all sections.

Microwave Cumulative Contest rules

0900-2000gmt, 21 April, 12 May, 16 June, 14 July, 11 August, 15 September

The following bands will be active on these dates: 3·4GHz, 16 June; 5·7GHz, 11 August; 24GHz, 21 April, 12 May, 16 June, 15 September.

Each band will be scored separately and each band leader will receive a certificate. In the case of 24GHz, the scores from the best two days are combined to form the final score, although all available logs should be sent in to assist in adjudication.

During each activity period, a station may change location once (see general rule 5b). For the purposes of this contest the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

Stations operating from within the UK must state the national grid references of all sites used on their cover sheet(s). A separate cover sheet is required for each band entered.

Crossband contacts will count for half-points (see general rule 10b). A full contest exchange (report, serial number, IARU locator and QTH) should be given on both bands.

Entries should be postmarked no later than 1 October. Please do not send in logs until after the last event.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 8a, 9, 10b, 11b, 12a, 13-24.

All entries and checklogs to: The VHF Contests Committee, c/o Dr C W Suckling, G3WDG, 46 Windsor Close, Towcester, Northants NN12 7JB.

10GHz Cumulative Contest Rules

0900-2000gmt, 21 April, 12 May, 16 June, 14 July, 11 August, 15 September

Three activity periods will count towards the final score. Entrants unable to be active for three periods are strongly encouraged to send in logs, as a record of their activity, but will not be eligible for an award. Such logs will be included in the table of results. All available logs should be sent in, to assist in adjudication.

During each activity period, a station may change location once (see general rule 5b). For the purposes of this contest the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

Entries from stations outside the UK will be accepted, whether or not they are RSGB members.

Stations operating from within the UK must state the national grid references of all sites used on their cover sheet.

Crossband contacts will count for half-points (see general rule 10b). A full contest exchange (signal report, serial number, IARU locator and QTH) should be given on *both* bands.

There will be two sections, wideband and narrowband, which are scored separately. Stations may operate in both sections if they wish, provided that separate equipment is available for both modes (excluding antennas, preamps and power amplifiers). A given station may be contacted twice, once on narrowband and once on wideband, to count for both sections. In the case of cross-mode contacts, the points for the contact should be counted towards the section appropriate to the equipment used at *your* end. Serial numbers start at 001 and advance by one for each contact, irrespective of section. Awards will be made to the winner and runnerup in both sections, as well as to the leading foreign station and fixed station in each section.

Entries should be postmarked no later than 1 October. Please do not send in logs until after the last event.

Except where modified above, the following general rules for vhf/uhf/shf contests published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 10b, 11b, 12a, 13-24.

All entries and checklogs to: The VHF Contests Committee, c/o Dr C W Suckling, G3WDG, 46 Windsor Close, Towcester, Northants NN12 7JB.

June 1,296MHz Trophy Contest rules

1600-2400gmt 8 June 1985

The following general rules, published in the "Operating Guide" supplement *Rad Com* January 1985, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-24.

The VHF Contests Committee Cup will be awarded to the station with the highest overall score in the contest.

All entries and check logs to: VHF Contests Committee, c/o M. Pharaoh, G3LCH, 49 Streathbourne Road, London SW17 8QZ.

June 432MHz Trophy and SWL Contest rules

0900-1700gmt 9 June 1985

The following general rules, published in the "Operating Guide" *Rad Com* January 1985, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-24.

The 1951 Council Cup will be awarded to the station with the highest overall score in the contest.

All entries and checklogs to: VHF Contests Committee, c/o C J Easton, G8TFI, Highlands, Townsend, Nympsfield, Glos.

144MHz CW and Marconi Memorial Contests, November 1984

Conditions for this contest were poor overall, but with some good openings. Support was about the same as for 1983, with 19 single-operator 6h compared with 21 entries last year. Multi-operator 6h attracted four entries, as in 1983. The 24h part of the contest was, as usual, timed to coincide with the IARU Region 1 Marconi Memorial Contest, and all entries both 6 and 24h have been forwarded to ARI (Italy) for the international contest. A number of 6h entrants have in fact done well, even when entered for the 24h contest.

Some comments were: "A few bad signals to start with, but later cleared up"—G6SNO. "Most Continentals seemed to be looking east"—G4RGK. "Where were all the G stations"—G3ISL. "First attempt at a 144MHz CW Contest, we were very pleased to see what could be worked even in flat conditions"—G4VXE.

Overall, the contest was well enjoyed. Only one entrant commented on the change to point/km scoring for the UK contest—not having a computer, he found the use of a pocket calculator tedious. However, this scoring system is common practice for IARU Region 1 contests.

Certificates go to the winners of each section. A check log was received with thanks from GM4YXI.

G3FZL

SIX-HOUR SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4MDZ	41,202	130	AL76	DL6SAZ/P	671
2	G3POI	37,991	127	AL51	DJ3XK/P	726
3	G2VJ/P	27,377	105	AK12	DJ9YE	655
4	GW4MGR/P	24,111	92	YN75	DL8GP	815
5	G4EZA	23,921	71	AL05	DK8ZB/P	857
6	GW4TTU/P	20,116	93	YL25	DL5DAV	720
7	G4BUO	15,374	75	AL62	HB9BLF/P	661
8	G4XEN	15,197	61	ZM57	DK0BN/P	649
9	G4BLX	15,154	66	ZK10	DL5FS/P	649
10	G4ERG	13,540	52	ZN28	F6EZV/P	705
11	GW4ALG	12,035	58	YL27	F6DJB/P	560
12	G4NSE/P	10,459	38	ZO67	DL9GS	677
13	G4VBG	8,463	33	ZO03	F6EYM/P	658
14	G3ISL	7,423	21	ZO58	DL6FAW/P	699
15	G4NVF	7,412	31	YN15	PA2VST	530
16	G3TUX	6,088	35	ZL77	DK3KD	536
17	G4TIL	5,910	34	ZM64	F6HPP/P	430
18	G3DAO	5,900	26	XK30	ON6HZ/A	610
19	GW3POM	4,974	25	YL34	ON6HZ/A	567

SIX-HOUR MULTI-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4VXE/P	24,416	104	YL20	DL5FS/P	748
2	G4HVC	15,715	59	ZN78	DK0BI/P	667
3	GM3LKY/P	10,474	29	XO26	PA0FHG/P	666
4	G4UJS	8,519	46	YN78	F6HPP/P	554

24-HOUR MULTI-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4NUT	55,069	234	ZM77	HB9BLF/P	778
2	G4SFY/P	37,757	108	AM06	HB9BLF/P	764
3	G4JKG	34,501	151	AL33	F6HYE/P	716
4	G4EKT/P	31,311	113	ZO79	DK0BN/P	713
5	G3SDS/P	31,068	118	YK28	DF0VK	733
6	G4RST	21,775	114	ZM57	DK8ZB/P	676
7	G4VIX	9,632	67	AL32	DL8GP	538

24-HOUR SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G4NDG/P	40,326	147	YK21	DL0SE/P	804
2	G4RGK	19,635	100	ZL37	DK0BN	624
3	G4AGQ	19,062	84	ZL66	DL6FAW/P	623
4	G3ILO	7,621	38	YL29	DK3KD	641
5	G2DHV	2,526	30	AL41	ON6HZ/A	327

432MHz Cumulative Contest results

The 1984 Cumulatives deliberately excluded multi-op stations in an attempt to encourage more activity from members' homes but several contestants disliked the restriction, some refused to enter, and there was no sign that operators from the big groups had entered individually. Single operators, please let us have your views! Nevertheless it is gratifying to see some of the newer callsigns creeping up the list.

As in 1983, one session (5) dominated the results, and good dx was worked by all. The lift was on its last legs, and faded out for the southern stations before the session was over. Congratulations particularly to G6XVV, who worked OZ1HRA with 0dBW. Log-keeping was reasonable, but many people are still confused about the cover sheets required. Please read the rules carefully and, if in doubt, ask the adjudicator beforehand.

Congratulations and certificates go to GW8TFI/P and GW6SNO/P, and to G4SIV, the leading fixed station. BRS25429 has suggested a listener section for 1985—any other BRS stations interested?

G4JLG

Posn	Callsign	QTH	Points	+Pwr	Ant	Best DX	Km	Sessions
1	GW8TFI/P	YL25J	3,848	+26	4×16Y	OZ1HDB	1048	1,3,5
2	GW6SNO/P	YN75F	3,529	+20	2×19Y	DL9AAH/P	934	2,3,5
3	G4NVA/P	ZN61F	1,584	+25	1×21Y	F6CBC	927	2,4,5
4	G4SIV	ZM29H	1,488	+23	2×21Y	DJ0PQ	511	1,3,4
5	G6OYL	ZN44C	1,248	+18	1×21Y	DF4KT	631	3,4,5
6	G6TMP	YM38B	1,109	+16	4×17Y	DL9AAK/P	875	3,4,5
7	G4JZF/P	ZM21G	1,032	+13	HB9CV	F1CYB	677	2,4,5
8	G6HKM	AL13G	1,009	+17	1×21Y	F1DFZ	537	1,3,5
9	G6XVV	ZN44C	911	+00	1×48MB	OZ1HRA	767	3,4,5
10	G8YTF	YN30D	862	+10	1×24Y	F1BUU	984	1,3,5
11	G8CRN	ZL08B	817	+21	1×48MB	F1CYB	562	1,2,5
12	GM8MJV/P	YP19E	796	+20	1×21Y	DJ9DL	809	1,3,5
13	G8FMK	ZL26H	758	+17	1×11Y	G1MGJ	355	1,3,4
14	G4TBR	ZL27C	569	+16	2×19Y	F1CYB	540	1,3,5
15	G8GTP	YN39J	566	+17	1×18Y	F1FHI	716	1,4,5
16	G4HAY	ZL30H	517	+17	1×48MB	GW3NYY	270	1,2,4
17	G4DDL	ZL47F	502	+08	1×19Y	G4HGT	278	1,3,5
18	G6ZEK	YN79J	452	+17	2×21Y	F1DUZ	675	1,3,5
19	G3KPU	ZN36G	342	+10	1×46MB	F1FHI	840	1,2,5
20	G8AAY	YK20D	314	+10	1×18PB	F1FHI	—	3,4,5
21	G4FVK	ZM39C	232	+10	—	—	—	1,2,3
22	G4IDF	YM70G	170	+10	1×11Y	F1FHI	563	3,4,5
23	G6TGB	ZK14G	115	+10	1×18PB	F1FHI	385	3,4,5

Check logs gratefully received from G8OHM, G2DHV, F1FHI and BRS25439.

10GHz Cumulative Contest 1984 results

There was a considerable revival of interest in this event in 1984, together with a much larger foreign entry. For the first time the winning entry came from overseas. The adjudicator would like to thank DJ6XV for collating and sending the logs from Germany. Most of the German activity took place during the DARC Microwave Contest which coincided with the RSGB June event.

Propagation in the UK was generally reported as average: however, one very interesting event took place over the Broadway-Merryton Low path which allowed G8AGN/G3PHO and G3LQC to make the first-ever QSO over this path, which has proved unworkable on a number of occasions before and since. The opening lasted only for a short time and seemed to coincide with the passage of a weather front over the path.

Narrowband activity was somewhat higher than in 1983, possibly due to the reintroduction of separate sections for wideband and narrowband. Several stations had difficulty in understanding the scoring of the two sections, and added their wideband and narrowband scores together instead of listing them separately. The only comments on the organization of the contest came from G4MBS and G3FYX, both of whom wanted longer operating times.

Congratulations to the following stations who will receive certificates: DJ4YJ/P (leading wideband station, leading foreign station and overall winner), G6ZME/P operated solo by G8UGL (runner-up wideband), G3FYX/P (leading narrowband station), F8WN/P (runner-up and leading foreign station in narrowband section) and G4MBS (leading fixed narrowband station).

G3WDG

WIDEBAND SECTION

UK stations, and foreign stations active for three events

Posn	Callsign	Points	QSOs	Best dx	Km	QTH
1	DJ4YJ/P	4,518	27	HB9MMM/P	272	FH GI GJ
2	G6ZME/P	2,450	33	G3NKL/P	160	YM
3	GW3PPF/P	2,031	25	G3PHO/P	162	YM
4	G3PHO/P	2,004	24	GW3PPF/P	162	ZN
5	F8WN/P	1,970	16	G3JHM/P	182	ZJ
6	G8MWR/P	1,710	33	G3PHO/P	119	ZM
7	G4FHQ/P	1,592	29	G6CWK/P	100	ZM
8	G8GKV/P	1,500	27	F8WN/P	176	ZK
9	G2DSP/P	1,464	29	F8WN/P	169	ZK
10	G4ETU/P	1,401	26	F8WN/P	169	ZK
11	G6WOK/P	1,387	22	G8HMV/P	87	ZM
12	G3LQC/P	1,345	20	G3PHO/P	125	ZM
13	G3NKL/P	1,239	13	G6ZME/P	160	YN
14	G8AGN/P	1,174	15	G3LQC/P	125	ZN
15	G4FPV/P	1,072	19	G3PHO/P	119	YM
16	G8UDT/P	867	25	F8WN/P	174	ZK
17	G4EML/P	701	21	G3KSU/P	70	ZL
18	DJ6XV/P	606	17	DG3LV/P	87	DL
19	DL4BBU/P	517	13	DL5YAG/P	73	DL
20	G3AYJ/P	488	8	G3PFR/P	95	YM
21	G3OXL/P	420	9	G3PHO/P	84	YM
22	G3NEO/P	364	10	G8HMV/P	102	ZN
23	DG8YCU/P	273	9	DL4BBU/P	61	DL

Foreign stations active for less than three events

Posn	Callsign	Points	QSOs	Best dx	Km	QTH
1	OE2JG/P	1,196	14	OJ9SR/P	143	GH
2	OE2GKM/P	1,066	9	DJ9SR/P	150	GH
3	HB9MDP/P	1,005	7	HB9AC/P	217	EH
4	DJ9SR/P	942	9	DJ4YJ/P	243	GH
5	DL8RAH/P	916	9	DJ4YJ/P	243	GJ
6	DL/OE2BM/P	866	9	DJ4YJ/P	243	GJ
7	DL3SBD/P	696	10	DJ4YJ/P	220	GI
8	DC6GS/P	637	8	DJ4YJ/P	218	GI
9	HB9MMM/P	570	6	DJ4YJ/P	272	DH
10	HB9MIN/P	558	6	DJ4YJ/P	272	DH
11	DK8PN/P	294	2	DJ4YJ/P	159	EI
11	DL71X/P	294	2	DJ4YJ/P	159	EI
13	DKONA	292	7	DL7QY	171	FK
14	DKOPX	288	2	DJ4YJ/P	185	EI
15	DL5YAG/P	160	3	DL4BBU/P	73	DL
15	DL9YAB/P	160	2	DJ4YJ/P	137	DL GH
17	DJ8UQ/P	97	6	DJ6XV/P	35	DL
18	DB7YAH/P	81	3	DF6VW/P	27	EM
19	HB9MIO/P	75	2	HB9MMM/P	47	DH
20	DJ4HH/P	70	2	DKONA	30	DL
21	DCODA	60	2	DB3YZ/P	48	DL
22	DB8QO/P	59	5	DJ6XV/P	28	DL
23	DF1BO/P	58	3	DK3UC/P	29	EM
24	DB3YZ/P	36	1	DCODA	48	DL
25	DH4NAG/P	30	2	DKONA	20	FK
26	DF6VB	24	1	DCODA	24	DL

NARROWBAND SECTION

Posn	Callsign	Points	QSOs	Best dx	Km	QTH
1	G3FYX/P	810	14	G4MBS	106	YL
2	F8WN/P	520	6	G4ELM/P	182	ZJ
3	G4MBS	463	11	F1EDJ/P	180	ZL
4	G8MWR/P	224	5	G8FWA/P	75	ZM
5	G4FHQ/P	199	4	G8MWR/P	56	ZM
6	G3YGF	154	4	G3JVL	50	ZM
7	G4MBS/M	148	4	G3FYX/P	53	ZL
8	G3AYJ/P	93	1	G8FWA/P	93	YM

Microwave Cumulative Contest 1984 results

No entries were received this year for 2·3GHz, which is perhaps not too surprising as the number of other contests on this band had been increased in 1984. However, the lack of scoring entries for 5·7GHz is rather disappointing: G4MBS sent in a "zero score" log to show that some tests (with G3FYX/P) had been made, which were unsuccessful. In contrast, the interest in 24GHz is obviously growing (there were no entries at all last year). The change in licensing conditions on this band, which now allows operation in the lower part of the band without prior permission, will hopefully give rise to even more activity in 1985.

Congratulations to the winners, G3FYX/P and G3BNL/P, both of whom will receive certificates. *G3WDG*

3·4GHz BAND

Posn	Callsign	Points	QSOs	Best dx	Km	QTH
1	G3FYX/P	196	2	G4MBS	106	YL
2	G4MBS	106	1	G3FYX/P	106	ZL
3	GW3PPF/P	90	1	G3FYX/P	90	YM

24GHz BAND

Posn	Callsign	Points	QSOs	Best dx	Km	QTH
1	G3BNL/P	83	3	G3JHM/P	65	ZL
2	G3YJH/P	51	1	G8HMV/P	51	YM
	G8HMV/P	51	1	G3YJH/P	51	YM
4	G3YGF/P	25	1	G3BNL/P	25	ZL
	G4KNZ/P	25	1	G3BNL/P	25	ZL

21/28MHz Telephony Contest 1984 results

Given the sorry state of hf conditions of late, this contest coincided with a slight upturn which saw 115 multipliers available on 21MHz and 48 on 28MHz. The most worked by any competitor was 80 and 31 respectively. Both the British Isles and overseas sections were well supported, and despite some grumbles about sunspots, most reported that they enjoyed the contest.

The Whitworth Trophy was won by GU3HFN, operated by GU4WTN who at 15 years of age put in a very impressive performance. GW4HSH, by making extensive use of 28MHz, won the Powditch Trophy as band leader. GW8GT led the multi-operator entries, having made 756 contacts.

Most of the top logs from the British Isles and overseas contained unmarked duplicates, but 9J2BO and UP1BWW submitted dupe-free logs to win the single and multi-operator overseas sections respectively. The HF Contests Committee continues to be puzzled by the lack of attention to duplicate cross-checking which negates much of the hard work put in during the contest. A check log compiled in the heat of the contest is seldom reliable, so a thorough check for repeat contacts should always be carried out once the entry has been written up. If readable, the check sheet can be submitted with the entry to ease the adjudicator's task.

Logs in the receiving sections were generally good, and inevitably Bob Treacher, BRS32525, retained the Metcalfe Trophy while Martin Parry, BRS52543, took the Powditch Receiving Trophy.

A handful of transatlantic QSOs were made on 28MHz by UK entrants, while almost half of the overseas competitors were unable to use the band. Nevertheless CT2FH achieved fifth place with an enforced 21MHz-only log. Several UK entrants had problems with the changed Russian prefixes—it is now the second letter which counts, not the number: for example UB4IXZ, UT5GM and RB7GA are all in the Ukraine. Many anticipated the ARRL decision and claimed ZC4 and 5B4 as separate multipliers—nice try, lads!

Equipment used and breakdown of the leader's scores:

GU3HFN—FT107M plus SB200 linear, TET 3-el tribander up 50ft;
GW4HSH—TS830 2-el Gemquad up 40ft;
G4CHP—No details given;
GW8GT—FT980 plus homebrew linear, TH6DX on 21MHz, 5-el monobander on 28MHz.

	21MHz Points/mults	28MHz Points/mults	QSO total
GU3HFN	73/1,718	13/178	643
GW4HSH	58/627	31/374	379
G4CHP	64/768	21/156	319
GW8GT	80/2,129	20/75	756

G4BUO

BRITISH ISLES TRANSMITTING—SINGLE-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	GU3HFN	163,056	23	G4RHS	21,315
2	GW4HSH	89,089	24	G4XRX	21,009
3	G4CHP	78,540	25	G3UHU	20,349
4	GM4TOQ	77,760	26	G4FJT	18,630
5	G3PJK	73,566	27	G3KSH	18,048
6	GW4BKG	71,208	28	G4FVK	13,986
7	G2QT	68,558	29	G4XTM	10,045
8	G4OBK	65,520	30	G6QQ	9,287
9	G4AMT	61,614	31	G3SXW	8,742
10	G3FYQ	57,378	32	G4YEK	6,944
11	G3SYA	56,883	33	G4SDZ	6,633
12	G4IUF	55,284	34	G3ZRH	6,336
13	G4UPS	52,824	35	G3ZGA	6,237
14	G3RTE	49,227	36	G4MVN	5,460
15	G4OTU	48,600	37	G3ILO	4,524
16	G3YEC	48,321	38	G3ICG	3,150
17	G4UCR/P	33,807	39	G3TXF	3,087
18	G6CW	33,756	40	G4PCI	1,615
19	G3WBM/P	26,847	41	G3CWL	930
20	G4MGQ	23,688	42	G4LZZ	540
21	G4MET	22,386	43	G3TGR	90
22	GM3UTQ	21,600			

BRITISH ISLES TRANSMITTING—MULTI-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	GW8GT	220,400	8	G3BZU	46,920
2	G4LAB/A	89,474	9	G4NOK/A	42,303
3	GW4EZW	87,330	10	G4RUD/P	34,884
4	G8FG	69,130	11	G4ORC/A	23,595
5	G3GRS/A	68,040	12	G4TTT	21,042
6	G4NLZ	55,185	13	G4VAT/A	18,705
7	G4ATH/A	50,034			

OVERSEAS TRANSMITTING—SINGLE-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	9J2BO	27,636	53	Y26LN/A	1,287
2	YU3MA	26,650	54	UR2OI	1,200
3	HB9CSA	25,860	55	RC2AF	1,134
4	EA6VQ	19,125	56	EA4CFN	1,080
5	CT2FH	19,006		3D6AK	1,080
6	HA4ZZ	12,512	58	DL7SN	1,056
7	DF2UU	12,246	59	OK1BNS	1,053
8	UA4PO	10,302	60	LA9PT	1,050
9	LZ1CW	10,098	61	EA3ERT	1,032
10	YU2SXS	8,493	62	SM3LIV	1,020
11	UA6LGP	8,478	63	UA6HCS	1,008
12	EA5BZS	7,650	64	DF0SX	918
13	RB5MF	7,350	65	9H4G	864
14	EA6MR	7,290	66	LA4HH	744
15	9K2BE	6,912	67	LZ2TU	720
16	SM0DJZ	6,808	68	EA5CTP	702
17	HZ1AB	6,264	69	YV3ANG	696
18	IV3AVQ	6,069	70	OK1DBM	627
19	HA4XX	6,048	71	CT1TM	624
20	UA6LCN	5,250		Y22SEV	624
21	I3VWK	4,640	73	ON5VF	621
22	YU3TE	4,488		PA0KDM	621
23	Y63VG	4,224	75	OK2BHQ	609
24	RA3AA	4,199	76	SP6CZ	600
25	EA3ELZ	4,140	77	YU7SF	576
26	CT1AMK	4,005	78	DL3NAC	567
27	UH8EAA	3,996		U1ZM	567
28	I4CSP	3,876	80	DK5KJ	552
29	UB5EGB	3,816	81	HA5FA	510
30	LZ1KKA	3,708	82	Y58ZA	441
31	YO3CD	3,570	83	CT1TH	424
32	LA9GV	3,330	84	YO9FL	414
33	YU1EA	2,835	85	UA9CS	384
34	N4UH	2,790	86	YU3DFT	378
35	CT1AFN	2,730	87	Y24XA	357
36	UT5GM	2,574	88	SM5DYC	336
37	OK1DKS	2,430	89	HG5AIY	330
38	HA1UG	2,244	90	YO6MD	312
39	UP2NX	2,178	91	YO5BAT	306
40	SP9MQH	2,040	92	YV3ALK	252
41	UR2RNJ	2,013	93	CT1CAR	245
42	RI8AO	2,010	94	HG9TL	228
	OK1KZ	2,010	95	LA5TBA	210
44	UA6HKN	1,755	96	G4DUW/DU1	189
45	F6BVB	1,728	97	SP6DVP	162
46	UY5TE	1,680	98	Y72VL	120
47	Y22WF	1,650	99	OH6UP	81
48	EA5CIT	1,599	100	RF6QAI	60
49	I2OKW	1,443	101	OZ3KE	45
50	5B4DN	1,332	102	EA1COF	12
51	VO1AW	1,320	103	DL8AAM	9
52	UA3TAM	1,290	104	OH7NW	6

OVERSEAS TRANSMITTING—MULTI-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	UP1BWW	28,674	9	UH8EWW	2,184
2	UZ6LWZ	13,080	10	UM9MWO	2,070
3	UZ6LWT	11,067	11	OK2KOZ	1,770
4	ZC4ESB	8,550	12	OK3KTY	1,188
5	YO4KAY	5,577	13	UM9MZD	816
6	SP6PCL	3,456	14	UF7FWY	414
7	LZ1KBZ	2,520	15	UB4TWL	36
8	UZ6HWA	2,409	16	JA3YBF	12

BRITISH ISLES RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS32525	39,984	4	BRS20249	19,116
2	BRS52543	30,624	5	BRS44395	9,430
3	BRS26407	19,448	6	BRS28198	7,137

OVERSEAS RECEIVING

Posn	Station	Points	Posn	Station	Points
1	UB5-073-3135/U6F	4,368	9	UA9-134-128	1,104
2	Y2-EA-13689	2,592	10	OE1-0140	870
3	UQ2-037-135	2,574	11	Y2-EA-19002	792
4	UF6-014-100	2,160	12	Y2-12003	672
5	Y2-11249	2,119	13	Y2-9540	660
6	UA3-121-2186	2,112	14	ONL620	540
7	EA4-424218	1,530	15	VO1PJ/SWL	336
8	DEOWSS	1,521			

Checklogs: GW4BLE, BRS25429, EA4CFZ, HA5KFV, HA8ZO, LZ1NS, OH2SE, OZ1ACB, OZ4ZT, OZ5XT, SM6EOI, UA3DJU, UV3DN, UA3DQS, UA4NC, UA6HRG, UZ9SWY, Y32XG, Y39SH.
Disqualified (Rule 7 excessive duplicates): G4NUT, F6IRG, LZ1KDP, UB4IXZ, RB7GG.

70MHz CW Contest 1984 results

The change of date from January to December was introduced to provide a more balanced year of contests on 70MHz. The move did nothing to help with conditions however, which were universally regarded as poor. G3UKV commented that the band was "flat all day with deep QSB; activity was exceptionally low—haven't scored so low since 1977".

G4MHC raised the question of whether it is fair to expect fixed and portable stations to compete against each other. It is to be hoped that one day there will be sufficient entries to justify having separate sections. It is also worth reflecting that the weather at this time of year is hardly conducive to portable operation. GW4MGR/P had to endure heavy snow, ice and fog. The effort was rewarded by a higher points/QSO average than the runner-up.

The standard of log-keeping was good—perhaps reflecting the more relaxed gentlemanly attitude towards contests on 70MHz.

Congratulations to the winner and runner-up, to whom certificates will be awarded.

G4ERP

Posn	Callsign	Points	QSOs	QRA	Final tx	Best dx	Km
1	GW4MGR/P	250	38	YN75	4CX250F	GM4DGT	349
2	G4MHC	236	46	YM79	Transistor	G4EKT/A	259
3	G3UKV	233	41	YM28	QQV06-40A	GM4DIJ	359
4	G3TBK	167	36	ZN77	SRF1397	G3BPM	270
5	G4EKT/A	153	17	ZO79	QQV06-40	G3BPM	353
6	G3TCU	150	31	ZL67	QQV06-40A	G4EKT/A	321
7	G3BPM	123	18	YK07	2 × BLY90	G3SYA	315
8	G4ENA	121	25	YL29	QQV06-40	G4EKT/A	292
9	GW4ALG/P	114	24	YL06	Transistor	G3SYA	209
10	G4ZTR/P	111	25	AM71	2N6084	G3SYA	267
11	G4FOH	107	23	ZM60	SD1287	G3BPM	249
12	G3UEY	88	22	YM80	2N6080	G4EKT/A	251
13	G4APL	79	19	ZL60	—	G3YKP	283
14	G3RDQ	74	16	ZL63	2N6084	GW4MGR/P	239
15	G4CAX	70	14	YN68	4CX250B	G3TCT	263
16	G5UM	50	18	ZM26	QQV03-10	GW4MGR/P	152
17	GM4DGT	49	5	YQ61	QQV03-20	G3VIP	374
18	G3TUX	47	13	ZL77	2N6082	GW4ALG/P	172
19	G2DHV	33	9	AL41	QQV03-20A	GW4MGR/P	282

Check log from G3YKP received with thanks

G T Peck Memorial Trophy DF Event

Date: 14 April 1985.
Map: OS Sheet 175 1:50000 series, Reading and Windsor.
Assembly: 1300bst for start at 1320bst.
Location: Peppard Common, NGR 709818.

Competitors requiring tea should notify Mr W. Pechey, Jays Lodge, Grays Pond, Reading RG8 7QG, Tel 0491 680552, not later than 7 April 1985.

DF Qualifying Event—Oxford

Date: 28 April 1985.
Map: OS Sheet 164 1:50000 series, Oxford.
Assembly: 1300bst for start at 1320bst.
Location: Shotover Plain, NGR 572059 Please approach from the east.

Competitors requiring tea should notify Mr P Bradley, 60 Weyland Road, Headington, Oxford OX3 8PD, Tel 0865 61808, not later than 21 April 1985.

Details of rules etc for RSGB top-band df events may be obtained from E L Mollart, G6AGE, 17 Spinfield mount, Marlow, Bucks SL7 2JU.

National Final DF Event results

The Slade Radio Society chose Lickey Beacon on the Birmingham map for the start of the 1984 DF Final. Eighteen teams which had previously qualified or had been invited, assembled at the start. Also present was the RSGB President, Mr R G Barrett, who had travelled from Cardiff to see how the "professionals" dealt with finding three hidden stations within 4h.

Station A, G3SRS/P, was located 10 miles due north in Sandwell Valley Park, hidden at the end of a long antenna radiating just over 1W and half-a-mile from the nearest road.

Station B, G3ORI/P, was located 10 miles northwest in some old coal mine workings in Brierley Hill, with the transmitter nestling against a long chain link fence and surrounded by the usual brambles and wet areas.

Station C, G4MDF/P, was located 15 miles northeast near Coleshill. A large thick wood was used, which apparently had more snakes than footpaths (the operator was not informed until the event was over).

Additional navigational problems were experienced due to the stations being located so close to a large city even though travelling distances were reasonable.

Mike Hawkins, the eventual winner, ran out of brake pads during the event but nevertheless found all three stations with 18min to spare. An AA man, thoughtfully provided by his well-known guardian angel, was standing by at the third station and promptly effected repairs.

