RADio COMmunication

January 1981

Commencing in this issue

The RX80 Mk2

A 3·0 to 4·0MHz ssb/cw receiver and tunable i.f. for a complete hf receiver

by A. L. BAILEY, G3WPO

Journal of the Radio Society of Great Britain

APPROVED TRIO DEALER

CATRONICS FOR TRIO

GET READY FOR THE NEW BANDS WITH A TRIO TRANSMITTER

NEW TS830S
WITH NEW BANDS

TS830S Brief Specification

Frequency Range:	9 bands, 160m-10m
Modes:	CW, USB, LSB
Final Power Input:	220 watts PEP (SSB) 180 watts DC (CW)
RX Sensitivity:	0·25μV at 10dB S/N
Price:	**£639**

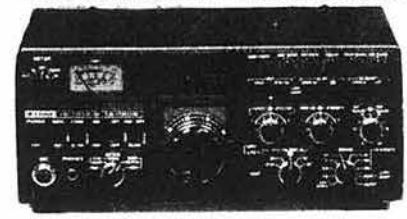
NEW TS130S
WITH NEW BANDS

TS130S Brief Specification

Frequency Range:	8 bands, 80m-10m
Modes:	CW, USB, LSB
Final Power Input:	~200 watts PEP (SSB) ~160 watts DC (CW)
RX Sensitivity:	0·25μV at 10dB S/N
Price:	**£491**

25W PEP version also available TS130V at **£404**

TS180S
THE NEWEST HF TRANSCEIVER



TS180S Brief Specification

Frequency Range:	160m to 10m Amateur Bands
Modes:	CW, USB, LSB, FSK
RF Input Power SSB:	200 watts PEP
CW:	160 watts DC
FSK:	100 watts DC
RX sensitivity:	10dB S/N at 0·25μV
Power requirements:	Max. 20A at 13·8V DC
Price:	**£589** or **£679** with dig. freq. cont.

TS770
ALL MODE 2M+70CM

TS770 Brief Specification

Frequency Range:	144-146MHz 430-440MHz
Mode:	SSB (USB, LSB), CW, FM
RF Output Power:	10 watts. Only for FM: 10W (Hi)/Approx. 1W (LOW)
Sensitivity	SSB/CW 0·5μV for 10dB (S+N)/N FM 1μV for 30dB (S+N)/N
20dB quieting (FM):	Less than 0·4μV
Price:	**£730**

TR2400
2M SYNTHESIZED PORTABLE

TR2400 Brief Specification

Frequency Range:	144-148MHz
Mode:	FM
RF Output Power:	1·5 watts min.
Sensitivity:	1·0μV for 30dB S/N
Display:	LCD
Memories:	10 built in
Scanning:	Auto in 5kHz steps
Price:	**£198**

TR9000
2M COMPACT ALL MODE

TR9000 Brief Specification

Frequency Range:	144-146MHz
Modes:	USB, LSB, FM, CW
RF Output Power:	10 watts
Sensitivity:	SSB/CW 0·25μV for 10dB S/N FM 0·25μV for 12dB SINAD
Frequency Control:	Digital, phase locked VCO
Memories:	5 built in
Scanning:	Auto-25/12·5kHz/100Hz
Price:	**£345**

TR7800
2M FM SYNTHESISED

TR7800 Brief Specification

Frequency Range:	144-145·995MHz
RF Output power:	H1 25W, LO 5W (adjustable)
RX sensitivity:	0·2μV for 12dB SINAD
Autoscan:	5kHz or 25kHz
Memories:	15 inc 1 × priority
Repeater shift:	+/-600kHz & Reverse
Frequency display:	4 digit LED & Mem. No.
Price:	**£268**

TR3200
PEAK PORTABLE PERFORMANCE

TR3200 Brief Specification

Frequency Range:	432-436MHz
Channel spacing:	25kHz
Repeater shift:	-600kHz
Power output:	2W (HI) or 0·4W (LO)
RX sensitivity:	1·0μV for 20dB S/N
Tone burst:	1,750Hz tuning fork (Automatic)
Price:	**£164** inc. charger

R1000
COMMUNICATIONS RECEIVER

R1000 Brief Specification

Frequency Range:	200kHz-30MHz
Modes:	AM, USB, LSB, CW
Sensitivity	<2MHz: 5μV >2MHz: 0·5μV for 10dB S+N/N on SSB
Digital Readout:	to 1kHz
Clock:	Quartz controlled
Price:	**£285**

We always have a good selection of used equipment in stock—ask for current list.

We are 300 yards from Wallington Railway Station (London Bridge or Victoria). Frequent buses from Croydon and Sutton. Three large car parks within 100 yards. Hire purchase facilities available on all equipment. Credit cards accepted. Mail orders—normally dealt with on day of receipt. Express delivery arranged. All prices include VAT.

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Shop/showroom open Monday-Friday: 9.00-5.30, closed for lunch: 12.45-1.45. Saturdays: 9.00-1.00

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Croydon,
Surrey CR0 5NL

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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 will be made for all articles published.

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

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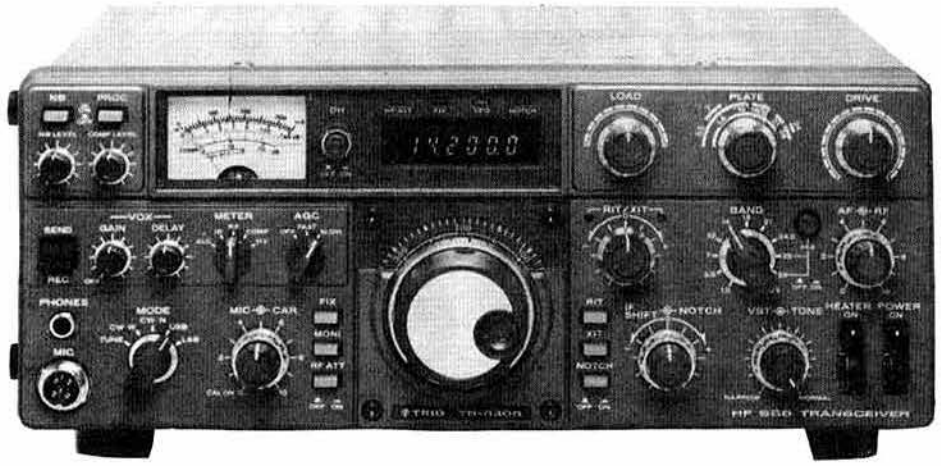
TRIO *pacesetter in amateur radio*



TS-830S *V.B.T., notch, IF shift, wide dynamic range*

Now most Amateurs can afford a high-performance SSB/CW transceiver with every conceivable operating feature built in for 160 to 10 metres (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455kHz second IF. Its optical VFO-230 remote digital VFO provides five memories.

TS-830S FEATURES:

- **160-10 meters, including three new bands**

Covers all Amateur bands from 1·8 to 30 MHz (LSB, USB, and CW), including the new 10, 18 and 24MHz bands. Receives WWV on 10MHz.

- **Wide receiver dynamic range**

Junction FETs (with optimum IMD characteristics and low noise figure) in the balanced mixer, a MOSFET RF amplifier operating at low level for improved dynamic range (high amplification level not needed because of low noise in mixer), dual resonator for each band, and advanced overall receiver design result in excellent dynamic range.

- **Variable bandwidth tuning (VBT)**

Continuously varies the IF filter passband width to reduce interference VBT and IF shift can be controlled independently for optimum interference rejection in any condition.

- **IF notch filter**

Tunable high-Q active circuit in 455kHz second IF, for sharp, deep notch characteristics.

- **IF shift**

Shifts IF passband toward higher or lower frequencies (away from interfering signals) whilst tuned receiver frequency remains unchanged.

- **Various IF filter options**

Either a 500Hz (YK-88C) or 270Hz (YK-88CN) CW filter may be installed in the 8·83MHz first IF, and a very sharp 500Hz (YG-455C) or 250Hz (YG-455CN) CW filter is available for the 455kHz second IF.

- **Built-in digital display**

Six-digit large fluorescent tube display, backed up by an analog dial. Reads actual receive and transmit frequency on all modes and all bands. Display Hold (DH) switch.

- **Adjustable noise-blanker level**

Built-in noise blanker eliminates pulse-type (such as ignition) noise. Front-panel threshold level control.

- **6146B final with RF NFB**

Two 6146B's in the final amplifier provide 220W p.e.p. (SSB)/180W dc (CW) input on all bands. RF negative feedback provides optimum IMD characteristics for high-quality transmission.

- **More flexibility with optional digital VFO**

VFO-230 operates in 20Hz steps and includes five memories. Also allows split-frequency operation. Built-in digital display. Covers about 100kHz above and below each 500kHz band.

- **Built-in RF speech processor**

For added audio punch and increased talk power in DX pileups.

- **RIT/XIT**

Receiver incremental tuning (RIT) shifts only the receiver frequency, to tune in stations slightly off frequency. Transmitter incremental tuning (XIT) shifts only the transmitter frequency.

- **SSB monitor circuit**

Monitors transmit IF signal whilst transmitting, to determine audio quality and effect of speech processor.

MATCHING ACCESSORIES FOR FIXED STATION OPERATION.

SP-230 external speaker with selectable audio filters.
£33.14 inc VAT.

VFO-230 external digital VFO with 5 memories.
£194.45 inc VAT.

AT-230 antenna tuner.
£106.75 inc VAT.

TRIO TS-830S £639.52 inc VAT.

carriage by Securicor £4.50

SP-230 TS-830S VFO-230 AT-230

HF EQUIPMENT FROM TRIO

TRIO TS-130V/S

TS-130V	£404.34	inc VAT.
TS-130S	£491.05	inc VAT.
AT-130	£72.89	inc VAT.
SP-120	£25.30	inc VAT.
PS-20	£44.85	inc VAT.
PS-30	£85.10	inc VAT.
DFC-230	£163.13	inc VAT.

The TS-130 Series is an incredibly compact, full-featured, all solid-state HF SSB/CW transceiver for both mobile and fixed operation. It covers 3·5 to 30MHz (including the three new amateur bands!) and is loaded with optimum operating features such as digital display, IF shift, speech processor, narrow/wide filter selection (for both SSB and CW modes), and optional (DFC-230) digital frequency controller.
The TS-130S runs high power, and the TS-130V is a low-power version for QRP operation.

TRIO

TS-520SE

VOTED "MY FAVOURITE TRANSCEIVER"
£437.00 inc VAT.

TS-180S

ALL SOLID STATE HF SSB TRANSCEIVER
£679.65 inc VAT.

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Ward Electronics
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021 554 0708

SOUTH LONDON
Catronics Ltd
20 Wallington Square
Wallington SM6 8RG
01-669 0700

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Waters & Stanton Electronics
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Hockley Essex. 0702 206835

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0222 616936

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London NW6 3AY
01-624 7174

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Leeds Amateur Radio
27 Cookridge St
Leeds LE2 3AG
0532 452657

EAST SCOTLAND
Jay-Cee Electronics
20 Woodside Way
Glenrothes
Fife KY7 5DE. 0592-756962

TRIO

IMPORTANT INFORMATION

TRIO

As the appointed distributors for Trio, we recommend that you purchase your Trio equipment from an approved stockist (list above). Any stockist *not* on this list has no connection with the Trio UK sales and service organisation and cannot, despite claims to the contrary, offer any meaningful guarantee of backup service on Trio equipment.

LOWE ELECTRONICS

CHESTERFIELD ROAD MATLOCK TEL 0629 2817

TRIO R-1000

SP-100 SPEAKER

£285.20 inc VAT £26.45 inc VAT

THIS PRICE INCLUDES D.C. KIT FITTED

CARRIAGE BY SECURICOR £4.50

The R1000 uses an advanced PLL system in an up-conversion scheme to a high (48MHz) first IF to remove any possibility of image responses. The receiver covers the entire frequency range from below 200kHz right up to 30MHz in 30 bands, each 1MHz wide. The bands are selected, not by ambiguous knob twiddling as in receivers using the Wadley loop but by a 30 position band switch which controls the PLL system.

The band switch also electronically selects the appropriate band pass filter network in the RF stages of the receiver so there are no "preselector" or "antenna trim" controls to twiddle – simply set the band switch to the range required – that's it!

A highly stable VFO tunes each 1MHz range and its linear, back lit scale makes readout easy. However, in addition to this dial, Trio have also provided 5 digit true frequency digital readout so as to guarantee spot-on accuracy on any frequency. As a further feature, the digital display can also be switched to read time, this being derived from a quartz standard. Marvellous for accurate log keeping. The display uses high intensity readout units which can be dimmed for use in low light conditions.