Contests Calendar

6, 7 April	SPDX *(Rules in April* MOTA)
6, 7 April	GARTG-SSTV 1985 *(Rules in April* MOTA)
7 April	ROPOCO 1 *(Rules in March issue)*
13, 14 April	BARTG Spring VHF/UHF RTTY *(Rules in March issue)*
13, 14 April	CARF Commonwealth Phone *(Rules in April* MOTA)
14 April	GARTG-RTTY 1985 *(Rules in April* MOTA)
14 April	G T Peck Memorial Trophy DF Event (Details in April issue)
20, 21 April	Vigo 85 World Fishing *(Rules in March* MOTA)
21 April	Low Power *(Rules in February issue)*
21 April	70MHz *(Rules in February issue)*
27, 28 April	Helvetica *(Rules in April* MOTA)
28 April	DF Qualifying Event, Oxford (Details in April issue)
May-September	10GHz Cumulatives *(Rules in April issue)*
May-September	Microwave Cumulatives *(Rules in April issue)*
4, 5 May	432MHz-24GHz
12 May	WAB LF *(Rules in February* MOTA)
18, 19 May	144MHz
19 May	Region Round-up *(Rules in April issue)*
19 May	DF Qualifying Event, Chelmsford/Colchester
1, 2 June	HF NFD *(Rules in February issue)*
8 June	GARTG-RTTY 1985 *(Rules in April* MOTA)
8 June	1,296MHz Trophy *(Rules in April issue)*
9 June	432MHz Trophy *(Rules in April issue)*
9 June	DF Qualifying Event, Dartford Heath
16 June	BATC Summerfun ATV *(Rules in* CQTV 129)
22, 23 June	Summer 1·8MHz
23 June	DF Qualifying Event, South Manchester
6, 7 July	VHF NFD *(Rules in April issue)*
13, 14 July	SWL
14 July	DF Qualifying Event, Mid-Thames
21 July	Low Power Field Day
27 July	432MHz Low Power
28 July	144MHz Low Power
4 August	DF Qualifying Event, Salisbury
18 August	1,296/2,320MHz
18 August	DF Qualifying Event, Coventry
25 August	ROPOCO 2
25 August	GARTG-RTTY 1985 *(Rules in April* MOTA)
7, 8 September	IARU Region 1 FD
7, 8 September	144MHz Trophy and IARU
8 September	DF Qualifying Event, Slade
2, 10, 18, 26 September	28MHz Phone Cumulative
14/15 September	International ATV *(Rules in April issue)*
22 September	70MHz Trophy
29 September	DF National Final, Northampton
5, 6 October	432MHz-24GHz and IARU
5, 6 October	GARTG-SSTV 1985 *(Rules in April* MOTA)
8 October	432MHz Cumulative
12 October	GARTG-RTTY 1985 *(Rules in April* MOTA)
12 October	DF Double Night Event, Slade
13 October	21/28MHz Phone
16 October	1,296/2,320MHz Cumulative
20 October	21MHz CW
24 October	432MHz Cumulative
26 October	DF Treble Night Event, Mid-Thames
27 October	70MHz Fixed
1, 17 November	1,296/2,320MHz Cumulative
2, 3 November	144MHz CW
3 November	WAB CW *(Rules in February* MOTA)
9, 25 November	432MHz Cumulative
9, 10 November	2nd 1·8MHz
11, 19, 27 November, 5, 13 December	28MHz CW Cumulative
1 December	144MHz Fixed
3, 19 December	1,296/2,320MHz Cumulatives
11 December	432MHz Cumulative
15 December	70MHz CW

The Slade Radio Society wishes to place on record its thanks for the valuable assistance of the Sutton Raynet Group in monitoring the event. Tea for 67 people was provided at the Kingsway Road Community Centre, where prizes and trophies were presented by the RSGB President.

Posn	Name	Club	Time of arrival Stn A	Stn B	Stn C
1	M. Hawkins	Chelmsford	1503	1413	1621 +
2	P. Lisle	Mid-Thames	1456	1404	1625
3	D. Yorke	S. Manchester	1500	1412	1625 +
4	B. Bristow, R. Parsons	Mid-Thames, Burton-on-Trent	1455 +, 1538 +	1407, 1627	1627, 1448 +
6	G. Whenham	Coventry	1456 +	1408	1627 +
7	T. Gage	Mid-Thames	1455	1354	1628
8	E. Mollart	Mid-Thames	1527	1403	1629
9	W. Pechey	Mid-Thames	1403	1510	1630
10	I. Butson	Colchester	1414	1508	—
11	T. Judd	Oxford	1545	1409	—
12	D. Brocks	Chelmsford	1559	1508 +	—
13	P. Tyler	Mid-Thames	1625	1507	—
14	A. Butcher	Chelmsford	—	1547	—
15	C. Wells	Mid-Thames	—	1552	—
16	D. Newman	Slade	—	1600	—
17	P. Woollett	Dartford Heath	—	—	—
18	S. Holley	Dartford Heath	—	—	—

International ATV Contest 1985

Please note the rules are as below and are basically unaltered from last year —the points gained from operation on each band are *not* combined. Note also new locators must be used.

Section A. Transmit/receive stations

Date. 14/15 September 1985

Time. 1800gmt Saturday–1200gmt Sunday

Bands. 432, 1,260, 10,000MHz

Scoring. Two points/km for each two-way QSO.
One point/km for each one-way QSO.

Exchanges.

(1) Code group consisting of four non-sequential digits individually chosen by each entrant, eg: 1865 or 9732. **This code group must be exchanged on video only.**

(2) Call, new locator, report, serial number starting at 001. This data is to be exchanged via video or, if necessary, by sound.

Entries must include log sheets recording all the above information together with your full postal address, locator, code-group used and station details, and be mailed not later than 30 September 1985 to: G. Shirville, G3VZV, 18 Church End, Milton Bryan, Milton Keynes, Bucks MK17 9HR.

Notes. Multi-operator stations may only use one callsign. QSOs via repeaters do not count. Please keep **all** video transmissions as brief as possible, and QSY from the calling channels when contact has been established.

Section B. Receive-only stations

The same rules are applied as above. Please note: entrants in Section B may not "give" points to those in Section A—ie receive-only stations may not "advertise" for one-way QSOs on 144·75MHz!

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in the July 1985 issue.

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **June** issue should reach them by **15 April** and for the **July** issue by **13 May.**

Club programmes are given in order of date, subject, time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Ainsdale (AARC)—2, 16 April (Natter night at The Mint, Manchester Road), 14 April, 10.30am and 30 April, 7.30pm (df hunt, start at Mere Brow OS squares), 23 April (normal meeting, Scout HQ, Marine Drive 9), 8pm. Will all members please contact sec for details of proposed visit in April to the Communications Centre, The Oil Rig, Great Horse Bank, near Manks Marsh. Sec David Norris, G4TUP, tel Southport 35947.

Blackburn (East Lancs ARC)—2 April ("Crime prevention" by the local Police), 30 April (Informal), 7 May ("The Tornado fighter aircraft"), 7.30pm. Conservative Club, Cliffe St, Rishton. On Tuesdays when no meeting a club net operates on 145·400MHz, 7.30pm. PRO Stuart Westall, G6LXU.

Bury (BRS)—9 April ("The joys of mw dxing", Chris Marcroft, G4JAG). 8pm. Mosses Community Centre, Cecil Street, Bury. Sec Brian Tyldesley, G4TBT, tel Burnley 24254.

Chester (C&DRS)—9 April ("HF aerials and atus", Dennis, G3EWZ), 16 April ("Installation of pmr equipment," Geoff, GW1ATZ), 23 April ("Entertainment electronics", Chris' GW8ICT), 30 April (Outside activity night—The Yeld, Kelsall, Chester). 8pm. Morse classes 7.15pm, before main meetings with Adrian, G4MOU. Chester Rugby Football Club, Hare Lane, Vicars Cross, Chester. Contact PRO, David Hewitt, G8ZRE.

Fylde (FARS)—2 April ("A home-brew hf transceiver", Ken Porter, G3KEN), 16 April ("Modifying portable broadcast receivers for df work on top band, df fox hunting", Harold Fenton, G8GG), 7 May (Visit by B Donn, G3XSN, RSGB Region 1 representative). 7.45pm. Kite Club, Blackpool Airport. Sec H Fenton G8GG, tel 725717.

Kendal (Westmorland RS)—9 April ("Oldham Batteries, a film show and talk regarding sealed for life batteries for amateur use") 8pm. Strickland Arms, Sizergh, Nr Kendal. Sec G Chapmann, G1IIE, tel 0539 28491.

Liverpool (L&DARS)—2 April ("Interference", Don Smith, G3LIS), 18 April (Bring and buy sale, Harry Cohen, G4GHS auctioneer), 16 April ("Our solar system", Albert Webb, G6XBK), 23 April ("Contests for 1985", Al Neilson, G4CVZ), April 30 ("Advanced driving" Gordon Andrews, G3DVW). 8pm. Churchill Conservative Club, Church Road, Wavertree. Sec Albert Webb, G6XBK.

Liverpool (Sefton ARC)—3, 17 April, 8pm. Liverpool Prison Officers Club, Hornby Place, Walton, Liverpool. L9 3DF. Sec, Jim, G6PVQ, tel 051 523 3971.

Manchester (South Manchester RC)—12 April ("Operating from VP8", Ron Smith, G3SVW), 19 April ("2m/160m df"), 26 April (Home-built equipment contest), 3 May (Talk by the winner of the home-brew equipment contest). 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 061-973 1837.

Preston (PARS)—11 April ("QRP", Rev G C Dobbs, G3RJV), 25 April ("Microchips—their use and abuse", Greg Wimlett, G8GLS), 9 May (Discussion on antennas and propagation). 8pm. Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

St Helens (StH & DARC)—4 April (Talk on crime prevention by the Liverpool Police), 11 April ("Antennas", George, G4KCB), 18 April (On the air), 25 April (Visit by Bert Donn, regional representative RSGB). 8pm. Conservative Rooms, Boundary Road, St Helens. Details from Alan Manchester, G6FJU, tel 56025.

Stockport (SRS)—10 April ("Basic electronics", B Turley), 24 April (Junk sale), 22 May (Visit by Bert Donn, Region 1 representative, RSGB). Every third Wednesday, informal meeting and morse class. Magnet Inn, Wellington Road, Stockport. Sec Mel Betts, G4FFW, tel 061 224 7880.

Tarporley (Mid-Cheshire ARS)—6 May (Mobile Rally at Winsford Civic Hall, High Street, Winsford). 8pm. Details from D Card, G4VOH, 7 Glebe Green, Winsford, Cheshire. Tel 06065 4719.

Thornton Cleveleys (TCARS)—1 April ("How to blow your rig up", Harry Leeming, G3LLL), 8 April (No meeting—Bank Holiday), 15 April (Talk by Crime Prevention Officer, Lancs Constabulary), 22 April (Auction), 29 April ("Advanced morse class", Ian Cobbe G3ZRZ). 7.45pm. 1st Norbreck Scout HQ, Carr Road, Bispham, Blackpool. Sec Mrs E E Milne, G4WIC, tel 0253 821827.

Warrington (WARC)—2 April (AGM—all members please attend), 9 April (Visit by Bert Donn, G3XSN, regional rep RSGB). 8pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec W Green, G8HLZ, tel 0925 814740.

Wirral (WARS)—3 April (Sale of surplus equipment), 17 April ("QRP working", Rev George Dobbs, G3RJV), 1 May (DF techniques, start of df hunts for the year), 3 May (Annual dinner dance at the Heatherland Restaurant, Thurstaston. 8pm. Heswall Parish Church Hall, Heswall. Sec Cedric Cawthorne, G4KPY, tel 051 625 7311.

Wirral (W&DARC)—3 April (D&W The Seven Stars, Thornton Hough), 10 April ("VHF in small boats", Keith Ford, G4ZKF), 14 April (Sunday series df hunt No 1. Meet 2pm, Heswall lay-by), 17 April (D&W The Ridger, Newton), 21 April (Club entry in the 70MHz contest), 24 April (Mobile treasure hunt—start and finish at Irby, from 8pm), 1 May (D&W The Eastham Ferry Hotel, Eastham), 4, 5 May (432MHz—24GHz Contest, club entry). Late Spring Bank Holiday, 25, 26, 27 May (Special event station GB2IWF to mark the "International Waterways Festival" at Ellesmere Port Boat Museum, operational on hf, vhf, uhf, Talk-in etc). Irby Cricket Club, Mill Hill Road, Irby. Sec Gerry Scott, G8TRY, tel 051-630 1393 or 227 1018.

My thanks to Mid-Cheshire ARS and South Cheshire ARS for their hospitality when I visited them during February.

I am still waiting for some clubs in the region to contact me. *RR1*

REGION 2—RR *(To be elected)*

Goole (GR&ES)—2 April (Natter night), 9 April ("VHF operating", Geoff Cowling, G8ERX), 16 April (Natter night), 23 April (Visit to Viking Radio, Hull), 30 April (Discussion, "Contest tactics 1985"). 7.30pm. Goole Junior Chamber, Boothferry Road, Goole. Details G8VHL and G8IOH.

Maltby (MARS)—5 April ("Looking for the hidden station around Maltby", df hunt), 12 April ("Licence rules and regulations"—questions and answers), 19 April ("Short wave listening", G8NVS), 26 April (Computer night, bring your computer along and demonstrate it), 3 May ("Getting on 23cm", G60YL). 7pm. Church Building, Church Lane, Maltby. Details from Ian, G3ZHI, tel Rotherham 814911.

Todmorden (ARS)—1 April (Video, "China"), 15 April (Informal chat night). 8pm. Queen Hotel,

Murray, G3AAS, with his entry for the White Rose Constructors Cup, also shown. His reproduction three-valve 'thirties radio was the winning entry in this year's competition against all the latest circuitry

Todmorden. Sec J Gamble, 283 Halifax Road, Todmorden, tel Todmorden 2494.
Wakefield (W&DARS)—2 April (AGM), 16 April (On the air/natter night), 14 May (Talk, "CW", G4KLN), 28 May (Junk sale, bring and buy). 8pm. Ossett Community Centre. Details G8PBE, tel Wakefield 378727.
York (YARS)—19 April (Homebrew night). 7.30pm. United Services club room, 61 Micklegate, York. Sec Keith Cass, tel York 36230.

REGION 3—RR G. Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 616941.

Birmingham (Aston RS)—Lunch time Monday and Friday. This club has been reorganized and now has a permanent shack, with two 80ft masts located 135ft above ground. Sec G1KTH, tel 021-359 3611 ext 5115.
Birmingham (Midland ARS)—1 April (Committee meeting), 2 April (Computer night), 3 April (Lecture), 4 April (Raynet group meetings), 23 April (Surplus equipment sale). Every Monday (Construction night), Wednesdays (Morse and natter night), Thursdays (Night on the air), Fridays (RAE class), weekends (Contests). 294a Broad Street, Birmingham B1 2DS. Sec GBBHE, tel 021-422 9787.
Birmingham (South RS)—3 April (Starting on 23cm). 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham. Sec Tim Scrimshaw, 10 Somerdale Road, Birmingham B31 2EG.
Birmingham (UoBARS)—Every day, 1pm. Fridays (Club night), Tuesdays (RAE classes). 7.30pm. Club Room, second floor, Union Building. (Midland Bank entrance and follow signs). Sec GW4YEG.
Bromsgrove (BARS)—12 April (Constructors competition), 26 April (Constructors night). 8pm. Avoncroft Arts Centre, Bromsgrove. Club net, 144·850MHz. Sec G6EAM, tel Kingswinford (549) 298580.
Coventry (CARS)—12 April (Night on the air), 19 April ("Making pcbs"), 26 April (Night on the air). 8pm. Scout HQ, 121 St Nicholas Street, Radford, Coventry. Sec G4JDO, tel 73999.
Halesowen (MEB RC)—23 April (AGM). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Hereford (HARS)—5 April ("Radio activity, fact or fiction", G8OHH), 19 April (Informal meeting). 8pm. The Old Goal, Goal Street, Hereford. Sec G3WRQ, tel 0432 54064.
Shropshire (Salop ARS)—11 April (Construction Competition). Thursdays, 8pm. Old Bucks Head, Frankwell, Shrewsbury.
Solihull (SARS)—16 April (Leicester repeater group talk). 7.30pm. The Manor House, High street, Solihull. Sec G8AYY, tel 021-783 2996.
Stafford (S&DARS)—9 April ("Talk", G3BA), 30 April ("Dog handling", Constable Wilson). 8pm. Coach and Horses, Pasturefields, Staffs, Sec G4RSW, tel 0785 46306.
Stratford upon Avon (S-upon-A&DARC)—22 April (Visit to Rugby radio station). Second and fourth Monday in each month, 7.30pm. The control tower, The radio station, Bearley, Nr Stratford. Sec G8OVC, tel S-on-A 750584.
Sutton Coldfield (SCARS)—22 April (PCB making). Second and fourth Mondays in each month, 7.30pm. Public Library, Sainsbury Centre, Sutton Coldfield. Sec G3CNV, tel 021-354 4369.
Tamworth (TARS)—1 April (UHF on the air), 8 April ("Raynet"). 8pm. Rugby Club, Cotton Green, Tamworth. Sec G4SRI, tel 0827 68137.
Telford (T&DARS)—3 April (AGM), 10 April (VHF field day planning), 17 April ("Test equipment demo", G8INA), 24 April (Construction contest). 7.45pm. Community Centre, Dawley Bank, Telford. Sec G6XUF, tel 0952 770568.
Walsall (WARC)—Wednesdays. (A lot of activities are planned, please join in.) 8pm. Forest Comprehensive School, Bloxwich. Sec G46HZI, tel 0922 32607.
Wolverhampton (WARS)—2 April ("SSB generation by the third method", G6UDX), 12 April (144MHz df hunt), 16 April (General meeting), 23 April (Wolverhampton repeater group), 30 April (Home built Equipment Competition). 8pm. Electricity Sports Club, St Marks Road, Chapel Ash, Wolverhampton. Sec K Jenkinson, Tel 0902 24870.
Worcester (WARC)—1 April (Construction Contest, at the Old Pheasant), 15 April (Informal night), 29 April (Topic to be announced). 8pm. Sec G4RBD, 14 Oakleigh Heath, Hallow, Worcester.

Members of the Maltby ARS at their annual junk sale. Also in the photograph is the sponsored scarf knitted by Bev, G1DUY, which raised over £50 for club funds

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ Tel Derby (0332) 556875.

Bolsover (BARS)—10 April ("The story of microfilm", G1GNC), 17 April (Angel Pub, natter night), 24 April (First df hunt team event). 7.30pm. The Angel Hotel, Bolsover. Sec Ian Mellors, G4WCX, tel Mansfield 811129.
Buxton (BARS)—9 April (Open forum), 23 April ("GB3SF repeater", G3RKL). 8pm. Haddon Hall Hotel, London Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.
Derby (D&DARS)—3 April (Junk sale), 10 April ("Electric cars", G3URU), 17 April ("Severn-Trent radio systems", Mr Potter), 24 April ("Flying helicopters", Brian Hopper), 1 May (Junk sale). 7.30pm. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Grantham (GRC)—16 April (Quiz night). 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton. G8WWJ, tel Grantham 65743.
Grimsby (GARS)—4 April ("Communications with aliens"), 18 April (CW operating). 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec George Smith, G4EBK, tel Grimsby 887720.
Loughborough (L Falcon ARC)—12 April (Junk sale), 19 April (160m df), 26 April (TBA). Brush Sports and Social Club, Fennal Street, Loughborough. Details G4DZL, c/o the club.
Mansfield (MARS)—5 April ("VHF then and now", G5UM, and constructors contest). 7.30pm. Victoria Social Club, Princes Street, Mansfield. Sec Keith Lawson, G4AAH.
Melton Mowbray (MMARS)—4 April (AGM), 11 April ("Transistor testing", G3YUT), 18 April (Activity night), 25 April (Talk, G3KDQ). Woodthorpe House, Mansfield Road, Nottingham. Sec Jim Towle, G4PJZ, tel Nottingham 624764.
Spalding (S&DARS)—12 April ("Air traffic control", G3PLL). 7.30pm. The Ship Albion, Albion Street, Spalding. Sec Betty Whitley, G4ZGT, tel Spalding 2781.

At the annual dinner of the Buxton ARS, whisky goblets and life membership certificates were presented to Mike, G4HEU, and Gill, G4UAN, for services to the society. Front row, l to r: G4HEU; G4UAN; Gordon, G6MDK, chairman; and Dave, G6MIF, secretary

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515 or at work on 0582 21151.

Bedford (B&DARC)—This club now has a new venue: The Queens Engineering Works Social & Recreation Club, Hurst Grove, Bedford. For further details contact Sec Julian W Wanden, G8ATI.
Cambridge (C&DARC)—12 April (2 metre df hunt), 19 April (Informal evening), 26 April (Quiz evening). Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge. Sec D M Leary, G8JKY, The Farmhouse, Blackers Hill Farm, Lowndes Drove, Needingworth, Cambs PE17 4NE.
Dunstable Downs (DDRC)—12 April ("Solar factual data", G8AFN), 26 April ("The best of QSL"). 8pm. Chews House, High Street South, Dunstable. Sec P A Morris, G6EES.
Leighton Linslade (LLRC)—15 April (TBA—any takers?). 7pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard.
Milton Keynes (MK&DARS)—3 April (Technical topics), 10 April Club closed (Easter Holiday), 17 April (Natter night), 18 April (Quiz at Northampton Radio club), 24 April (TBA). The club now meets at the Community Centre, Hodge Lea Lane,

Hodge Lea, Nr Wolverton, Milton Keynes. Sec David White, G3ZPA.
Nene Valley (NVRC)—Wednesdays, 8pm. Dolben Arms ph, Finedon, Near Wellingborough, Northants. A new sec has been appointed, John, G4XEN.
Northampton (NRC)—4 April (lecture on "Raynet and emergency planning", Keith Howell, G4YKE), 18 April (Quiz with Nene Valley Radio Club). 8pm. Kingsthorpe Community Centre, Thorntons Park, Kingsthorpe, Northampton. Sec G6XKT. 35 Knightscliffe Way, New Duston, Northampton NN5 6DF.
March (M&DARS)—9 April (Visit by regional representative G3DOT). 7.30-9pm—unless centre is closed for holidays. Neale Wade Adult Education Centre, Station Road, March. Sec V Cracknell G4KPZ.

REGION 6—RR F S G Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRC)—2 April (TBA), 16 April ("23cm and 13cm, how to get started", G3OOS), 30 April (Cheese and wine social evening, tickets £3, all members, wives and visitors are welcome). 8pm. Haydon Hall Community Hall, Dickens Way, Aylesbury. Details Cathy Clark, G1GQT, tel Kingston Blount (0844) 51461.
Banbury (BARS)—The society have planned a whole range of visits, lectures, and contests, df hunts, for the coming year, not only of interest to club members, but other local amateurs. Details Sec John Burrell, G8OZH, QTHR.
High Wycombe (CARC)—Please contact sec G3NCL, tel High Wycombe 712020, or chairman G4CYR, tel Radage 9826, for details of all coming events.

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Leatherhead, Surrey. KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—8 April, (Natter night and construction evening), 25 April (AGM). The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec Bob Crane, G4PHS, tel 01-977 4157.
Bexleyheath (North Kent RS)—2 April (Junk auction). 16 April (AGM). 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec J R Frampton, G6CUE, tel 01-309 7214.
Biggin Hill (BHARC)—16 April (Souvenir evening). 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. Sec Ian Mitchell, tel 09598 376.
Coulsdon (CATS)—15 April (Date change) ("SSB project and theory"). 8pm. St Swithuns Church Hall, Grovelands Road, Purley, Surrey. Sec Alan Bartle, G6HC, tel 01-684 0610.
Cray Valley (CVRS)—4 April (Construction contest), 18 April (AGM). 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec P Clark, G4FUG.
Croydon (SRCC)—1 April (AGM). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon, Surrey. Sec John Simkins, G8IYS, tel 01-657 0454.
Crystal Palace (CP&DRS)—20 April, ("What am I doing with my computer", G8OTG). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec Geoff Stone, G3FZL, tel 01-699 6940.
Sutton and Cheam (S&CRS)—19 April, ("Tape recording", M Cummings). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec Alan Keech, G4BOX.
Thames Ditton (TVARTS)—2 April (Equipment and components sale). 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec R Muir, G3LHN.
Wimbledon (W&DRS)—12 April (General activity evening). 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G Cripps, G3DWW.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—Thursdays (except during school holidays). Marle Place, Burgess Hill. Details from new club secretary Mr C R Cook, GIFRF, tel 07918-2937.
Canterbury (UoKARS)—Tuesdays, 7.30pm. This club now has a new purpose built shack located beside the "Oast House" on the playing fields beside the Parkwood residences. They are, or soon will be, active on nearly all amateur bands, and the club equipment is extensive. Prospective new members will be made most welcome. New club secretary Bruce Nicholson, G4SAY.
Chichester (CARC)—2 April ("QRP", Chris Page, G4BUE in the Long Room). 18 April ("Xerography", Mike, G4TSQ, in the Green Room). 7.30pm. Fernleigh Centre, 40, North Street, Chichester. Details from Chris Bryan, G4EHG, tel Chichester 789587.
Crawley (CARC)—10 May (Advance notice of CARC annual dinner, Goffs Park Hotel, Crawley). Trinity United Reform Church Hall, Ifield, Crawley. Details from Dave Hill, G4IQM, tel Crawley 882641.
Dartford (DDFC)—9 April (Pre-hunt meeting at Horse & Groom). 15 April (Club hunt). Pre-hunt meetings (Tuesdays), Horse & Groom ph., Leyton Cross, Dartford Heath, Dartford, Kent after 9pm. Further details from Pete, G8DYF, tel Greenhithe 844467.
Canterbury (East Kent ARS)—4 April (Talk and dem by G6VRI), 18 April (Natter night). 7.30pm. The Cabin Youth Centre, Kings Road, Herne Bay. Details from new Secretary Mike Bryant, G6TRM, tel 02273-69454.
Gillingham (Bredhurst R & T S)—4 April ("Construction of printed circuit boards", Dave G4GIK), 11 April (Construction night), 18 April (Dem of uhf equipment, Fred, G8WQM), 25 April (Construction night). 8pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham, Kent. Details from John Scott, G4ZTF, tel Medway 374670.
Eastbourne (Southdown ARS)—1 April (Surveillance satellites), 7.30pm. Chaseley Home, Southcliff, Eastbourne. Meetings also held on Tuesdays and Fridays of each week at Wealden District Council Offices, Vicarage Fields, Hailsham. Details from Sec Mr R Wilson, G1BAB, tel Eastbourne 890234.
Hastings (HERC)—17 April (Junk auction), 8pm. West Hill Community Centre. As other meetings are held during the week, contact sec, Dave Shirley, G4NVQ, tel Hastings 420608 for further details.
Swale (SARC)—15 April, ("This is amateur radio", Talks and demonstration of various types of amateur radio equipment", this will be in the form of an open club evening intended for people considering amateur radio as a hobby). 7.30 for 8pm. The Ivy Leaf Club, 52, Dover Street, Sittingbourne. Details from Brian Hancock, G4NPM, tel Minster 873147.
Tunbridge Wells (West Kent ARS)—19 April (Club AGM), 7.30 for 8pm. Adult Education Centre, Annexe, Quarry Road, Tunbridge Wells. Details From Brian Guinnessy, G4MXL, tel after 7pm. 0892-32877.

Many thanks to all the clubs that send me copies of their News Letters/Mags. etc. However, please note, that forthcoming events, if mentioned, are often too late for inclusion in 'Club News'. No doubt, some clubs are concerned that they are not appearing in 'Club News' even though they send me their Newsletters. Therefore, please check that forthcoming events are mentioned (if any), and that they are received in time for publication.
Mike RR8

REGION 9—RR A H Hammett, G3VWK Rosehill, Ladock, Truro, Cornwall TR2 4PQ.

Exeter (ARS)—15 April (Talk on fault finding and circuit testing), 7.30pm. Community Centre, St Davids Hill, Exeter. Details Roger, G4KXR.
Torbay (ARS)—Fridays, EEC Social Club, Ringslade Road, Highweek, Newton Abbot. Club net on Mondays, Wednesdays, Fridays and Saturdays, freq. 3·755MHz. Sec Brian Wall, G1EUA, 48 Pennyacre Road, Teignmouth, S. Devon.

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF5 7RS. Tel 0222 810368.

Abergavenny & Nevill Hall (A&NHARC)—Thursdays, 7.30pm. Pen-Y-Fal Hospital, above male ward 2, Abergavenny. Regular morse classes every week. Please note that due to illness Mr D Jones, GW3SSY has resigned, new club sec is Mr J B Davies GW4XQH, tel 0873 4655.
Bristol Channel Repeater Group (GB3BC)—19 May. (AGM), 2.30pm. Tyrhiw Community Centre, Taffswell. Leave the M4 at junction 32 and head for Taffswell. Sec Roy Sellek, GW6MBU, 12 Norseman Close, Rhoose, tel Barry 711146.
Cardiff (CRSGBG)—1 April (To avoid Easter Monday) (A talk about the weather by "A man from the Met.") 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP. tel Cowbridge 3212.
Chepstow (C&DARS)—9 April (Free night and discussions). 7.30pm. Club net every Sunday at 8pm. 2 metres fm. Chepstow Leisure Centre. Sec Alam Purnell, GW6NJY. QTHR.
Newport (NARS)—Coach to NEC £4.50, places available on 13/4/85. The trip to Lundy progressing, dates confirmed 5/10/85 to 12/10/85. All bands. Mondays 7pm. Brynglas House, Brynglas Road, Newport. Sec Dudley GW6ZUQ. tel 02912 6876.
Swansea (SARS)—18 April (Visit to South Wales Electricity Board systems operation centre, Swansea, conducted by Phil GW4HAT, Rob, GW4BCC, and Neil, GW1AUT). 6.30pm. The visit will take in telecommunications control and distribution, microwave systems. Members are strictly limited to 15, but another visit should be possible on a later date if demand is exceeded. 7.30pm. Lecture Room N, Applied Sciences, Swansea University. Details Roger, GW4HSH, tel Swansea 404422.

I am again pleased to report that we have an area rep. for the Carmarthen area. A. F. Dowling, GW3GUE. Congratulations and thanks.
John RR10 73.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Bangor (The Dragon RC, GW4TTA)—First and third Mondays in each month. Bangor Rugby Club. Sec W Williams, 31 Ty Groes Estate, Llanfair PG, Anglesey, Gwynedd LL61 5JR, tel 713941.
Colwyn Bay (Conwy Valley ARC)—11 April ("The use of the gdo", GW3JGA), 8pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J N Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.
Deeside (A&DARS)—Alternative Mondays, 8pm. Shotton Social Club, Shotton Lane, Shotton. Sec G C Cook, GW4RKX, 20 Eccleston Road, Kinnerton, Chester CH4 9DY, tel 0244 660066.
Porthmadog (P&DARS)—18 April (Video, RSGB), 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadoc. Sec Mrs L Jones, GW4WKQ, Henllys Bach, Llanbedrog, Pwllheli, Gwynedd LL53 7PG, tel 0758 740445.
Rhyl (R&DARC, GW4ARC)—1 April ("Equipment demo", G3LEQ), 15 April (Activity night). 7.30pm. The Mona Hotel, Market Street, Rhyl. Sec M Allington, GW1AKT, 13 Bronalth, Groes, Denbigh, Clwyd LL16 5RT, tel Nantglyn 469.

REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH.

Aberdeen (ARS)—5 April (Junk sale). 7.30pm. The Club rooms, 35 Thistle Lane, Aberdeen.
Caithness (CARS)—Programme details from new secretary, Dave Lindsay, GM1AHC, 83 St Andrews Drive, Thurso, tel 0847 63638.
Elgin (Moray Firth ARS)—Pre-arranged dates. Details from new secretary A J Wills, GM4IZY, 23b South Guildry Street, Elgin, tel Elgin 41549.

At the time of writing (late Feb) the total support for the coach to the NEC convention amounts to one phone call and one letter, which hardly justifies the enquiries made, let alone the cost of the bus. Pity since at around £20 return it must be the cheapest transport to the NEC from this part of the world.

On a brighter note, the planning for the convention, SARCON '85, to be held in Dundee on Sept 21, at the College of Education, is going well with a very good response from traders both north and south of the border (some 20 positive replies already). Any traders who wish to attend and have not yet received an invitation please contact GM4DQJ QTHR (phone 0738 52477) or RR12. Space is also being made available for clubs/repeater groups etc. Please write to RR12 if you're interested.
RR12.

REGION 13—RR A Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Berwick on Tweed (BARS)—19 April ("Test instruments and measurements"), 3 May ("Demo-antennas"), 12 May ("Cubical quads"). 8pm. Tweedview Hotel, Berwick on Tweed. Details Stan, G1IUK, tel Berwick on Tweed 305465.
Glenrothes (G&DARC)—21 April (TBA), 19 May ("Talk and film, RAF Leuchars air-sea rescue flight"). 7.30pm. Provosts Land, Leslie, Fife. Details Jim, GM4TNP, tel 755958.
Kelso (KARS)—5 May (Anglo Scottish Rally). 11am-5pm. Tait Hall, Kelso. details Andre, GM3VLB, tel 24664 evenings.

Some members at a recent meeting of the Ayr ARG. L to r: Leo, GM4/N6ITL, who spends six months in California and six months in Ayr; Jack, GM3KJF, with the Jock Wyllie Trophy; Jack, GM3MHG, with his HA-DX Certificate; and Bill, GM3KGT, a senior member of AARG. *Photo:* GM4PPT

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Eldersile, Strathclyde PA5 9AD. Tel Johnstone (0505) 22749.

Ayr (AARC)—19 April (Visit to the IBA transmitting station, Blackhill). No meeting at Leisure Centre. Details GM3THI, QTHR.

Dumfries (Maxwelltown ARK)—1 May (Visit and talk, GM4FDM). 8pm. Tam O'Shanter Inn, Queensbury Street, Dumfries. Details GM4NNC, QTHR.

Glasgow (West of Scotland ARS)—11 May (Glasgow amateur radio exhibition, Cardonald College of Technology, Trade stands, talks, exhibits etc, 11am–5pm). Talk-in S22 Fridays (CW classes available). 7.30pm. Details, tel Ian, Brediland 2708.

Motherwell (Mid-Lanark ARS)—12 April ("DF techniques and construction of df antenna", GM4OYK). 7.30pm. Fridays, weekly (CW and RAE classes). Wrangholm Hall, Jerviston Street, Motherwell. All club secretaries note, final nominations for the GM3EHI Trophy should be in the hands of the secretary by 2 April. Details Anne, GM4UXX, QTHR.

REGION 16—RR A Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA. Tel 0473 51319.

Bury St Edmunds (BstERS)—16 April ("Amateur radio awards", Alan, G4HMF). 7pm. The Guildhall, Guildhall St, Bury St Edmunds. Details John Munro, G3GBB, 29 Angel Hill, Bury St Edmunds.

Colchester (CRA)—18 April ("Packet radio", Peter Robinson, G3MRX), 2 May (NFD and Anglian Rally planning). 7.30pm. Colchester Institute, Sheepen Road, Colchester. Sec Frank Howe, G3FIJ, tel 0206 851189.

Ipswich (IRC)—10 April (Repeater group meeting), 24 April (AGM), 8 May (df hunt). 8pm. Rose and Crown, Norwich Road, Ipswich.

Leiston (LARC)—2 April (RSGB with zonal rep and regional reps), 18 April ("Planning a wavemeter project"), 7 May ("How to build a multimeter", G8AXD). 7.30pm. Sizewell Sports and Social club, St George's Avenue. Third Tuesday, 7.30pm, (practical evening), at Main Street. Sec G6ORK, tel Leiston 831597.

Vange (VARS)—4 April (Junk sale), 11 April ("Cellular radio", G6DAE), 18 April ("British Rail", G3IOI), 25 April ("Army cadets", G4VZF), 2 May (No meeting). 7.30pm. Barslable Community Centre, Basildon, Sec Mrs D Thompson, 10 Feering Road, Basildon SS14 1TE.

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.

Basingstoke (BARC)—1 April ("Raynet", G3KWU), 8pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Please note change of day and location. Sec G4WIZ, tel Tadley 5185.

Bournemouth (BRS)—5 April (Natter night), 19 April ("Troposcatter", G3YGF). 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel (0202) 877945.

Devizes (D&DARC)—5 April ("The RSGB", G3KWU). 8pm. Football Club Social Club, Nursteed Road, Devizes. Sec G3MQD.

Eastleigh (Itchen Valley ARC)—12 April ("HM Coastguard" by an officer of the service), 26 April ("The beginnings of satellites" G3WPI). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Sec G6DIA, tel (0703) 863039.

Farnborough (F&DARS)—10 April (Bring and buy sale), 24 April ("Amtor" G4CJO, and G4EMR), 8 May ("HF contest operating"). 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G4MEE, PRO G4MBZ, tel Farnborough 837501.

Fareham (F&DARS)—3, 17 April (Natter nights), 10 April ("Home brew aerials", G4ITF and G4ITG), 24 April ("HF receiver project", Mr Sinclair). 7.30pm. Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham 234904.

Horndean (H&DARC)—1 April ("Working mobile suppression)", G4DIU) 8pm. Merchiston Hall, London Road. PRO G4BEQ. QTHR.

Liphook (Three Counties ARC)—17 April)"Kit construction" by Wood & Douglas), 1 May ("Horizontal fm," G4RRA). 8pm. The Railway Hotel, Liphook. Sec G3TBT, tel Passfield 368.

Waterside (WSWC)—23 April (AGM). 7.30pm. Fawley and District Community Centre, Blackfield, Southampton. Sec G6DLJ. QTHR.

Weymouth (SDRS)—2 April (AGM). 7.30pm. Army Bridging School, Wyke Regis. Sec G6KHD, QTHR.

Wimborne (FRARS)—7 April (Natter night), 14 April (Constructors Trophy), 21 April (RSGB video), 28 April ("The amateur in astronomy", Colin Pither). 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8ZLH, (0202) 570894.

Local affiliated clubs are invited to contact G8ZLH if they would like to stage a demonstration of amateur radio at this year's hamfest on 11 August.

REGION 18—RR Ian Gibbs, G4GWB, 61 The Gables, Widdrington, Morpeth NE61 5QZ. Tel 0670 790090.

Aycliffe & Shildon (ARC)—2 April ("ATV Slowscan"), 9 April ("HB9CV antennas"), 16 April ("Domestic TV's," Don, G4GEA), 23 April ("Computer graphics," Peter, G4HBG). 8pm. Sunnydale Leisure Centre, Shildon, Sec Ernie, G3LUC, tel 0388 774466.

Berwick (Borders ARS)—5 April (Normal meeting), 19 April ("Test instruments and measurements"). 8pm. Tweed View Hotel, Tweed St., Berwick. The Galashiels Rally takes place 5 May. Sec Mr S Jones, G1IUK. Tel Berwick 305465.

Consett (Derwentside ARC)—1 April ("GB3TW repeater"), 15, 22 April ("Natter night). 7.30pm. Consett Assocn Football Club, Belle Vue Park, Consett. Sec June, G1AAJ, tel Lancaster 520477.

Easington (ARS)—Tuesdays & Thursdays, 8pm. Easington Village Workmens Club, Seaside Lande. RAE & morse tuition as and when requested. The 70cm Repeater Group is gathering momentum, interested persons contact either G6CVJ or G6LMR. Sec John, G4LOM.

Hazelrigg (North East R & CC)—Mondays, 7.30pm. Hazelrigg Village Hall, Newcastle on Tyne. RAE & morse tuition in progress. Information from George, G1HDV. Tel Newcastle 2742413.

Morpeth (Northumbria ARC)—Thursdays, 7.30pm. Old Telephone Exchange, Cresswell Road, Ellington. New club sec David, G6IIA, Tel Morpeth 513026.

Sunderland (ARS)—Mondays, The Brewery, Westbourne Road. Sec J A Budd, G4WMW.

I would like to take this opportunity to ask those club secretaries in my region who have not replied to my letters to do so, without their club information I am unable to compile a comprehensive list of the regions activities for "Club News"

Ian, RR 18

REGION 19—RR R J C Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—10 April (Natter night), 17 April ("BBC OB communications," G3OJI), 24 April ("Natter night/RAE revision"). 8.15pm. The Church Rooms, Church Lane, Wormley, near Cheshunt, Herts. Sec Roger, G4OAA, tel 0992 464795.

Chiswick (ABCARC)—16 April ("80 QRP at a restricted antenna QTH", G4HMC). 7.30pm. Chiswick Town Hall, High Road, Chiswick, London W4. Sec W Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—11 April (Informal), 25 April ("Operating techniques", G3SJE), 8pm. 145 Orange Hill Road, Burnt Oak, Edgware. Sec G4RMD, tel Hatfield 64342.

Ealing (E&DARS)—16 April ("Dxing and hf awards", G3GIQ). This club is back at its old venue and welcomes all radio amateurs and visitors. Northfields Community Centre, 71a Northcroft Road, London W1B. Sec Anton Berg, tel 01-997 1416.

Grafton (GRS)—12 April ("Coils and capacitors", G3MCD), 26 April (Junk sale), 8pm. Five Bells Pub, East End Road, East Finchley. Details G4RPX, QTHR.

Havering (H&DARC)—3 April (Quarterly business meeting), 10 April (Informal), 17 April (Videos "W5LFL space shuttle" and "G3EUR, BBC SOE"). 24 April (Informal). 8pm. Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex. Sec G1HGQ, tel 04024 41532.

Harrow (RSH)—12 April (Junk sale), 19 April (Activity night-top band), 26 April ("Listening in", G3WCB). Morse classes held on activity nights. 8pm. The Harrow Arts Centre, High Road, Harrow Weald. Talk-in on GB3HR (RB14). Details G8XBZ, tel Rickmansworth 779942.

London (CSARS)—1 April (AGM), 13 April (Lunchtime natter). Civil Service Recreation Centre, Monck Street, London SW1. Details C P Woolley, 195 Conisborough Cres, London SE6 2SF.

Southgate (SARC)—11 April (Junk sale). 8pm. St Thomas' Church Hall, Prince George Avenue, Oakwood, London N14. Details G4OBE, QTHR.

St Albans (Verulam ARC)—9 April (Informal), 23 April ("Amtor", G3NRW). 7.45 for 8pm. RAFA HQ, New Kent Road, St Albans. Sec Hilary, G4JKS, tel St Albans 59318.

REGION 20—RR N F O'Brien, G3LP, 26 Southfield Road, Gloucester GL4 9UD. Tel 0452 34890.

Bath (B&DARC)—3, 17 April, 1 May, 8pm. Englishcombe Inn, Englishcombe Lane, Bath. Club Station G4TMH regularly operating. Full details Colin Ashley, G4UNN, tel Frome 63939.

Bristol (BARC)—2 April ("Specialist video"), 9 April ("Club management meeting"), 16 April ("Night on the air"), 23 April ("Computer night"), 30 April (tba). 7.30pm. YMCA, Park Road, Kingswood, Bristol. Details from D Gulley, G4YOC, tel Bitton 4116.

Bristol (BRSGBG)—29 April, 7.30pm. Small Lecture Theatre, Bristol University. Details from Brian Goddard G4FRG, tel 0272 848140 or Tony Capel, G4ROX, AR on 0272 513573.

Bristol (South Bristol ARC)—3 April ("Lecture—10GHz equipment", Glen Ross, G8MWR), 10 April ("QRP 2 metre cw activity night", David, G4WRW), 17 April ("Start of club vhf dx contest"), 17 April ("Computer night", John, G4WOD), 24 April ("Microwave workshop", Kevin, G2BDZ), 1 May ("Lecture—slow scan television", Bert, G2BAR). 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurce, Bristol BS14 0LN. Details from Len Baker, G4RZY, tel 0272 834282.

Cheltenham (CARA)—12 April (tba). 26 April ("Natter night"), 29 April (Quiz at Worcester Club). 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from Tim Kirby, G4VXE, tel 36723.

Cheltenham (Smiths Industries RS)—4, 18 April, 2 May, 8pm. Club House, Newlands, Bishops Cleeve. Full details from Roger Hawkins, G8UJG, tel Bishops Cleeve 2175 or Bishops Cleeve 3333 ext 2511.

Gloucester (GARS)—3 April ("Construction contest"), 17 April ("Visit to Allied Mills, Tewkesbur"). 7.30pm. St John Ambulance Headquarters, Heathville Road, Gloucester. Full details from Nick Negus, G6AWT.

Portishead (Gordano ARG)—24 April (AGM),

7.30pm. Ship Hotel, Down Road, Portishead. Details from John Davies, G3LJD.
Shirehampton (SARC)—Fridays 7.30pm. Twyford House, High Street, Shirehampton, Bristol. April programme includes construction contest, field days and how to win them, 144MHz df hunt. Details from Ron Ford, G4GTD.
South Cotswold (SCARS)—3 April, 17 April, 1 May, at new premises, Nelson School, Stratford Lodge, Stroud. Sec. P R Gainey, G1DCT.
Street (S&DARS)—2 April (AGM). Wessex Hotel. Details Colin Webber, G4SCD.
Weston-super-Mare (WsMARS)—15 April (RSGB video "Secret Listeners" and discussion of plans for Field Day). 7.30pm. Club net every Thursday 8pm on 28·725MHz with G3GMC net control. Rugby Club (off Drove Road), Weston-super-Mare. Details from Dave Restrick, G4/KAONGP, tel W-s-M 28482.
Yeovil (Y&DARC)—11 April (AGM), 18 April ("Mutual coupling between aerials" G3MYM), 25 April (Natter night), 2 May ("The Yagi aerial", G3MYM). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details from Sec Eric Godfrey, G3GC, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £2 for 40 words or less: advertisements containing more than 40 words will cost an additional £2 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

The closing date for the **June 1985** issue is **Wednesday 17 April**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Yaesu FT980 gen cov tx/rx, exc cond, 15 months old, £925 ono. GM4TNW, QTHR. Tel 0968 77363.
Realistic DX300 communications rx, 10kHz to 30MHz, digital display, manual, original packing, unmarked, no mods, buyer collects, £100. Tel Merseyside 051 525 6152 evenings.
Disc drive believed wkg, realistic offers. G6VBJ, QTHR. Tel 01-310 5123 home, 01-283 1880 work.
KW201 rx, £80. GEC BRT400, £50. HRO with boxed set of coils, £40. *Wanted* Compass rx type AN/ARN-6. A H Baker, 34 Wenny Estate, Chatteris, Cambs PE16 6BA.
Oscilloscope, Scopex 45-6 6MHz single beam, as new with handbook and probe, £45. G1CRB, QTHR. Tel 0203 413350.
RTTY complete tx/rx unit, home or portable, requires 13·8V, all leads to connect to your tx/rx, tv, cassette player, 2×81 16K ram based, still usable as computer, (Software included), built into professional intercom keyboard, £100 ono. G4OAK, QTHR. Tel 09066 5151.
Belcom liner 2 with Belcom psu, gd cond, £75. Colour Genie computer 32K with technical manual and software, £150 inc postage if required. H L Hall, G6JLB, 1 Dodmoor Grange, Randlay, Telford, Shropshire TF3 2AW. Tel 0952 594959.
Trio TS130S, mounting bracket, cw filter, 1·8kHz filter perfect wkg order, £445 ono. *Wanted* Linear L4B, SB200, SB220, TL911, TL922. G4YUV. Tel Rugby 0788 79067 day, or 0788 817369 after 6pm.
Icom ICR70 rx, mint cond, £450. Yaesu FRT7700 atu, £25. Both in original packing. Tel Ian, Glasgow 041 638 0329 after 6pm, not Sundays.
TS130E, PS30, AT130, VF120, SP120, mobile mount, all boxed, Welz CP5 vertical, £600 ono. G4SBE, QTHR. Tel 0704 37248.
TR9130 cw BO9A base, £350. FT790R cw MML432/30-L, £350. G4AQK, QTHR. Tel Swindon 825748.
TR2300 2m fm, case, nicads, carry strap charger, mains power pack, £100. Buyer collect. 60ft tower, three section lattice, £300. Buyer collect from Middlesbrough, Cleveland. Tel Thirsk 0845 567249 after 6pm, or Eston Grange 0642 456327 day.
FT101ZD hf tx/rx, Warc 9-band a.m., fan, mic, manual, mint cond, £425 ono, Securicor £15. SSM Z-match, instructions, £30 ono. Philips N1700 video recorder, three tapes, leads, as seen but will demonstrate, £40 ono. G4BLT, QTHR. Tel Wakefield (0924) 255515.
Used Icom IC290E, £250. Brand new and unused Yaesu FT680, offers. Brand new, boxed, Yaesu FT230R, offers. New (unboxed), FT730R (Japanese repeater shift), plus Tokyo 45W vhf linear. John Richards, G6BWJ. Tel 01-390 2271.
MZ80K as new, £200. MX80B with single disk drive, £795. Watkins tape echo unit, £30. Realistic PB car radio, never used, £7. Three inch reflector telescope, with tripod, unwanted gift, £175. Advance sig gen, £40. GW3UOO, QTHR. Tel Buckley (0244) 542595.
Collins S line 75S-3B rx, 325-1 tx, 516F-2 pu, winged emblem spare pa tubes, £450 ono. G3FZG, QTHR. Tel Penketh 2403.
ICB1050 converted to 10m, £25. Optical shaft encoder Bi-phase 100 ppr o/p, suit digital tuning, £8 each with data. G4IOK. Tel Chris, Witney 4867.
Racal MA79 with manual, offers. G3XIX, QTHR. Tel Felixstowe 275676.
TS120S, £310. MB100, £10. TS30, £65. All boxed. Strumech Versatower ground post, 13in bottom section, winch etc, makes galvanised 30ft tilting tower, £130. Datong RF clipper, £25. *Wanted* Bencher paddle, Gem quad, 3-500Z, TL922. Tel 0565 873205.
Acorns "View" rom, plus books, £25. BBC bitstick cad system, cost £374, as new, £200. Post free. MM144/1296 1·5W transverter, as new, worked "GM" from "GJ", £135. Post free. GJ4ICD, QTHR.
Icom 251E as new, no mods, in original package, £400 or near offer part ex FTV707 or four metre equipment. Tel 01-370 1185.
Yaesu 21002, used little, £425. Yaesu FV901DM scanning, vfo, £100. Genuine reason for sale. GIKSQ, Mick Oakley, Tel (Beds) 3897 between 5-8pm.
Yaesu FT707 hf rig, with fm, FP707 power supply with built in spkr, FC707 atu, mint cond, £495 ono. Will split or swop for 2m rig. Tel Pete, Blackpool (0253) 28796.
Icom 251E multimode tx/rx, exc cond, original packing, approx one year old, reason for selling, lack of space, for quick sale, £350. GW4RIX, QTHR. Tel 0938 84300, daytime 0938 84477, evenings.
Bargain! TS280FM 50W, 2m mobile, full coverage 144-146MHz in 25kHz steps, auto repeater shift, hi/lo power switching, exc cond, with original packing, handbook etc, must sell, £95. *Wanted* Nascom two keyboard. G8OUU. Tel 01-348 4482.
Standard C8900 slim-line 2m, 10W mobile, nice cond, instruction book, £160. MM 144/30LS linear, new cond, £45. Buyer collect or pays postage. *Wanted* 20A psu. Jeff, G6XRL, QTHR. Tel Poynton (Cheshire) 876192.
Trio 130S (filters fitted), plus psu DS30, mic and DFC230, as new, £300. Yaesu linear amplifier, 21002, as new, £175. Trio 9000 2m multi £200. Trio 8400, 70cm, £220. All as new. GM4OHE, QTHR. Tel Hamilton 423289.
Collins 1KW hf amplifier, £225 ono. SEM atu with 160m, £35 ono. Microwave Modules 2m-10m transverter, £65 ono. Prefer buyer collects. Mike, G4ORP not QTHR. Tel Brighton (0273) 411019.
FTV107R transverter, 2m and 70cm modules fitted, nine months old, as new cond, modified by SMC in January, and xtalled for full UK 70cm repeater operation, includes FRB707 relay box, £375 no offers. Would consider part ex 2m multimode base station, preferably Trio 700G or similar Trio, cash either way. John G4WLD. Tel 01-857 8096.
Trio TR2300 2m fm portable tx/rx, (fitted reverse repeater mod), complete with nicads, charger, carrying case, helical antenna, instruction book, matching VB2300 10W pa MB1 mobile mount, and original packing, exc cond, £140. GM3SIM, QTHR. Tel Elgin (0343) 41901.
FT790, boxed with nicads, soft case, flexible whip, tonna beam, magnetic mount whip, all for, £230. Sony CDP101 compact disc player, mint boxed, with four discs, £400. Tandy model 4, 128K, LPVI, software, £1,200. G4IAC, QTHR. Tel 05645 78218.
ICL VDU 7561, £35. WISU 10ch, £75. PF2FMB, £45. PF2U, £55. Vehicle adapter, £15. Ten-way charger, £10. One-way charger, £7.50. F30FM 12ch, £80. UHF relectometer, £10. Creed model 75, £15. Tape reader, £5. All ono. G8GFB, QTHR. Tel Chorley 72837.
FT480R multimode vgc, £250. Matching 200W linear, vgc, £110. Creed 444 with punch/reader, clean, £20. Colour Genie software rtty, rttyb, £8. Both morse tranceive, £8. Speech synth modules, £30. CP/M software swaps, w.h.y?. Phil G4PHL, QTHR. Tel 0742 882913.
Yaesu FRG7700 communications rx, £200. Yaesu 902 DME tx/rx, £400 ovno. Tel Charing (Kent) 0233 3051.
Trio 4000A dual band tx/rx with voice synth, as new, boxed, £400. G6NLK, QTHR. Tel Tamworth (Staffs) 68913.
Yaesu FR50 rx, 10-80 plus 10MHz calibrator, £70. FL50 tx, cw, ssb, a.m. two xtals, manuals, gd cond, £60. Heathkit variable 400V psu, £12. BC221 calibrator, £12. Buyer collects. G4KYX, QTHR. Tel 0234 211044 after 6pm.
CR100 rx, manual, spare valves, spkr, £25. Top band homebrew a.m. tx, £10. DX40U cw-only tx, manual, changeover relay, vfo, £20. G3SOY, QTHR. Tel Orpington 29791.
Morse tutor Drae, £30. If I passed it must be good. G4WTE. Tel Medway (0634) 221061 evenings please.
ICO2E 2m handheld c/w, spkr/mic, charger, s/case, few minutes use only, £215. (Consider exchange for TR201A in similar cond). Drae 6A

p/s, almost unused, £35. Trio SC-4 soft case for 2500/3500 handhelds, £9. Tel Dunstable (Beds) 0582 606983.

Computer terminal 12 in screen, full typewriter keyboard, RS232 interfaces, tele-typewriter compatible quantity D plugs and cables, hand book, £30, or swop for CR100 rx. *Wanted* Heathkit SB600 spkr unit. Tel Mr Sharp, Swindon (0793) 826325 after 7pm.

Handhelds, Trio TR2500, helical, nicads, AA battery box, £175. Yaesu FT208, helical, nicads, £125. Pye PF1C tx/rx, xtalled RB2, nicads, charger, service manual, £25. NC8 quick charger/psu, £35. G6KEJ not QTHR. Tel Norfolk (03666) 689.

Commodore SX64 portable computer, built-in 5in colour monitor, built-in 5·25in disc drive, all Commodore 64 disc software runs on this machine, still under guarantee, £400 ono. G4VRW, QTHR. Tel Leeds 605662.

Yaesu FT225RD 2m all mode tx/rx, with Mutek front-end, £425. G3ILO. Tel Nailsworth (Glos) 045383 3411.

Yaesu FRG7700 memory antenna tuner, instruction manual, as new, best offer secures. Peter Simper Senior. PO Box 43, Bath, Avon. Tel Bath 311323 day, Bath 26429 evenings.

Computer, Atari 400 16K memory, with data recorder, plus games, software, £90 ono. Tel Lea Valley 713176.

Trio 120S, PSU 30, AT120, SP120, boxed, as new, £395. Marine vhf, 25ch RT525, boxed, unused, with antenna, £185. Redifon GR673, 12ch marine, £60 *Wanted* hf coils for HRO, R1155/54 for spares. G3DVF, QTHR. Tel 0665 602487.

Set of valve characteristics data books, seven different volumes, thousands listed, £10. Valve equivalents data book, £3.50. Service manuals for CR100, R1155, £10.50 each. AR88, £4.50. Others available. Sae enquiries, Mr Small, 8 Cherry Tree Road, Chinnor, Oxon OX9 4QY.

Trio TS780 dual bander, mint cond, £695. Trio TR2500 handheld, mint cond, £195. ST2 base charger for handheld, £40. M/M 144/100S linear, 10W in, 100W out, mint cond, £95. Tel 01-540 3959.

Printer Creed type 75, 230V, 50Hz, and another for spares, £20, for the two. G3MED. Tel Watford (0923) 28678.

Automatic atu, 30-76MHz, 0·5-70W, manual £85. LCL 2740FM, modified to 10m, as new, boxed, handbook, £35. Pye power/reflectometer, 75Ω, 68-174MHz, £10. Pye Cambridge, 6ch, 70-26MHz, fitted, gd cond, £30 ono. Buyer please inspect/collect if possible. G4NCE, QTHR. Tel 021-357 6139.

70cm equipment, Trio TR3200 portable, 10 xtal, two sets nicads, charger, £135. MML432/100 100W linear, £190. 2 × Jaybeam C8 colinear, £50 each. Acorn Electron, brand new, £120. Buyer collects or prepaid carriage. Paul G4UOT, QTHR. Tel 061-789 3089 after 6pm.

KE 2000B hf tx/rx, exc cond, £190 ono. Phil, G4RJI. Tel 051-727 3913 evenings, or weekends.

Racal RA17 rx, 1-30MHz, rack mounting, gd cond, £100. Carriage extra (heavy!). Homebrew QRP, 0·5W, 80m, tx/rx, built around Plessey SC600, cabinet with Eddystone drive, plus 12V stab, pu, £80. J Gray, GM3PLO, QTHR.

21MHz quad, all parts: boom, spiders, canes, £20. Fractional hp motor, 7000rpm, 220/240, vgc, £5. Hunts res/cap bridge, exc, £15. Wide-spaced split-stator capacitor 75pF sections, £5. FB blower 240V, £7. G3AO, QTHR. Tel 0663 50639.

10W h/b tx/rx, 80-10m transistors, built-in power supply 200-240V, twin meters, sturdy base station, suit beginner, most reliable, £118. SSTV monitor, 5in screen, h/b used with above tx/rx, £40. *Wanted* FT101ZD, FT/FP707, G3NXD, QTHR. Tel 0562 850570.

Ultra Loop UL/1000, £10. 2m/BY Jaybeam, £12. N Roussiano, RS36233, 10 Sandleigh Road, Leigh-on-Sea, Essex SS9 1JU.

TRS80 computer 16K, c/w recorder, monitor and programs, £120. Anadex DP8000 printer, £200. Realistic gen cov rx, £45 ovno. *Wanted* atu for Icom 740, telescopic (pneumatic) mast anything over 30ft considered. Tel Windsor 61785, day, 66054 evening.

Icom IC11E 2m base station multimode, with Mutek board, mint cond, £350. Star 700, 100W ssb, hf transmitter, with 700A matching rx, £200. Datong universal rf speech clipper, £25. G6IAI, QTHR. Tel 0323 898929.

Woodpecker blanker, Datong SRB2, as new, £55. G130TV/EI5DI. Tel 0001-953668.

Icom IC2E 2m fm handheld, complete with two ICBP3 and ICBP4 battery packs and charger, Icom service manual cost £10, the lot, £130. GW6ZFF, QTHR. Tel Penarth (0222) 708336.

Printers, Nascom-Imp dot-matrix printer, full Ascii, £98. Teletype RO33, 110 baud Ascii, £20 ono. Creed 7B teleprinter, electronic governor, offers. 2708 Eprom's 50p. CRT's VCR97, CV1596 (Hartley 13A scope), £3. G8ISI, QTHR. Tel Liphook (0428) 723168.

Linear, Yaesu FL2100Z linear amplifier, all new bands, as new cond, in original packing, £450. Tel Bob, Swanley 64356 after 6pm.

Icom IC720 cw and a.m. filters, ICPSIJ mains power supply factory service manual, exc cond, £575. GW4ACO, QTHR. Tel 0492 515240.

Cushcraft AVS vertical, brand new, still in box, £85. *Wanted* HQ-1 mini quad or mini beam in gd cond. Tel 0285 861141 after 5pm.

FT790R, £210. YC355D, £60. R4-C, £275. R7A, £865. Casio Crio calc and print, £12. FT221R front end board, £10. Tel Brian, 0274 497438.

Drake R7 rx PBT notch, exc cond, Beyer phones, Datong AD170, £550. Tel 01-556 2969 evenings or weekends.

Yaesu FRG 7700 with memories, also, FRT7700 atu, little used, £260. Tel 0305 813293.

Transformers, 7V, 20A, secondary, 0-200-220-240V primary, size 5in × 5in × 5in, weight 5kg, two available, £5 each. B2 suitcase radio coils, set of four coils, plus socket, £5. Filter sharp cut-off above 55Mc/s 50Ω 50W plus data, £5 each. G8ZGK. Tel 0608 810126.

FDK multi 700E, 12·5kc spacing, 25W 2m tx/rx complete with mic, manual and mobile mount, mint cond, used little, £150. BL40X 50Ω 1kW balun, £10. 3·5MHz to 150MHz swr bridge, £12.50. G3XSZ. Tel Reigate (07372) 46051 after 7pm, or weekend.

TS700 Trio 2m multimode, 240/12V, 10W o/p, no mods, superior performance to modern portable multimodes for the same price, £210. Delivery free within reasonable distance of Plymouth. Datong D70 morse tutor, immac cond, postage free or deliver around Plymouth area, £37. GJ8SBT. Tel 0534 42258, evenings.

Sharp MZ80K 48K computer as new, with books and software, including morse tutor, rtty, Pascal, M/C code assembler, etc, £175 ono. G4UMN, QTHR. Tel 0373 63939 evenings or weekends.

Cubical quad, Gem quad, three band 20/15/10m, as new, complete with improved hi-power balun, £145 plus carriage. Two Dymar 881 walkie-talkies, cw nicads, both hi-band one converted 2m, £75 each. G3SWC. Tel Rudgwick 040372 2444 evenings.

FT901 FVR transverter, with 70cm, 2m, 4m boards inc handbook, leads, mint cond, £500 ono. G3YRB, QTHR. Tel 01-684 3974.

Icom IC471E 70cm 25W o/p multimode, £650. Yaesu FT290R nicads, case, mobile mount and MML 144/30LS 2m linear (30W), £250. Jaybeam 24-ele parabeam, 70cm and 2M/8-ele quad, £20 each. Tel Stoke-on-Trent (0782) 328561.

PR30 preselector mains by Codar, £10. SWL Lar omni match antenna tuning unit, £30. Broad-band preamplifier by SEM, £5. Tel Mr Wood, Clochen 378.

Sommerkamp FR500, FL500 with spare valves, gd cond, carriage at cost, £190. *Wanted* FT707 or TS130S. GM6JIC, QTHR. Tel 0563 34383.

813s (CV26), brand new, £80 each. Mufax FAX tx, £70. Buyer collects. G3NOH, QTHR. Tel 01-997 4756.

Oscilloscope Cossor D/beam, model 1049 Mk4 with handbook, £60. Buyer collects. BC348R rx 1·5-18mc/s in five ranges, £30. Institution of Electrical Engineers publications in 12 bound volumes, 1926/37, offers. Groom, G3ONE, QTHR. Tel Chelmsford (0245) 361508.

KDK 2030 2m fm tx/rx, full scanning facilities, ten memories and priority channel, complete with up/down mic, mobile mount and handbook, £150. Rotator with 7-el commercial ZL special, £40 or £185 the lot. All in vgc. G4ANW. Tel 0730 61859.

Modem prism acoustic coupled 1200/75, suitable for BBC or similar, £30. G4LID, QTHR. Tel Royston (0763) 43003.

Dragon 32 computer, with rtty transceive program, split screen type A head works without tv, cond as new, with joysticks, basic tutorial and some games, software, £95. G3TSO. Tel Cirencester (028 575) 532.