As for what else is inside this superb instrument – selectivity is catered for by three custom made IF filters; a 12kHz wide AM filter; 6kHz narrow AM filter; and a new 2·7kHz SSB filter with a shape factor of better than 1:2 6:60dB. Selectable sidebands are available at the touch of a switch. As an option, on request, you can have 6kHz AM wide, 2·7kHz AM narrow and 2·7kHz SSB. The 12kHz filter remains in the set for use if required.

For the first time in a mid-price receiver, a true noise blanket is provided to remove pulse type ignition noise.

To minimise front end overload, a step RF attenuator is included which gives 0 to 6dB attenuation in four steps.

All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting. The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial long lump of wire works really well with the R-1000.

This receiver is so advanced it makes everything in its price range completely obsolete.

FOR THE HF RECEIVERS USE THE TRIO HEADPHONES HS5 OR HS4

HS5 £21.85 inc VAT. HS4 £10.35 inc VAT

XTLS £2.50/CH

AR22 FLEXIBLE ANTENNA £3.00

SR9 DAIWA

2mtr FM TUNABLE/XTAL RECEIVER

£46.00 inc VAT carriage £1.50

SL-1600A

16 CHANNEL 2mtr SCANNING RECEIVER

£39.50 inc VAT carriage £1.50

AOR AR22

2mtr FM SYNTHESISED RCVR

£83.00 inc VAT carriage £1.50

TRIO

THE ULTIMATE 2 METRE MOBILE **TR-7800**

£268 inc VAT. Carriage by Securicor £4.50

THE VERSATILE 2 METRE PORTABLE **TR-2300**

£166.75 inc VAT. Carriage by Securicor £4.50

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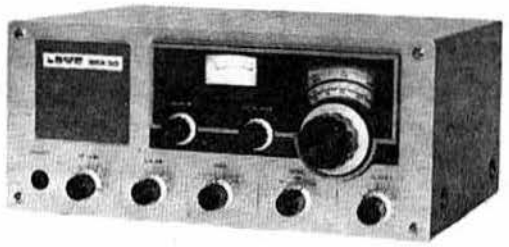
FROM THE JAPAN RADIO CO Ltd

The NRD 515 is a PLL-synthesised communications receiver of the highest class featuring advanced radio technology combined with the latest digital techniques.
The new NRD 515 is full of performance advantages including general coverage, all modes of operation, PLL digital VFO for digital tuning, 24-channel frequency memory (option), direct mixing, pass-band tuning, etc. JRC's 65 years of radio communications experience will give you "the world at your fingertips".
The NRD 515 is but a single item from the JRC product range which extends all the way to full marine radio installations for supertankers.

NRD-515 receiving for the discerning few

NRD 515 SYNTHESISED HF RECEIVER	£948.75 inc VAT	NVA 515 LOUDSPEAKER	£27.60 inc VAT
NHD 515 MULTI CHANNEL MEMORY UNIT	£161.00 inc VAT	CFL 260 600Hz CW FILTER	£34.50 inc VAT



LOWE SRX-30

THE SRX-30 IS THE MOST IMPRESSIVE MID-PRICE RECEIVER AVAILABLE TO THE KEEN DX-ER.
500kHz–30MHz CONTINUOUS COVERAGE. DRIFT CANCELLING SYSTEM.
£158 inc VAT. Securicor carriage £4.50

TRIO

TS-770E 2 METRE & 70 cm MULTIMODE

£730.25 inc VAT. Carriage by Securicor £4.50

TRIO

TR-9000 2 METRE MULTIMODE

£345.00 inc VAT. Carriage by Securicor £4.50

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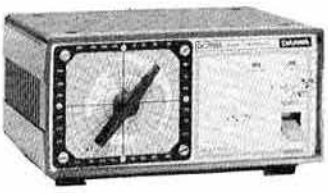
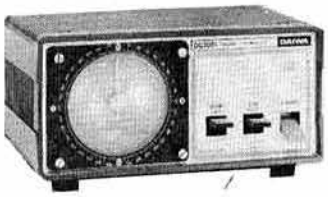
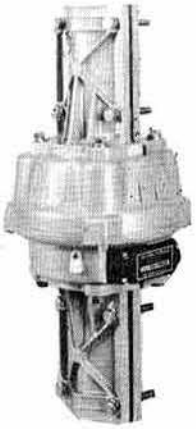






The Daiwa range of rotators are probably the best amateur rotators available. The quality of construction is up to the high standards we have come to expect from Daiwa and the rotator system is of a completely new design which eliminates "out of sync" operation and for the first time gives a true 360° indication on a circular scale based on a great circle map centred on the UK.

Both the DR7500 and DR7600 can be supplied with either of the controllers available, and both upper and lower mast clamps allowing mounting inside a standard tower or on the top of a pole. The DR7500 will handle beams up to and including 3-element tribanders, whilst the DR7600 will handle up to and including a 2-element 40 metre beam.

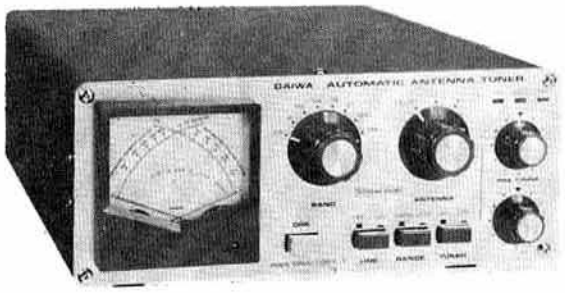
Each rotary system is supplied complete with rotator unit, control unit, and upper and lower mast clamps.

The rotators can be ordered as either "R" or "X" versions. The "R" suffix denotes the controller with the back lit scale and control by switches marked "left" and "right" to drive the rotator round. The controller pointer then smoothly indicates the direction in which the rotator is pointing. However, as an alternative, the "X" suffix unit is of the preset type where the controller pointer is turned by the operator to the beam heading required. The rotator then turns to this heading and stops. Correct operation of the rotator is indicated by a discreet flashing light on the control unit. With this type of control unit, you can go into the shack, set the rotator turning to the direction you need and then do something else whilst the rotator comes round.

Either control unit can be specified with either of the two rotators, ie DR7500R is the smaller rotator with the round control whilst DR7500X is the same rotator, but with the preset control unit.

DAIWA ROTATOR SYSTEMS

DR7500X £98 inc VAT
DR7500R £108 inc VAT
DR7600X £135 inc VAT
DR7600R £144.90 inc VAT



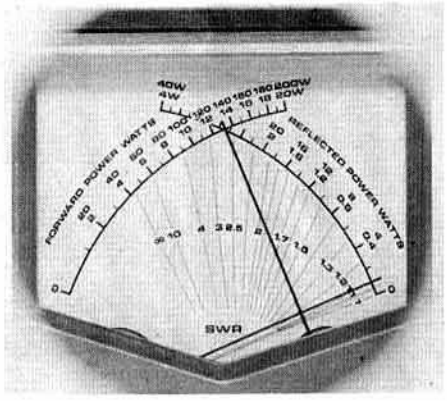
The new CNA1001A antenna tuner from Daiwa has already changed the whole concept of antenna tuning in the amateur radio station. No longer do you have to fiddle with this control and that control in order to reach a match condition, simply push a button and let the tuner do it for you.

The CNA1001A incorporates a sensitive reflected power detector which monitors SWR all the time. At the first push of the operate button, a motor driven gearbox drives the load and match variable capacitors through their entire range in overlapping small increments seeking a correct match. When matching is achieved, the motor drive stops and that's that. The CNA1001A needs only a small sniff of RF to work on (typically 5 watts) so you needn't worry about blowing up your PA, and it covers all the current and future amateur bands from 3–30MHz, includes switching for two antenna systems, a 10 watt (50 watt 1 minute) dummy load and best of all includes a cross needle power and SWR meter.

This section measures power from 0–200W in two ranges and reflected power from 0–40W together with the unique Daiwa cross pointer SWR system. All this in one compact unit requiring only 12V dc to drive the tuning motors.

DAIWA CNA1001A ANTENNA TUNER

£129.95 inc VAT. HIGH POWER MODEL CN2002 £190 inc VAT



WHAT TO YOU KNOW ABOUT DAIWA CROSS POINTER POWER METERS?

Until recently, the in-line measurement of RF power and SWR involved calculation or the use of two instruments. Now, DAIWA have introduced a range of power meters which provide an elegant solution to whole problem of RF measurements. Utilising two toroidal current transformers to detect true forward and reflected power, and feeding the outputs to a twin movement meter with crossed pointers, it is now possible to measure forward power (LH scale), reflected power (RH scale) and SWR (where the pointers cross) at a single glance. The photograph shows 130W forward power, 1W reflected, and an SWR of about 1·2 to 1. The DAIWA CN series power meters represent the ultimate power meter for the professional and amateur alike, and are indispensable in the fully equipped station. Three models are currently available covering frequencies right up to 2·5GHz so there's one for you whatever your interests.

CN620A	1·8–150MHz up to 1kW	£52.81 inc VAT
CN630	140–450MHz up to 200W	£71.00 inc VAT
CN650	1·2–2·5GHz up to 20W	£95.00 inc VAT

SENSOR

MICROPHONE

CONTROLLER

DAIWA INDUSTRY CO., LTD.

DAIWA INFRA-RED MOBILE MIKE £45.00 inc VAT carr £1.00

DISTRIBUTED IN THE UK BY LOWE ELECTRONICS LIMITED

LOWE ELECTRONICS

CHESTERFIELD ROAD MATLOCK TEL 0629 2817

THE SHIMIZU SS105S 80–10 METRES SSB/CW TRANSCEIVER

This super new transceiver covers 80–10 metres, gives 10W out and is smaller than anything else we have seen so far. Ideal for transverter driving, the SS105S has FM transmit and receive options as well as excellent performance on SSB/CW for HF band use. The SS105S is supplied in semi-kit form so as to keep down the price, but all the RF and mixer boards are ready built and aligned so no test equipment is required. All the cabinet work has been carried out so all you have to do is assemble the IF strip, xtal oscillator, and fit them to the completed chassis. Great idea and it brings back the flavour of home brew with the added advantage that the rig will work when you've finished it. For more info, just ask us or come along and see it. It's a great little rig.

		Price inc VAT	Carr
SS105S	80–10m solid state SSB/CW/FM transceiver. Semi-kit form	258.75	4.50
SE-NB	Noise blanker kit	7.76	.50
SE-FMrx	RX FM discriminator kit	17.25	1.00
SE-FMtx	TX FM generator kit	12.65	1.00
SE-MK	RX marker kit	11.04	.50
0·5 CWF	500Hz CW filter	22.43	.50
Optional band crystals		3.45	.25

AR245 2 metre HAND HELD FM SYNTHESIZED 144–148MHz TRANSCEIVER 5 WATTS 1 WATT OUTPUT £178.00 inc VAT, carriage £1.50

"A staggering technical achievement"; "How can they get it into such a small size"; "Outperforms any rig I've ever had"; these are typical of the comments made by amateur radio operators after seeing and using the remarkable AR245 2 metre FM handheld transceiver. What does it mean to you? Well, at last you can really take your amateur radio with you, anywhere you want to go, because in this handheld unit, you have a complete synthesized 2 metre FM transceiver covering 144·000 to 147·995kHz in 5kHz steps. Also included are + and −600kHz repeater shifts and a crystal controlled tone burst unit.

ALSO AVAILABLE THE ORIGINAL AR240A SAME OUTSTANDING FEATURES BUT 1½ WATTS

AR240A £158.00 inc VAT. Carriage £1.50

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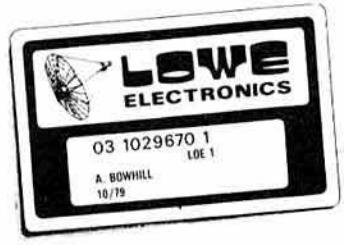
WRITE FOR FULL DETAILS TODAY



FOR ALL THAT'S BEST IN AMATEUR RADIO CONTACT US AT MATLOCK

HEAD OFFICE AND SERVICE CENTRE

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CLOSED FOR LUNCH 12.30 TO 1.30

For personal attention on the South Coast contact John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer 812071.
For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

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Thanet Electronics
for ICOM
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This month we are showing you:

IC-451 UHF Base Station
IC240 – The best value for money in synthesized rigs.
Theta 7000E – An outstanding communications computer.
IC202S
IC402 – A pair of magnificent sideband portables.

On these, and all our other products:

* we offer a full year's warranty on all parts and labour
* Free delivery for all transceivers, using registered first class post

IC2E – Probably the smallest made, extra sensitive handy talkie.
IC251E – Must be the best value in 2M base stations.
IC255E – A great value 25W mobile transceiver.
IC260E – The ideal choice for multimode mobile.

* All prices including V.A.T.
* H.P. and Part Exchange welcome

IC-451 UHF Base Station

£579 inc. V.A.T.

ICOM are proud to annouce the introduction of the 70cm version of their famous 2m base station – the IC-251. Of course, it is engineered to the usual high ICOM standards and includes such features as:-

* 3 memory channels
* Automatic repeater shift on switch-on
* Additional selectable shift for European DX
* Selectable channel steps for FM (supplied with 25KHz – others are diode programmable)
* Full power control on SSB/CW/FM
* Superb receiver performance using MOSFETS
* Multipurpose scanning
* Covers 430-440 MHz
* Xtal controlled Toneburst
* Cool running chopper power supply

Also available from our shop in Herne Bay are:

* MICROWAVE MODULES
* J-BEAM
* RSGB PUBLICATIONS
* WESTERN
* G-WHIP
* BEARCAT
* ANTENNA SPECIALISTS
* YA ESU MUSEN
* VIDEO GENIE COMPUTERS

IMPORTANT

We would like you to phone, or write to us so that we can give you as much detailed information as possible on any particular product. Use our 24 hour ansafone when calls are cheap.

Send for Technical Details

Thanet for ICOM

143 RECULVER RD.,
BELTINGE,
HERNE BAY, KENT.
Tel: 02273/63859

The IC-240 - The start of a revolution in 2 meters transceivers

£169 INCL

- Easy channel selection with minimum knob twiddling – yet with all the normal FM channels available – an all important safety feature.
- A fully automatic tone burst which operates only in repeat mode with NO buttons to press either on the front or on the back of the set.
- Instant reverse repeat at the flick of a switch without any re-tuning or memory programming.
- A very sensitive receiver with a spurious response performance far better than the average and a very clean transmitter with excellent clear, crisp modulation. (We measured a sensitivity of 0.1 uv pd for10dB sinad).

SPECIFICATIONS

GENERAL		
Semiconductor Complement	Transistors	34
	FET	7
	IC	13
	Diodes	33 to 128 depending on channels
Frequency Range (for specification)	144-146MHz	
Voltage	13.8 VDC Negative Ground	
Current Consumption	TX	2.0AMP at 10W
	RX	700MA at MAX Audio
		400MA Squelched
Size	58mm (h) x 156mm (w) x 218mm (d)	
Weight	1.9 kilograms	
Antennas Impedance	50 OHMS	
Number of Channels	22 channels selected from any of the 80 channels on 25KHz spacing.	
Frequency Control	Stabilized Master-oscillator PLL programmed by diode matrix.	
TRANSMITTER		
Power Out	10 watts	
Deviation	5KHz	
Microphone Impedance	500 OHMS	
Spurious Level	Lower than -60dB below carrier	
RECEIVER		
Modulation Acceptance	F3	
Type	Double Superhet, 1st I.F. 10. 7MHz, 2nd I.F. 455kHz	
Receiver Sensitivity	0.4uV or better	
1 Microvolt S+N/N	30dB or better	
Spurious Response	60dB or more attenuation	
Bandpass	± 7.5KHz/-6dB, ± 15KHz/-60dB	
Squelch Sensitivity	-8dB below 1 microvolt	
Audio Output	1.5 watts or more into 8OHMS	

FOR ONLY £640.00 INCL.

Tono Theta 7000E A great computer on offer from Thanet

The new THETA 7000E means that every Amateur can enjoy the visual display of CW, RTTY and ASCII in both transmit and receive modes. Just connect the TONO to any TV set via the antenna terminals or to a page printer from the parallel port provided. Bring up your CW speed in receiving or sending by either watching receiver sent or from recorded cassettes. Connection to the transceiver is via the key, phone and mic sockets.

Some of the Outstanding Features
COMMUNICATIONS COMPUTER THETA 0-7000E
0-7000E
UHF and Composite Video Output * Printer interface * Wide range of transmitting and receiving speeds – 10CW speeds + 8RTTY * Built-in demodulator for high performance for 170, 425 and 820 Hz shift * Crystal controlled modulator for ASFK – Hi or Lo tone * Convenient ASCII key arrangement * Large capacity display memory – 2 pages 32chr x 16 lines split screen for Rx & Tx if required * Automatic transmit/receive switch * Anti-noise circuit * Battery backed-up memory 7 channels of-64chrs * Send function * Buffer memory – 53 character type ahead, rub out function * Simultaneous access of the memory – 53 character type ah
LF (line feed) cancel function * Cursor control function * Word mode operation * Automatic CR/LF (72, 60 or 80 chrs per line) * Echo function * Word Wrap around function * Transmit/receive in ASCII mode or RTTY * CW indentification function * Mark and break (space and break) system * Monitor circuit & CW practice function * Variable CW weights * Cross pattern checking output terminal * Log computer output provided * Test message function (Ry and QBF).

Phone or write for the price list of accessories for this unit.

IC-202S
£169 INCL.

What a tremendous pair

The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW. * Large Battery capacity (HP11 type) or Nicads if you wish * A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m * Each of the four 200kHz band positions allows operation anywhere in 2m. (Supplied with 144-144.2 and 144.2-144.4) * Top of the band Oscar xtals available for "cross-pond working" * It has a DC socket and SO239 sockets for mobile or base station working, barefoot or as a prime mover * Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig.

Their versatility is well worth an enquiry.

IC-402
£242 INCL.

The 70cm twin of the 202S having very similar features, covering the frequency range of 432-435.2 MHz.

Send for Technical Details

Thanet for ICOM

2E or not 2E that is the question we have the answer IC-2E Handy Talky £159 INCL.

CHECK THE FEATURES

FULLY SYNTHESIZED – covering 144-145.995 in 400 5kHz steps.
POWER OUTPUT – 1.5W with the 9V rechargeable battery pack as supplied – but lower or higher output available with the optional 6V or 12V packs.
BNC ANTENNA OUTPUT SOCKET – 50 ohms for connecting to another antenna or use the Rubber Duck supplied.
SEND/BATTERY INDICATOR – Lights during transmit, but when battery power falls below 6V it doesn't light indicating the need for a recharge.
FREQUENCY SELECTION – by thumbwheel switches, indicating the frequency.
+5kHz SWITCH – adds 5kHz to the indicated frequency.
DUPLEX SIMPLEX SWITCH – gives simplex or plus 600kHz or minus 600 kHz Transmit.
HI-LOW SWITCH – reduces power output from 1.5W to 150mW reducing battery drain.
EXTERNAL MICROPHONE JACK – If you do not wish to use the built-in electret condenser mic an optional microphone/speaker with PTT control can be used. Useful for pocket operation.
EXTERNAL SPEAKER JACK – for speaker or earphone.
This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

It will seduce you in it's own way the ICOM IC 251E

only £479 INCL.

Send for Technical Details

Thanet for ICOM

for only £255 INCL.

IC-255E– An experts mobile choice

NOW WITH IMPROVED FRONT-END

25 Watts – 5 Memories – Scanning – 600kHz
AND User Selectable Repeater Shift – Full Coverage in 5kHz or 25kHz Steps.

- Crystal controlled Tone Burst
- Full band coverage – extendable to 148MHz if required
- Four digit LED display
- 25 Watts output or 1W low power
- A superb receiver using grounded gate FET front end
- Scanning over a user programmable range
- Memory scan
- Stop on empty or busy channels
- Tuning in 25kHz or 5kHz steps
- 5 Memories – retained while the power is connected to the rig
- Built-in 600kHz Repeater Shift
- Alternative programmable shift
- Reverse Repeater facilities
- RIT (± 3kHz for those off channel stations)
- Scan control from the microphone (optional mic available)
- Good loud audio
- Optically coupled tuning between control knob and CPU
- Multiway 24 pin socket on back for touchpad, computer, or external control
- Rugged modular PA (Guaranteed of course!)
- Mobile mount which can be padlocked
- Up-down scanning microphone available

CAN YOU RESIST SUCH A TEMPTATION

Enjoy VHF mobile at it's best-IC-260E

Replacing the IC-245E, the IC-260E offers such extras as full frequency read out, upper and lower sideband, and scanning as well as FM and CW. Thus, it makes an ideal base station, when used with a DC power supply, as well as a mobile. The use of a microprocessor instead of an LSI chip has enabled Icom to offer this at a lower price than the IC-245E.

Send for Technical Details

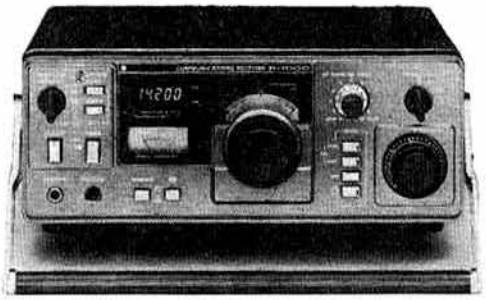
£339 INCL.

AGENTS (PHONE FIRST – All evenings and weekends only, except Barnsley and Burnley)

Scotland	Jack GM8GEC (031-665-2420)	Midlands	Tony G8AVH (021-329 2305)
Wales	Tony GW3FKO (0874 2772)	North West	Gordon G3LEQ (Knutsford (0565) 4040)
Burnley	(0282 38481)		

STEPHENS-JAMES LIMITED

APPROVED TRIO DEALER

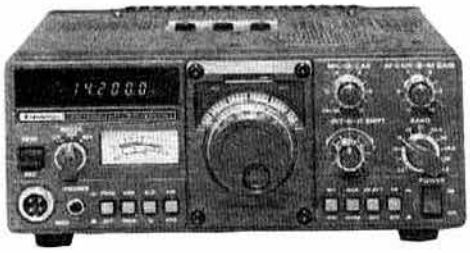


TRIO R-1000

TR-9000

TRIO TS-830S

TRIO TS-130S



TRIO PRICES
Full Range of Accessories Available

TS520SE	£437.00	TS120S	£432.40	AT200	£82.80	TR7800	£268.00
TS830S	£639.52	TS120V	£347.30	DM801	£51.75	TR9000	£345.00
TS130S	£491.00	TS130V	£404.34	TL922	£595.70	R820	£690.00
TR2300	£166.75	TR2400	£198.95	TS770E	£730.25	TS180S	£679.60

ROCKWELL/COLLINS PRO-MARK KWM-380 TRANSCEIVER

Frequency Range: 1·6 to 30MHz tunable in 10Hz steps (0·5 to 1·6MHz at reduced sensitivity)
Transmit: SSB-CW 160 through 10m Amateur Bands. AM on receiver mode
Power: 240V AC or 12-15V DC. Power output 100 watt PEP Nominal
Size: 15⅓" wide, 6¼" high, 18" deep. 50lbs. **PRICE £1,897.50 inc VAT**

SECONDHAND EQUIPMENT

We carry a good range of secondhand equipment and we shall be pleased to send you details on receipt of an SAE. Good clean equipment wanted and purchased for cash, or we can sell your unwanted equipment on a commission basis. **PLEASE NOTE DUE TO POSTAL CHARGES BEING INCREASED ALL ENQUIRIES MUST INCLUDE SAE. WE REGRET WE CANNOT SEND ANY INFORMATION FREE OF POST.**