Philips NI500 vcr, wkg but slight fault, exc video heads, plus three tapes, £20. TI99/4A software, including random morse, locator programs, tv pattern generator, word writer on cassette. *Wanted* Extended basic for T199/4A. Dave, G8PQ4. Tel Oxford (0865) 67165.

FT290R, case, nicads, Mutek front end, mint cond, £200. Alinco 30W 2m linear, £30. Tandy CGP115 four colour plotter, £80. Grafpad graphics tablet, for BBC micro, £80. Apple silentype printer, £80. G6TVS, QTHR. Tel 01-841 8857.

DX302 gen cov rx, digital readout 10kHz to 30MHz, fitted fine tune and xtal ssb filter, usb, lsb a.m., mains and 12V, need cash for new rig, shipped free, £130 ono. G4PVM, QTHR. Tel 09363 6104.

Trio TS130V, TL linear VFO120, SP120 complete line up, boxes, manuals, etc, mobile mount, £475 no split. G whip multimobile, inc 40m, 80m, £35. G4WBW. Tel Alsager 6226 after 7pm.

TR2500, gd cond, spare nicad and charger, £160 ono. G8HNN, QTHR. Tel Worcester 426382 4 to 7pm.

Kenpro KT200EE 2m portable, one spare nicad pack, spkr, mic, carrying case, base charger, mobile charger, all boxed, mint cond, £135 ono. G4SOA, QTHR. Tel 0527 26567. (Redditch, Worcs).

Centronics printer, Dot matrix, thermal, compact, new cond, bargain, £55 (new £220). Ace Telecom 16 memory telephone, internal L/s, £35. Indesit dishwasher, wkg well, £55. Telephone answering machine, battery operated, simple but works, Tandy made, £20. G6ASA. Tel Oxford (0865) 863333.

Standard C58 nicads charger, £200. M/M 144/30LS linear 1/30, £60. FT790 charger, nicads, £190. Alinco 70cm linear, 3/30, £60. SX200 scanner, £190. Hitachi 6500 portable video, camera psu, nicads, little used, £550. G6XRG, QTHR. Tel 04536 5406 after 6pm.

AT230, brand new, £125. MM/144/100S, mint cond, used only pre-amp, cost £149, sell for £95. Jaybeam 48-el 70cm beam, hardly used, £22. Sycamore, 50 Hillcross Avenue, Morden, Surrey. Tel 01-540 3959.

Drake L4B linear very nice cond, TS430 as new. *Wanted* ant rotator, h-duty, must be good. Any Collins radio, only gd cond please. Alpha linear required. Tel Derby 557705.

Sota 144P PA, will accept i/p of 10-20W, max o/p 100W, preamplifier incorporated, complete with instructions, £75. Postage paid. GW4CPZ, QTHR. Tel Cwmbran (Gwent) 06333 67457.

Yaesu FT301D plus FV301, YO301, FC301, FB301, bargain, £399. Yaesu FT77, all extras fitted, £350. FC102, £60. Microwave Modules, MM4000 rtty plus keyboard, £125. Datong FL1, £25. GJ4WNL not QTHR. Tel 0534 25682, 6 to 7.30pm.

Kenwood Trio TR7600 fm tx with RM76 microprocessor, vgc, £150. Not QTHR. Tel Stanford-le-Hope 640357.

Trio TS520SE tx/rx exc cond, complete with mic and handbook, £330. Buyer collects. G3YJH, QTHR. Tel Brownhills (Staffs) 05433 4280.

Teletype, Type 33 with stand paper and manuals, £12. G4BRE, QTHR. Tel Crawley (0293) 25903.

15ft Weston mast, free/st, t/o w/u 31ft. Needs p/p (stands 100mph gale), £250. Buyer collects or exchange for Roman/Greek silver coins, any gold pre-1885 or purchase. Unmounted, undamaged, (pick-up mast). G6LYZ, 107 Hanson Lane, Halifax, West Yorks HX1 4SD.

ICR70 rx, Yaesu atu, ICSP3 spkr, 144MHz converter, D70 morse tutor, as new, bargain the lot, £400. Tel Windsor 56073.

Yaesu FRG7000 communications rx, property deceased swl, four years old, immac cond, can be seen at Hoddesdon, Herts, £210. G3UML, QTHR. Tel 01-202 7071.

20A power supply, variable voltage set 13·8V. Over voltage protection set 14·9V, £50 ono. Yaesu FRG7 2kHz filter, mint, boxed with manual, £150 ono. *Wanted* Icom 251/211 or Yaesu 225/221 with Mutek. Cash waiting. Julian Tether, G6LOH, Highview Culworth, OX17, 2AX. Tel Banbury 768152.

Sem Z match atu immac cond, £20. Osker SWR200, £15. G6NYC, QTHR. Tel 0703 643520.

Rotator 9502B with controller, boxed, £30. 4-ele monobander for 28MHz, £35. GW4VDP, QTHR. Tel Holyhead 2197.

Yaesu FTV107R frame (new) c/w 2m module, suitable for most rigs, £120. *Wanted* 2m mobile rig, 70cm pre-amp, consider exchange. G6YRT not QTHR. Tel Reading 596485 after 8pm or weekends.

FT101ZD Mk3 nine bands a.m. fm cw filter, dc, psu, £450 ono. Eddystone 770R vhf rx, £50 ono. Part built Mapun organ including keyboard, offers. *Wanted* Scanning vhf rx. G4CCN, QTHR. Tel Keats, Felixstowe 693612 daytime, 6529 evenings.

One mains pre-selector, PR40 by Godar, £10. One Lar modules omni-match antenna tuning unit, £29. Tel Wood, Clochen 378.

FT208R 2m h/h keyboard entry. LCD readout, band scan, 10 memories, NC8 psu/charger, two FNB2 nicad packs, YM24A spkr mic, two rubber ducks, FB2A, PA3, MNB-10 bracket, case, strap; exchange for gd hf rig. GM4RPO, QTHR. Tel Tom, 0387 63518.

Exchange. Trio 7500 vgc for equivalent 2m rig with North American channels and repeater shifts. G4LXG, QTHR. Tel 0924 402716.

IC720A, cw filter, mic, etc, mint, £550. IC2E spkr/mic, charger, whips, etc, £110. Pye pocket phones on RBO, £25. Fraser, G4BJM. Tel 0908 567362 evenings.

Westower 2S/FBP 42ft free standing tower. Two section telescopic and tilt over, complete with Kenpro rotator and 2m 10-ele crossed Yagi, £400 ono. Buyer arranges collection. G6KVI. Tel 0621 816105.

Technidyne personal stereo recorder with fm tuner, headphones and case, metal tape facility, little used, £40 only. G3KLY. Tel 021-453 2920 evenings.

Yaesu MMB/2, brand new, unused, mobile bracket, suit FT707/77, cost £17, accept, £8. Tel Rod, 0522-86 523 after 3.30pm.

FT225RD mint, original cond in original packing. Jaybeam, 2M 10XY, several drums UR67, offers please. Steve Woods, G8ZUO, QTHR. Tel 0254 887670 work, 0254 885654 home.

FT790R, nicads and case, auto t/burst, etc, vgc, £210. R4C and extras, £275. G8ESK, QTHR. Tel 0274 497438.

Yaesu FRG7700 rx, FRV7700 vhf transverter, FRT7700 atu, as new, boxed, £300. Adonis compressor mic. Model AM803, YM23 condenser mic, both never used, £25 each. Buyer pays postage. Tel George, 0292 268055.

FT707 exc cond, with cw filter and mobile mount, for quick sale, £299. G3VZJ, QTHR. Tel 024-365 312.

RTTY, Microwave Modules MM4000 with keyboard, £150. 10fm mm 2m to 10m transverter, £75. FT290R, nicads charger, case no-mods, £180. All as new. Exchange 70cm FT708 or w.h.y? G3TXA, QTHR. Tel 01-882 5292 after 6pm.

FT290R, vgc, Mutek, nicads charger, case. £200. G6ZAM, QTHR. Tel Ashford (Middx) 57276.

490E Icom multimode, 70cm, £375 ono. Icom 255E, 25W, 2m, £175 ono. Hitachi portable battery/mains colour tv, radio cassette, £185 ono. Awai 60W micro hi-fi, radio cassette, £200 ono. G8YUR, QTHR. Tel 01-804 0734 after 6pm.

Trio Kenwood R1000 rx, SP70 spkr, mint, KX3 atu, mint, ST1 h/phones, ½ size G5RV antenna, instructions and service manuals, etc, complete receiving station, £230. I will despatch. Jon Kempster, 1 Downs Villas, Park Road, Tring, Herts HP23 6BW.

KW2000B, not used since serviced by KW, extra 10m xtals, Shure 201 mic, £195. G4CDN. Tel 0692 80890.

TS830S, absolutely mint, never used, boxed, £600. Phil Smith, G4TXS not QTHR. Tel 0602 616619.

Yaesu FT225RD, 2m allmode, tx, immac cond, latest Spec Mutek FE board, also original packing etc, manual, Datong processor, Sem preamp, reason for sale, going hf. Sensible offers to Keith. Tel Oldham 061-626 1618 after 6pm.

FT230R 25W fm tx/rx, boxed as new, £195. *Wanted* 2200GX, gd cond, will p/ex for above. G4YZX. Tel 0304 375136.

Adonis MM202FX mobile mic with up and down scanning surplus to requirements, £20. G4XVJ, QTHR as G6LLH. Tel Graham, 0635 298416.

Racal RA17 0·5-30MHz rx, re-valved and aligned, manual, smashing cond, to good home only, can arrange delivery, £180. Please, please, please, have you a heater transformer for 2 × 813, can collect anywhere in GB. G4ILR, QTHR. Tel Cromer 761612 evenings.

Eddystone, model 880, professional gen cov rx, 0·5-30MHz, a bit deaf, otherwise exc cond. A true enthusiast would appreciate this fine equipment, £189. Tel Bob, Luton (0582) 411096.

SSM Europa transverter 28/144 with receive converter built-in, C/with LT psu, especially compatible Yaesu gear, good value, £60. G2BIM, QTHR. Tel 040481 4359.

Sig gen Marconi TF144G, £38. Advance 10-300Mc, £27. Lavoie freq-mtr 375-750Mc, £22. Wave-mtr, class D1, £10. Radar Pat-genr band 1/3, £15. Wayne Kerr bridge, £20. Marconi aircraft rx AD94, handbooks available, Telequipment Seviscope 531, £15. Eddystone dial 898, etc. G6VHI not QTHR. Tel Oxon 06087 2494.

Marconi sig gen TF801D/1/S 10-480MHz, exc cond, £70. Valve voltmeter TF1041B, £10. TF1131 dual trace 50MHz scope (has intermittent fault), £50. TF144G sig gen, £20. *Wanted* TF2300 mod meter and Hilomast. G3NPZ, QTHR. Tel 0329 283736.

All items must go. Nascom 2 cased, gwo, with info, £150. Green screen monitor, £30. Rtty terminal board, cpu controlled with full info and ccts, £40. Dot matrix printer mechanics (new), with all parts needed and ccts, data etc, £40. Hitachi b/w camera, (with lens) and monitor, £125. Shibaden SV700 b/w video recorder wkg. £50. 145MHz, 40W switched tx/rx, PA, £25. S100 computer boards, Eprom programmer, Ram Pcb's cpu boards, tel for details. 19ins rack mount fan, assy (new), with two fans inbuilt, £25. Stereo preamp board complete and with data, £10. Please tel for details and with offers. *Wanted* Circuits etc, for Lier Seigler ADM3A terminal. Simon, G8POO. Tel Stocksfield 0661 843449.

Yaesu FT77 100W, £340. Yaesu FP707 20amp, £95. Trio TS7930, new Xmas, £295. Tono codemaster, cwr 610E, perfect, £130 or exchange all for Trio TS780 2/70cm multimode. G4OLC, QTHR. Tel 0670 855753.

Icom IC271E 25W base station multimode, with Mutek front end board, (fitted by Mutek Ltd), £580. 8amp SMC power supply, £15. Tel 0782 328561.

Trio JR310 rx, £50. MM432 144s converter, new, £15. MM 500MHz counter, £30. 4CX250B vhf base chimney, £15. 4CX250Bs, £4. 4X250Bs, £3. 4X150As, new, £5. Advance psu 24V 10A, £8. *P E* mags, May 79-Nov 83, £10. G4DSC, QTHR. Tel 0765 2230.

FT102 a.m./fm, cw filter, FC102, SP102, mic, little used, for quick cash sale, £730. Collected or Securicor at cost. Demo sked possible. Max, G3WMB. Tel Hoddesdon 0992 460455 weekday evenings, Ware 0920 3564 weekends.

Yaesu FT708R 70cm handheld, with 12V charger and magmount car antenna, £140 ono. Purchase of new QTH forces sale. G6ADF not QTHR. Tel 01-446 5711 evenings.

Yaesu FR101D rx amateur, plus sw broadcast bands, vgc, £195 ono. G6VNU, QTHR. Tel 04446 45182 after 6pm.

Moving QTH, must clear shack/10ft/garage, large accumulation of components, psu's pa's equipment etc, sae list. *Wanted. Hansworthy Wireless Encylopedia.* G8CUB, QTHR.

Small cabin cruiser, Norwegian Morebas 15, fibre glass planing hull, ¼ fibre glass cabin, on trailer with winch, in gd cond, new silver century outboard motor, consider exchange for hf equipment. Letters please, G0AEJ, 23 Trent View, Keadby, Scunthorpe DN17 3DR.

Heathkit SB620 scope, analyser etc, 65. Gem quad 2-ele, £90. Dentron MT3000A atu, £225. Astatic mic, £25. RAF key, £8. Daiwa IR mics × 2, £30. Kenwood ham clock, £45. 12V, 25A psu, £45, and there's more. Tel 07842 57076 after 6pm.

RTTY for £50. Creed 7E teleprinter, plus terminal unit fitted with FSK/AFSK board, computer direct connection facility, buyer to collect. G3WYV, QTHR. Tel Rochdale (0706) 42821.

UR57 75Ω h/duty coaxial 9·5m length, £6. 18m length, £10. Small sig transistor, 2N4123, 15p ea. Tuning inductor, panel mounting, 30-570mH, 75p ea. 2-pole c/o slide switch, 20p ea. TNC plugs (URM43 entry), £1.50p ea. Inductors, miniature, 470mH, 20p ea. *Wanted* KW1000/600. G4GCJ, QTHR. Tel 0908 644253.

70cm Palm 4 handheld, seven xtals, £85. MMT432/144R transverter, attenuators for 3W or 10W i/p, £110. DX200 300kHz to 30MHz, gen cov rx, original packing, £75. Acorn electron with printer interface, software etc, £200. Gary G6TBT, QTHR. Tel 01-995 4701 evenings.

HW100 with some HW101 mods and cw filter. SB650 digital frequency display; SB600 mains psu and spkr, with manuals, leads, package deal, £170 ono. G3TFM, QTHR. Tel Stratford-on-Avon 299400 daytime, 294055 after 6pm.

Complete station. SB104, SB604, psu/spkr, SB634, Console, SB644, vfo as new cond, Shure 444, mic, Datong proc, £400 no split. Datong UCI converter, £75. Tono 7000E, £300. Datong FLI, £30. CGP115 printer, £100. G3LCZ, QTHR. Tel 0642 582738.

IC240, £100 ono. 13cm rx converter, pcbs on duroid, as uhf compendium 3, £20. TWT new, psu, 'N' connectors, freq. unknown, offers. 120ft HJ4-50 Andrew Heliax with connectors 'N', 4CX250B bases, uhf, £20. Bob, G8NCT not QTHR. Tel 01-673 3184.

"Silent key". Property of the late G4KNB, Icom IC740 hf tx/rx, inc: PS30 power supply, fm board fitted, plus extra scan mic, £650. G3YBD, QTHR. Tel Manchester (061) 998 5648 evenings.

Sankyo XL400S 8mm sound camera, and Sanyo 8mm portable sound projector with built-in screen, £250 or exchange for hf linear or 70cm base station. W.H.Y? G4NJP, QTHR. Tel 0262 673635.

Standard C78 70cm portable/mobile fm synthesized tx/rx, five memories scanning reverse repeater, 10W, amp, preamp, nicads charger, case, mobile mount, £200. G3WWT, QTHR. Tel 01-898 2417.

Trio separates, TX599 and JR599CS, connecting cables and manuals, all in exc cond, £350 ovno. Professional mast sections, galvanized, very heavy duty, 12ft 6in sections, £20 each. Buyer collects. Transformers 14V, 10A £5 each. G3MXH, QTHR. Tel 0789 294387.

FT790R 70cm multimode, nicads, Mutek preamp fitted, orig packing, dc lead, £210 ono. G4FBA not QTHR. Tel 0977 550926.

IC720, fitted cw filter, PS20 psu, SM5 desk mic, positively as new used little, £600. Drake TR4C plus psu, exc cond, £250. IC215, £70. IC202S, as new, £105. *Wanted* TR9000 and Collins KWM2A etc. GW3JUV, QTHR. Tel 0656 3875.

Linear FL2100B, mint, unused, £260. Allweld SM30 steel mast, post mounting, unused, £200. G3KSR, QTHR. Tel 0984 492.

RF amplifier type L454, for use with WSC42 or WSC45, manual, and all connecting cables, never used, as new. Also, 1984 call books, US and foreign. Offers please. G4VJK, QTHR. Tel 02934 3556.

Trio TS510 tx/rx plus PS510 psu, £190. HRO rx, with full set coilpacks, HRO gen cov, and bandspread coilpacks, HRO parts, offers. DNT 10m fm tx/rx with repeater, £30. Tel St Albans 39333.

Icom 720A psu, as new, £575 ono. FT208R, brand new, £155 ono. Would consider p/exch PRO30 HH scanner. Tel 0252 874380.

KDK FM2025 5/25W 2m/fm, 10 memories scanning, handbook, £100. Trio R1000 gen cov rx, manual, boxed, £190. *Wanted* Linear Drake L7SE, Collins 30LI etc. Shure mic 444D, 444T, 526T. G3VKC, QTHR. Tel 0202 476593.

Linear 2100B, unused, mint, £260. Allweld SM30 steel mast, postmount, unused, £200. Fujion radio direction finder, portable, £65. AR245 2m 5/1W hand portable, £99. G3KSR, QTHR. Tel 0984 492.

KW204 160-10m cw/ssb tx, new mains transformer recently, some spare valves, £120 ono. Eddystone EA12 160-10m, superb rx, some spare valves, £130 ono. WS38 Mk3, offers. G4EUW. Tel Brightlingsea (020630) 3071.

Marconi TF1066B RF sig gen, 10-470MHz, a.m./fm, in vgc, £200 ono. Yaesu FT101ZD Mk 2, a.m. WARC bands, used receive only, mint cond, £420. Buyer collects. G6AQC. Tel Oxford 243634 after 7pm.

IC120 23cm fm, 1·5W, mint cond, as new, includes 23-el Tonna, 10m H100, r/s plugs, will deliver within reasonable distance, £350 ono. G3WDN, QTHR. Tel Lowestoft 62161 ext 422, 8.30am-4pm. only.

FT707 hf tx/rx, eight bands, ssb, cw, a.m., £330 ono. D70 Datong morse tutor, £35 or exch D70 for 20A psu or 100W atu. 4-ele quad 2m, £8. G6ZRW, QTHR. Tel 01-857 1367.

Yaesu FT101 ZD, fm, Mk3, as new, £550 ono. Lady owner. G6UOJ. Tel Northants 053 672 3708.

FT290R, nicads, charger, flexiwhip, carrying case, all gd cond, £210 ono. Datong cw keyboard, mint cond, £95. Tel 0463 241211.

HQ1, £75. Buyer collects. G4NZA, QTHR. Tel 082347 3218.

Kenwood TR7600 2m 10W fm rig, plus RM76 remote keyboard, boxed and vgc, £120. Robin, G4WIJ. Tel Egham 36693.

IC2E 2m handheld, c/w rubber duck, λ/4 wave, two nicad packs, 12V-9V power supply, spkr, mic, charger, all 100 per cent wkg order; two years old, £140 ono. G4NVQ, QTHR. Tel Hastings (0424) 420608.

FT101ZD fm Mk3, mic, Blower matching spkr and FV101DM digital memory, vfo, latest model, new, used few times only, total value £962, sell nearest £650. Need house deposit. G3IPM, QTHR.

Oscilloscope camera, Telford type A, poloroid pack film back, Bezel ring fits Heathkit scope, type 10-12U or similar, instruction manual, offers. G2RF, QTHR. Tel 0940 28358.

Marconi TF801D/I sig gen, with handbook, £180. Marconi TF1041C valve v/meter, with handbook, £30. Both ono. 500V wee megger, gwo, in leather case, £15. G3ACO not QTHR. Tel Herts 058285 2185.

FT790R 70cm multimode exc cond, c/w 2·2ah, nicads and case, £210. Racal RA17U, a magnificent example of this fine rx in Racal desk cabinet with ssb adapter and full service manual, three volumes, £320. Tel Wimborne (0202) 883616 or 26777.

FT107M hf tx/rx, c/w matching psu and spkr, marrow cw filter, digital memory system, 100W o/p module, all solid state rig for easy band changing, £450 ono. Richards, G4WNC. Tel 0202 883616 or 0202 26777.

Operating desk, 37in wide, 22in deep, 27in high, equipment recess 9in high, 10in deep, 36·5in wide, side cupboard 13in wide, 22in deep, hinged

cover encloses equipment when shut, £25. G3BUF, QTHR. Tel Potters Bar 42887.

SSTV Wrasse SC422A scan-converter, bw and colour, sends and receives eight sec and 16 sec, bw, and frame sequential and 24 sec line sequential colour, three picture memories. As new with manual, orig packing, will pay Securicor delivery, £425. GD4HOX. Tel 0624 73264.

Hi-Q balun, for trap dipole, £4. TVI filter by Mutek Ltd, £2. Lower mast clamps for Kenpro rotator, £9. *"World at their fingetips"* RSGB publication, £4. Jaybeam, the best 2m colinear base station antenna, £34. Tel 0376 84478 evenings only.

Shure 444 desk mic, little used, £25. Osker block SWR200 swr/power meter, £15. G3VIE, QTHR. Tel Wokingham (0734) 784048.

High quality printer, Diablo, model 1620. paper traction attachment, three daisy wheels, stand alone terminal, cost £2,100, consider exchange for top grade gen cov rx with memory, or W.H.Y? Tel (North Hampshire) 025-14 28526.

Data storage unit, transdata model 309, 8in f/disc drive, with all control electronics, 64K ram ports for printer, keyboard, vdu, modem, user manual, original cost, £2,000, exchange for FRG7000M or similar, W.H.Y? Tel (North Hampshire) 025-14 28526.

80-10m xcvr, Trio TS500 and PS500, remote vfo, 2×6146 pa, spares inc, free swr meter, bargain, £175. Would p/exch with FRG7 (or similar rx). Tel Andy, 01-764 6872.

Jaybeam TB2 2-ele tribander, one year old, £75. Mini products, model C4 vertical 6-10-15-20m, (base insulator damaged), £25. G4TLK, QTHR. Tel Norwich (0603) 410229.

Trio TR9130, mint cond, boxed, still in guarantee, never used in slide mount, unmarked, purchased new from Lowes, £375 cash. Carriage extra. Nigel, G1HOI. Tel Southampton 554157 after 6pm.

IC251E no Mutek front end, ace conox, no mods, £320. NAG144XL 2m amplifier, modified to take 4CX250FG 200, very clean and stable watts minimum o/p, two spare valves, £225. Mutek GFBA144E 1000W thru power FBWKNG, cond, bird muck cleaned off, £110. TS830S MFTRCVR, exc cond, no mods or case scratches, complete Shure mic, £510. Mickey mods 144MHz transverter, (28MHz IF), gd cond, £65. All collect or deliver by arrangement. Richard Stables, G4HGI, QTHR. Tel 061-905 1788 day, Lymm 092575 3533 evening.

FT101Z six band hf from Yaesu, mic, fan, 600Hz filter, Yaesu mod for 10MHz, handbook, original box, mint, £350. John not QTHR. Tel Rotherham 74747 evenings.

Manual and circuits for Pye PF2UB pocketfone, £5. BC348 American aircraft rx, 200kHz/18MHz, £25. Collect or carriage extra. Benkson 5in b/w portable tv, £30 plus carriage. Command transmitter, T20/ARC5, 90W i/p, with circuit, £20 plus carriage. G3JDK, QTHR. Tel Wickersley 541606.

Tekronix oscilloscope, type 503, all functions wkg, recently overhauled, a good instrument, £75. G4MHQ. Tel Lee-on-the-Solent 550834, evenings or weekends.

Collins 75S-3B, extra filters, auto transformer, £250. Hewlett Packard hf sig gen, 606B, £150. Marconi 75Ω 100W power meter, TF1020, £35. G3GGK, QTHR. Tel 0954 210374 (Cambs).

ITT Starphone, xtalled, RO 144-875, tatty looks but works well, £40 ono. UHF PF70, ME/CB SU8 with leather case, £50 ono. 2m linear, mains powered, 85W o/p, 10W i/p, £50. G8YKY, QTHR. Tel Coventry 543409, after 4pm. weekdays.

Eproms 2716, £1. 2532, £1.50p. 2764, £5. Programming service available. TMS1000 doorbell sound chips, 50p ea. Discounts for quantities, postage 60p extra, data on all items if requested. Dale, G3VMK not QTHR. Tel 0602 635170.

Trio TR7800 2m fm mobile, £145. KDK2030 2m mobile, new, boxed, £145. Multi U-11 70cm fm mobile, xtalled for 10-ch, £110. AR88D, exc orig cond, £65. *Wanted* 4D32 Tetrode. Tel Telford 608060 (office).

AR2001 rx, 25/500MHz, as new, boxed, £280. Trio TR2500 2m handheld, exc cond, complete with spkr, mic, soft case, mobile mount/charger, £220. Datong D70 morse tutor, £35. G4SVN, QTHR. Tel Rotherham 555624 after 6pm.

Yaesu FT290R, case, £210. Mobile mount, unused still in box, £20. 2m, 7λ/8 mobile whip and mag mount, £20. GW6XQX not QTHR. 57 North Street, Shotton, Deeside, Clwyd. Tel Deeside (0244) 811912.

FL2277Z, FL2100Z, hf linear amp, nine bands, gd cond, plus carriage, £325. *Wanted* AMT2 terminal unit, interface for Comm64 or similar. G4OWV, QTHR. Tel 0493 663195.

Junker Honnef DBGM morse key, practice use only, mint, cost new £49.85, sell inc postage, £32. Grundig TK145 mono reel to reel tape recorder, hardly ever used, ideal for shack, mint, inc mic, leads, instructions, £15. G4WBT, QTHR under G6MEF.

Daiwa CN520 cross needle swr and power meter, 1·8-60MHz, 200W/2KW, £25. Hannaford, 7 Priors Ave, Bury St Edmunds, Suffolk. Tel 0248 702281.

FT757GX, mint cond, used little, under warranty, all modes, plus gen cov rx, £550 no offers. G4JQI, QTHR. Tel Lancs 025482 3366.

Variacs 8A and 15A 0-260V, £10 ea. Creed 75, 115V, £10. Two 12-ele 2L special antennas, £30 pair (Ant Products). *Wanted* Ceramic valves of 2C39 family. G6OYL, QTHR. Tel 0709 546474, after 5.30pm.

MBA-RC AEA morse baudot, Ascii reader, code converter, tx, £160 ono. Drae vhf wavemeter, £14. Toyo wide band dummy load, 100W, 50Ω, £10. Sephton, 16 Bloemfontein Ave, Shepherds Bush, London W12 7BL. Tel 01-749 1454.

Morse reader, MBA-RO, reads and displays cw, Baudot and Ascii, as new, offers. G4NRG, QTHR. Tel Brentwood 810831.

Icom IC271E, new cond, £565. ICPS15 psu, £85. FT708 with over £100 accs, £195. FTV107R, 2m transverter, unused, £110. Tranzmatch with Ezi-tune 160-10m, £80. Lots of 'Pet' programs, accessories, p/exch possible. *Wanted* FT726, 23cm. W.H.Y? Tel Rayleigh (0268) 774089 after 3pm.

Yaesu FT101ZD Mk3, cw filter, fm, fan, mic, manual, immac, £490. Trio 2200GX 2m fm tx/rx, 12ch fitted, telescopic and helical antennas, nicads, Eveready case, mains charger, box, as new, £115 ono. KW2000B hf tx/rx, 160-10m, with matching ac psu, all in immac cond with manual and boxes, £230. AR88D gen cov rx, in gwo with manual, £35. G3XFB, QTHR. Tel 0902 850033.

Hygain 18AVT/WB vertical antenna, 80/10m, £25. Novex colour monitor, model NC1414CL, £170. Heathkit valve voltmeter, model AV3U ac volts, 10Hz/400kHz, 10mV-300V, £20. Will deliver monitor 50 miles, otherwise postage extra. G3RDG, QTHR. Tel 01-455 8831.

Sony ICF 7600D digital rx, 150kHz to 30MHz, and fm, cost £180 new, sell £130. FRG7 rx, mint cond, fitted fm and time-step digital, £140. Syd, G4PVJ. Tel 0744 23040.

Rotator, Kenpro KR2000RC, new, unused, boxed, £250. Carriage extra. KDK 2025E, £100. G3FPD. Tel 0403 723205.

Icom 730, mint cond, never used mobile, cw audio filter, c/w mic, transverter units, £400. Shure 444 mic, £20. Buyer collects or arranges carriage. G2LL, QTHR. Tel Cooden (04243) 4645.

Yaesu FRG7 gen cov rx, 500kHz to 30MHz, battery pack fitted, unmodified, as new, boxed, £150. Datong FL1 agile filter unit, immac, £48. Microwave modules MMC144/28, 2m converter, boxed, used once only, £19. G6MNX, QTHR. Tel York 53173.

18AVT/WB vertical 80-10, one year old, £80. G4SSX. Tel Ruislip 30627.

Trio 2400, soft case, boxed, new cond, £140 ono. Yaesu FT208, nicads case, charger, spkr/mic, £180 ono. Going QRT. Tel Crewe (0270) 664916.

Marconi GR300 rx with built-in psu and new service manual, gd cond, £35. G6DKE. Tel Sudbury, Suffolk 73238.

FT101E 10MHz, 24MHz cw filter fitted, exc cond, front panel still covered with orig polythene/packing, £320. Europa 2m transverter, QQVO640 pa, £30. G3TTP, QTHR. Tel 0278 652058.

Drake SSR1 communications rx, mint cond, Heath continuing education, D C electronics, A C electronics, semi-conductor devices, electronic circuits, trainer and oscilloscope, very gd offer considered. Buyer collects. Tel 01-727 2141 evenings/weekends.

Eddystone EC958 high stability proff, rx, 0·10-30MHz, £320. Hallicraft 5×28 rx 0·5-42MHz, £85. Sony 7600D rx, as new, £125. Autek audio filter, £30. All in exc wkg order. Tel 0834 3057.

Yaesu FT101ZD Mk3, with fm, as new in box, £475. M F J Versatuner, tunes coaxial end fed etc, 1·4 balun built-in 200W, tunes anything, bargain, £50. Tel Irvine (0294) 217611.

30ft galvanized steel lattice tilt over tower, in three 10ft sections, £100 ono. Eddystone 888A amateur band rx, £65. Hallicraft Sky champion gen cov rx, £35 ono. Buyer collects, no room at new QTH. G3AQR. Tel Evesham (0386) 41891 evenings.

Linear amp, AR30, 2m, £45. Handheld tx/rx, Belcom LS20XE, 2m, fm, almost new, inc nicads no charger, £120. G R Foster, G1DRG not QTHR. Tel Peterborough 63714 evenings.