YAESU	
FRG7 Receiver	£189.00
DRAKE	
TR7 Transceiver and AC PSU	£1,242.00
MN7 Antenna Matching Unit	£124.20
R7 General coverage receiver	£989.00
Other Drake equipment available to order.	
S.T.E. MILAN	
AA1 Audio Module	£4.95
AT23 C.C. FM Transmitter	£50.00
AR20 C.C. FM Receiver	£50.00
AG10 Tone Burst unit	£4.50
STABILISED POWER SUPPLIES	
Model 125 10-15V 5A	£28.00
Model 1210/1 10A 13·5V	£65.00
Model 156S 4-15V 6A Twin Meter	£40.00
Model 1210S 4-20V 10A Twin Meter	£88.00
Model 1220 13·5V 20A	£95.00
Maximum ratings quoted.	
MICROWAVE MODULES	
MMC144/28Lo 2m Converter	£24.15
MMC432/28S 70cm Converter	£29.90
MMC432/144S 70cm Converter	£29.90
MMC1296/28 23cm Converter	£32.00
MMC1296/144 23cm Converter	£24.15
MMV1296 23cm Tripler	£39.50
MMDO50/500 500MHz Freq. Counter	£69.00
MMT432/28S 70cm Transverter	£136.75
MMT432/144R 70cm Transverter	£173.50
MMT144/28 2m Transverter	£90.75
MMA144 2m Preamp	£14.90
MML144/100 2m Linear Amplifier	£142.50
MML144/25 2m Linear Amplifier	£48.30
TRANSCEIVERS AND RECEIVERS	
SRX30 Solid State Receiver	£158.00
Sky Ace aircraft band hand held receiver	£49.00
R512 Aircraft Band Scanning Receiver	£138.00
Digital Flight Scan Airband Receiver	£230.00
SR9 2m FM Receiver	£46.00
FDK TM56B FM Scanning Receiver	£109.00
AMR217B 2m Scanning Receiver	£120.75
Bearcat 220FB Scanning Receiver	£258.75
Standard C8800 FM Transceiver	£252.00
AR22 2m Handheld Receiver	£85.00
SX200 Scanning Receiver	£239.00
HY-GAIN	
12AVQ 10-15-20m Vertical Antenna	£43.13
14VQ/WB 10-15-20-40m Vertical	£60.38
18AVT5WB 10-15-20-40-80m Vertical	£87.40
VARIOUS ANTENNA	
HF5 vertical 10-through 80m	£41.40
Discone 5 Antenna 50-480MHz	£36.80
C4X 10-15-20m Vertical	£46.00
HQ-1 Minibeam Tribander	£96.76
Complete range of JAYBEAM HF AND VHF-UHF Antennas, send 15p for catalogue and price list.	
G-WHIP. Mobile Antenna Range	
Tribander Helical 10-15-20m	£23.00
LF Coils for above	£6.56
LF Telescopic for coils	£3.00
Standard Basemount	£4.20
MultiMobile 10-15-20m	£26.45
Coils for above	£6.56
Extendarod	£10.93
Flexiwhip 10m	£16.00
Coils for above	£6.56
FDK	
Multi 700EX Transceiver	£199.00
Multi 750 Transceiver	£290.00
Palm 2 Portable Transceiver	£89.00

NRD-515 RECEIVER

For the discerning DXER comes the modern NRD-515 general coverage receiver ● Full of all performance advantages offered by any receiver ● All modes of operation PLL Digital VFO ● Solid state ● Up conversion type double conversion ● Frequency coverage 100kHz to 30MHz ● LF/MF bands below 1·6MHz are clearly receivable through the use of a filter/tuned circuit ● Band Pass tuning ● Noise Blanker ● RIR ● Attentuator ● AGC ● Recording terminal ● Mute terminal, etc which permits operation with the NSD-505 transmitter or ant transmitter ● Optional: speaker, memory unit, cw filter available. PRICE: **£948.75** inc VAT

Shop Hours: Mon to Fri 9.30am to 5.30pm
Saturday 9.30am to 4.30pm ACCESS and Barclaycard facilities
HP terms arranged. Part exchanges always welcome
We are located on the A574. Turn at the Greyhound Motel on the A580 (East Lancs Road) and we are about ½-mile on right. No parking problems at any time.

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47 WARRINGTON ROAD
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ENGLAND
Telephone (0942) 676790

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835

FDK MULTI-700EX

2m 25W OUTPUT + PRIORITY SCANNING

COMPARE THE PRICE **£199 inc VAT**

- Full coverage of the 144-146MHz band with facilities for 12·5kHz steps anywhere in the band.
- Large four digit LED frequency display tuned in 40 × 25kHz steps in each 1MHz range.
- A specially designed five stage helical-resonator assembly together with the latest dual-gate MOSFET front end ensures excellent cross-modulation characteristics.
- Built-in crystal controlled automatic tone-burst with ±600kHz shift for repeater operation and optional +1·6MHz shift for use in conjunction with FDK/MJV-430A UHF transverter.
- Four additional priority channels—two diode matrix programmable in 12·5kHz steps and two crystal controlled for any frequency between 144-146MHz.
- Channel scanning of two chosen channels either synthesizer/matrix or matrix/crystal.
- Continuously variable RF output control from 1-25W.
- Advanced PLL technology provides good stability with low spurious output; integral power supply noise filter eliminates vehicle line noise and an automatic protection circuit protects the RF output power module against poor SWR, open or short circuit.

Complete with microphone and mobile mounting brackets.

PALM II

2m HANDHELD

BACK IN STOCK

£89.95
(Toneburst £10 extra)

Illustration shows 70cm version (PIV) **£149**

FDK MULTI-750E

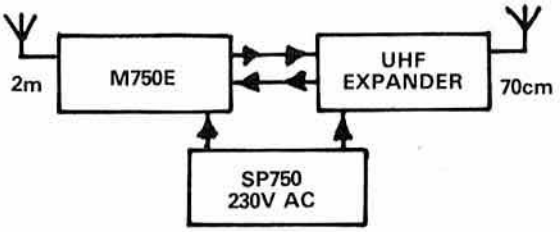
2m (& 70cm) ALL-MODE

AMAZING VALUE **£299 inc VAT**

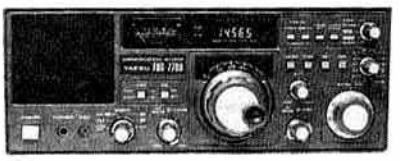
- Simple and smooth VFO control gives either 100Hz or 5kHz steps on both FM and SSB modes for optimum convenience.
- The large green fluorescent display tube gives full frequency readout to 100Hz and provides safe and clear readout for both night and day operation.
- Standard features include noise-blanker, RIT control with switch, RF attenuator gain control, automatic crystal controlled tone-burst, high and low power switching and remote up/down frequency control microphone unit.
- Compare its compact size and light weight, its smart appearance and comprehensive front panel controls. Simple and reliable operation is made possible by employing advanced solid-state and logic techniques.
- A dual VFO is employed for the selection of two independent frequencies anywhere in the band. This also enables split frequency operation, particularly useful when used in conjunction with the optional "UHF-EXPANDER" transverter.

For normal repeater operation a pre-programmed shift is selected by front panel selector.

M750 BUILDS INTO A 2m & 70cm PACKAGE
(70cm module available late summer)



SUPER PACKAGE OFFER



FRG-7700 RECEIVER

0·2-30MHz

£309

(Free Securicor delivery)

The receiver that gives you full frequency coverage with digital readout through long wave-medium wave and short wave. All mode reception includes FM, SSB, AM and CW and of course each one is individually tested by us before despatch. This means you get a receiver with guaranteed performance. All FRG7700s are despatched via Securicor to reach you within 24 hours of leaving our premises and each one is covered by our own insurance. Just one of the advantages of dealing with the largest specialist dealer in the South.

PLUS FREE 'GLOBAL' SW AERIAL

Yes, we are actually giving away one of the famous 'GLOBAL' short wave aerials free with all orders personally collected from our premises. The lightweight aluminium alloy wire is supplied complete with insulators, nylon end supports earth wire and earth stake plus full instructions.

EXISTING RECEIVER OWNERS!

If you want to improve your reception why not send us a 12p stamp for a copy of the GLOBAL antenna brochure specially for short-wave listeners. Remember the antenna makes all the difference!

DELIVERY BY SECURICOR
Order by post or telephone with confidence – you'll receive your order in 72 hours by Securicor or post (aerials excepted).

'Such nice people'

WATERS & STANTON

OUR BEST ADVERTISEMENT . . . IS OUR NAME!

MAIL ORDER—Anywhere in UK HEAVY PARCELS—Securicor
OTHER PARCELS—Parcel Post or British Rail
All goods sent are covered free by our own insurance

PRICE LIST—JANUARY 1981

TRIO		
TS830S	160-10m transceiver 9 bands	£639.52 (4.50)
VFO230	Digital VFO with memories	194.45 (4.50)
AT230	All-band ATU power meter	106.72 (1.50)
SP230	External speaker unit	33.14 (1.50)
DS2	Optional dc pack for TS830S	39.90 (1.50)
DFC230	Dig fequency remote controller	163.13 (1.50)
YK88C	500Hz CW filter	17.25 (1.00)
YK88CN	270Hz CW filter	28.62 (1.00)
TS520SE	160-10m trans 200w pep	437.00 (4.50)
DG5	Digital readout	103.50 (1.50)
SP520	Speaker	17.25 (1.50)
VFO520S	External VFO	98.90 (4.50)
YG3395C	CW filter 8 pole	37.95 (.50)
DK520	DG5 to older TS520	10.35 (.75)
AT200	160-10 metre antenna tuner	82.80 (1.50)
SM220	Station monitor scope	197.80 (4.50)
BS8	Pan display TS820/180/830	48.30 (.50)
BS5	As above for TS520	48.30 (.50)
R820	Amateur band receiver	690.00 (4.50)
YG455C	500Hz CW filter	58.65 (.50)
YG455CN	250Hz CW filter	60.95 (.50)
YG88A	6kHz AM filter	34.50 (.50)
TS180S	160-10m S/State transceiver	679.65 (4.50)
VFO180	External VFO	96.60 (1.50)
SP180	External speaker unit	36.80 (1.50)
AT180	Matching 200W antenna tuner	95.45 (4.50)
YK88C	500Hz CW filter	28.75 (.50)
YK88S	Second SSB filter option	28.75 (.50)
PS30	AC power supply for TS180S	85.10 (4.50)
TS130S	8 band 200W pep	491.05 (4.50)
TS130V	8 band 20W pep	404.34 (4.50)
DFC230	Dig frequency remote controller	163.13 (1.50)
TS120S	80-10m 200W pep mobile trans	432.40 (4.50)
TS120V	80-10m 20W pep mobile trans	347.30 (4.50)
TL120	200W pep linear for TS120V	128.80 (4.50)
MB100	Mobile mount for TS120/130	17.25 (1.00)
YK88C	500Hz CW filter	28.75 (.50)
YK88CN	270Hz CW filter	28.62 (1.00)
VFO120	External VFO	89.70 (4.50)
SP120	Base station external speaker	25.30 (1.25)
SP40	New mobile speaker unit	26.89 (1.50)
AT130	100W antenna tuner	72.89 (1.50)
PS20	AC power supply TS120/130V	44.85 (4.50)
PS30	AC power supply TS120/130S	85.10 (4.50)
MA5	5 band mobile aerial system	74.75 (4.50)
TL922	160-10 metre 2KW linear	595.70 (4.50)
MC50	dual impedance desk microphone	24.15 (1.50)
MC35S	Fist microphone 50K impedance	13.80 (1.00)
MC30S	Fist microphone 500ohm imp.	13.80 (1.00)
LF30A	HF lowpass filter. 1kW	18.40 (1.00)
RD300	1kW oil filled dummy load	48.30 (1.50)
TS770E	2m/70cm all mode transceiver	730.25 (4.50)
SP70	External speaker unit	18.40 (1.00)
TR9000	2m synthesised multimode	345.00 (4.50)
BO9	Base plinth for TR9000	32.20 (4.50)
TR7800	2m FM synthesised mobile	268.00 (4.50)
TR2300	2M FM synthesised portable	166.75 (4.50)
VB2300	10W amplifier for TR2300	49.45 (1.50)
MB2	Mobile mount TR2300/VB2300	17.25 (1.00)
RA1	Rubber flexible antenna	6.90 (.50)
PS1200	AC power unit and charger	29.50 (1.50)
TR2400	2m FM synthesised handheld	198.95 (4.50)
ST1	Base stand and quick charger	43.70 (1.50)
BC5	12V quick charger	17.25 (1.50)
SC3	Soft carrying case.	11.50 (.50)
LH1	Hard leather holster	18.50 (.50)
PB24	Spare battery pack/charger lead	14.26 (1.50)
TR3200	70cm FM portable transceiver	164.45 (4.50)
PL1	Spare power/charge lead	1.30 (.15)
R1000	Gen. Coverage Receiver	285.20 (4.50)
YAESU		
FT101Z	160-10m 6 band transceiver	488.75 (n.c.)
FT101ZD	as above but with digital	569.25 (n.c.)
DIG101Z	Digital kit	86.25 (n.c.)
DCT101Z	12v DC adaptor	34.50 (1.00)
FV101Z	Remote VFO for FT101Z/ZD	126.50 (n.c.)
FT107M	160-10m 9 band transceiver	690.00 (n.c.)
FV107	Remote VFO for FT107	92.00 (n.c.)
FC107	160-10m atu, aerial switch, p/meter	97.75 (1.50)
FP107E	230v AC power supply for FT107	106.95 (2.50)
FP107	As above but fitting internally	97.75 (2.50)
FTV107	Transverter main frame	110.40 (n.c.)
FTV107(2)	Transverter main frame	207.00 (n.c.)
144V107V901	2 metre transverter	101.20 (n.c.)
50V107V901	6 metre transverter	69.00 (n.c.)
430V107V901	70cms transverter	178.25 (n.c.)
SP107P	External speaker in cabinet	55.20 (2.50)
SP107	External speaker in cabinet	27.60 (2.00)
DMST107	12 channel memory	100.05 (n.c.)
CW	CW filter for FT107	23.00 (.50)
AM	AM filter for FT107	23.00 (.50)
YM34	500ohm desk mic FT707/FT107	21.28 (1.50)
YM35	500ohm up/dwn mic FT707/107	12.65 (.75)
YM36	500ohm noise cancelling FT707/107	13.80 (.75)
YM37	500ohm manual mic FT707/107	8.63 (.75)
FT707S	160-10m 9 band transceiver	465.75 (n.c.)
FT707	160-10m 9 band transceiver	499.00 (n.c.)
FP707	230v AC to 12v DC for FT707	109.25 (2.50)
FC707	160-10m atu	74.75 (1.50)
FV707DM	External digital vfo for FT707	178.25 (n.c.)
MR7	Metal rack for FT707	14.95 (1.50)
MMB2	Mobile mounting bracket FT707	14.95 (1.50)
FRB707		21.85 (1.00)
FL2100Z	160-10m 1200 watt linear	362.25 (n.c.)
YP150	150 watt dummy load	63.25 (1.75)
YH55	8ohm headphones	10.35 (1.25)
FF501	Low pass filter	19.95 (.75)
QTR24D	24 hour quartz clock	24.96 (1.50)
FP12	230v AC 12 amp DC p/supply	78.20 (2.50)
FP4	230v AC 4 amp DC p/supply	41.40 (2.50)
FSP1		9.95 (1.00)
FRG7	.5-30MHz communications Rx	189.00 (n.c.)
BHRG7	Battery holder for FRG7	5.00 (1.00)
YC500J	Frequency counter	189.75 (n.c.)
YC500S	Frequency counter	270.25 (n.c.)
YC500E	Frequency counter	345.00 (n.c.)
FRG7700	1981 version of FRG7000	309.00 (n.c.)
FRG7700	MEM As above with freq mem	380.00 (n.c.)
FT207R	144-146mHz synthesised h/h	199.00 (n.c.)
NC1A	Ni-cad 230v AC charger	18.98 (1.50)
NC2	Ni-cad 230v AC fast charger	39.68 (1.50)
NC9	Ni-cad 230v AC charger	7.48 (.75)
NBP9	Spare ni-cad battery pack	16.68 (.75)
FLC2	Heavy duty case	20.70 (.75)
PA2	12v PSU	16.68 (1.00)
FBA1	Ni-cad pack charging adaptor	2.59 (.35)
FT225R	144-146mHz FM Base station	449.00 (n.c.)
FT225RD	with digital readout	499.00 (n.c.)
MEMT225	Memory option module	92.00 (n.c.)
DIST225	Digital readout for FT225R	57.50 (1.00)
FT480R	2 metre 10W FM transceiver	359.00 (n.c.)
FT720R	2m/4m/70cm control head	149.50 (n.c.)
S72	Switching box	55.20 (n.c.)
E72S	2m of connecting cable	23.00 (1.00)
E72L	4m of connecting cable	27.20 (1.00)
720RV	10W 2m module	166.75 (n.c.)
720RVH	25W 2m module	172.50 (n.c.)
720RU	10W 70cm module	201.25 (n.c.)
MMB3	Mobile mounting bracket	5.00 (1.50)
NEW	FT101Z (WARC) 9 band HF transceiver	t.b.a. (n.c.)
NEW	FT101ZD (WARC) 9 band HF transceiver	t.b.a. (n.c.)
FDK VHF/UHF EQUIPMENT		
M700EX	2m FM 25 watt trcvr. 12v DC	199.00 (n.c.)
M750E	2m FM/10W trcvr 12v DC	299.00 (n.c.)
Expander	70cm transverter	169.00 (n.c.)
PS750	230v A.C. power supply	69.00 (2.50)
Palm II	2m FM 6 channel portable	89.00 (n.c.)
Palm IV	70cm FM 6 channel portable	149.00 (n.c.)
TB1	1750Hz tone burst	10.00 (n.c.)
Palmsizer	2m FM 40 channel handheld	149.00 (n.c.)
Multi 3000	2m FM/10 watt base station	399.00 (n.c.)
TM56B	2m FM monitor 230v/12v DC	79.00 (n.c.)
FDM40SP	Speaker/mic for Palmsizer	11.00 (.50)
CC2	Leather case for Palm II/IV	5.75 (.50)
BC2	230v AC battery charger	4.50 (.50)
SC2	Leather case for Palmsizer	9.75 (.50)
BB2	"AA" size external battery case	5.00 (.50)
BT2	Ni-cad battery pack	12.00 (.50)
Xtals for Palm II and Palm IV		3.00 (.15)
Xtals for TM56B		2.50 (.15)
MICROWAVE MODULES		
MMT28/144	10m linear transverter	99.00 (1.75)
MMT144/28	2m linear transverter	99.00 (1.75)
MMT432/28-S	70cm linear transverter	149.00 (1.75)
MMT432/144-R	70cm linear transverter	134.00 (1.75)
MMT70/28	4m linear transverter	115.00 (1.75)
MMT70/144	4m linear transverter	115.00 (1.75)
MMT1296/144	23cm linear transverter	184.00 (2.25)
MML144/25	2m 25W linear amplifier	59.00 (1.75)
MML144/40	2m 40W linear amplifier	77.00 (1.75)
MML144/100	2m 100W linear amplifier	142.60 (2.75)
MML144/100P	2m 100W linear amplifier	142.60 (2.75)
MML432/20	70cm 20W linear amplifier	77.00 (1.75)
MML432/50	70cm 50W linear amplifier	119.00 (2.75)
MML432/100	70cm 100W linear amp	228.65 (2.75)
MM2000	RTTY to TV converter	169.00 (1.75)
MMC28/144	10m converter	27.90 (.65)
MMC50/28	6m converter	27.90 (.65)
MMC70/28	4m converter	27.90 (.65)
MMC70/28LO	4m converter	29.90 (.65)
MMC144/28	2m converter	27.90 (.65)
MMC144/28LO	2m converter	29.90 (.65)
MMC432/28-S	70cm converter	34.90 (.65)
MMC432/144-S	70cm converter	34.90 (.65)
MMC435/51	70cm ATV converter	34.90 (.65)
MMC435/600	70cm ATV converter	27.90 (.65)
MMC1296/28	23cm converter, 10m output	32.20 (.65)
MMK1296/144	23cm converter, 2m output	59.80 (1.75)
MMD050/500	500MHz digital freq meter	69.00 (.65)
MMD600P	600MHz prescaler	23.00 (.65)
MMDP1	Frequency counter probe	11.50 (.65)
MMA28	10m preamplifier	14.95 (.65)
MMA144V	2m RF switched preamp	34.90 (.65)
MMA1296	23cm preamplifier	29.90 (.65)
MMF144	2m filter	9.90 (.65)
MMF432	70cm filter	9.90 (.65)
MMV1296	70cm-23cm varactor tripler	34.50 (.65)
MMS384	384MHz frequency source	27.60 (.65)
MMR15/10	15db attenuator, BNC terms	5.75 (.65)
JAYBEAM ANTENNAS		
TB3	HF 3 element Tribander Beam	167.90 (4.50)
VR3	HF Vertical Triband	42.50 (3.00)
4 metre Antennas		
4Y/4M	4 element yagi	20.70 (3.00)
PMH2/4M	2 way phasing harness	12.20 (1.00)
2 metre Antennas		
DC1/WB	Wide band discone (100-470MHz)	41.40 (2.50)
LR1/2M	Omnidirectional vertical	24.15 (2.50)
C5/2M	5dB glass fibre colinear	44.30 (3.50)
5Y/2M	5 element yagi	11.25 (2.00)
8Y/2M	8 element yagi	14.50 (2.50)
10Y/2M	10 element 'long yagi'	31.00 (3.50)
PBM10/2M	10 element Parabeam	36.80 (3.50)
PBM14/2M	14 element Parabeam	44.85 (4.50)
5XY/2M	Crossed 5 element yagi	22.75 (3.00)
8XY/2M	Crossed 8 element yagi	28.40 (3.50)
10XY/2M	Crossed 10 element yagi	37.70 (4.00)
X6/2M/X12/70cm	Dual band crossed yagi	38.50 (4.50)
PMH/2C	2 way phasing harness	7.50 (.75)
Q4/2M	4 element quad yagi	23.70 (2.50)
Q6/2M	6 element quad yagi	31.40 (4.50)
D5/2M	Double 5 slot-fed yagi	20.15 (2.50)
D8/2M	Double 8 slot-fed yagi	27.15 (4.00)
SVMK/2M	Kit for vertical polarisation	7.25 (1.50)
UGP/2M	ground plane	10.15 (1.50)
HO/2M	Mobile 'halo' head only	4.50 (1.50)
HM/2M	Mobile 'halo' with 24" mast	5.40 (1.75)
PMH2/2M	2 way phasing harness	9.90 (1.00)
PMH4/2M	4 way phasing harness	23.00 (1.75)
70cm Antennas		
C8/70cm	8dB glass fibre colinear	50.00 (3.50)
D8/70cm	Double 8 slot-fed yagi	20.70 (2.50)
PBM18/70cm	18 element Parabeam	25.30 (2.50)
MBM48/70cm	48 element Multibeam	28.75 (3.00)
MBM88/70cm	88 element Multibeam	39.30 (4.50)
8XY/70cm	Crossed 8 element yagi	34.15 (3.50)
12XY/70cm	Crossed 12 element yagi	42.32 (4.50)
PMH2/70cm	2 way phasing harness	8.50 (1.00)
PMH4/70cm	4 way phasing harness	18.00 (1.50)
23cm Antennas		
D15/1296	Double 15 slot-fed yagi	34.00 (1.50)
PMH2/23cm	2 way phasing harness	25.40 (1.00)
Matching Transformer		
MT75/50	Impedance transformer 75/50Ω	3.60 (.50)
Chimney Lashing Kit		
DL	Double lashing chimney kit	8.25 (2.00)
Wall Brackets		
W6	6" wall bracket (1½" masts)	2.65 (1.00)
W21	21" wall stand-off bracket	10.35 (3.00)
W24HD	24" wall stand-off bracket,	14.70 (4.50)
Masts (Aluminium)		
SPM	16' × 1" Portable Mast	15.15 (3.00)
PME	4' extension for double arrays	2.50 (2.00)
A4	4' 6" × 1½" straight	3.80 (1.50)
A5	5' × 1" straight	2.30 (1.50)
A9	9' × 1½" straight	6.50 (2.50)
A10	10' × 2" straight	12.55 (2.50)
A12	12' × 2" straight	14.95 (2.50)
A14	14' × 2" straight	17.40 (3.00)
Accessories		
CP1	Cross-over plate 2" × 2"	3.35 (1.50)
JBL59/15	15" jointing sleeve for 2" masts	6.60 (1.50)
JBL29	u/v clamp 1½" boom to 1"-2" mast	1.60 (.75)
JBL30	u/v clamp 1" boom to 1"-2" mast	1.60 (.75)
JBL53	u/v clamp 1" boom to 1"-2" mast	1.45 (.75)
JBL58	Guy wire clamp: non-rotating	1.50 (.75)
JBL63	u/v clamp 1"-1½" boom to 1"-2" mast	1.40 (.75)
JBL64	Die-cast clamp 1" boom to 1" mast	1.20 (.75)
JBL65	Die-cast clamp 1" boom to 1"-2" mast	1.30 (.75)
JBL73	HD u/v clamp 1½" boom to 1"-2" mast	2.10 (1.00)
MBP	Mast base plate for 2" mast	3.60 (1.50)
STANDARD VHF/UHF		
C800	2 metre portable scanner receiver	79.00 (n.c.)
C8800	2 metre FM mobile transceiver	251.00 (n.c.)
C7800	70cm FM mobile transceiver	297.00 (n.c.)
G-WHIP MOBILE ANTENNA RANGE		
Tribander Helical for 10/15/20 metres		24.75(2.00)
LF40m Coil for above		6.55(.50)
LF80m Coil for above		6.55(.50)
LF160m Coil for above		6.55(.50)
LF telescopic resonator whip		3.35(.75)