Alda tx/rx American solid state, 100W mobile similar Atlas with improved circuitry, exc spec, performance, p/ex QRP, W.H.Y? Joystick, £5. Yaesu XF31A ssb filter with carrier xtals, £10. *Wanted* Atlas filter, spares, accessories, wkg or faulty. G3MXO. Tel 021-788 0518.

Transverter 28-144 self contained, all psu, relay switching etc, valve transmit solid state rx, £45. Rack cabinet 19in, 36in high, all fittings, four racks, one with low voltage psu, three roller-coasters, £5 ea. G3OXV, QTHR. Tel Daventry 702265.

Sharp MZ80A micro with AR progs and extended basic, £350. Braun SE600 2m multimode, old but gd, £150. MFJ memory keyer, £80. Xtals for KWM2A, all Warc, 28·0, 28·8, 14·0, 3·6, £3.50 ea. All ono. G4BWP, QTHR. Tel 0462 812383 evenings.

Philips N1700 video recorder, one owner, 16 video tapes, £100. JVC colour video camera, 6·1 zoom lens, VDU viewfinder, ideal for ATV, £150. Tel 051 428 6731.

Ex-army portable vertical antenna, 10×3ft threaded sections plus 14ft whip, complete with guys in bag, almost as new, not weathered, £20. Honda E300 generator, 240VAC 300W, vgc, £125. Buyers to collect (West Sussex). G2ARU, QTHR. Tel Eastergate 3488.

10-20 wire trap dipole, 15m UR67, £15. 10-80 W3DZZ wire trap dipole, 16m UR67, £15. Three section 17ft mast with wall brackets, £7. Phones, £4. Various books, GC map, *Rad Com* 1972 onwards, offers. G3VDG, QTHR. Tel 091-253 3605.

Complete 2m base station, FDK750XX multimode, 20W o/p, Yaesu 20A power supply, rotator, 8-ele Jaybeam, 5λ/8 vertical, two way antenna switch, band pass filter, absorption wave meter, cables plugs etc, £375. G1GVM. Tel 0703 692503.

Trio TR9000 2m multimode plus mobile mount mic, and PS20 psu, handbook and orig packing, exc cond, unmarked never used mobile, £350. G6RNP, QTHR. Tel 0675 2342.

Complete multi code decoder and display unit MBA-RO, ideal for swls, mint cond, £80 ono plus postage. Alun, GW1GZD. Tel Llanstephan 345.

Kenwood (Trio) TR9130, exc cond, plus 7λ/8 mobile antenna, mic, manual etc, £375 ono. 15 rolls five track paper tape, suit rtty, £1 ea. STC Starphone single ch 450MHz rig, possible for 70cm, £15. G1BUE not QTHR. Tel St Albans 32759 evenings/weekends.

DX160, ideal swl comm rx, with separate spkr, manual, gd cond, £55. 2m portable scanner, MR1000A, 10ch xtal included, autoscan, charger, £40. Litton teleprinter, paper tape reader, £15. Collect. Tel Bruce 01-995 4965.

HP 616A uhf sig gen, 1·8-4·0GHz, £80. Marconi Sanders 6460 microwave power meter, 10MHz-12·4GHz with handbook, £100. Eddystone 850/2 lf rx, £35. *Wanted* Selectivity and RF gain control knobs for HRO. G4KHU not QTHR. Tel 0963 70045 or 34121.

Kenwood TS930S Aug 1983, save £400, complete with matching SP930 and MC60 stand scan mic, all in immac and superlative cond, incl handbook, boxed—any test of comparison welcome, £975. G3RHM, QTHR. Tel 01-423 0306.

FT203R handheld, FNB3 nicad battery pack, FBA5 cell case with AA nicads, two NC9C slow chargers, soft case, instruction manual, technical supplement, orig packing, £155. Postage extra. GW4CPZ, QTHR. Tel 06333 67457.

FTV107R 70MHz transverter with 4m module, £95 ono. G3SYS, c/o CP van Hagen, G1BIJ, 18 Fraser Court, Handbridge, Chester. Tel 0244 676570.

World wide countries check list, keep an easy record of countries worked, includes full countries, prefix and continent index, £2.50 plus 50p p/p. A Goodier, 35 Rose Lane, Marple, Stockport, Cheshire SK6 6DS.

Telomast, 50ft telescopic mast, five sections-base 2·5in diameter, top 1in diameter galvanized steel, requires guys—not supplied. Ideal for contest group. Buyer collects, £50 ono. Richard, G4CZZ not QTHR. Tel Welwyn Garden City 07073 21939.

Framed RAF signals training poster, Marconi T1154/R1155 back tuning—sig 2 40 × 28in, black and white with some colour tinting, mint cond, £30. David, G4JLV, QTHR. Tel 01-954 9180.

Trio 2400 2m handheld, spkr/mic, £100. FT708R 70cm handheld, spkr/mic, exc cond, £135. G6YLR, QTHR. Tel Fakenham (Norfolk) 710135 evenings.

Galaxy ssb tx/rx, 80-10m, complete psu, manual, spkr, mic, buyer collects. QVO320, £3.50. QVOZ6, £3. G3FD, QTHR. Tel Southend 554764.

MMT 432/144R transverter, as new, £160. G4VRI, QTHR. Tel 0634 53480.

Transformers, brand new heavy duty British made, 240V i/p, 17·5V o/p, 8A continuous 12A intermittent, two off, £10 ea. Nigel, G4NRR. Tel 021-744 8672.

IC202 ssb handheld, 3W, nicads and case, £95. IC22 fm mobile, £40. Ancient scope Girling, no info, very heavy, £10. G4CLZ. Tel Warrington (0925) 601236.

Drae morse tutor, 240V, £35. Yaesu SP102 spkr with dual i/p and audio filtering, £35. TAL rtty module, £25. Bremi 5A-7A psu, unused, £13. G6IAT, QTHR. Tel Luton 0582 23750.

SX200N scanning rx, plus ssb adapter, power supply, telescopic antenna, exc cond, £240 ono. Tel Plymouth 880674.

KW2000B tx/rx, with ac/psu, mic and manual, vgc, carefully used and maintained by Echelford ARS, as hf stn of G3UES, best offer over £150 secures. *Wanted:* Yaesu FT290 2m all-mode, preferably with Mutek front-end, and either with/without associated psu and/or linear. Alternatively, would consider Yaesu FT480R. Part exch with cash adjustment could be arranged. Tony, G3HBZ, QTHR. Tel Sunbury-on-Thames (09327) 82262.

WANTED

HRO coil from approx 3·5MHz to 7MHz, I have two at 7MHz to 14MHz! Also wanted, disc drive for Vic 20 computer. Brian, G1ECE. Tel Kingston Blount (0844) 51461.

British cat plugs, Cannon connectors, WW2, TU5B etc, tuning draws, 62 indicator, have radar swaps, parts from scrap T1154, compass set control and cable, good R107, books, *Babanis World encyclopedia*, valves 1950s, *history Royal Signals*. 52 Bramble Lane, Mansfield, Notts NG18 3NR.

Heavy-duty rotators, ham IV or similar, with control, reasonable price. GW4SOC, QTHR. Tel 0633 275574 after 7pm.

Yaesu SP901 spkr, Katsumi EK121 electronic keyer, Memory unit for Yaesu FT225RD. G4KZZ, QTHR. Tel Coventry (0203) 444160.

Drake TR7 or TR7A required, with psu etc, must be mint and fwo, fair price paid immediately. G1DES, QTHR. Tel Ruislip 33118.

Signal R532 airband rx or similar, 110-140MHz. Also, Daiwa 1000ch rx 144-154MHz. Part exchange Trio 9R59DS preferred but not essential. Tel Shipside Worksop (0909) 473302.

Split Stator capacitor wanted by atu builder. Any value from 200pf to 350pf. G14PCY, QTHR. Tel 0365 24993 after 6pm.

Hacker Sovereign model RP18, RF module, requires BRS46827. Tel Stewart, 025 081 285.

ST5/6 terminal unit, wkg or not. QTHR near High Wycombe, Bucks. Tel 024-024 2565.

Murphy type 618 hf tx, AP100333 and power unit, AP100336. Also, Marconi Kestrel tx and any other Marconi marine gear. G4FUY, QTHR. Tel Reading 733633.

Power supply No5, HRO psu, 14-30MHz and 180-430kHz coil packs for an HRO-M, HRO S meter, 38 set AFV, also interested in any ex WD equipment and books. G4MSF, QTHR. Tel Keith, 0632 693955.

Morse tutor RAIBC member needs this for test practise, now be reasonable, tutor will be passed on to RAIBC after test, without charge. In grateful thanks. Tel Largs (0475) 673271.

B2 or A Mk 3 would be interested in any of the suitcase or resistance sets, spares, manuals in any cond. G4OFO. Tel 01-949 2317.

Valves type BW1124, BR1126, BW1121 as used in RF industrial induction heating. Closed circuit tv camera and monitor, microwave intruder alarm. G3SMK, QTHR. Tel Earlswood (WARKS) 3423 after 7pm.

Icom IC251E or 211, Yaesu FT225RO or 211R, preferably with Mutek front end, cash waiting. *For sale* FRG7, mint, boxed, £150 ono. 20A, 13·8V psu, £50 ono. G6LOH, Julian Tether, Highview, Banbury Lane, Culworth, Banbury OX17 2AX. Tel 0295 768152.

VFO 30G for 2.200 GX. G4IKO, QTHR. Tel 01-677 6430 mornings.

100-800Mc/s calibrated sig gen. G3NXD, QTHR. Tel 0562 850570.

Vacuum variable and fixed capacitors, roller coaster type inductors. Transformers, 813 valves bases. Coax relays. Turns counters. 8875 valves. Bird Thruline equipment. W.H.Y? Your price paid. Tel 03306 613 after 7.30pm.

Nelson Ross plug-in microwave spectrum analyser, model 511, for Tektronix scopes, service manual or circuit, wanted to borrow or buy. G3UUT, QTHR. Tel Cambridge (0223) 843546.

Any suitcase sets, miniature tx's or similar military equipment, any World War 2 military manuals, especially those dealing with army communications, any manuals or books dealing with communications in occupied Germany 1945-1956. Taylor, G3UCT. 8 Government House Road, York YO3 6LU. Tel York (0904) 29777.

Mic and rxs' head gear, Assy No 15 telephone hand set No 11, and pouches, all for an 88 set, 14-30MHz, and 180-kHz coil packs, for an HRO-MX. Keith, G4MSF, QTHR. Tel 0632 693955.

WW2 unmodified units, R1125, R1124C, R1084, R1188/AR77, TR1196, tx type 22, rx type 25, T1154. Test oscillators types 5A, 11, 12, 12A, W1191 control units A1134A, 10A/11841. G3UZB, QTHR. Tel 0642 470623.

One of the following, TS530S, TS530SP, TS830S, must be top class cond and subject to test. Tel Harvey, Cumbria (0229) 85669.

TR9500 for school club, cash waiting, other 70cm multimodes also considered. Books, posters, W.H.Y? 70cm Yagi array, elevator rotor and rtty/data/Ascii interface, also required. Malcolm, G6VHI, QTHR. Tel Warwick (0926) 496820 before 10pm.

VFO30G to match TR7010, also TS700S or TS700G. G3XXQ, QTHR. Tel 0632 782965 daytime.

Lowe FX1 wavemeter. G4VSF, QTHR. Tel 0604 44322.

Linear required suitable for Yaesu FT290R, 25-50W o/p, must be in vgc. Dean Shelton, G1GRJ. Tel Ware 822445 evenings.

70cm portable IC4E or other type 23cm ssb transverter, Microwave Modules frequency counter up to 500MHz, have OM2 Olympus kit, Four old bangers for spare or repair, Triumph 1300, Reliant, Imp. memory-phone, freedom-phone. Tel Watford (0923) 662567.

MS matching spkr for Drake R4B rx. KW160 topband a.m. tx. KW160 for atu for topband, prefer exc unmodified cond. Also, 1920s xtal rx's and valves, components, books, mags, cats, gd prices paid. N Richardson, 2 Edna Road, Maidstone, Kent ME14 2QJ.

Circuit and V/ma on pins of plug-in psu, (115V version), 63ES (6625-99-943-2770), for VTVM CT54. B Carter, Ty Ysgol, Cathedine, Brecon, Powys LD3 7SX.

Grundig ssb unit for Satellit 2100 rx. Good price paid for sound unit. Tel Cleveleys (0253) 864136.

TS830S or TS530SP in gd cond, cash waiting. G4LUO, QTHR. Tel Newington 842127.

Collins KWM 380, new or mint cond. L R K Gregory, RS85497 not QTHR. The Well House, The Downs, Herne Bay, Kent CT6 6JP. Tel 0227 374774.

Collins or especially Rockwell KWM2A R/E, only S/N 3900 plus, in perfect cond, cash waiting, or would trade new 51S1 rx R/E. G3YFK. Tel 0743 81425.

Circuit diagrar: and/or servicing information for catronics DFM5 frequency meter. Also, circuit diagram and information for Oskerbloc SWR200B power meter. G3ARU, QTHR. Tel 01-989 3196.

Diawa DK210 electronic keyer, in gd cond. G4XCL. Tel Sandiacre (0602) 394068.

Robot 400 board blank, or part complete to make colour unit. G3LEE, QTHR. Tel 061-748 8031 after 7pm.

Gonset G76 ac psu, model 3349 or tx/rx, model 3338 complete with psu. Also, National HRO spkr, in 10in metal case. G2ABC, QTHR. Tel Truro (Cornwall) 78393.

FT225RD, FT221RD or similar 2m base station, must be in exc wkg order, realistic price paid, cash waiting. Geoff, G1HMT not QTHR. Tel Market Deeping (0778) 343664.

G3PLX VDU pcb's catronics, or photocopy thereof. GM3RUI, no QTHR. Tel 06516 528.

Airband rx 118MHz to 136MHz, portable or base, possibly Lowe R512R or similar, price range of interest, up to £60 or so. Tel John, Rotherham 74747 evenings only.

Trio TR7500, late model, must be in mint cond, and no mods. Details please. G3ESB, QTHR. Tel 0332 671536.

MMT 432/28 70cm transverter. Robin, G4WIJ. Tel Egham 36693.

Antenna tuning unit, SEM z-match or KW109 or FC902. Also, Bird 43 element 230H. G4VJK, QTHR. Tel 02934 3556.

Icom IC402 still required for ssb operation on 70cm, good price paid and postage covered if necessary. Also interested in modifications for the IC202S and IC402. G6TKI, QTHR. Tel Gravesend (0474) 59346.

Valves HL13C, C30B, 5-pin versions of the following, SP4, AC/HL, SV4B, AC/VP1, VP4, AC/PEN etc. Early radio rx's up to late 'thirties. Books on radio, and wholesalers catalogues of radios up to 1939. G4OOW, QTHR. Tel Hinckley (0455) 612091 after 7pm.

Hustler mobile antenna resonators for all hf bands are urgently required, must be in gwo please. G4RLZ, 10 Lower Glen Park, Pensilva, Liskeard, Cornwall. Tel Liskeard 62954 evenings.

Trio 120V or 120S, or Yaesu FT7 or FT7B, and Trio 530S. Also, Icom R70 rx. G3XFB, QTHR. Tel 0902 850033.

2m base station rig for Farnborough Radio Society club station. Late FT221R or FT225 with or without Mutec board, other makes considered. G4ISK, QTHR. Tel Crowthorne 771141.

Instrument person to repair and service Marconi TF 106A sig gen, mod fault and TF1417 freq counter, fault unknown. Spare board available, fee negotiable. Also, 3-ele tribander, reasonable. G3WR, QTHR. Tel Brighton (0273) 501100.

KW Atlanta or Swan 500 or FRDX560. Also, SP901P, YO901, FTV901R. Tel Jim 0273 596116.

70cm Yagi. Also, small rotator. G1HVQ. Tel Mr Baier, Camb 0223 63684.

Hazeltine 1420 terminal, circuit diagram/manual required, any reasonable sum paid, most urgent, copying facilities available. G4DIB, QTHR. Tel 01-690 8441.

Main printed circuit board for Creed type 2300 tele printer. Also, line terminating unit 11B. Tel 0795 875836 evenings.

Older Type tx/rx like Yaesu FTDX401, Trio TS515, KW2000E, Drake TR4C or W.H.Y? Can view and collect 60 mile radius Hereford. Items must be gd cond. Rick Logan, G4WXF, QTHR as G6ZOY. Tel How Caple 205 evenings/weekends.

Kokusai mechanical filter type MF45510(C)K with (if possible), two carrier xtals and/or data sheet. Prefer cylindrical type of mounting. Mr Miller, G3ZZO, 31 Coronation Road, Chatham, Kent ME5 7DD. Tel Medway (0634) 41587 after 8pm or weekends.

2m handheld WTD. Also atu for Trio TS120S and 20m mobile antenna. Tel Blackpool (0253) 404566.

Suitcase tx/rxs, any spares, incomplete or damaged sets. Any connecting leads for WS (CDN) No 29 Any orig ex-WD manuals, instruction books or similar, for army sets. Any manuals, reports or similar from BAOR or CCG 1945-1956. Taylor, G3UCT. Tel York (0904) 29777.

Swan 100MX service manual or info on PA stage components parts list. Will pay for all expenses, photo copying, postage etc. Peter, G4XOC, 22 Bushey Road, Sutton, Surrey. Tel 01-644 6549 evenings.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX, Tel: (0702) 206835
12 NORTH STREET, HORNCHURCH, ESSEX. Tel: (040 24) 44765

OUR HOCKLEY SUPER STORE
EVERYTHING YOU WANT
ALL UNDER ONE ROOF

TEL: (0702) 206835 for BEST PRICES & PX DEALS!

TRIO - YAESU - ICOM
WELZ - FDK - JAYBEAM

THE BEST VALUE IN TRIBANDERS
10-15-20M

Almost half the price of Hygain TH2!*

Securicor £6 extra

MODEL TB3 TRIBANDER

TB1 Rotary Dipole 2kw EL. 7.7m Rad. 3.85m **£77**
TB2 2 Element Beam 2kw gain 5dbd F/B 15db **£143**
TB3 3 Element Beam 2kw gain 8dbd F/B 25db **£212**
These highly rugged antennas are superbly built and represent the very best in engineering. Details, booklets are available upon receipt of SAE.
Jaybeam TB2 = £143. Hygain TH2 = £279.

SPECIAL OFFER

Communication headphones
LOW IMPEDANCE
LIGHTWEIGHT
¼" MONO JACK
TAILORED RESPONSE
REMOVABLE PADS
£5.95

G5RV 5 BAND DIPOLE

This famous 5 band dipole has been packaged as a ready to go item. 102ft long – all you need is a length of 50ohm coax plus optional ATU.
Half size 40-10m **£17.95**
Matching ATU **£14.95**
£79.95

New SWL HF Dipole
Ready assembled, this dipole antenna has been designed for general listening use between 3 and 30mHz. Only 9 metres long it requires 50ohm coax **£8.95**

NEW AIRCRAFT FREQ LISTINGS

If you've got an AOR2001 this will interest you. Not only is it one of the most comprehensive lists of frequencies in the VHF band, it also contains lists of the UHF channels (200-400mHz) used at military VHF/UHF fields. Plus HF communication channels. **£2.95** p&P 50p

80-10m 16ft high 6ft rigid radials

"My first contact on 20m was with VK - G4TZO"
CP4 40-10m
£109

WELZ CPS

5 band DX aerial for small gardens
£149

NEW MAGNETIC MOUNT! THE "LIMPET"

Over 3 times stronger than its competitors, it takes a 7/8th antenna with ease. On test we broke the aerial before the mount parted company with the car roof! **£14.95** £1.50 p&p

WE'VE GOT CASH WAITING FOR YOUR GOOD SECOND HAND GEAR BUYING OR SELLING
TEL: (0702) 204965

CALLING CW ENTHUSIASTS

MORSE TRAINING KIT

If you're intending to learn morse code, this package will give you all you need. A complete ARRL morse course, including book and 2 LP tapes to take you over 12 w.p.m. A high quality morse key that is ideal for on air use once you've passed the exam. And a battery operated code oscillator with pitch control, speaker and earpiece.
£35

ELECTRONIC KEYER ONLY £18.95

This electronic keyer is exceptional value. In order to keep the price down it's offered as a kit which includes everything including metal case and speed control. The unit draws only a few m.a. from an internal PP3 battery. Building time is approx. 2 hours and the unit provides both normal and iambic keying. Just connect a paddle and you're ready to go.
OPTIONAL PADDLE £16

KILL TVI! HP4A £6.95

Our famous HP4A braid breaker filter has sold in thousands. Used by MPT, TV rental companies and recently reviewed in the press "In practice the filter was successful in eliminating breakthrough on a TV whose aerial was a matter of six feet away from the transmitting aerial carrying 100 watts of RF!"

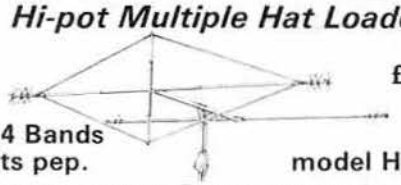
FERRITE RINGS 75p

SAGANT 80-40M
SHORT DIPOLE £45

The Sagant 80-40m dipole is the ideal antenna for the small garden. Only 70ft long, it provides full-size antenna performance on both bands. It is rated at 1kw and comes complete with all hardware including balun for either dipole or inserted 'V' configuration

MT 240X
5 BANDER VERSION **£56**

NEW *Hi-pot Multiple Hat Loaded!*



£199

6m-20m 4 Bands
1200 watts pep.
model HQ-1

There is no substitute for the real thing! That's what purchasers of alternative models tell us. We've been selling this for 12 years and its superb construction and performance protected by World patents leaves the competition standing. Boom length 4.5ft. Element length 12ft, weight 15lbs. This antenna can be operated without an atu and really gets the DX even in the smallest QTH.
Free 24 hr delivery on this item.

DON'T FORGET NEC BIRMINGHAM EXHIBITION, APRIL 13 & 14
SEE US THERE AND LET'S DO A DEAL!

NATIONAL PANASONIC 600

£429

The receiver that has everything! Coverage from 150kHz-30mHz plus 87.5-108mHz FM. Band search plus 9 memories. USB, LSB, CW & AM. Dual speed tuning, micro computer controlled, LED display to 100Hz etc etc. Built-in mains supply or battery.

NATIONAL PANASONIC RF-3100

£249

Covering 150kHz to 30mHz in 31 bands plus FM broadcast, this receiver is ideal for the amateur on a budget. Its bright digital display and excellent stability make it a joy to operate whether on SSB, CW or AM. Up to the minute PLL circuitry ensure top performance on today's crowded bands.

FDK M750XX – 2M SSB-CW-FM

The FDK M750XX 2m transceiver is the latest all-mode rig from FDK. A full 20 watts output ensures that when there is DX about you'll stand a better chance than many of making it. The transceiver features dual vfo, up/down scanning microphone and comes ready to operate from a 12v DC source.

£389

TRIO R2000

PLUS FREE PHONES - DIPOLE ANTENNA - DX MAP & SWL BOOK
£479

YAESU FRG8800

PLUS FREE PHONES - DIPOLE ANTENNA - DX MAP & SWL BOOK
£529

TRIO R600

PLUS FREE PHONES - DIPOLE ANTENNA - DX MAP & SWL BOOK
£299

YAESU FT290
£329
or with nicads and charger £349

Probably the most widely sold rig in the UK and rightly so. It forms the ideal basis for a 2 metre station whether it be portable, mobile or fixed. Many people have tried to modify it but we reckon that in its ex-factory form it takes a lot of beating!

NEW PEP METER!

If you have ever wanted to measure PEP then this new item will do the job whether you are an HF, VHF or UHF operator. Hopefully a sample for N.E.C.

ALTAI DIP/ WAVEMETER

Are you within the law? It says you should have a wavemeter. We reckon a dip meter is much better value and have been selling this model for several years. **£57**

TRIO TS711E 2M BASE STATION

£829

Another fine model from Trio featuring a whole host of features. Certainly one of the most advanced transceivers of recent times. Why not send SAE for all the information on this fine 25watt rig.

WELZ SP200 VSWR/ POWER METER
£89.00

The SP200 power meter fulfils the needs of both HF & VHF operation. The meter reads absolute power up to 1kw in 3 ranges. Coverage 1.8 to 160mHz.

WELZ		DIAMOND		SAGANT	
SP300 1kw 1.8-160mHz	£129.95	M285 – 5/8 mobile whip	£11.50	Super Rod Telescopic 5/8 BNC	£10.95
SP400 150w 130-500mHz	£89.00	M287 – 7/8 mobile whip	£19.95	Portable Ground Plane 2m	£25.50
SP15M 200w 1.8-160mHz	£49.00	EL770E 2m/70cm whip	£24.00	Balun 3-40mHz 50ohm 1kw	£15.60
SP45M 100w 130-470mHz	£69.00	GH22 – 6.5db base	£39.90		
SP350 200w 1.8-470mHz	£79.00	GLS Gutter mount & cable	£12.45	**WELZ PSU's**	
AC38 8 band ATU	£85.00	**ADONIS MOBILE MICS**		RS455 DC 3-15v, 3.6 Amps	£46.50
CH20A coax switch	£22.95	MM202S Lapel/visor	£32.50	RS655 DC 3-15v, 6 Amps	£78.85
CT150 150w load	£49.00	MM202FX swan neck	£47.50	RS1100 DC 13.8v, 10 Amps	£99.00
CT300 watt load	£69.00	FS3 swan neck + speaker	£59.00	RS1150 DC 3-15v, 10 Amps	£119.00

WELZ SP15M
£49

Probably our most popular VSWR meter. This budget version of the SP200 reads up to 200watts and covers 1.8-160mHz. Highly versatile and compact.

MAIL ORDERS TO: 18-20 MAIN ROAD HOCKLEY, ESSEX

BARCLAYCARD ACCESS

INSTANT CREDIT

Carriage items under £10 – £1 Over £10 – £2
Securicor £6 Large aerials £6

GOING-GOING GONE!

Selling your rig can be fast, easy and painless when you use the services of *G3RCQ ELECTRONICS*. We advertise in all the magazines, our turnover of equipment is fast, this means we can offer the *BEST PART EXCHANGE* deal and the *BEST CASH DEAL*. Our advertising is there to help you sell your used equipment without delay. *REMEMBER* if you are selling *USED EQUIPMENT* – Contact G3RCQ Tel: (040 24) 55733

★ **AUCTION** ★

Auction your surplus equipment from the comfort of your own home! *HOW?* Lets say you have an "XYZ" rig for disposal and you value it at £150 you send me 10% (£15) for inclusion into the auction, plus FREE entry into *LIST-A-RIG* your estimated price of £150 will not be quoted so you may even receive bids over and above what you expect. There are no further charges. If your rig does not sell within 2 months (that's two auctions) your 10% fee will be returned in full.

★ **NATIONAL ADVERTISING FREE** ★

I will advertise nationally lists of items to be auctioned. Potential purchasers will be invited to submit their bids by post to me before a specified date (auctions are monthly). All bids will be forwarded to you the seller. It is then up to you to contact the bidder of your choice and conduct the sale.

★ **LIST-A-RIG** ★

Imagine a data base which is constantly being updated and contains items for sale or wanted. The list encompasses Dealers' and Readers' adverts. LIST-A-RIG is sent *FREE* upon receipt of a S.A.E. To include your own advert the fee is £2 for *TWO MONTHS ADVERTISING*

★ **A FAIR DEAL IS MY POLICY** ★

When you deal with *G3RCQ* you get a straight deal. A full no quibble guarantee, coupled with free advice covering 25 years of Amateur Radio.

BUY & TRY

If you buy a rig from me you have one month to change your mind! If during the first month of purchase you decide that you have made a mistake or you simply cannot get on with the rig I will allow you 90% in part exchange for another rig of equal or greater value. If you want cash back without another rig I will give you 80% of your purchase price.

APRIL AUCTION

ICOM 271 2M TRANSCEIVER
SANYO RP8800 RX
ICOM IC 740 HF TRANSCEIVER
YAESU FT480R 2M MULTIMODE
TV CAMERA & MONITOR
TECH TE20D SIGNAL GENERATOR
SC7000 SCANNING RECEIVER
MM ATV CONVERTER
YD148 BASE MICROPHONE

★ **BUY & TRY** ★

KW 103 SWR/POWER
HF TRAP DIPOLE WITH FEEDER
ADVANCE VALVE VOLTMETER
70CMS BEAM 2-14 ELEMENT
DATONG PC-1 GEN/COV 2M CONV.
TANDY TRS80, MONITOR, CASSETTE
YAESU FT230R
NAG LINEAR (2m)
TRIO 530S
STANDARD C78 (70cm)
CCS 100MHZ FREQUENCY COUNTER
STANDARD C146 2M HANDIE
ICOM BASE MIC, IC SM6
QM70 2M LINEAR AMPLIFIER
YAESU FT707 TRANSCEIVER
YC-601 DIGITAL DISPLAY
YAESU YM-38 SCANNING MIC
TRIO AT 230 ATU
TRIO 2600E
YAESU FT230R
ICOM IC25A 2M FM TRANSCEIVER
YAESU FT720RU 70CMS FM
KW204 TRANSMITTER
TRIO TM-201A MINIATURE FM
MM RECEIVE CON 28/144
TRIO SIG GENERATOR SG-402
YAESU FT902DM
YAESU FTV 901R
FRG 7700 (MEMORY)
YAESU FT 790R
YAESU FT1012D

If you are interested in purchasing any of the above please send your bids to the address below. (Equipment may be sold by private treaty).

Send S.A.E. today for current list and full information

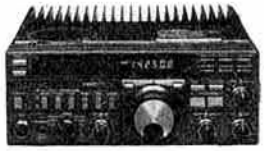
USED EQUIPMENT CENTRE, G3RCQ ELECTRONICS
65 CECIL AVENUE, HORNCHURCH, ESSEX.

Telephone: Hornchurch (040 24) 55733 Please leave a message on the answerphone. 73's de DAVE & CORAL G3RCQ & G4RCQ.

ALYNTRONICS

AUTHORISED YAESU DEALER
AUTHORISED ICOM DEALER

IC 751 — The latest H.F. transceiver from Icom



FT 757GX — the complete H.F. transceiver — with general coverage on receive!

IC 271 — Icom's v.h.f. multimode base station

FT 726R — Yaesu's v.h.f. & u.h.f. multimode base station

Approved stockists for all of the following companies:
ICOM — YAESU — K.D.K. — TONNA — DATONG — MICROWAVE MODULES — WELTZ — SHURE — HANSEN — KENPRO — C.D.E. — DAIWA — TONO — HY-GAIN — A.E.A. — A.K.D. — T.A.L. — I.C.S. — TASCO — G. WHIP — HI-MOUND — S.M.C. ANTENNAS — WESTERN ANTENNAS

Always in stock, a large selection of plugs and sockets. Antenna mounting hardware — R.F. cables (H-100, URM 43, 67 and 76, 300Ω Ribbon) plus 5, 6 and 8 core rotator cable

129 Chillingham Road, Newcastle-upon-Tyne
Tel: 091-276 1002
Mail Orders Welcome
Open Tues-Fri 10 am to 6 pm
Saturday 10 am to 5 pm

LOSING DX?

ANTENNA FAULT? Poor reports?

Check **FAST** with an Antenna Noise Bridge and your receiver.
MEASURE resonance 1-160MHz and radiation resistance 2-1000 ohms, just TUNE your receiver and TURN the resistance control to null the noise, then simply READ resonance from the receiver and radiation resistance from the bridge.
Get **ANSWERS**, no confusion with harmonics, no 10 second limit.
ALSO measure RF resistance, and hence Q, of loading coils, preamplifier matching, phasing lines or use as a noise generator.
FUN-TO-BUILD kit, (ready-made to order) only **£21.20** includes ALL parts, case, pcb, pre-wound transformer, instructions, by-return postage etc and list of other kits.