AMATEUR RADIO CENTRE OF THE SOUTH—WELL WORTH A VISIT

Base mount single hole fixing + 3m cable	4.50(.50)
AERIAL ROTATORS (complete with control boxes)	
CDE AR30 (5 core cable)	47.00(1.50)
CDE AR40 (5 core cable)	59.80(1.50)
Channelmaster 9502 (3 core)	42.00(2.00)
Sky King SU4000 (6 core)	75.00(2.50)
Jaybeam KR400 (6 core)	105.00(2.00)
CDE alignment bearing	7.75(1.00)
Channelmaster alignment	11.75(1.00)
HF ANTENNAS (various manufacturers)	
Mini-Products HQ-1 20/15/10m 2 el	96.50(2.50)
Mini-Products C4 20/15/10m vert dipole	48.50(2.00)
Mosley TD3JR 20/15/10m wire dipole	34.50(1.50)
Mosley "Mini-Beam" 20/15/10m 2 el. 600W	99.00(2.00)
Mosley "Mini-Beam" 20/15/10m 2 el. 2kW	129.00(2.00)
Mosley TA32 20/15/10m 2 el.	89.70(2.00)
Mosley TA33 20/15/10m 3 element	133.40(2.50)
Mosley Mustang 20/15/10m 3 element 2kW	166.75(4.00)
Hy-Gain 12AVQ 20/15/10m vertical	43.00(2.00)
Hy-Gain 14AVQ 40-10m vertical	60.00(2.00)
Hy-Gain 18AVT/WB 80-10m vertical	87.00(2.50)
HF5 80-10m vertical 200 watts	48.00(2.00)
Radial Kit for HF5	28.00(2.00)
Sagant EL40X 80-40 Balun fed dipole (79')	36.00(1.50)
Jaybeam TB3 HF 3 element Tribander	167.90(4.50)
Jaybeam VR3 HF Vertical Triband	42.50(3.00)
DENTRON	
MLA2500B 6 band 160-10m 2kW linear	695.00(n.c.)
Clipperton-L 6 band 160-10m 2kW linear	459.00(n.c.)
DTR-1200L 5 band 80-10m 1·2kW linear	t.b.a.(n.c.)
GLA-1000B 5 band 80-10m 1kW linear	295.00(n.c.)
DTR-3KA 1·8-30MHz ATU/2kW	t.b.a.(n.c.)
MT-3000A 1·8-30MHz ATU/3kW	275.00(n.c.)
AT-1K 1·8-30MHz ATU/1kW	99.00(n.c.)
HF200A 80-10m transceiver 10W AC PSU	399.00(n.c.)
Spare set of D50A tubes	24.00(n.c.)
All band Doublet 1·8-30MHz + 470Ω feeder	22.50(2.00)
100ft 470Ω semi-air spaced feeder	22.00(2.00)
ADONIS MICROPHONES	
AM202G Mobile safety mic	20.95(n.c.)
AM202S Mobile safety mic	20.95(n.c.)
AM202H Mobile safety mic	29.00(n.c.)
AM502G Base station compressor mic	39.00(n.c.)
AM802G Base station compressor mic	59.00(n.c.)
SEM	
2m power amplifier/pre-amplifier 5/30W	50.00(1.00)
2m power amplifier/pre-amplifier 16/50W	66.70(1.50)
2m power amplifier/pre-amplifier 16/100W	126.50(1.50)
2m converter	23.00(.35)
2m Auto switching pre-amplifier	21.73(.35)
70cm Auto switching pre-amplifier	24.73(.35)
2m pre-amplifier	14.95(.35)
70cm pre-amplifier	17.73(.35)
2-40MHz pre-amplifier auto switching	18.66(.35)
2-40MHz pre-amplifier	11.73(.35)
PA3 miniature 2m pre-amplifier	8.00(.35)
PA70 miniature 70cm pre-amplifier	10.00(.35)
Z Match Aerial tun unit 1·8-30MHz 500W	47.15(1.50)
EZITUNE Aerial tuning aid	30.48(.75)
IAMBIC Keyer	34.50(.75)
2 METRE PORTABLES	
SB2M 2m SSB portable	99.00(1.50)
AR245 2m FM synthesized handheld, 5W	178.00(1.50)
AR245 carrying case	4.10(.50)
AR245 optional helical	4.10(.50)
AR245 12V DC car adaptor/charger	4.10(.50)
VHF/UHF MONITORS	
TM56B FM Scanner 4 + 12 channels	79.00(n.c.)
Sound Air 008 8 channel FM monitor	69.00(n.c.)
Sound Air M161 16 channel FM monitor	59.00(n.c.)
MF083 Marine or Amateur + 3 FM broad.	85.00(n.c.)
BEARCAT 220FB VHF/UHF	258.00(n.c.)
SX200 VHF/UHF	240.00(n.c.)
SR9 Tuneable 144-148 or 156-162MHz	46.00(n.c.)
AR22 2m FM pocket synthesized handheld	83.00(n.c.)
AR22 flexible antenna	3.00(n.c.)
VHF/UHF MOBILE AERIALS	
ASP201 2m ¼ wave with base	3.50(1.25)
ASP2009 2 5/8th wave with base	9.25(2.00)
ASP3009 2m 5/8th wave with base	9.75(2.00)
ASP462 70cm co-linear with base	8.25(1.25)
Magnetic base adaptor	8.50(.75)
ASP677 2m 5/8th wave	14.95(2.00)
ASP667 70cm co-linear	17.95(1.25)
ASPM125 27MHz ¼ wave	18.50(2.00)
Magnetic base adaptor	8.50(.75)
ASP 'no hole' boot mount adaptor	3.75(.50)
2NE 2m 7/8th mobile whip	13.00(2.00)
RG4M Base for above aerial	3.50(.75)
GSS Heavy duty gutter/boot mount	3.15(.50)
MB5 Magnetic mount with 5m coax	7.95(1.00)
10SE 28MHz whip 1·72m long	11.50(1.25)
15SE 21MHz whip 1·72m long	11.50(1.25)
20SE 14MHz whip 1·72m long	13.80(1.25)
WELZ PROFESSIONAL POWER/SWR METERS	
SP200 1·8-160MHz 20W-200W-1kW	49.95(n.c.)
SP300 1·8-500MHz 20W-200W-1kW	69.95(n.c.)
SP400 130-500MHz 5W-20W-150W	49.95(n.c.)
SHORT WAVE LISTENER AERIALS	
3-30MHz Inverted "L"	9.95(1.00)
3-30MHz Broad band dipole	29.00(1.00)
Mosley RD5 all-band dipole	40.00(1.00)
AIR BAND PORTABLE MONITORS (see also VHF/UHF Monitors)	
SHARP FX213 tuneable receiver	13.50(.75)
INGERSOLL MW/FM/Airband monitor	12.95(.75)
R517 Tuneable + 3 Xtal controlled chan's	49.50(.75)
NAIGAI	
500W pep 2m amplifier	429.00(n.c.)
MISC STATION ITEMS	
SEIF 13·8V 4 amp AC power supply	22.95(1.50)
PS125 6 amp AC power supply	28.00(2.00)
EK121 Katsumi Electronic Keyer	29.00(.75)
EKM12 Matching side tone monitor	10.95(.50)
CW2A general purpose morse oscillator	6.95(.50)
Telegraph CW key (manual)	10.50(.75)
YW3 Twin SWR/Pwr/Field strength meter	11.50(.50)
MF210 Self powered 2M FM monitor	12.95(.50)
FX1 d/l station w/meter 700kHz-250MHz	28.00(1.00)
DM801 700kHz-250MHz dip meter	51.75(1.00)
Station log books	1.95(.50)
12BY7A driver valves	2.75(.50)
6146B/S2001A P.A. valves	8.70(.50)
6JS6C P.A. Valves Matched pairs	9.95(.50)
PL259 plugs	.63(n.c.)
PL259 reducers	.17(n.c.)
SO239 chassis sockets	.60(.10)
PL259 joiners	.85(.10)
N. Plugs. Silver plated UR67	2.00(n.c.)
N. Plugs. Silver plated UR43	2.00(n.c.)
4 pin mic plugs	.85(.10)
3 pin mic plugs	.85(.10)
6 pin mic plugs (FDK 750)	1.00(.10)
3 pin chassic socket	.85(.10)
4 pin chassis socket	.85(.10)
BNC plugs (bayonet)	.90(.05)
Pen Cell Ni-cads (HP7 size)	1.20(.05)
Cigar lighter plugs	.55(.10)
UR67 cable 50Ω per metre	.69(.10)
UR43 cable 50Ω per metre	.23(.05)
5 core rotator cable per metre	.30(.05)
BL40X balun 50Ω	11.25(.35)
3 core rotator cable. Per metre	.22(.05)
Ferrite rings 1½" diameter	.35(.05)
Mosley aerial insulators	.30(.05)
KX2 SWL aerial tuner 0·5-30MHz	29.90(1.50)
APM1 Audio Peak and notch filter	33.00(1.00)
HP3A TVI high pass filter (UHF T.V.)	3.50(.50)
Drake TV3300 LP Low Pass Filter	18.40(1.20)
Shure 444D high impedance desk mic	27.50(1.50)
Shure 201 high impedance hand mic	11.75(1.00)
Trio HCM10 Digital World Clock	55.20(1.50)

TRIO TS830S £639.52

A brand new model having all nine bands fitted and providing 200 watts input SSB/CW. Built-in 230V ac supply, 6146B tubes and full digital and analogue display. Plus a really comprehensive variable selectivity and notch filtering system. The DX'ers dream.

TRIO TS130S £491.05

Base or mobile this solid state HF transceiver covers eight bands SSB/CW with a genuine 100 watts output. No tune up, IF tuning and speech processing are just a few of its features. 12V dc operation with full digital display plus optional PS30 for 230V AC operation.

TRIO TS520SE £437.00

The transceiver that gives 1·8-30MHz coverage at a really attractive price. 6146B PA tubes give 200 watts input and the built-in 230V ac power supply makes it a really superb SSB/CW self-contained base station. You won't find better value.

TRIO R1000 £285.20

The receiver that revolutionised short wave listening. Full 30 band coverage 200kHz to 30MHz SSB/CW/AM. Both digital and analogue readouts are provided together with 230V or 12V dc operation facilities. Trio engineering at its best and at a very competitive price.

TRIO TR9000 £345.00

An all mode 2 metre transceiver that serves the dual roll of mobile and base station. Features include digital readout, 12½ or 25kHz steps in FM, five memories band scanning and a lot more! Send for coloured leaflet.

TRIO TR7800 £268.00

The latest Trio 25 watt FM transceiver with a host of features that makes mobile operating a real pleasure. Built-in keypad, digital readout, 14 memories—the list of features is endless. Send a SAE for full details.

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Full coverage from 200kHz up to 30MHz with both digital and analogue readout for ease of use. Three IF filters—wide, narrow, AM & SSB. Noise blanker, RF attenuator, tone control, recorder o/p, multiple antenna inputs, digital clock all built in.

£285.00 inc VAT and carriage

MIZUHO KX2 ATU

Tunes and matches your antenna for optimum performance from your receiver.

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NEW! SHORTWAVE LISTENERS' AERIAL

This inverted 'L' antenna provides good all-round performance between 3 and 30MHz. It comprises longwire, insulators, support ropes, terminating clips, earthwire and earth ground rod.

£9.95 inc VAT (carriage 75p)

MICROWAVE MODULES CONVERTERS

Allow use of your HF receiver on 2m and 70cm bands.

MMC144/28 (2m) **£24.90** inc VAT and carriage
MMC432/285 (70cm) **£29.90** inc VAT and carriage

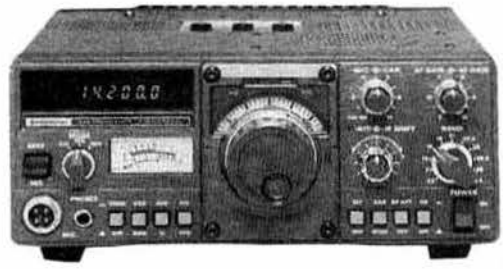
TS-830S

TS-830S All the new bands, 220W PEP and 2 × 6146B's in the final.

£639.00 inc VAT and carriage

THE LATEST HF TRANSCEIVERS FROM TRIO

TS-130S/TS-130V



TS-130S/TS-130V All the new bands, speech processor, choice of filters plus all the features of the TS-120.

TS-130S **£491.00** inc VAT and carriage
TS-130V **£404.00** inc VAT and carriage

TR-2400

2 METRE RIGS FROM TRIO

TR-2400 The clever handheld from TRIO. Large LCD readout, 1·5W o/p, 10 memories, automatic scanning, instant reverse repeater. Shown in ST1 base stand for fast charge charging, use of fist mic and external aerial.

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TR-7800

TR-7800 This is the latest 2m FM rig from TRIO. Visit our showroom for a full demonstration of its many features.

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FT902DM

YES INDEED, WHEN YOU BUY YAESU MUSEN EQUIPMENT YOU ARE BUYING THE VERY LATEST THAT TECHNOLOGY CAN OFFER IN THE FIELD OF AMATEUR RADIO AND THIS MONTH WE FEATURE BRAND NEW MODELS FROM YAESU WHICH INCORPORATE THE NEW WARC BANDS

THE FT-901DM HAS LONG BEEN CONSIDERED THE ULTIMATE IN HF TRANSCEIVERS AND NOW THE NEW FT-902DM MAKES ITS APPEARANCE, BRINGING ALL THE SUPERB FEATURES FOUND ON THE 901 AND GIVING THE ADDED BONUS OF THE NEW BAND FACILITIES. NO OTHER EQUIPMENT AVAILABLE ON THE MARKET TODAY CAN OFFER YOU THE PERFORMANCE OF THE 902DM—JUST LOOK AT THE FOLLOWING CONDENSED SPECIFICATION:

FT-902DM SPECIFICATIONS

GENERAL

Frequency coverage:
1·8-2·0MHz, 3·5-4·0MHz, 7·0-7·5MHz, 10·0-10·5MHz, 14·0-14·5MHz, 18·0-18·5MHz, 21·0-21·5MHz, 24·5-25.0MHz, 28·0-29·9MHz

Power requirements:
AC 100/110/117/200/220/234V, 50/60Hz; DC 13·5V, negative ground

Power consumption:
AC 117V: 70 watts receive (45 watts HEATER OFF), 320 watts max transmit; DC 13·5V: 5A receive (1·1A HEATER OFF), 21A max transmit

Size: 342(W) × 154(H) × 324(D) mm

Weight: Approx 18kg

TRANSMITTER

Emission:
LSB, USB, AM, CW, FM, FSK

PA input power:
SSB—180 watts PEP
CW—180 watts DC
AM, FM, FSK—80 watts DC

Carrier suppression:
Better than 40dB

Unwanted sideband suppression:
Better than 50dB @ 1,000Hz

Spurious radiation:
Better than 40dB below rated output

Transmitter frequency response:
300-2,700Hz (−6dB)

3rd order distortion products:
Better than 31dB below rated output

Stability:
Less than 300Hz drift from a cold start; less than 100Hz drift over a 30 minute period after warm-up

RF negative-feedback:
6dB at 14MHz

Modulation type:
SSB—balanced modulator; AM—amplitude modulation of a low power stage; FM—variable reactance frequency modulation, maximum deviation ±5kHz

Antenna output impedance:
50-75 ohms unbalanced

Microphone impedance:
500-600 ohms (low impedance)

RECEIVER

Sensitivity:
0·25μV for S/N 10dB

Image rejection:
1·8 21MHz—better than 60dB; 28MHz—better then 50dB

IF rejection:
Better then 70dB

Selectivity:
WIDTH control at "0"
SSB 2·4kHz (−6dB), 4·0kHz (−60dB); CW/FSK (with optional CW filter installed) 0·6kHz (−6dB), 1·2kHz (−60dB); AM (with optional AM filter installed) 6kHz (−6dB), 12kHz (−60dB); FM 12kHz (−6dB), 24kHz (−60dB)

Passband tuning:
Continuous from 300Hz to 2·4kHz

Audio output:
Better than 3 watts @ 10%
THD, audio output impedance 4-16 ohms

Access

Access or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.

THE BRAND NEW FL-2100Z LINEAR AMPLIFIER, MATCHING IN STYLE OF COURSE TO THE FT-101ZD and FT-902DM, AND NOW INCORPORATING THE NEW WARC BANDS ALSO.

FL-2100Z ▶

HOW TO REACH US (EASY PRIVATE PARKING ON OUR 90ft FORECOURT)

FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.
FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.
FROM THE WEST AND SOUTH WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.

AMATEUR ELECTRONICS UK

AEUK—Your number one source for YAESU MUSEN

YAESU FT-101ZD (WARC)

HERE IS THE BRAND NEW FT-101ZD WHICH NOW COMES COMPLETE WITH THE NEW WARC BANDS AND RETAINS ALL THE SUPERB FEATURES WHICH HAVE MADE THIS THE FINEST VALUE FOR MONEY HF TRANSCEIVER EVER AVAILABLE TO THE DISCERNING AMATEUR

FT-101ZD SPECIFICATIONS

GENERAL
Frequency coverage:
160m 1·8-2·0MHz, 80m 3·5-4·0MHz, 40m 7·0-7·5MHz, 30m 10·0-10·5MHz, 20m 14·0-14·5MHz, 17m 18·0-18·5MHz, 15m 21·0-21·5MHz, 12m 24·5-25.0MHz, 10m 28·0-29·9MHz
Operating modes:
LSB, USB, CW, AM
Power requirements:
100/110/117/200/220/234 volts AC, 50/60Hz; 13·5 volts DC (with optional DC-DC converter)
Power consumption:
AC 117V: 75VA receive (65VA HEATER OFF), 285VA transmit; DC 13·5V: 5·5 amps receive (1·1 amps HEATER OFF), 21 amps transmit

Size: 345(W) × 157(H) × 326(D) mm
Weight: Approx 15kg

TRANSMITTER
PA input power:
180 watts DC (SSB/CW), 50 watts DC(AM)
Carrier suppression:
Better than 40dB
Unwanted sideband suppression:
Better than 40dB @ 1,000Hz, 144MHz
Spurious radiation:
Better than 40dB below rated output
Third order distortion products:
Better than −31dB
Transmitter frequency response:
300-2,700Hz (−6dB)
Stability:
Less than 300Hz in first 30 minutes after 10min warmup; less than 100Hz after 30 minutes over any 30min period
Negative-feedback: 6dB @ 14MHz
Antenna output impedance:
50-75 ohms unbalanced
Microphone input impedance:
500-600 ohms

RECEIVER
Sensitivity:
0·25μV for S/N 10dB (SSB/CW)
0·5μV for S/N 10dB (AM)
Selectivity:
2·4kHz at 6dB down, 4·0kHz at 60dB down (1·66 shape factor); Continuously variable between 300 and 2,400Hz (−6dB); CW (with optional CW filter installed); 600Hz at 6dB down, 1·2kHz at 60dB down, (2:1 shape factor)
Image rejection:
Better than 60dB (160-15 metres);
Better than 50dB (10 metres)
IF rejection:
Better then 70dB (160, 80, 209-10m);
Better than 60dB (40m)
Audio output inpedance: 4-16 ohms
Audio output power:
3 watts @ 10% THD (into 4 ohms)

LAST BUT NOT LEAST, HERE IS THE VERY LATEST IN RECEIVERS BY YAESU MUSEN—THE BRAND NEW FRG-7700 WHICH SETS NEW STANDARDS FOR GENERAL COVERAGE RECEIVERS, AND HAS FEATURES NOT FOUND ON ANY COMPETITIVE PRODUCT REGARDLESS OF COST. THIS IS TRULY A NEW BREAKTHROUGH IN RECEIVER TECHNOLOGY.

A NEW BREAKTHROUGH IN RECEIVER TECHNOLOGY!

Frequency coverage 150KHz-29·999MHz

The exciting new FRG-7700 GENERAL COVERAGE RECEIVER from YAESU MUSEN, the world's largest manufacturer of Amateur Radio equipment, will satisfy the demands of the most critical Short Wave Listener or Licensed Operator with its superb performance and incredible specification—just consider the following details:

MODES:
AM (fitted Narrow, Medium and Wide Filters). USB, LSB, CW and FM.
Memory option with 12 channels and automatic band selection.
CPU Digital Clock and Timer.
State-of-the-Art Noise Blanker.
FM Squelch Control.
Mains or Battery operation.
Digital and Analogue read-out.

FOR FULL DETAILS OF THESE NEW AND EXCITING MODELS, SEND TODAY FOR THE LATEST YAESU CATALOGUE AND LEAFLETS. ALL YOU NEED TO DO TO OBTAIN THE LATEST INFORMATION ABOUT THESE EXCITING DEVELOPMENTS FROM THE WORLD'S NO. 1 MANUFACTURER OF AMATEUR RADIO EQUIPMENT IS TO SEND 36p IN STAMPS AND AS AN ADDED BONUS YOU WILL GET OUR CREDIT VOUCHER VALUE £3.60—A 10 TO 1 WINNING OFFER

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WALES & WEST—ROSS CLARE, GW3NWS, "GLENVIEW" NEWPORT ROAD, MAGOR, GWENT (0633) 880 146.
EAST ANGLIA—AMATEUR ELECTRONICS UK—EAST ANGLIA, DR T. THIRST (TIM) G4CTT, NORWICH 06925 865
NORTH EAST—NORTH EAST AMATEUR RADIO, DARLINGTON 0325 55969
SOUTH EAST—AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT
KEN McINNES, G3FTE, THANET, (0843) 291297, 9 a.m.-10.30 p.m.

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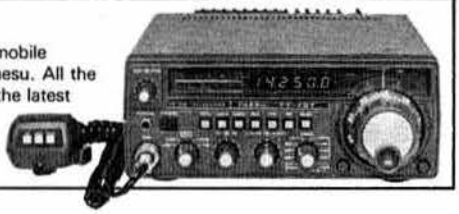
FT-707

The ultimate in HF mobile transceivers from Yaesu. All the new bands, and all the latest technology.

£499 inc. VAT

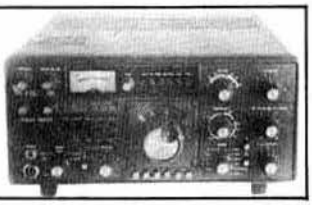


FT-101

Yaesu's '101' series HF base stations have earned an outstanding reputation for reliability over the years, and our 101s come complete with cooling fan and mic.

FT-101Z **£488** inc. VAT

FT-101ZD **£569** inc. VAT



FRG-7

Still the finest value-for-money communications receiver on the market at only

£185 inc. VAT and free Heliscan aerial worth **£15**

R-1000

Trio/Kenwood's successful new receiver with the PLL system that has proved so popular

£285 inc. VAT and free Heliscan aerial worth **£15**

FT-107M

Yaesu's solid state, broad band tuned HF transceiver, will operate into a 3-1 SWR and still bring in the DX

£690 inc. VAT

FRG-7700

Yaesu's latest receiver with FM right across the band and optional memory facility plus excellent filtering

£309 inc. VAT and free Heliscan aerial worth **£15** (Memory extra)

IC-720

Icom's superb new HF rig with general coverage receive 100kc-30MHz plus transmit facility across its entire range for commercial purposes

£699 inc. VAT

TS-830S

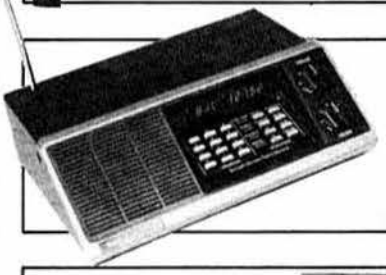
Another Trio/Kenwood development of an existing best-seller . . . the TS-820 gives way to the TS-830S, now with all the new bands, notch filter, IF shift, etc

£625 inc. VAT

TS-130S

Trio/Kenwood take up where the successful TS-120 models left off with this new mobile HF transceivers with the new WARC bands

£479 inc. VAT



BEARCAT 220FB

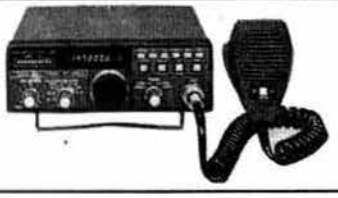
The super scanner which brings you all the excitement of the VHF and UHF frequencies . . . aircraft, marine, amateur, plus so much more

£258.75 inc. VAT

FT-480R

Yaesu's new 2m all-mode mobile, already acclaimed as the pace-setter in its class