CAMBRIDGE KITS
45 (RR) Old School Lane, Milton, Cambridge.

VALVES VALVES VALVES

The following valves in matched pairs 6JS6/C, 6KD6, 6J86/A, 6LQ6, 6HF5, 6146A, 6146B. **YES** the 6JS6/C is Japanese and works in the FT101. Most amateur radio valves including difficult to obtain types **EX STOCK.** Quotations without obligation. If we don't stock your type we may be able to import for you, PLEASE ENQUIRE. REMEMBER over 200 types **EX STOCK.** Sae for list. 'Phone for assistance re types suitable for your equipment. USA and Jap manufacture of popular types available.

DON'T DELAY 'PHONE TODAY 045 75 6114, G4AZM
Wilson, Peel Cottage, Lees Road, Mossley, Tameside, Manchester

2m 12V 6-CHANNEL TRANSMITTER FOR £30. Assembled & Tested

Board size 140 × 82mm ● Frequency multiplication × 12 ● Crystal sockets HC25/U ● 12V 2m PA board 180 × 30mm 150mW/25W, **£20.**

40673	75p	2N3553	£1.10	2N6082	£7.50	2N5180	60p	BLY55	£3.00
3N201	75p	2N4427	90p	2N6084	£11.00	2N2369	15p	CA3089E	£1.50
TIS88A	40p	2N5913	£1.50	2N5595	£15.00	2N3478	60p	SL620C	£4.00
3N204	80p	2N5590	£6.50	2N5862	£18.00	BC183L	10p	SL630C	£2.50
40841	40p	2N5591	£8.50			BLY33	£1.80		

Mail order only. £3 min, p&p 40p. 15% VAT to be added to total.

HELLER ELECTRONICS LTD, 49 Blossom Waye, Hounslow, Middx TW5 9HB

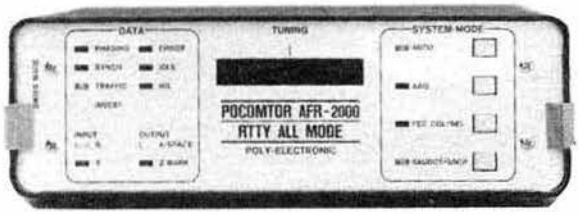
DEWSBURY ELECTRONICS

G4CLX

APPROVED TRIO DEALER

TRIO R-2000

The fabulous TRIO R2000 General Coverage Receiver offers the ease of operation and features hitherto offered only on the professional grade receivers; a ten channel memory unit, retaining not only the frequency but also the mode. All channels can be used as a separate VFO. Stability is such that a TOR station will be held all day on frequency. The optional VC10 VHF converter covers from 118 to 179MHz usefully extending the 150kHz to 30MHz range. TRY ONE. You will be pleased.



For those who like to listen only DEWSBURY ELECTRONICS is proud to announce the POCOMTOR AFR 2000 code converter. We believe it to be the first Automatic converter to read RTTY—AMTOR—SITOR—TOR—ASCII—its so easy to use, simply tune in the desired station. Press the automatic button, lo and behold 15 seconds later the AFR 2000 has selected BAUD RATE, PHASE, SHIFT, and commences to print on the user supplied screen. It will even receive the 200 baud ASCII press broadcasts. FULL DETAILS WILL BE SENT ON RECEIPT OF A LARGE SAE. Price of AFR 2000 £427.00 inc.

APPROVED TRIO DEALER

TRIO TS-930S

TS930S, truly an HF transceiver to savour. From the superb smooth tuning to the basic simplicity of controls, makes HF operating a most enjoyable and memorable experience. DEWSBURY options on the TS930S are 16, not 8 memories, an extra digit giving readout accuracy to one hundredth of a kHz. Both at no extra cost.
The TS930S is a sought-after treasure. Be sure to check availability before sending your cheque.

Dewsbury Electronics stock the entire Trio range. From the simplest of plugs to the top of the range TS930S.
Dewsbury Electronics is the only full time specialist amateur radio dealer in the Midlands. We do not sell PMR, we do not sell computers or cordless telephones. We do not sell CB. Our efforts are directed solely at the radio amateur.
PERSONAL SERVICE is a bye word at this emporium. Sales under the personal care of TONY DEWSBURY G4CLX, Engineering and repairs under the EAGLE eye of JOHN BILLS G3KZG, both ably assisted by MARTIN G4VZO together offering over 43 years of Amateur Radio Experience.

MAIL ORDER We are happy to supply our equipment to addresses all over the world, arrangements can be made to supply goods for export by ourselves or for personal export. All the necessary documents prepared. For your next purchase DEWSBURY ELECTRONICS promise satisfaction, next day delivery often included in the price.

Simply send us CASH, Cheque, Barclaycard, Visa or ACCESS accompanied by your name and address we will do the rest. IF THE REQUIRED GOODS ARE NOT IN STOCK YOU WILL BE INFORMED IMMEDIATELY.

SORRY WE DON'T SPEAK JAPANESE OR GERMAN, HEBREW WE CAN TRY, BLACK COUNTRY VERNACULAR A SPECIALITY.

Dewsbury Electronics offer a full range of **Trio Equipment** always in stock

We are also stockists of DAIWA—MET ANTENNAS—MUTEK—WOOD & DOUGLAS—TASCO TELEREADERS—MICROWAVE MODULES—ICS AMTOR—AEA PRODUCTS—DRAE

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228.
Telex: 337675 TELPES G

BARCLAYCARD VISA

Instant finance available subject to status. Written details on request.

Access

DATONG

20 EXAMPLES OF 'STATE OF THE ART DESIGN'

The following list shows most of our products. Please phone or write for a free catalogue and free data on product(s) which interest you. It takes only a phone call with your Access or Barclaycard number to speed any product on its way to you. Normally we despatch the same day. Or if you prefer you can obtain our "amateur" products from your local dealer.

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

AUDIO FILTERS

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**

FL3 SSB/CW/RTTY audio filter (as in FL2) plus **automatic** whistle remover. **£129.37**

FL2/A Fully assembled PCB module with hardware and instructions to convert FL2 to FL3. **£39.67**

RF SPEECH PROCESSORS

ASP The fully automatic **definitive RF Speech Processor** ("73" July 81) **£82.80**

D75 Manually controlled RF speech processor **£56.35**

D75/K Uncased version of D75 **£40.70**

MORSE EQUIPMENT

D70 The **"go-anywhere"** Morse Tutor. The PP3 battery supplied should last you until the exam! **£56.35**

MK Deluxe **Self contained** keyboard morse sender with memories. (SWM April 82, Amateur Radio April 83) **£137.42**

RADIO DIRECTION FINDER

This system turns any NBFM rig into a radio direction finder **which really works.** It is currently in use from HF to UHF by Government Departments, professionals of all kinds, and **amateur DFers** (Rad. Com. Jan. 84, Citizens Band Jan. 83).

DF + DFA2 Display unit with magmount antenna combiner. Just add four quarter wave whips and your receiver. (Antennas also available). **£182.85**

MINIATURE ACTIVE RECEIVING ANTENNAS

You don't need unsightly rambling antennas for HF reception. Be discrete like the professionals and use a Datong active Antenna. **Your neighbours will definitely approve.** And so will you when you hear the DX!

AD370 Complete active dipole receiving antenna. **Covers 100kHz to 100 MHz.** Weather-sealed for outdoor mounting. With mains power unit. (Rad. Com. June 82). **£69.00**

AD270 Indoor version of AD370 **£51.75**

RF CONVERTERS AND AMPLIFIERS

Other companies also make converters and preamps. When you choose **check the "fine print"** first. You can trust Datong to "do it right".

VLF Receiver 0 to 500kHz on your 28 to 28.5MHz receiver. **£29.90**

PC1 Get **"no-compromise"** reception from 50kHz to 30MHz on your existing 2-metre all-mode. (Rad. Com. April 82) **£137.42**

DC144/28 Receive 2-metres on your 28MHz receiver. Again it is the "fine print" performance which makes this the **best of its type.** (SWM Aug. 82, Rad. Com. April 82) **£39.67** Uncased version: **£29.95**

RFA 5 to 200MHz low noise preamplifier. **Why be bound to one band per preamp?** (Ham Radio Nov. 83) **£33.92**

SELECTIVE CALLING EQUIPMENT

PTS Sixty four channel tone squelch system for fitting to any FM or AM rig. **Excellent performance on noisy channels.** One needed per rig. **£45.99**

CODECALL 4096 channel Selcall for any FM, AM, or SSB rig. **No internal connections** needed. One needed per rig. (R&EW June 82). **£33.92**

PROFESSIONAL PRODUCTS

DATEST 2 Automatic in-circuit tester for transistors, FETs, SCRs and triacs. Complete with test probes. **£51.75**

SS-32 Speech Scrambler Module for first level Security in mobile radio systems **POA**

RFS-1 Wideband RF signal detector and locator **POA**

DF2 Microprocessor controlled direction finding system **POA**

POA PRICE ON APPLICATION

DATONG ELECTRONICS LIMITED

ORDER FORM

Please send me the following — Model / Qty / Unit Price / Unit Total

I enclose CHEQUE/POSTAL ORDER No. for £

Please debit my VISA/ACCESS account

Your Name ... Call Sign ...

Address ... Tel ...

Town ... Total £

City ... Post Code ... Prices include Post, Packing and VAT (U.K.)

Card No.

All orders sent by return. 1st class parcel post. Any delay will be notified to you immediately

SEND TO - Dept RC Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England Tel (0532) 552461

FARNBOROUGH COMMUNICATIONS

PRICE? Bargain with Mick G4MPW

PRICE? Bargain with Mick G4MPW

FOR ALL YOUR AMATEUR EQUIPMENT

Yaesu, FDK, Icom, Drae, Microwave Modules, J-Beam, Shure Mics, Adonis Mics, Welz Equipment. TVI high pass and band stop filters.

Instant HP Terms

97 Osborne Road
North Camp
Farnborough, Hants
Tel: (0252) 518009

Buy it with Access

BARCLAYCARD VISA

BRAND NEW COMPONENTS BY RETURN OF POST

VAT Inclusive Postage 20p (Free over £5). List Free

HIGH STABILITY MINIATURE FILM RESISTORS 5% Tolerance

¼W E24 Series 0·51R—10MO **1p** (75p/100 one value) 0·125W E12 Series 10R to 1M8.**2p**
0·5W E12 Series 1RO to 10MO **1½p** 1·0W E12 Series 10R to 10MO. **5p**
¼W metal film 10R to 1MO. 5% E12 series **2p** 1% E24 series **3p**

Mullard or equivalent Subminiature Ceramic Plate capacitors 100V E12 Series

2% 1·8pf to 47pf **3p** 2% 56pf to 330pf **4p** 10% 390pf to 4700pf **4p**

Plate Ceramic Capacitors 50V working for vertical mounting

E12 Series from 22pf to 1000pf then E6 series 1k 5pf to 47k pf. **2p**

Miniature Polyester capacitors 250V working for vertical mounting

·01, ·015, ·022, ·033, ·047, ·068 **4p** 0·1 **5p** 0·15 & 0·22 **6p**
0·33 & 0·47 **8p** 0·68 (250V, 63V) **11p.** 1·0 **15p.** 1·5 **20p.** 2·2 **22p**

ELECTROLYTICS Wire Ended (Mfds/Volts)

·47/50 **5p**	10/50 **5p**	47/16 **6p**	100/25 **7p**	220/25 **8p**	470/40 **16p**
1·0/50 **5p**	22/16 **6p**	47/25 **6p**	100/50 **8p**	220/50 **10p**	1000/15 **15p**
2·2/50 **5p**	22/25 **6p**	47/50 **6p**	150/16 **7p**	470/16 **11p**	1000/25 **25p**
4·7/50 **5p**	22/50 **6p**	100/16 **7p**	220/16 **8p**	470/25 **11p**	1000/40 **35p**

TAG ENDED CANS: 5000/30V. **£1.00** 4700/16 **25p.** 4700/25V axial **70p.**

TANTALUM BEAD ELECTROLYTICS Subminiature vertical Mounting (Mfds/Volts)

0·1/35 **14p**	2·2/35 **15p**	15/16 **20p**	22/16 **30p**	47/16 **80p**
0·22/35 **14p**	4·7/6 **14p**	15/25 **35p**	22/25 **35p**	68/3 **30p**
0·47/35 **14p**	4·7/25 **15p**	22/6 **20p**	33/10 **30p**	100/3 **35p**
1·0/35 **14p**	10/25 **29p**	22/10 **25p**	47·6 **30p**	220/16 **£1.20**

POLYSTYRENE Capacitors 63V working E12 Series Long Axial Wires

10pf to 820pf **3p** 1kpf to 10kpf **4p** 12kpf **5p**

TRANSISTORS

BC107/8/9 **12p**	BC547/8/9 **8p**	BC212L **10p**	BFY50/51/52 **20p**	BFX88 **25p**
BC147/8/9 **10p**	BC557/58/9 **8p**	BCY70 **15p**	2N2926 **7p**	BSX19&20 **15p**
BC157/8/9 **10p**	BC182L, 184L **10p**	BF195&7 **10p**	2N3055 **50p**	BD135&6 **25p**

8 pin i.c.s. 741 **25p** 555 **28p** Holders 8 pin **9p** 14 pin **12p** 16 pin **14p** 28 pin **25p** 40 pin **40p**

DIODES (p.i.v./amps)

75/25mA 1N4148 **2p**	800/1A 1N4006 **6p**	400/3A 1N5404 **14p**	115/15mA OA91 **6p**
100/1A 1N4002 **4p**	1000/1A 1N4007 **7p**	60/1·5a S1M1 **5p**	100/1A Bridge **25p**
400/1A 1N4004 **5p**	1250/1A BY127 **10p**	30/45mA OA90 **6p**	30/150mA AAY32 **8p**

Zener Diodes E24 series 400mW. 3V3 to 33V to 33V **8p.** 1 watt 3V9 to 33V **12p.**
LEDs 3 & 5mm. Red **10p.** Green & Yellow **14p.** Grommets 3mm & 5mm **2p.**
Fuses 20mm glass 100mA to 5A. Q Blow **5p.** A/Surge **8p.** Holders **5p.** (p.c. or chassis)
High speed p.c.b. drills 0·8. 1·0, 1·3, 1·5, & 2mm **25p.** 12V Drilling machines **£6.00**

The C.R. Supply co. 127 Chesterfield Rd, Sheffield S8 0RN. Tel: 557771

ANTI-TVI AERIALS

Data Sheets, Large 24p SAE. Aerial Guide £1

G2DYM, UPLOWMAN, TIVERTON, DEVON

Callers welcome by appointment ONLY Tel (039 86) 215

PHOTO ACOUSTICS LTD. Tel: 0908 610625

58 HIGH STREET, NEWPORT PAGNELL, BUCKS, MK16 8AQ

TS-940S

HF TRANSCEIVER
£1695.00 inc VAT

The TS-940S is a competition class HF transceiver having every conceivable feature, and is designed for SSB, CW, AM, FM and FSK modes of operation on all 160 through 10 meter Amateur bands, including the new WARC bands. It incorporates an outstanding 150kHz to 30MHz general coverage receiver having a superior dynamic range (102dB typical on 20 metres, 50kHz spacing, 500Hz CW bandwidth). Engineered with the serious DX'er/contest operator in mind, the TS-940S features a wide range of innovative interference rejection circuits, including SSB IF slope tuning, CW VBT (Variable bandwidth tuning), IF notch filter, AF tune circuit, Narrow/Wide filter selection, CW variable pitch control, dual-mode noise blanker, and RIT plus XIT. The use of a new microprocessor with advanced digital technology controlled operating features, plus two VFO's, 40 memory channels, programmable memory and band scans, a large fluorescent tube digital display with analogue-type sub-scale for frequency indication, and a new dot-matrix LCD sub-display for showing graphic characteristics and messages, all serve to provide maximum flexibility and ease of operation. In addition, a CW full break-in circuit, switchable to semi break-in, a built-in automatic antenna tuner, a solid-state final amplifier that is powered from a higher voltage source, a speech processor, all-mode squelch, and a host of other convenience features all add up to even greater versatility of use in fast-paced DX operations. With its power supply and antenna tuner built-in, and with its new whisper-quiet cooling system, the TS-940S is a complete, all-in-one type transceiver that brings tomorrow's sophistication to today's serious enthusiast. The unit may be ordered with the antenna tuner installed or available as an option.

TH 21E

This tiny 2m handheld measures just 2.24ins wide by 4.72ins high by 1.1ins deep yet still gives a full one watt output.

£188.46

70cms version. Same size, same facilities.

Just £214.50

R2000

Trio's sophisticated general coverage (150kHz-30MHz) receiver. FM, AM, CW and SSB modes—10 memories—memory scan—programmable band scan between user defined limits—VHF Converter (118 to 174MHz) available.

£479.47

FRG8800

All mode HF (150kHz-30MHz) receiver. Keyboard frequency entry and dual speed VFO. 12 memory channels (stores frequency *and* mode), programmable memory scan, selectable band scan, suberb LCD display that includes an S/SINPO meter. Optional VHF (118-174MHz) converter available.

£525:00

WPO KITS

ALPHA SSB/CW TRANSCEIVER (state band 160 or 20M)		
Complete kit with case/hardware/display, etc	Kit	199.50
Basic pcb kit with heatsink	Kit	149.50
Digital Display and Bezel	Built	24.10
Case and Hardware kit	Kit	40.00
Optional Active Filter—pcb kit	Kit	16.65
PCB ONLY + articles (3 parts)	each	22.45
Please see parts list for individual parts.		
PROJECT OMEGA MULTIBAND TRANSCEIVER		
Complete set of kits/case, etc to date	Set	650.00
CIFPU (I.F. unit)	Kit	74.50
—pcb only + article	each	8.50
Notch Filter	Kit	12.50
Pre-Selector	Kit	14.85
—Notch/Presel. pcb's only + article	pair	3.85
Active Filter	Kit	16.65
—pcb only + article	each	3.80
PLL Synthesised VFO	Kit	109.00
—kit less crystals	Kit	68.00
—crystals	each	5.50
—pcb's (2) + article	pair	9.50
Pair of Sm Drives + spacers/bolts, etc	Kit	6.90
Digital Frequency Display	Kit	33.00
—pcb only + article	each	2.60
Receive only LSB SSB Adaptor	Kit	6.20
QRP power Amplifier (3W)	Kit	21.80
—pcb only + article	each	4.20
Logic/Antenna Switch	Kit	17.65
—pcb + article	each	4.00
Low Pass Filter (100W)	Kit	34.00
—pcb only + article	each	7.00
TX/RX SSB Adaptor	Kit	59.50
—pcb pair only + article	pair	7.00
RF Broadband Preamplifier	Kit	13.50
—pcb only + article	each	4.20
QRO PA with all metalwork	**Kit	149.00
—pcb only + article (includes 11/12 ends)	**Set	11.50
QRO PA Access. pcb (ACC/Power meter, etc)	***Kit	18.90
—pcb only + article	***each	4.50
Diecast Boxes—(CIFPU, VCO)	each	5.50
—(VFO)	each	4.00
—(Tx/Rx SSB Adaptor)	each	3.90
—(Preamplifier)	each	3.65
Meter (100μA 2.5%)	each	8.00
Mode Switch	Kit	6.90
Omega Case (drilled screened, etc)	Kit	30.00
Case Hardware	Kit	32.30
Illuminated Switch SEI	Kit	33.20
Omega Reprint Set (To date with all corrections)		6.50
Talking Frequency Counter for blind ops.	Built	179.00
VHF Minisynth—2 meter VFO (Ex crystals)	Kit	38.50
—pcb only + instructions	each	8.40
Digital Display for VHF Minisynth	***Kit	47.00
VHF Minisynth & Display kits as one item	pair	80.00
2 Metre FM Transmitter—pcb kit complete	Kit	32.50
2 Metre FM Receiver—pcb kit complete	Kit	39.50
2 Metre FM Transceiver (Both kits above)	pair	68.00
—pcb only + article (state Tx or Rx)	each	4.00
—Verocase as article (undrilled)	each	7.50
—IO × AA Battery holder	each	0.92
6 Metre Converter—pcb kit	Kit	15.00
6 Metre Converter—pcb kit + case, etc	Kit	20.50
6 Meter Converter—pcb only + article	each	3.00
2 Meter Preamplifier—pcb kit	Kit	5.50
Capacity Add-On for DFM's—pcb kit/case	Kit	18.20
QRP Antenna matching unit (RX80) kit with case	Kit	29.45
Universal Morse Memory	Built	49.50
DSB80/DSB160 (state which)	Kit	37.45
—Case + Hardware	Kit	24.45
—PCIM177 Digital Readout + Bezel	Built	24.10
—Complete Kit + Case + Readout	Set	79.00
—Optional mulitpole audio filter	Kit	16.65
Minisynth PLL VFD (with polyvaricon)	Kit	29.70
Minisynth PLL VFD (with air spaced)	Kit	36.70
Please state band and I.F. required (see main catalogue)		
HF Minisynth pcb only + article	each	5.60
Diecast box for above	each	3.50
DSB2 Txvr—Basic Kit (no VFO)	Kit	40.00
DSB2 Txvr—Kit with Minisynth (polyvaricon)	Kit	68.00
DSB2 Txvr—Kit with Minisynth (air-spaced)	Kit	75.00
Air spaced capacitor alone (Jackson)	each	8.50
DSB2 Tvxr—pcb only + article	each	7.50
DSB2 Digital Readout (160 or 80M)	Kit	24.10
DSB2 Digital Readout (40-15M)	Kit	30.00
DSB2 Case + Hardware	Kit	24.45
DSB2 + VFO (polyvaricon) + case	Kit	89.50
DSB2 + VFO (air spaced) + case	Kit	96.50
(state band required when ordering DSB2's)		

Please note: Prices subject to change without notice

SPEND UP TO £1,200 INSTANTLY WITH A PHOTO ACOUSTICS LTD. CREDIT CHARGE CARD – APPLY FOR DETAILS

PART EXCHANGE WELCOME, ASK FOR KERRY, ANDY OR ROY

Monday-Friday 9.30-5.30 – Saturday 9.30-4.30

R. WITHERS COMMUNICATIONS

584 Hagley Road West, Oldbury
Warley B68 0BS
Tel: 021-421 8201/2 (24 hr Answerphone)

"THE FASTEST GROWING AMATEUR RADIO DEALERS IN THE UK"
Full range of Yaesu, Icom, Trio, etc. Some at pre-increase prices—phone for latest stock levels

NEW PRODUCTS EXCLUSIVE TO R.W.C.

10 Mtr MOD BOARD

£22.50
+ £1.00 carriage

This is a complete modification board designed to fit all CB radios that incorporate the SANYO LC7137 series of synthesizer chip, the unit comprises of a small pcb with six microchips and **fits almost all current legal (CB 27/81) radios,** the unit is supplied with **full fitting instructions** and can be **fitted easily by most enthusiasts,** with the current upsurge in interest in this band demand has been high as this means that over 90% of current CB radios can now be used on 10 mtr amateur band.

RAYCOM MODULAR RF AMPLIFIERS

from £39.50
FOR THE 15W VHF MODEL
+ £2.00 post

A complete range of linear and fm amplifiers for use with both VHF and UHF hand portables and multimode potables such as the YAESU FT290R and FT790R. Power output from 15W to 45W depending on model (eight are available). All units feature Mitsubushi or Toshiba power modules as used in the majority of mobile and base radio transceivers. Two versions are also available for business radio applications.

A.R.M. MULTI P6 ANTENNA

£29.50
+ £2.50 carriage

This is one of the most exciting new products to be launched by RWC and is the result of many months of development by Antenna Research Manufacture based in Devon. The antenna has been designed to meet the growing popularity in multimode portable and mobile operation and **is capable of being used on both vhf and uhf** in both **horizontal and vertical polorization** modes, both portable and mobile. The antenna has the facility of being used as both omni-directional or directional modes as well as having capability of DF function. No ground-plane or radials are required and the antenna **can** therefore **be used in a variety of applications on frequencies between 140-450 mhz.**

ANNOUNCING THE SUPER YAESU FT757GX

- **The modification serves two major purposes**
- **(1) To improve VFO tuning and eliminate "VCO GLITCH"**
- **(2) to increase tuning speed from 5khz per dial revolution to 50khz per dial revolution (selectable on the 500khz step switch)**
- **UK price is £29.50 for the built and tested pcb with complete fitting instructions and £39.50 plus carriage for a unit factory fitted and tested.**

ALL PRODUCTS ON SHOW AND AVAILABLE AT THE N.E.C. CONVENTION

AJH ELECTRONICS (G8AQN)

151a BILTON ROAD, RUGBY CV22 7AJ
Tel: Rugby (0788) 76473

We are pleased to announce that our new shop is now open in Rugby for the sale of all our products and also as a branch of Amateur Electronics (UK) Ltd, the main importers of 'YAESU MUSEN' amateur radio products, 'TOKYO Hi POWER' products, 'TET' antenna's, etc. Items listed below are only a small sample of stocks.

YAESU—(vhf/uhf)
FT203R, FT209R, FT230R, FT290R, FT708R, FT730R, FT790R, FT726R.

HF—
FT77, FT757GX, FP757GX, FC757AT, FP757HD, FT980, FTONE, FT7700.

Range **'SUN'** mobile & fixed station **antennas** for VHF/UHF in stock, plus Bantex 2mtr mobile ¾ wave. Yaesu mobile antenna's SWR meters, etc.

TOKYO Linears—**(vhf/uhf)**
HL45U **£125.75**
HL82V **£144.50**
HL160V-3 3w in 160 out 2mtr 12v. **£244.50**
HL160-25 25w in 160 out 2mtr **£209.75**

DNT CB rigs converted to 10mtr FM by ourselves, new, boxed **£45.00.**

30 watt 2mtr Linear amplifier Kit—designed for the FT290R, etc or any Tcvr with 1 to 4 watts output, givesw 10db gain ie, 2½ watts in 25 watts out, built in pre-amp 20db gain (adjustable) supplied with all components drilled PCB, circuit & info. **£31.50,** heat sink & box **£6.00.**

CO-AX Relay made by B&R relays, 70 ohm 50 volt coil easy to rewind for 12v, etc rated at least 400 watts, ex-equipment & supplied with matching plugs to take UR57/67, etc. **£8.00.**

BOLT-IN FEEDTHROUGH CAPACITORS 1000pf 500VDC wkg. 2BA thread **40p** each.

MAGNETIC DEVICES RELAYS as used in most PYE radiotelephones, Westminster-Cambridge, F30 base stations, etc. Type No. 354 12v coil spec will handle in excess of 50 watts up to 200MHz, new, unused only **£1.25ea. 2 for £2.25.**

Solder-in feedthrough **capacitors** 1000pf 500v. **10 for 60p.**
Solder-in feedthrough **insulators** for 4mm hole. **100 for 65p.**
PTFE feedthrough **insulators** (oxley) 4mm hole. **25 for £1.25.**
Racal 852 Radiotelephone Calibrators for 12½, 25, & 50KHz channel spacing. **P.O.A.**

Right angle 50 ohm **'N' plugs** ex-equipment ex-condition **£1.35 ea.** List £6.50.

5Kv Anode blocking capacitors 240pf & 500pf disc type, 55mm dia, 12mm thick, made LCC, France bolt on fixing **£2.00** each. **Two for £3.50.**

TF144G Signal gen. **£25.00** (callers)
TF144H/4 Signal Gen. **£85.00** (callers)
S/h scopes, sig. gens.—RF & audio, many bargains for callers, come and see us, we are easy to find on the main A426 Leicester to Leamington Rd.

Please add 60p p/p.

THE NEW UNIDEN 2021 PORTABLE COMMUNICATIONS RECEIVER

We recommend this receiver to all Amateur and Short Wave Listeners who require first class performance comparable with the best. At a competitive price.
Brief Spec. AM/S.S.B. (U.S.B. and L.S.B.)/C.W. 150 kHz to 29999 kHz. Triple superhet. Digital Tuning, Scan and six memories. Also F.M. 76-108 MHz. L.C.D. frequency display, etc., etc. Supplied with mains power unit.

£166.74 inc. VAT and Carriage

For full technical Spec. send S.A.E.

G4FLN **G8ADO**

EMA Electronics Engineers
MUNDAYS LANE, ORFORD, WOODBRIDGE, SUFFOLK
Tel: (039 45) 696

ELECTRONICS C.A.D.

"ANALYSER"

PERFORMANCE ANALYSIS of LINEAR CIRCUITS using the BBC MODEL B AND SINCLAIR SPECTRUM 48K MICROS
Simulates Resistors, Capacitors, Inductors, Transformers, Bipolar and Field effect Transistors and Operational Amplifiers in any circuit configuration.
Performs FREQUENCY RESPONSE ANALYSIS on Circuits with up to 16 Nodes and 60 Components, for Phase and Gain/Loss, Input impedance and Output impedance
Ideal for the analysis of ACTIVE and PASSIVE FILTERS, AUDIO, WIDEBAND and RF AMPLIFIERS, LINEAR INTEGRATED CIRCUITS etc, etc.
"ANALYSER" can greatly reduce or even eliminate the need to breadboard new designs
USED BY INDUSTRIAL AND UNIVERSITY R&D DEPARTMENTS WORLD WIDE.
VERY EASY TO USE. PRICES FROM £20
"PAYMENT BY ACCESS OR AMERICAN EXPRESS WELCOME"

For further details write or phone

NUMBER ONE SYSTEMS
Dept RC, 9A Crown Street, St Ives
Huntingdon, Cambs PE17 4EB
Tel. (0480) 61778 Telex 32339

DRESSLER (U.K.) LTD.,

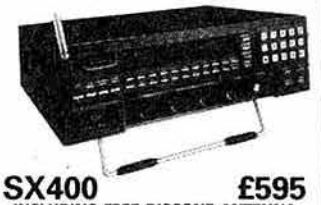
191 FRANCIS ROAD LEYTON E10
TEL 01-558 0854 TELEX 8953609 LEXTON G
01-556 1415

HP FACILITIES AVAILABLE

PROMPT MAIL ORDER

EAST LONDON HAM STORE
WHERE YOUR POCKET COUNTS
FREE DELIVERY ON ALL RIGS: Phone us last for best prices

ICOM R71 £699
INCLUDING DATONG AD270 ACTIVE ANTENNA



SX400 £595
INCLUDING FREE DISCONE ANTENNA

ICOM R71 SPECIAL OFFER
FOR ONE MONTH ONLY
£699 inc. ARA 30 ACTIVE ANTENNA
★ ★ ★ ★ ★
RS 2000 £450
INCLUDING DATONG AD 270 ACTIVE ANTENNA
ALSO AVAILABLE THE DC 10 VHF CONVERTOR
IF BOUGHT WITH ABOVE – £15

£365 AOR 2001
INCLUDING FREE DISCONE ANTENNA

ICOM IC751 £1239
INCLUDING SWR200 METER OR 5 BAND TRAPPED VERTICAL ANTENNA WITH RADIAL KIT

ICOM ICO2E OR ICO4E
+ FREE SPEAKER MIKE AT
£259 ICO2E
£269 ICO4E

ICOM IC745 £898
INCLUDING SWEDISH BRASS MORSE KEY OR BASS MIKE

ICOM IC271E £699
INCLUDING 9XY TONNA OR SWEDISH BRASS MORSE KEY OR PS25 INTERNAL POWER SUPPLY

FT757GX+FC757+FP757HD
INCLUDING 5 BAND VERTICAL + SWEDISH BRASS MORSE KEY

TW4000 £510
INCLUDING DIAWA DUAL BAND ANTENNA + GUTTER MOUNT OR VS1

TR9130 £445

FT726 + 70cm ± SATELLITE INC.
FREE 9XY + 19XY TONNA + SWEDISH MORSE KEY

Communications Terminal New Tonno 777 Tx/Rx, use it with any Micro with RS232. AMTOR/RTTY/CW. For £399. Also Tonno Q5000 AMTOR/RTTY/CW/ Keyboard + 5" Monitor. P.O.A.
Also many others in stock. Also available TONNA ANTENNAS, DATONG, MUTEK & DIAWA. Also VAT FREE on all exports of Amateur Radio, Video & T.V.

Swedish Key £60.00

NEW

THE LATEST FRG 8800
P.O.A.

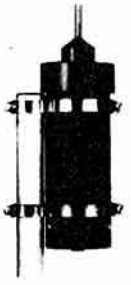
TS 711E
FOR £775 INC. 9XY TONNA OR SWEDISH MORSE KEY

TH21
ONE OF THE MOST POWERFUL, NEATEST AND SMALLEST 2M PORTABLES.
£175

TR2600
INCLUDING DIGITAL CODE SQUELCH
£270

dressler – ara 30 – active antenna
200 kHz . . . 40 MHz

Professional electronic circuitry with very wide dynamic range. Meets professional demands both in electronics and mechanical ruggedness. 120 cm long glassfibre rod. Circuit is built into waterproof 2,5 mm thick aluminium tube. Ideal for commercial and swl-receiving systems.



£90

KENWOOD TRIO TM201A SPECIAL OFFER
£295.19
FOR ONE MONTH ONLY **£265.00**

VHF POWER AMP.

D200 2MTR. 300w F.M. 550w SSB	£675
D200S 2MTR. 400-500w 1Kw. D.C. in	£799
D70 70cms 325w F.M. 500w SSB	£799

NEW MODEL DUE TO ARRIVE
1296 MWZ. 1w-in-10w out.

MAST HEAD PRE-AMPS GAAS FET
POWER HANDLING UP TO 1KW
·7 to ·9dB NOISE
15 to 19dB GAIN
0·2dB INSERTION LOSS

EVV200 GAAS 2MTR. 750W SSB	£80
EVV2000 GAAS 2MTR. 1KW SSB	£90
EVRPS receive 2MTR. only	£50
EVRPS receive 70cm.	£49
EVV700 GAAS 70cm. 500W SSB	£90
EVV70 GAAS 70cm. 100W	£60
EVV2 GAAS 2MTR. 100W	£60
VV200VOX GAAS 2MTR. 250W SSB	£85
INTERFACE	£21
DRESSLER ASA12 Mast Head Coaxial 2 in 1 out Switch with 'N' Connector 1Hz-1GHz 1KW. PEP 0.15dB Insertion Loss	£45

GAREX THE SCANNER SPECIALISTS

J.I.L. SX-200N—THE SUPERIOR SCANNER
★ The choice of the professionals
★ AM + FM all bands
★ Wide coverage: 26-88, 108-180, 380-514MHz
★ 16 memories ★ Positive action keyboard
★ Proven reliability ★ 12v DC & 230v AC **£299**
★ **S-meter & 96-108MHz converter available**

REVCO RS-2000-E—THE VERSATILE SCANNER
★ 70 memories ★ AM + FM all bands
★ Covers: 60-180, 380-520MHz
★ Search & store of active channels
★ All the usual search & scan functions
★ 12c DC & 230v AC operation **£259**
★ Counts activity of selected channel

J.I.L. SX-400—PROFESSIONAL SCANNER
★ Covers 26-520MHz (no gaps)
★ AM + FM (manual, automatic or programmable)
★ Computer interfacing for limitless memory, remote control & data logging
★ Switchable channel spacing & I.F. bandwidths
★ I.F. output terminals (10.7MHz & 455KHz) **£598**
★ Specifications set by the professionals

Regulated mains adaptor for SX-400.....£29.50

SX232 Computer/Terminal interface.....£224.25

NEW! HANDHELD SCANNER just in. SAE details

★ **REVCONE** ★
A superb quality 16 element, all British made VHF/UHF broadband fixed station aerial from Revco. Ideally suited to all scanners and other VHF/UHF Receivers
Covers 50-500MHz PRICE £27.45 inc

ASK FOR OUR LIST OF SECONDHAND SCANNER BARGAINS

★ **SPECIAL OFFER** ★
CENTURY 21D communications receiver. 0.5 to 30MHz. CW, USB, LSB, AM & FM. Digital readout. Provisions for an external speaker and headphones. An excellent performer for only **£199**

CRYSTALS FOR NR-56, SR-9, SR-11, TM-56B. We have a range of 2m & VHF Marine band crystals for these receivers at **£3.00** each (+**20p** post per order). Please phone to check stock.
RESISTOR KITS a top selling line for many years. E12 series, 5% carbon film, 10Ω to 1m, 61 values, general purpose rating ¼W or ½W (state which).
Starter pack 5 each value (305 pieces).....**£3.10**
Standard pack 10 each value (610 pieces).....**£5.55**
Mixed pack, 5 each ¼W + ½W (610 pieces).....**£5.55**
Giant pack, 25 each value (1525 pieces).....**£13.60**
DC/DC TRANSISTORISED INVERTERS 12V input, 400V 200mA rectified and fully smoothed output.....**£9.50**
This unit is a chassis section cut from R/T equipment, tidied, fully wired & tested. Free-standing but no luxuries like cabinet. 24v version—same price. SAE for details.

We have in stock a very large range of spare parts for PYE RADIOTELEPHONES. Models include Olympic, Westminster, Whitehall, Europa, Mascots and PF70 Series. Parts also available for Cambridge, Vanguard etc. etc.
SAE FOR FREE EXTENSIVE LIST

GAREX FM DETECTOR and squelch conversion for Pye R/T equipment Ready Assembled, full instructions. Tailor-made, easy-fit design, replaces existing squelch board, with minumum of modifications. For AM Cambridge **£6.30**; for Vanguard AM25B (Valve RX) **£6.10**; for Transistor Vanguard AM25T **£6.95**.

MAIN DISTRIBUTOR OF REVCO PRODUCTS
Interest free credit available.
Ask for written details.
PRICES INCLUDE UK P&P and 15% VAT

GAREX ELECTRONICS
7 NORVIC ROAD, MARSWORTH, TRING, HERTS, HP23 4LS
Phone 0296 668684. Callers by appointment only

ANTENNES TONNA (F9FT)
YOUR NUMBER ONE CHOICE FOR
6m, 2m, 70, 24 and 23cm ANTENNAS

Below is a list of our complete range of Tonna antennas, and accessories. We believe that our antennas offer the best value today. Purchase with the confidence that our products are backed by nearly 40 years of experience in amateur antenna design and manufacture . . . . c'est magnifique!

50MHz		
20505	5 element	£34.30(a)
144MHz		
20104	4 element	£14.95(a)
20110	5 element crossed	£26.30(a)
20109*	9 element fixed	£17.71(a)
20209*	9 element portable	£20.00(a)
20118*	9 element crossed	£32.43(a)
20113	13 element portable	£31.05(a)
20117*	17 element	£37.66(a)
435MHz		
20409	9 element	£16.10(a)
20419*	19 element	£20.70(a)
20438*	19 element crossed	£34.27(a)
20421*	21 element 432MHz	£29.67(a)
20422*	21 element ATV	£29.67(a)
144/435MHz		
20199	9&19 element Oscar	£34.27(a)
1250MHz		
20624	23 element	£25.90(b)
20648	4×23 element—power splitter—stacking frame	£140.00(a)
1296MHz or 1269MHz Oscar Uplink		
20623	23 element	£25.90(b)
20696	4×23 element—power splitter—stacking frame	£140.00(b)

*Denotes available for 50Ω or 75Ω all other 50Ω only. All antennas supplied complete with mast clamps for up to 50mm masts.

Power Splitters		
29202	2 way 144MHz	£35.94(c)
29402	4 way 144MHz	£41.26(c)
29270	2 way 435MHz	£34.21(d)
29470	4 way 435MHz	£39.39(d)
29224	2 way 1250MHz	£29.19(d)
29424	4 way 1250MHz	£30.19(d)
29223	2 way 1296MHz	£29.19(d)
29423	4 way 1296MHz	£30.19(d)
Portable aluminium telescopic masts		
50422	4×1m 3.7 metres	£20.70(a)
50432	3×2m 5.7 metres	£24.15(a)
50442	4×2m 7.7 metres	£36.66(a)
Galvanised steel telescopic masts		
50223	2×3m 5.9 metres	£30.48(a)
50233	3×3m 8.8 metres	£54.77(a)
50243	4×3m 11.7 metres	£88.41(a)
50523	5×3m 14.6 metres	£119.60(a)
Stacking frame kits for 4 antennas		
20014	20109 or 20118	£39.39(a)
20044	20419 or 20421/22	£28.61(a)
20016	20623/24 horiz	£17.71(b)
20017	20623/24 vert	£13.80(b)

Andrew Heliax LDF4-50A coaxial cable
Attenuation per 100ft. 144MHz-0.8dB. 435MHz-1.6dB. 1296MHz-2.9dB.
£4.00 per metre (a)
'N' type connectors for LDF4-50 male or female **£14.90**
Rotators—coaxial cables—connectors

All prices include VAT. Carriage extra

FOR FULL SPECIFICATIONS FOR OUR RANGE OF ANTENNAS SEND 40p FOR OUR CATALOGUE. PLEASE ADD CARRIAGE AS SHOWN. (a) £4.00. (b) £1.95. (c) £2.20. (d) £1.10. MAINLAND ONLY Cash with order. ACCESS, VISA CARDS—telephone your card number for immediate despatch. **CALLERS WELCOME, BUT BY TELEPHONE APPOINTMENT ONLY, PLEASE.**

UK DISTRIBUTOR
RANDAM ELECTONICS (R)
12 Conduit Road, Abingdon, Oxon OX14 1DB. Tel: (0235) 23080 (24 Hours)

IQD
North Street, Crewkerne, Somerset TA18 7AR
Tel: (0460) 74433 Telex: 46283 INFACEG

FREQUENCY STANDARD, MARKER & CONVERTER CRYSTALS
5·0, 10·0, 10·7 & 38·66667MHz 18U **£3.10**; 1·0MHz 6U or 33U **£3.40**; 100·0kHz 13U or 34U, 116·0MHz 18U **£3.45**; 455·0kHz 6U **£4.03**; 200·0kHz 6U **£4.26**; 1·0MHz hi-stab 6U **£4.90**; 10·0MHz hi-stab 36U **£6.90**.

CRYSTAL FILTERS
Super selective 250Hz 8-pole CW filters for FT-101, FR-101, FT-301, TS-520, TS-820, FT-901 & FT-101Z **£25.88** each (9MHz types with appropriate carrier crystals):

9MHz SSB	6 pole, BW 2·5kHz at −6dB and 5kHz at −60dB	£23.58
9MHz SSB	8 pole, BW 2·4kHz at −6dB and 4·3kHz at −60dB	£27.60
9MHz CW	5 pole, BW 500Hz at −6dB and 2·2kHz at −60dB	£25.88
9MHz FM	8 pole, BW 12kHz at −6dB and 21·6kHz at −60dB	£27.60
10·7MHz FM	8 pole, BW 7·5kHz at −3dB and 17·5kHz at −70dB	£27.60
10·7MHz FM	8 pole, BW 15kHz at −3dB and 35kHz at −70dB	£27.60
21·4MHz FM	8 pole, BW 15kHz at −3dB and 50kHz at −80dB	£28.98

455kHz CFU series ceramic filters, various bandwidths in stock **£1.73**

POST AND VAT INCLUDED

W.H. WESTLAKE
CLAWTON, HOLSWORTHY, DEVON. (0409) 253758

1 H100 50 ohm Low Loss COAX **80p per m** 50m less 10% 100m less 20% (post 5p p/m).
2 POPES RG213U 10.3mm low loss Coax N/C PVC **60p per m** (p 6p p/m)
3 PERMANIOD or BICC UR67 10.3mm Low Loss 50 ohm **60p per m** (p 6p p/m)
4 UR76 50 ohm stranded conductor Coax **23p per m** (p 3p pm)
5 POPES RG58C/U (UR76) with NC PVC **23p per m** (p 3p pm)
6 Mini Coax RG174/U 50 ohm **25p per m** (p 1p pm)
7 UR70 6mm 75 ohm Coax **23p per m** (p 3p pm)
8 UR57 10.5mm low loss 75 ohm COAX **60p per m** (p 6p pm)
9 75 ohm Double Screened 8mm 75 ohm Coax **25p per m** (p 4p pm)
10 Low Loss UHF TV Coax 75 ohm **20p per m** (p 3p pm)
11 75 ohm Twin Feeder **18p per m** (p 2p pm)
12 NEW! RG62AU 95Ω 7mm dia coax **50p per m** (p 5p pm)
13 BOFA GMP6 Slotted 300 ohm Feeder **20p per m** (p 3p pm)
14 Strong PVC covered Aerial Wire **6p per m** (p 2½p pm)
15 14 SWG Copper HD Aerial Wire **20p per m** (p 2½p pm)
16 500m Mixed equipment Wire on Reels **£5** post £1.40
17 ROTATOR CABLE—6 core and 8 core **35p per m** (P&P 5p/m)
18 GREENPAR 50 ohm N Plugs for H100/UR67/213 **£2.40** each)
19 GREENPAR 50 ohm N line Sockets H100/UR67/213 **£2.20** each

Versatower: The professionals' choice!

A range of telescopic towers in static and mobile models from 7.5 to 36 metres with tilt-over facility enabling all maintenance to be at ground level.

Designed in accordance with CP3 Chapter V: part 2: 1972 **for a minimum wind speed of 85 mph in conditions of maximum exposure** and specified by professionals world-wide where hostile environments demand the ultimate in design, quality and reliability.

P40 Standard series
£472.00 inc. VAT (ex-works)
P60 Standard series
£574.00 inc. VAT (ex-works)
Further details available on request.

Ask for details of our NEW 'E' Series Masts— Developed to give a low line (22ft) mounting height.

Strumech Versatower Limited,
Portland House, Coppice Side,
Brownhills, Walsall, West Midlands,
WS8 7EX, England.
Telephone: Brownhills (05433) 4321.
Telex: 335243 SEL G.

Main agent:
South Midlands Communications Ltd.
SM House, Rumbridge Street,
Totton, Southampton,
Hants SO4 4DP
Tel. (0703) 867333

WOOD & DOUGLAS

VHF/UHF COMMUNICATION PRODUCTS

A NEW RALLY SEASON BEGINS!

During the next months you can meet our happy smiling staff at events up and down the country. Our new illustrated catalogue will be released at the NEC in April along with the new high quality products we have been devising in our winter hibernation!

See you there!

Package Prices		Kit
1. 500mW TV Transmit	(70FM05T4 + TVM1 + BPF433)	35.00
2. 500mW TV Transceive	(As 1 above plus TVUP2 + PSI433)	60.00
3. 10W TV Transmit	(As 1 above plus 70FM10 + BDX35)	65.00
4. 10W TV Transceive	(As 2 above plus 70FM10 + BDX35)	90.00
5. 70cms 500mW FM Transceive	(70'T4 + 70'R5 + SSR1 + BPF)	75.00
6. 70cms 10W FM Transceive	(As 5 above plus 70FM10)	105.00
7. 2M Linear/Pre-amp 10W	(144PA/S + 144LIN10B)	40.00
8. 2M Linear/Pre-amp 25W	(144PA4/S + 144LIN25B)	42.00
9. 70cms synthesised 10W Transceive	(R5 + SY + AX + MOD + SSR + 70FM10)	150.00
10. 2M Synthesised 10W Transceive	(R5 + SY + SY2T + SSR + 144FM10A)	120.00
11. 2M Crystal Controlled 10W Transceiver	(R5 + T3 + BPF + 144FM10 + SSR)	85.00
12. 70cms Linear/Pre-amp	(70LIN10 + 70PA2/S)	45.00

70cms EQUIPMENT	CODE	ASSEMBLED	KIT
Transceiver Kits and Accessories			
FM Transmitter (0.5W)	70FM05T4	48.00	28.75
FM Receiver (with PIN RF c/o)	70FM05R5	65.40	45.80
Transmitter 6 Channel Adaptor	70MC06T	21.30	14.25
Receiver 6 Channel Adaptor	70MC06R	25.20	17.90
Synthesiser (2 PCBs)	70SY25B	88.00	62.25
Synthesiser Transmit Amp	A-X3U-06F	34.15	22.10
Synthesiser Modulator	MOD 1	8.95	5.50
Bandpass Filter	BPF 433	6.50	3.30
PIN RF Switch	PSI 433	7.55	5.35
Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10
TV Products			
Receiver Converter (Ch 36 Output)	TVUP2	27.50	22.80
Pattern Generator (Mains PSU)	TVPG1	42.25	36.50
TV Modulator (For Transmission)	TVM1	9.85	5.75
Ch 36 Modulator (For TV Injection)	TVMOD1	9.80	5.50
Power Amplifiers (FM/CW Use)			
50mW to 500mW	70FM1	18.45	12.80
500mW to 3W	70FM3	23.45	17.80
500mW to 10W	70FM10	41.45	33.45
3W to 10W	70FM3/10	23.95	18.30
10W to 40W	70FM40	65.10	52.35
Combined Power Amp/Pre-Amp (Auto Changeover)	70PA/FM10	56.60	40.15
Linears			
500mW to 3W (Straight amp. no changeover)	70LIN3/LT	27.90	19.90
3W to 10W (Auto Changeover)	70LIN3/10E	41.05	30.15
1W to 7W (Auto Changeover)	70LIN10	44.25	32.50
Pre-Amplifiers			
Bipolar Miniature (13dB)	70PA2	8.10	6.50
MOSFET Miniature (14dB)	70PA3	9.65	7.50
RF Switched (30W)	70PA2/S	24.25	15.25
GaAs FET (16dB)	70PA5	20.10	12.80
6M EQUIPMENT			
Converter (2M i.f.)	6RX2	28.40	20.80
2M EQUIPMENT			
Transceiver Kits and Accessories			
FM Transmitter (1.5W)	144FM2T3	39.35	26.30
FM Receiver (with PIN RF Changeover)	144FM2R5	65.50	47.20
Synthesiser (2 PCBs)	144SY25B	78.75	60.05
Synthesiser Multi/Amp (1.5W O/P)	SY2T	27.90	20.65
Bandpass Filter	BPF 144	6.50	3.30
PIN RF Switch	PSI 144	7.55	5.35
Power Amplifiers (FM/CW Use)			
1.5W to 10W (No Changeover)	144FM10A	24.15	18.50
1.5W to 10W (Auto Changeover)	144FM10B	36.11	26.25
Linears			
1.5W to 10W (SSB/FM) (Auto Changeover)	144LIN10B	38.40	28.50
2.5W to 25W (SSB/FM) (Auto Changeover)	144LIN25B	40.25	29.95
1.0W to 25W (SSB/FM) (Auto Changeover)	144LIN25C	44.25	32.95
Pre-Amplifiers			
Low Noise, Miniature	144PA3	8.60	7.40
Low Noise, Improved Performance	144PA4	12.86	8.40
Low Noise, RF Switched, Full Changeover	144PA4/S	24.30	15.30
GENERAL ACCESSORIES			
Toneburst	TB2	6.70	4.25
Piptone	PT3	7.50	4.45
Kaytone	PTK3	8.75	6.05
Relayed Kaytone	PTK4R	12.70	8.20
Regulator (12V, low differential)	REG1	6.95	4.40
Solid State Supply Switch	SSR1	5.85	3.70
Microphone Pre-Amplifier	MPA2	6.10	3.50
Reflectometer	SWR1	6.35	5.35
CW Filter	CWF1	8.55	5.80
TVI Filter (Boxed)	HPF1	5.95	–
FM TV MODULES			
50mW 420MHz Source (Video Input)	UFM01	26.95	19.80
50MHz i.f. Processor	VIDIF	54.25	38.95
Varactor Multiplier (Boxed)	WDV400/1200	63.95	–
1250MHz Downconverter	1250DC50	69.95	–

Further details on our product range will gladly be forwarded on receipt of an A5 size SAE. Technical help is available by 'phone (NEW NUMBER) during normal office hours. Kits are usually available by return of post but please allow 28 days for unforeseen delays. Please add 75 pence to your total order for postage and handling. Credit card orders are gladly accepted, please give us a call.

ANYONE CAN SELL A KIT . . . REPUTATION SELLS OURS

UNIT 13, YOUNGS INDUSTRIAL ESTATE,
ALDERMASTON, READING RG7 4PQ
Tel: (073 56) 71444 Telex: 848702

RADIO SHACK FOR EVERYTHING IN AMATEUR RADIO

Performance and Value. Bearcat® 200FB

SPECIFICATIONS

Frequency range:

66-88 MHz	Low Band
138-144 MHz	Extended VHF Range
144-148 MHz	2-Meter Amateur
148-174 MHz	High Band
406-420 MHz	Extended UHF Range
420-450 MHz	70-cm Amateur
450-470 MHz	UHF Band
470-512 MHz	UHF 'T' Band

Size: 9"W × 3"H × 9½"D

Weight: 3 lbs.

Power Requirements: 12V DC

Audio Output: 800 Milliwatts RMS

Antenna: Telescoping (supplied)

Sensitivity: 1.0µV for 12 dB SINAD

Scan Rate: Selectable, 5 or 15 channels per second

Connectors: External speaker card edge connector (optional accessory Model No. WH-1)

16 channels. Program 16 frequencies for automatic scanning in any combination of bands and frequencies.

Patented Track Tuning. Electra-patented feature allows scanner to peak on each transmission automatically for optimum reception.

2 banks. Activate or lockout groups of channels quickly. Scan channels 1-10, 11-16, or both.

Priority. Lets you sample a designated frequency, on Channel 1, every two seconds to prevent missing important calls.

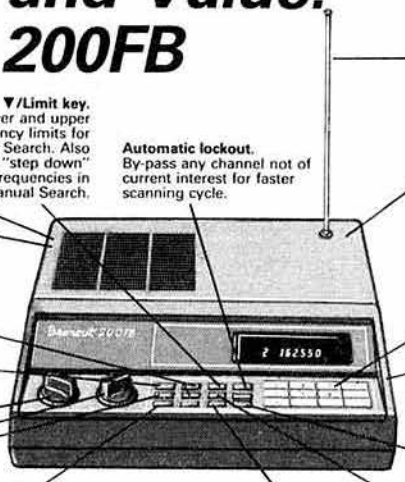
On/Off Volume. Power switch and continuously variable volume.

Automatic squelch control. Factory set for easier operation or manually adjust to block out unwanted noise.

Dual scan speed. Scan at either 5 or 15 channels each second.

▼/Limit key. Sets lower and upper frequency limits for Automatic Search. Also used to "step down" through frequencies in Manual Search.

Automatic lockout. By-pass any channel not of current interest for faster scanning cycle.



Single Antenna. Single telescopic antenna provides optimized reception without the need for long low band antenna.

Crystal-free. Program thousands of frequencies with pushbutton ease . . . and without a single crystal needed.

Decimal display. Bright vacuum fluorescent display shows frequency being received.

One piece keyboard. Sealed keyboard with "key locator" ridges for positive, easy operation.

8 band coverage. Includes Low, High, UHF and UHF-'T' bands, 2-metre and 70-centimetre Amateur ("ham") bands, extended Land-Mobile bands.

Direct channel access. Go directly to any channel, without stepping through other channels.

Automatic search. Seek and find new active frequencies automatically between frequency limits you select.

Patented Selective Scan Delay. Adds a two-second delay on desired channels to prevent missing transmissions when "calls" and "answers" are on the same frequency.

▲/Hold key. Stops searching action to hold on frequency of interest. Also used to "step up" through frequencies in Manual Search.

£199.95 Securicor Delivery £6.90

Access

RADIO SHACK LTD 188 BROADHURST GARDENS, LONDON NW6 3AY

(Just around the corner from West Hampstead Station on the Jubilee Line)

Giro Account No. 588 7151 Telephone 01-624 7174 Telex: 23718

BARCLAYCARD VISA

SMC LEEDS

Under the management of Colin, G3PSM since 1977, SMC LEEDS is one of the largest amateur radio outlets in the North of England. We are located 4 miles north of the city centre on the A660 Otley Road and just 400 yards south of the A6120 outer ring road junction. Bus services stopping outside the door include numbers 1, 4, 93 and 96 to and from the city centre. Colin and Sean G1LUO bid you welcome (and Sean might even be persuaded to make you a cup of tea . . .)

You can also play on the Tatung Einstein computer for which we are approved stockists. We should have amateur radio software available by the time this is in print.

MFJ402	Keyer c/w paddle	£20.00	ARC KD200	Multimeter	£25.00
ST12MF	Double 200/8Ω Noise Cancel	£18.00	PA 15/160 BL	VHF Linear 2M	£159.00
HF223	Double 200/8Ω	£25.00	FRV 7700	Converters all models.	£75.00
DH228	Handmike	£5.00	Jaybeam	Antennas (This month only)	10% off
DH277	Handmike c/w Preamp	£8.00	Bantex	Antennas (This month only)	10% off
MMC 70/28 LO	4m to 10m down conv.	£30.00			
MMC 144/28 LO	2m to 10m down conv.	£30.00			
MMA 1296	Low noise 1296MHz pre. amp	35.00	MML 114/100-LS	100W 2m linear	£130.00
MMD 600P	÷10 prescaler up to 600MHz.	27.00	DATONG FL-1	Audio Filter	£50.00
			SS242	Scanning Receiver	£45.00
			DATONG PC-1	50kHz to 30MHz Conv	£100.00

Tel: 0532-782326

Monday to Saturday 9.00-5.30

HATELY ANTENNA TECHNOLOGY (GM3HAT)

DIPOLE OF DELIGHT

Our Signal Success can be yours. Have you been unable to fulfil your hopes in amateur radio because of adverse environmental conditions? Then you need a Dipole of Delight. The DD gives an exceptionally quiet background because it has an entirely new lightweight capacitive balun and can therefore feed, and be fed properly, using coax cable, without an ATU.

Hundreds of operators now have good contacts because they have bought a Dipole of Delight. Whether you are an experienced operator struggling in a noisy location with TV sets all around, or are a beginner eager to achieve satisfying DX with a low power transmitter, why not try a DD and enjoy yourself? Remember we offer a 1 month money back policy for any purchaser not delighted with the DD.

All antennas are a full halfwavelength long on their lowest freq. band.

MULTIBANDERS

DD 3.65/7	£48.50	DD USA 7/21	£28.00
DD 7/14/21/28L	£58.00	DD 14/21/28L	£46.50
DD Europe 7/21	£28.00	DD 10/18/24	£56.00

MONOBANDERS

DDM 10 **£23.50**, DDM 14 **£15,50**, DDM 21 **£11.50**, DDM 28 **£11.50**

Unified Price structure. UK inc VAT and 1st Class Post. DX inc Air Mail.
For UK purchasers of antenna, recommended 5mm coax 30p per metre, inc reducer £1 parcel post paid.
Details and Photos SAE please.

Hately Antenna Technology, 1 Kenfield Place, ABERDEEN AB1 7UW, Scotland, UK
Proprietor: Maurice C Hately, M Sc, MIEE, Chartered Electrical Engineer (GM3HAT)

ROBOT SALE ITEMS

Pick a genuine bargain, but hurry, stocks are limited

MODEL		LIST	SALE
'400'	SSTV Send/Receive—New	£666	£444
'400'	Secondhand—Mint		£333
'800'	RTTY, ASCII, CW, SSTV—New	£675	£450
'400C'	Mint 400 with Robot Colour		£695
'400C KIT'	Converts 400 to Colour	£550	£485
'800C KIT'	Converts 800 to Colour ETC	£189	£175

NEW '450C' and '1200C' Colour Converters NOW IN STOCK

ROBOT (UK) LTD

Bldg 33, East Midlands Airport, DERBYS DE7 2SA.
Tel: 0332 812446

CLASSIFIED ADVERTISEMENTS

Classified advertisements **30p** per word, minimum **£4.80**
Box Number £2.00 extra to wordage or minimum.
Semi-display 1/8 page 2¼" × 3½" (57 × 91mm) **£81.00**
3/32 page 1⅞" × 3½" (42 × 91mm) **£63.00**
1/16 page 1" × 3½" (26 × 91mm) **£44.00**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.

Copy and remittance to: **M. J. HAWKINS G3ZNI, RSGB Advertisements, PO Box 599, Cobham, Surrey KT11 2QE.**
(Cheques should be made payable to RSGB.)

Members' Ads must be sent to the editor at Chelmsford.

AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

HOLIDAY ACCOMMODATION

GET FAT AT FAIRMOUNT! Enjoy our wonderful meals, beautiful en suite bedrooms, warmth and comfort, in a tranquil setting near historic Cockington village. Family holidays with FREE accommodation for children; dogs most welcome too. Special Spring Breaks, and pensioners reductions. From £15.50 B.B.E.D. Also meet G6GR, licensed 63 years, use the rigs if you are licensed also, and try the new TONO communications-terminal computer. Telephone (0803) 605446, Fairmount House Hotel, Herbert Road, Chelston, Torquay.
TORQUAY (0803) 607333. Self-contained holiday flats open all year. Example —early June flat for two, £55.00 weekly inclusive TV, linen. Linden House, Ruckamore Road, Chelston, Torquay.
CORNISH HOLIDAY COTTAGE sleeps four, fully equipped, colour TV, near coast. From £70 per week. Phone A. Jeffery G4YRL (032 65) 3617.
SELF-CATERING CHALETS. Explore by day, DX by night. My aerials, your rig. £15-£120 per chalet per week. Green, G0ATS, 'Chylean' Tintagel, Cornwall PL34 0HH. Tel. (0840) 212262.
SRI LANKA, MOUNT LAVINIA. Easy reach of beach, restaurants, shopping, city zoo. Transport. Two weeks bed and breakfast (single) US$210, (couple) US$375. Free laundering, no service charges. Write to Mrs Antoinette Perera, Spangles, 84 Templer Road, Mount Lavinia plus £1 or 5 IRCs.
SOUTH DEVON HOLIDAY—FARMBOROUGH HOUSE. Set in own 10 acres near Dartmoor. Opportunities painting, Yoga etc. Well equipped radio shack (G4YXC). Metal/woodworking facilities. Vegetarian wholefood, nonsmoking. Further information SAE please Mrs Sophie Edwards, Farmborough House, Chudleigh, Newton Abbot, Devon TQ13 0DR Tel (0626) 853258.
BOURNEMOUTH "DOLBADARN" PRIVATE HOTEL, 8 Grand Avenue, Southbourne BH6 3SU. Between sea and shops. Residential licence, room radio, call and teamaking facilities. Excellent food. Dinner, Bed and Breakfast from £11.00 daily. Bed and Breakfast from £7.50 daily. (0202) 424826. E. W. & J. W. Batten (G3BKN).
TEIGNMOUTH. ANDREA COURT HOTEL, Second Drive, Landscore Road, Teignmouth TQ14 9JS. Dinner, bed and breakfast from £55.00. Use shack. HF and VHF gear and antennas. Write or telephone for brochure and special discounts. (062 67) 2007. K & S Phillips G8IAW.
SHANKLIN, ISLE OF WIGHT. Small private hotel close all amenities. Superb food and accomodation. Most rooms en suite. Details with pleasure. Gill & Tony Perez (G4SVY), Kenbury Hotel, Clarence Road, Shanklin. (0983) 862085.

WANTED

WANTED: EX-RAF air publications, manuals, etc. from 1938 onwards; relating to transmitters, receivers, navigation equipment and radar. Excellent price given. M. Gee, 29 Studland House, Aston Street, London E14 7NL. Phone 01-254 9083 evenings.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT5, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am-5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT5.
GB NEWS 1985—packed with information for your Continental Holiday, 2 × 13p stamps. GB Car Club, FREEPOST 1, Romsey, Hants SO5 8ZT.
PATENTS, TRADE MARKS and DESIGN—Booklets on request, Kings Patent Agency Ltd. Established 1886 (B. T. King MIMech., E. J. B. King, regd. Patents Agents)—146a Queen Victoria Street, London EC4V 5AT. Tel 01-248 6161. Telex 883805.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send S.A.E. for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.
AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.
QSL & LISTENER CARDS. Quality printing on coloured and white gloss card at competitive prices. SAE for samples. S. M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.
G5RV TYPE AERIALS. Half-size £13.50, Full-size £15.50. New Hard Drawn Copper Aerial Wire, 140ft 14swg £7.90; 50 metres 16 swg £6.90. Enamelled soft copper wire 10 metres 12swg £3.50; 50 metres PVC covered Aerial wire £4.20. Ceramic Egg insulators, 40p. Guy rope, 4mm Polypropylene, 50 metres £3.95; 4mm Nylon 50 metres £6.90. 1Kw 1:1 Baluns £13.00. All items post paid. S.M. Tatham G3RSY, 1, Orchard Way, Fontwell, Arundel, West Sussex.
30FT TELESCOPIC/TILTOVER MASTS, £170 complete. SAE. M. White, 14 Pingle Lane, Northborough, Peterborough. (0733) 76682.
D.I.Y. QSLs/SWLs (state which!!). 100 mixed designs/colours, £2.50 (c.w.o.). Q/Cards, 87 Derwent Street, Blackhil, Consett DH8 8LT.
PERSONALISED QSL CARDS, 1000 £15.00, 5000 £50.00. Sae for samples. Q/ Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.
50m (165ft) AERIAL WIRE. Strong PVC covered copper only, £4.40 inc postage. W. H. Westlake, Clawton, Holsworthy, Devon.
QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gelildan, Blaenau Ffestiniog, Gwynedd.
CREED TELEPRINTERS 444(TP15) complete with perforator and reader. Tested working. Available to Raynet members only. £40. Details Mike Watson G8CPH, Ipswich (0473) 831448.
PAG, RTTY TERMINAL UNIT KIT. PLL, AFSK, auto start stop. Complete with PCB, power supplies, case components; £56. Details Mike Watson G8CPH, Ipswich (0473) 831448.
"RAYNET" YELLOW REFLECTIVE TABBARDS with RAYNET front and rear similar to Police and Ambulance, etc. Also "RAYNET CONTROLLER". 2 sizes. Prices from £6.90 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 831448.
200 DIY QSL's—mixed designs, colours £5.00 Hampshire Logbook £1.90. SAE lists. RWW, PO Box 11, Romsey, Hampshire SO5 8XX.
PHONE-ATLAS GAZETTEER—with maps, giving approximate location of all U.K. telephone numbers, £5.75. RWW, PO Box 11, Romsey, Hampshire SO5 8XX.
DX QSL CARDS. Display your best cards in our clear plastic hanging wallets. Holds twenty cards. Pack of three, £2.40. Viola Plastics, Dept RC, 36 Croft Road, Hastings, Sussex.
ALL THE FAMOUS MOSLEY ANTENNAE. TA33Jr, Mustang, Atlas, V-3Jr, TD-3Jr Beams, Verticals, etc. Also spares available only direct from us. Send £1 for our Handbook showing all Antennae. Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX.
AMATEUR RADIO EQUIPMENT bought, sold, exchanged. For the best deal, Guaranteed! Phone Dave (040 24) 57722 or send SAE for list. G4TNY Electronics, 132 Albany Road, Hornchurch, Essex RM12 4AQ.
MONOLOCK SAFETY MICROPHONE SYSTEM £32.95. Timer + pre-amp Ni-Cads + electret lapel microphone. Suits most rigs including Icoms. Microphone plug fitted. R & A Sudron Ltd, Colliers Lane, Leeds LS17 8LP. (0532) 737120.
G4TJB QSL CARDS Personal and standard designs, DIY cards, Log Books, SAE for samples and price list. G.C. Patterson, 16 Peartree Road, Great Barr, Birmingham B43 6HY.
YAESU VALVES FROM G3LLL. Stamped matched pairs P.A. FT101ZD, FT902, etc. 6146B/GE, £24 p.p. (matched 3 FT102, £33 p.p.) FT101Mk1-E 6JS6C/NEC, £22 p.p. NEC 12BY7A OK all, £5.75 p.p. See below AEUK.
BLACK STAR 600MHz COUNTERS. Quality and vlaue. Yes, it's British. Last chance old price, £139.99 p.p. Full range Yaesu on dem. AEUK/Holdings Ltd, 45 Johnston Street, Blackburn BB2 1EF. (0254) 59595. Access/Barclaycard. Closed Thursdays.
S.S.B. PRODUCTS. SALES/SERVICE. Yaesu FRG7700M, Lafayette HA55A, Eddystone EC10 receivers. Twenty others in stock. Transceivers, AR2001 Scanners, crystals, service manuals, part exchanges. Have your receiver re-conditioned by Norman Birkett. SAE. "The Moorings", Playing Place, Truro TR3 6HD. (0872) 862575.
SPECIAL OFFER Personalised QSL Cards £14.25 per 1000. Logbooks £2.30. SAE samples. G6DQS, 10, Springfield Avenue, Honley, Huddersfield.
QSL CARDS. Distinctive QSL's, many designs on high gloss card, competitively priced. Send for free samples, stating if SWL. Deroga Printing, Whitwell Road, Sparham, Norwich NR9 5PN.
G5RV. CONVERT YOURS to low loss open wire feeder. It's easy with our quick fit clip on spreaders. Set of 25, £4.50; or run feeder direct to shack. Extra spreaders, 18p each. 16 SWG hard drawn copper wire, 12p per metre. All post 50p. Complete G5RV kits. Full size, £12.00; half size, £10.50. Post paid. Viola Plastics, 36 Croft Road, Hastings, Sussex.
VHF AIRBAND ALLOCATIONS (118-136MHz). Convenient pocket-sized booklet containing over 450 allocations for 242 airfields and heliports in the British Isles. Control centres, company frequencies and others are also included, giving more than 600 allocations. Possibly the most comprehensive and compact guide available to the enthusiast. Price £2.50 inc p&p from K.J. Evans, (Ref RS), 11 Hill View, Bryn-y-Baal, Mold, Clwyd, CH7 6SL.
QSL CARDS. Try me for qualiy and price. SAE for samples. A. W. Bailey (G3YNI), Brean Down Press, Wick Lane, Lympsham, Somerset.

COMPUTER SOFTWARE/HARDWARE

G3WHO BBC SOFTWARE. Full feature AMTOR program now available on Eprom. Works with ordinary T.U. and timer unit (supplied). Split screen, memories, clock, mailbox etc. Phone or SAE for details. RTTY program also available on tape (£7.50), Disk (£9.50) and Eprom (£20). P.J. Harris, 10 Appleby Close, Great Alne, Alcester, Warwickshire B49 6HJ. Tel. 078981 377.

"DX" ON SPECTRUM 48K. Bearings, distances, F1/F2 hops, Lat/Long or Maidenhead plus nearly 400 pre-programmed co-ordinates including full DXCC. World map flashes locations. Run it during HF QSO's! Tape, £5.99. Autocraft, 10 Brocks Drive, Fairlands, Guildford, Surrey.

ATMOS RTTY £9.50, Morse Tutor £6, QTH Locator £5, all three for £17. Electron/BBC Ham package: Morse, QTH Locator, ATV test card £11, for Sinclair QL £17. AX.25 Packet Radio boards assembled/tested £249, in cabinet £289. SAE details: Vomek Software, 50 Mayridge, Fareham, Hants PO14 4QP.

BBC/ELECTRON. UHF/MICROWAVE. Matching—made easy! Input transistor data. Outputs component values and PCB dimensions. Tape, £6.50. R.N. Electronics, 13 Rosemead Gardens, Brentwood CM13 1HZ.

BBC32k: SUPERB SOPHISTICATED PROGRAMS featuring: random letters, numbers, words, mixtures; 100 plain-language tests; abbreviations/punctuation; output/speed choice; morse keyboard; write, save, replay own texts. £4.95. SAE details. D. Brandon (G4UXD) 1, Woodlands Rd., Chester CH4 8LB.

MORSE READER PROGRAMMES. Off air onto screen. Programmes for BBC B, Spectrum, ZX 81-16K, Dragon, Amstrad 464, Commodore 64 and any VIC 20. Sinclair computers need no interface, others use simple one transistor (BC107) interface. Programmes self tracking 8/30 WPM. All connections to existing sockets. Cassette with full instructions and circuit £6.00. J.E. Price, 4 Housman Walk, Offmore, Kidderminster.

BBC B. HF CONTEST CHECKER (2500 Calls). Used by many Contest Groups. Disc based. Instant duplicate check. Auto Clock, 59/599, Serial No. etc. Instant recall RST In/Out if duplicate found. Very easy to use. Post Contest Printouts (for Epson printers), Error correction facilities, makes contests fun!!! Also Morse Tutor (Transmit Only). SAE for details. Gordon MacKenzie (GM4NUN), 278 Ayr Rd, Newton Mearns, Glasgow G77 6AQ.

BBC MICRO SOFTWARE. RTTY transceive program in ROM which is entered simply by typing "*RTTY". Sophisticated Morse teacher, slow Morse broadcast software, Morse beacon. Written by professional software designers. Send large SAE for detailed technical specifications. GOC Software Limited, "CQ Cottage", Longhill Lane, Audlem, Cheshire CW3 0HU.

RTTY AND CW transceive with No Tu. Very sophisticated program yet easy to use. Split screen, type ahead, 26 saveable memories, CW indent, QSO review and much more. Needs only a very simple interface (kit, PCB and user port connector supplied). For CBM64, BBC-B, VIC20 (needs expansion). Tape, instructions, interface kit £20 inc p&p. Ready-made interfaces available. CW-only version for Spectrum £10. Technical Software (GW3RRI), Fron, Cesarea, Caernarfon LL54 7RF. (0286) 881886.

MORSE TUTOR CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Superb program, very easy to use. Absolute beginner to over 40 wpm. Learn in stages, random letters, figures, words, plain language. Any amount, any speed. Tape, instructions, comprehensive learning guide £6 inc p&p. GW3RRI, see ad above.

RAE MATHS CBM64, VIC20 (needs expansion), BBC-B, Spectrum, ZX81-16k. Gives unlimited practice and testing in all RAE formulae to make you perfect in this vital part of the exam. Don't let maths make you fail. Pass with this program. Tape, instructions, complete reference sheet £8 inc p&p. GW3RRI, see ad above.

LOCATOR GBM64, VIC20, BBC-B, Spectrum. QTH or Maidenhead locators or lat/long. Distance, beam and return headings, VHF contest points and totals, long path details, converts between locator and lat/long. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

LOGBOOK CBM64, VIC20 (Needs expansion), BBC-B, Spectrum. Records date, band, mode, callsign and remarks of all your contacts. Superfast callsign search. Easy, fast updating of files. Output to screen or printer. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

CONTEST LOG CBM64, BBC-B, VIC20 (needs expansion). All details for RSGB HF/VHF contests. Instant duplicate check. Calculates distance and points for VHF. Outputs in required page format. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

BBC-B LOCATE AMATEUR PREFIXES, countries, continents, zones etc. Fast 40 track disk. £6.75 incl. Peysoft, 1 Retreat Cottages, Broadbridge Heath, Horsham, Sussex.

GOT A DRAGON BUT NO PRINTER? Use your teleprinter as a normal line printer with "Tele-Face"; a relocatable m/code program to output the correct format and speed for a Creed 444 or similar. Output at TTL levels, details supplied of simple hardware to convert to 80v or interface available ready-built. Software cassette with circuit diagram of interface £4.99. Interface with cable £9.85. Computil (G8WTA), 22, Grove Park, Burbage, Hinckley, Leics. LE10 2BJ.

RTTY/CW/AMTOR. Don't trust to luck—ask around and ascertain whose software is well designed, thoroughly tested and highly recommended. Then contact us. RTTY software for CBM64, Vic20, Atom, Dragon/TRS80C. Useable with conventional RTTY. T.U.'s for excellent results; unlike some advertised systems. AMTOR Dragon/TRS80C split screen, type ahead, all modes, well reviewed. CW transceive Dragon/TRS80C auto tracking receive and type ahead transmit to 200wpm. Matching interfaces available. e.g. RTTY XR2211 based demodulator, £14. Grosvenor Software (G4BMK), QTHR. (0323) 893378.

AMSTRAD CPC464 SOFTWARE: Morse Tutor, cassette, £7 inc. QSO Indexing system, replaces the card index, cassette, £7 inc. Details as last month. Yeovil Electronic Developments, 44 St. Marys Crescent, Yeovil, Somerset BA21 5RR.

INDEX TO ADVERTISERS

RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£3.91	£3.52
Amateur Radio Awards (2nd edn)	£3.68	£3.31
Amateur Radio Operating Manual	*(Out of print)*	
HF Antennas for All Locations	£7.35	£6.62
How to Pass the Radio Amateurs' Examination	£3.42	£3.08
Microwave Newsletter Technical Collection	£6.83	£6.15
Morse Code for Radio Amateurs	£1.64	£1.48
RSGB Amateur Radio Call Book (1984 edn)	£7.14	£6.43
Radio Amateurs' Examination Manual (10th edn)	£3.84	£3.46
Radio Communication Handbook (5th edn) Vol 2	£8.46	£7.61
Radio Communication Handbook (Vols 1 and 2 combined, paperback)	£11.79	£10.61
Raynet Manual (1984 edn)	£2.78	£2.50
Teleprinter Handbook (2nd edn)	£12.72	£11.45
Television Interference Manual (2nd edn)	£2.31	£2.08
Test Equipment for the Radio Amateur	£6.41	£5.77
VHF/UHF Manual (4th edn)	£10.58	£9.52
World at Their Fingertips (paperback)	£7.75	£6.98

RSGB logbooks

Amateur Radio Logbook	£2.77	£2.49
Mobile Logbook	£1.23	£1.11
Receiving Station Logbook	£2.87	£2.58

RSGB maps, charts and lists

HF Awards List and Countries List	48p	43p
Great Circle DX Map (wall)	£2.43	£2.19
IARU Region 1 Beacon List	40p	36p
Locator Map of Europe (wall)	£1.95	£1.76
Locator Map of Europe (card for desk)	70p	63p
UK Beacon List	40p	36p
UK Repeater List and maps	50p	45p
World Prefix Map in full colour (wall)	£2.53	£2.28
Meteor Scatter Data	£3.51	£3.16

RSGB members' sundries (members only)

Radio Communication Easibinder	—	£6.71
RSGB badge car sticker	—	49p
RSGB belt (real leather)	—	£7.57
RSGB hf contest log sheets (100)	—	£3.13
RSGB vhf contest log sheets (100)	—	£3.13
RSGB tie (coffee, maroon, green or blue)	—	£3.18
RSGB callsign cap	—	£4.98
RSGB logo rubber stamp	—	£3.16
RSGB station callsign plaque*	—	£9.50
RSGB teeshirts (med, large, exl)	—	£4.90
Standard callsign lapel badge*	—	£1.96
De-luxe callsign lapel badge*	—	£2.80
Lapel badge (RSGB emblem, pin fitting)	—	59p
Mini lapel badge (RSGB emblem, pin fitting)	—	68p
Members' headed notepaper (50 sheets) quarto	—	£1.20
Members' headed notepaper (50 sheets) octavo	—	75p

**Delivery approximately five weeks*

Miscellaneous

"Amateur radio" (two colours) car sticker	73p	66p
DX Edge (HF propagation prediction aid)	£14.09	£12.68
"I'm on the air with amateur radio" (four colours) car sticker	84p	76p
"I'm monitoring ·5 are you?" (two colours) car sticker	73p	66p
QSL card holders	£1.23	£1.11
Radio Communication back issues *(As available)*	£1.32	£1.19
Radio Communication bound volume, 1980 (Parts 1 and 2)	£14.93	£13.44
Radio Communication bound volume, 1981	£14.93	£13.44
Radio Communication bound volume, 1982	£15.93	£14.34
Radio Communication bound volume, 1983	£16.90	£15.21
Smith charts, pad of 25 (Chartwell D7510)	£2.23	£2.01

Other publications

	Non-members' price	Members' price
Active-filter Cookbook (Sams)	£12.71	£11.44
All About Cubical Quad Antennas (RPI)	£5.83	£5.25
Amateur Single Sideband (Ham Radio)	£5.46	£4.91
Amateur Television Handbook (revised) (BATC)	£2.94	£2.65
Amateur Television Handbook Vol 2 (BATC)	£2.77	£2.49
Antenna Anthology (ARRL)	£6.00	£5.40
ARRL Electronics Data Book (ARRL)	£4.47	£4.02
Beam Antenna Handbook (RPI)	£6.83	£6.15
Better Short Wave Reception (RPI)	£6.83	£6.15
Care and Feeding of Power Grid Tubes (Varian)	£6.99	£6.29
CMOS Cookbook (Sams)	£13.07	£11.76
Complete DX'er (W9KNI)	£7.77	£6.99
Complete Shortwave Listener's Handbook (Tab)	£12.21	£10.99
Design of VMOS Circuits with experiments (Sams)	£8.50	£7.65
FET Principles, Experiments and Projects (Sams)	£8.04	£7.24
FM and Repeaters for the Radio Amateur (ARRL)	£4.30	£3.87
G-QRP Club Circuit Book	£4.52	£4.07
Guide to Oscar Operation (AMSAT)	£1.78	£1.60
Hints and Kinks for the Radio Amateur (ARRL)	£4.47	£4.02
How to Troubleshoot and Repair AR Equipment	£10.47	£9.42
IC Op-amp Cookbook (Sams)	£11.76	£10.58
International VHF FM Guide	£2.45	£2.21
Newcomer's Guide to Simplex and Repeaters on 2m (UK FM Group)	£1.24	£1.12
**Power Supply Handbook* (Tab)	£10.99	£9.89
Radio Amateurs Antenna Handbook (RPI)	£7.88	£7.08
Radio Amateurs Callbook (1985) (DX listings) (ARC1)	£18.35	£16.52
Radio Amateur Callbook (1985 USA listings) (ARCI)	£18.87	£16.98
Radio Amateurs Handbook (1984) (ARRL)	£6.66	£5.99
Radio Amateurs Handbook (1985) (Softback) (ARRL)	£15.80	£14.22
Radio Amateurs Handbook (1985) (Hardback) (ARRL)	£21.90	£19.71
RTTY Today (UEI) (A modern guide to rtty)	£7.19	£6.47
Radio Frequency Interference (ARRL)	£4.18	£3.76
Satellite Experimenters Handbook (ARRL)	£10.11	£9.10
Satellite Tracking Software for the Radio Amateur (AMSAT-UK)	£4.47	£4.02
**Secrets of Ham Radio DXing* (Tab)	£7.92	£7.13
Semiconductor Data Book (Newnes)	£7.97	£7.17
**Shortwave Listeners' Antenna Handbook*	£10.10	£9.09
Shortwave Propagation Handbook (Cowan)	£7.79	£7.01
Simple Low-cost Wire Antennas (RPI)	£6.83	£6.15
Solid State Design for the Radio Amateur (ARRL)	£7.87	£7.08
Television for Amateurs (BATC)	£2.23	£2.01
Towers International Transistor Selector	£13.95	£12.56
Towers International MOS Power & FET Selector	£10.95	£9.86
Towers Op-Amp Selector	£9.50	£8.55
**UHF-Compendium Parts 1 and 2*	£14.93	£13.44
Understanding Amateur Radio (ARRL)	£4.73	£4.26
Understanding the Oscilloscope	£10.10	£9.09
VHF Propagation Handbook (Nampa)	£3.75	£3.38
Weekend Projects for the Radio Amateur (ARRL)	£4.95	£4.46
World Atlas (RACI)	£3.35	£3.02
World Radio TV Handbook 1985	£18.91	£17.83
**99 Test Equipment Projects You Can Build*	£8.00	£7.20

***Items marked with an asterisk may not be available immediately. Please telephone before ordering to confirm availability.**

RSGB kits

Morseman kit 1	£12.78	£11.50
Morseman kit 2	£19.52	£17.57
Morseman kit 3	£36.11	£32.50
CMOS Z80 ic for Morseman	£8.17	£7.35

MORSE INSTRUCTION AID

RSGB morse course Stage 1 (to 5wpm)	£4.54	£4.09

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£31.53	£28.38
Two years	£60.00	£54.00
Three years	£89.74	£80.77
By air via KLM (to W Europe only) one year	£44.81	£40.33
Ham Radio Magazine (per annum) (incl air delivery)	£25.35	£22.81

NEWSLETTER SUBSCRIPTIONS

Microwave Newsletter, VHF Newsletter, DX Newsletter. For details contact the membership services department at RSGB headquarters.

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

ORDER FROM: RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

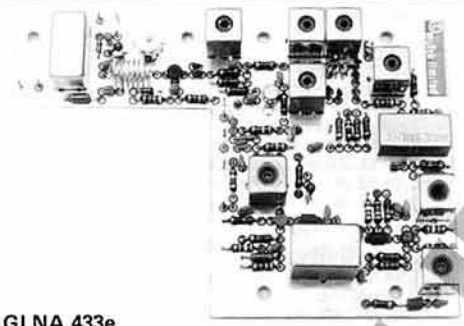
A Matter of Trust . . .

In these times of 'wonder claims' and cut-price merchandising, it's perhaps worth reflecting upon the less obvious but equally important after-sales back-up. We at muTek have always operated a fairly open-ended warranty system. Whilst we do reserve the right to charge for repairs etc outside of the statutory 12 month period, it's in fact very rare for us so to do. It all costs money of course, so it is hardly surprising that some manufacturers and retailers are found running rapidly in the other direction should problems occur!

I mentioned 'wonder claims' too in the opening line above. While we should consider ourselves fairly fortunate that although there are fewer wildly exaggerated performance figures quoted in UK advertising than is the case on the other side of the Atlantic (or indeed in some European countries), there are still many areas of concern to those of us in the business who prefer to sell products in an honest fashion. Not only are some performance figures presented in a manner likely (or intended) to confuse and obfuscate the equipment's true performance, but some specifications are quite simply downright dishonest! Since the beginning we have striven to maintain our standards, not only of product excellence but of engineering honesty and integrity—that's why we're still in business!

73 Stephen Prior G4SJP

Our recent move into the area of transverter manufacture doesn't mean that we've forgotten about all our other products. There is a full list below, and I would like to pull a couple of things out for special attention.



RPCB 271ub

We've recently slightly re-engineered the RPCB 271ub replacement front-end to allow fairly painless fitting to both the Icom IC271e and 'h models. The performance is unchanged, and is all you'd expect from a muTek front-end: good low noise figure (2dB typically) and quite superlative strong signal performance. The onboard antenna changeover relay switches the transmitter output in the 25W 'e version, and is employed as an isolation relay in the 100W 'h model. The price of the RPCB 271ub is still **£89.90** plus £1.50 p&p inc VAT.

GLNA 433e

Since the introduction of the GLNA 433e shortly before Christmas, it has quickly established itself in the 70cm scene. Housed in a highly durable polycarbonate environmental enclosure, the preamplifier uses a MGF 1202 'professional' GaAsfet (no cheap television 'gasfets' here!) in a circuit configuration designed to provide an optimum combination of low noise figure (typically 0.9dB), and good strong signal performance (third order input intercept −3dBm. That's +10dBm output intercept for those of you interested in the ignoble art of specmanship).

A two-pole high performance filter provides a good bandpass response ensuring that the preamplifier is suitable for use anywhere within the 430-440MHz band. The GLNA 433e is priced at **£79.90** plus £2.50 p&p inc VAT.

		£
TVHF 230c	High performance 2m to hf transverter	334.90
TVVF 50c	High performance 2m to 6m transverter	189.90
SLNA 50s	500MHz low-noise switched preamplifier using BF981	44.90
SLNA 144s	144MHz low-noise switched amplifier using BF981. 15dB typical gain, 0.9dB typical nf, 100W through-power	39.90
SLNA 144u	Unswitched version of the SLNA 144s	22.40
SLNA 144ub	Unboxed version of the SLNA 144u	13.70
SLNA 145sb	Transceiver optimised preamplifier for the FT290	27.40
SBLA 144e	Masthead mounting 144MHz high performance low-noise high dynamic range preamplifier with balanced pair of BF981's 13dB typical gain, 1.1db typical nf, 250W through-power	89.90
GFBA 144e	Ultra-high performance masthead mounting GaAsfet 144MHz preamplifier using advanced negative feedback circuitry for superb dynamic performance. Supplied with ATCS 500 sequence-controller. 13dB typical gain, 0.9dB typical nf, 1000W pep (ssb) through-power	139.90
GLNA 432e	Masthead-mounting 430-440MHz ultra-high performance GaAsfet preamplifier. Supplied with ATCS 500 sequencer-controller. 13dB typical gain, 0.9dB typical nf, 250W pep (ssb) through-power.	149.90

		£
TLNA 432u	Unswitched bipolar 430-440MHz preamplifier. 12dB typical gain, 1.5dB typical nf.	29.00
TLNA 432ub	Unboxed version of the TLNA 432u	20.40
BLNA 432ub	Sub-miniature 430-440MHz preamplifier. 14dB typical gain, 1.3dB typical nf. Requires external filtering	13.70
BBBA 500u	20-500MHz high dynamic range preamplifier, ideal for scanners	32.90
RPCB 144ub	Complete replacement front-end for the FT221 and FT225	74.90
RPCB 251ub	Complete replacement front-end for the IC211 and IC251	79.90
RPCB 271ub	Complete replacement front-end for the IC271	89.90
GDIF 107ub	Gunn diode WBFM 'back-end' processing board	49.65
XBPF 700ub	Microstripline bandpass tvi filter	2.95
CISA 001	UHF (f) to BNC(m) coaxial adaptor	1.60
ATCS 500	Sequence-controller	33.90
VFAT 206	25W 6dB attenuator (suitable for use with the TVHF 230c)	19.65

Carriage/Postage Rates

GFBA 144e, SBLA 144e, GLNA 432e, GLNA 433e	2.50
TVHF 230c, TWF 50c	5.00
All other products above	1.50

ALL PRICES INCLUDE 15% VAT

muTek limited —the rf technology company

Dept. RC, Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543

Access BARCLAYCARD VISA

YAESU

GENERAL COVERAGE RECEIVER

AUTHORISED YAESU

FRG-8800

General Coverage
Continuous coverage from 150KHz to 30MHz. Two speed spin tuned VFO plus keyboard plus computer interface control.

All Mode
The FRG-8800 demodulates SSB (USB & LSB) CW, AM (Wide and Narrow) and FM narrow as standard. This, complemented by an all mode squelch, produces the most practical receiver available. The FM narrow is useful for 10M, CB and for VHF with the optional VHF convertor.

Memory
The FRG-8800 comes fully equipped with twelve memories programmed and scanned at the touch of a single button. Any of the memory channels will accept a frequency within the whole range of the receiver including the VHF range (with the optional VHF unit). The mode is also stored in the memory eliminating the need for inconvenient manual mode change, when hopping from one memory to the next.

Selectivity & Sensitivity
Four filters are fitted as standard (SSB/CW, AM, AM-NAR and FM-NAR) with bandwidths chosen for optimum performance, these combined with switchable AGC and variable tone control provides maximum enjoyment despite todays crowded bands.

High input sensitivities are obtained by the latest in RF stages, making the most of inefficient aerials and difficult locations, and a continuously variable RF attenuator control overcomes problems encountered with very powerful stations.

LCD Display
The back-lit green LCD display incorporates easy to read "any angle" 10mm digits.

A twelve function display indicates the transceiver's status at a glance. It includes memory channel number, mode, and frequency to a resolution of 100Hz. Also included is a two dimensional LCD, graphical SIMPO and 'S' meter, which is conventionally calibrated at 1-5 and 0-9, +20dB, +40dB, +60dB respectively.

Keyboard
A 12 button keyboard is fitted as standard allowing quick accurate changes of frequency and band, (MHz and KHz programmed individually). The keyboard also has nine control buttons to allow rapid changes from memory to VFO, memory to memory and VFO to memory. Memory channels can also be recalled at the turn of a knob, ideal for storing calling/working channels or broadcast reception.

The keyboard is complemented by a opto-coupled two speed, VFO drive fast for rapid tuning of a band or slow for accurately tuning in a signal. In addition a fine tune control compensates for drift in the received signal.

Clock/time
Dual accurate 12 hour clocks, with AM/PM indicators are ideal for log keeping (GMT/Local). The clock uses the main digital display and features full back-up facilities in the event of a mains failure or disconnection. The timer can activate the receiver or tape recorder via the relay contacts provided. A snooze facility allows up to 59 minutes of listening.

VHF Convertor (optional)
The FRV-8800, extends coverage to include 118-174MHz all within the main frame, thereby allowing monitoring of, PMR, marine and air bands, as well as 2M.

The FRG-8800 is operated as before via the keyboard or VFO, and the memory still holds any frequency and mode. The *actual* VHF frequency is displayed on the main LCD to a resolution of 100Hz.

Worldwide
At 6·1Kg (excluding convertor) the FRG-8800 is ideal for taking on any trip. The power supply is easily adjustable from 240-220VAC to 110-120V, 50/60Hz mains and 12VDC operation is optional.

SPECIFICATION

Frequency coverage:
150KHz-29·999MHz
118MHz-173·999MHz*

Frequency resolution:
100Hz (Digital Readout)

Frequency stability:
< ±300Hz in 30 mins after 1 min on
<50Hz in 30 mins after warm up

Modes of reception:
AM, CW, NBFM SSB (LSB/USB) A3E, A1A, G3E, J3E

Selectivity
SSB/CW (J3E/A1A):
2·7KHz @ −6dB, 8·0KHz @ −50dB
FM(G3E) narrow:
12·5KHz @ −6dB, 30KHz @ −40dB
AM (A3EH3E) (standard/narrow):
6·0KHz @ −6dB, 15KHz @ −50dB
2·7KHz @ −6dB, 8KHz @ −50dB

Sensitivity:
SSB/CW (J3E/A1A) @ 10dB S+N/N:
<0·4μV into 50 ohms, 1·50-30MHz
<3·0μV into 500 ohms, 0·15-1·6MHz
<1·0μV into 50 ohms, 118-174MHz*
FM (G3E) @ 20dB S+N/N:
<1·0μV into 50 ohms, 1·60-30MHz
<2·0μV into 50 ohms, 118-174MHz*
AM (A3E) @ 10dB S+N/N:
<4·0μV into 50 ohms 1·60-30MHz
<3·0μV into 500 ohms, 0·15-1·6MHz
<10μV into 50 ohms 118-174MHz*

Squelch sensitivity:
SSB/CW (J3E/A1A):
<2μV, 1-60-30·0MHz
<4μV, 118-174MHz*
FM(G3E):
<0·5μV, 1·6-30·0MHz
<1·0μV, 118-174MHz*
AM (A3E):
<2μV, 1·60-30·0MHz
<4μV, 118-174MHz*

Audio output:
1·4W in 8 ohms internal @ 10% T.H.D.
4-16 ohms external speaker/phones
Constant level line output (recorder)

Power requirements:
100/120 220/240V @ 50/60Hz
35VA Rx, 5VA standby
12VDC (nominal)*
1A Rx, 0·020A standby

Dimensions (Ex/Inc projections)
335/350 W, 120/130 H, 235/270 D, mm
Weight 6.1/6.3 Kg (w/o, c/w VHF unit)

*OPTIONAL UNIT

SMC

South Midlands Comms Ltd
Rumbridge Street
Totton
Hants SO4 4DP

YAESU MUSENS ONLY AUTHORISED DISTRIBUTORS

Amateur Electronics
508-514 Alum Rock Road
Alum
Birmingham

G3FIK

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW
by E T Heron (Print) Ltd, Silver End, Witham, Essex