£359 inc. VAT



TR-9000

Trio/Kenwood's long-awaited entry into the 2m all-mode mobile field with 5-channel memory, twin VFOs etc

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IC-202S
Still the most popular portable 2m SSB rig on the market, now up-rated by Icom to include USB and LSB
£169 inc. VAT

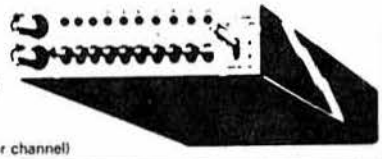
IC-240
Icom's ever-popular mobile FM transceiver, so simple to use with its 24-channel selection options
£169 inc. VAT

IC-255E
A really superior 2m synthesised mobile transceiver with 25W output, 5 memories, 2 VFOs, scanner, normal and reverse repeater, etc
£255 inc. VAT

IC-2E
About the smallest hand-held on the market, but with simplex and duplex over the full 144–146MHz range in 5kc steps, and giving a full 1·5W out
£159 inc. VAT

MR-1000A
The finest value pocket vhf scanning receiver ever offered. 10 channels, with scan or manual tune across selected crystal-controlled channels. Complete with Nicads and charger
£39 inc. VAT
(2m amateur band crystals **£2** per channel)

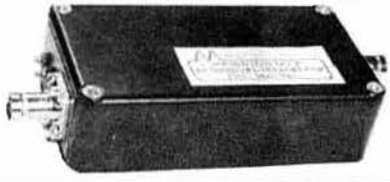
MR-110
VHF scanning receiver. 10-channel capability, with lock-out facility. Superb sensitivity. 12V only so ideal for mobile work
£39 inc. VAT
(2m amateur band crystals **£2** per channel)



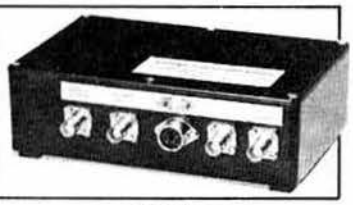
'SIX OF THE BEST' FROM MICROWAVE MODULES

MMD 050/500
Pinpoint accuracy from this frequency counter covering from 0·050-500MHz in 2 ranges. 6 digit readout
£69.00 inc. VAT

MMA-144V
Low-noise RF switched pre-amp for use in straight-through mode with up to 100W input.
£29.90 inc. VAT

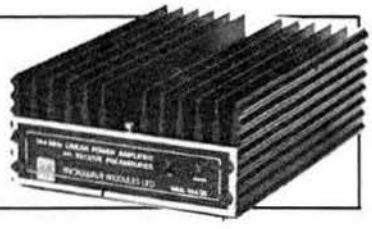


MMT 432/144 2-70 Transverter **£173.65** inc. VAT
MMT 144/28 10-2 Transverter **£99.00** inc. VAT
MMT 28/144 2-10 Transverter **£90.85** inc. VAT



MML 144/25
RF amp for 2m. 2W in/25 out
£48.30 inc. VAT

MML 144/40
RF amp for 2m. 10W in/40 out
£69.00 inc. VAT



MML 144/100
A really powerful RF amp with pre-amp. 10W in/100 out
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MM-2000
RTTY to TV converter. This complete terminal unit and TV interface only requires audio from receiver to display RTTY on TV
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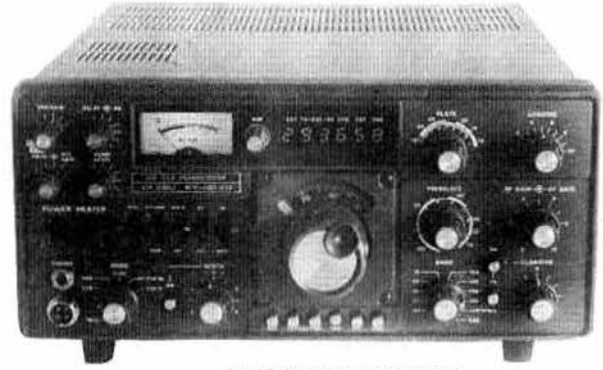
SOMMERKAMP FT307CBM includes all these "extras". **Basic set 80–10M + ready built VCO circuits** fitted 3 Marine bands, easy extension to new Amateur bands with extra crystals. Fan cooled "no-tune" PA. Audio peak & notch filters + variable bandwidth IF. RF speech processor, noise blanker etc. **DMS unit fitted**—12 channel memory + scanning from **YM35 Mic.** 234V ac **Mains PSU FP107** fitted + **CW filter.**
Our "ALL-IN" price £899.00

FT277ZD (FT101ZD) SOMMERKAMP SPECIFICATIONS BEATS ALL!!
Basic set 160–10M with WWV rx. & Aux. pair 6146B PA. with **Cooling Fan** fitted, 234V ac & **12 dc Inverter** fitted, full AM facility with **AM Filter** fitted and **CW filter.** All at the same price as others charge for basic set only! and we don't ask extra for the **YM37 mic.**
Our "ALL-IN" price £589.00



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Ultra compact 12V dc Transceiver with the wonderful receiver & unique digital LED metering. All Existing & proposed bands (80–10m + 30, 17 & 12m) factory fitted. YM35 Scan. Mic & CW Filter included at
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SPECIAL THIS MONTH
"ALL-IN" price £399.00

NEW! NEW! NEW!

TS788DX
10 Metre All-mode
FM + AM + CW + USB/LSB
Digital readout, remote scanner,
100 W PEP **£325.00** (Class A only)

NEW! NEW! NEW!

TS280FM
The Worlds most compact 80 channel 50W 2M FM Mobile featuring auto select of simplex/repeat mode & digital channel readout.
"ALL-IN" price £199.00
PLUS NEW version TS280LP has all facilities at 10 Watts output
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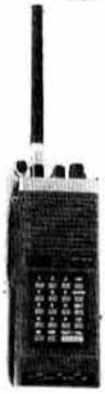

FT207R
Microprocessor controlled 2M FM hand-held scanner, memory, keyboard entry. Tone pad.
"ALL-IN" price £196.00
YM24 speaker mic. **£16.67** N9-C charger **£7.50**
"ALL-IN" package £217.00

NEW MODEL PRICES

FT470 70CM FM 25W Mobile	£287.00
FT404R 70CM FM Hand-held	£207.00
FT720RUB 70CM 10W FM Mobile	£355.00
FT720RVHE 2M 25W FM Mobile	£325.00
FT480R 2M ALL-MODE MOBILE	£359.00

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Amateur Radio Shop—4 Cross Church St, Huddersfield
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Lee Electronics Ltd

LEE LEE

NEW FROM STANDARD

THE C78 UHF FM SYNTHESIZED TRANSPORTABLE

SO NEW WE'VE NO TIME FOR PHOTOS

(SO COME IN AND SEE IT!!!)

JUST LOOK AT THE FOLLOWING FEATURES:

- ★ Full 10MHz coverage 430-440MHz in 25kHz steps
- ★ LCD digital readout for easy reading and power saving
- ★ Programmable repeater shift and tone burst
- ★ 5 Programmable memories for your favourite channels
- ★ Full scanning facilities of vacant or occupied channels
- ★ S-meter and power meter
- ★ A full 1W/2W switchable RF power
- ★ Up/down channel control on the microphone
- ★ Can be used from dry cell or rechargeable batteries
- ★ Optimal mobile mount and 10W booster available

THE C78 IS MADE TO THE SAME HIGH STANDARD AS THE C8800 AND C7800 SO YOU CAN BE ASSURED OF FIRST CLASS QUALITY AND VALUE FOR MONEY

C8800 2m FULLY SYNTHESIZED MOBILE TRANSCEIVER IS STILL ONE OF THE MOST POPULAR AT **£251** inc VAT

C7800 70cm FM FULLY SYNTHESIZED STILL THE ONLY ONE OF ITS KIND AT **£275** inc VAT

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KDK KYOKUTO

2m SYNTHESIZED 25W TRANSCEIVER

KDK 2025

- ★ Custom designed microprocessor control
- ★ 25kHz *and* 12·5kHz synthesizer steps!!
- ★ 'Instant QSY', 10 times rate button
- ★ 25 Watts of reliable RF output
- ★ Band scan between any 'easy set' limits
- ★ 10 write-in non-volatile memory channels
- ★ Memory scanning with hold facility
- ★ Standard ± 600kHz or any repeater split

The KDK FM2025E is a 12V dc two-metre FM transceiver for mobile or base station use. Although feature packed, operational ease is assured by use of a "custom microprocessor".

Digital frequency synthesis provides full band coverage in 12·5kHz or 25kHz steps. "Single knob" frequency selection is by an optically coupled encoder. A dialling speed switch (increases tuning steps) facilitates rapid QSY's.

A 10 slot memory with Ni-Cad back-up, provides 10 simplex (plus ±600kHz shift) and/or 5 semi-duplex channels, making the 2025 as easy to use mobile as a crystal controlled transceiver. One memory is semi-dedicated to "priority" and programmable when the 2025 is dial controlled.

The 2025 embodies the best non-lockout scanner. It scans occupied or empty channels and a flick switch enables immediate transmission. The scanner works on the memories and across any selected portion of the band (scan limits are defined by two of the memories).

Dual gate UHF MOSFETS in the RF and mixer provide superior intermodulation performance with high sensitivity maintained over the band by auto-varicap tuning. A monolithic crystal filter in the first IF and a 15 pole ceramic filter in the second provides excellent selectivity.

The single conversion transmitter uses a balanced mixer and a VCO on the signal frequency (directly modulated for superb FM) and a hybrid power module for 25W (or 3W) RF. The PA is impervious to breakdowns under infinite VSWR.

Necessary control function instructions are programmed into the microprocessor itself. But by re-arranging a diode matrix, the lower frequency transceive limit, the high frequency receive limit and the high frequency transmit limit may be altered to allow for changes of band plan or location.

Switchable auto-tone-burst, RF attenuator, squelch, microphone, microphone clip, power lead, mounting bracket, handbook are, of course, part of the package.

"What's the catch?" "None!" Compare the specifications, the features, the construction, the quality and the price.

£225 INC. VAT AT 15%
INC. SECURICOR

The 2025 is available from the importers or selected dealers

MICROWAVE MODULES LTD

L144/25 £51

2 METRE, 25W LINEAR AND PRE AMP
1W drive, (e.g. FT202R) 10W out, 3W drive (e.g. FT207R) 30W out. RF sensing with override. 10dB pre amp gain. Around 2·8A @ 13·8VDC (@ 25W)

L144/40 £67

2 METRE, 40W LINEAR AND PRE AMP
10W drive (e.g. FT480R) 40W output. RF sensing with override. 10dB pre amp gain. Around 5A at 13·8VDC (@ 40W).

L144/100 £124

2 METRE, 100W LINEAR
10W drive, 80W minimum (100W typical) output Thermal and VSW shutdown. Excessive and reserve polarity protection 12A max. at 13·8VDC (@ 80W).

L432/20 £67

70 CMS 20W LINEAR AND PRE AMP
3W drive (e.g. FT404R) for 20W output RF sensing with overide. 12dB pre amp gain. About 3A at 13·8V (@ 20W).

L432/50 £103

70 CMS 50W LINEAR AND PRE AMP
10W drive (e.g. FT780R) for 50W output. RF sensing with override. 10dB pre amp gain. Around 8A at 13·8VDC (@ 50W).

L432/100 £198

70 CMS 100W LINEAR
10W drive for 100W RMS output (−1dB compression). Thermal—VSWR—Excessive voltage and reverse polarity protection. 20A @ 13·8V for 100W.

T28/144 £86

10 METRE, 10W TRANSVERTER
10W on 10 meters output, from 2 metres. 2dB noise figure. RF sensing. 30mW or 10W drive (c/w 15dB pad).

T144/28 £86

2 METRE, 10W TRANSVERTER
10W on 2 metres from 10 metre source 5 500mW (on board attenuator). Current 2·1A peak, 0·3A quiescent.

T432/28S £129

70 CMS TRANSVERTER (SATELLITE)
10W on 70 cms from 10 metres (5-500mW drive). Dual crystal local oscillator chain, for 2MHz offset (434 up).

T432/144R £160

70 CMS TRANSVERTER (REPEATER)
10W on 70 cms from 2 metres. (10 watt drive). Double conversion. Dual crystal local oscillator chain for 1·6MHz offset.

T1296/144 £160

23 CMS 1·3W TRANSVERTER
1·3W on 23 cms from 2 metres (5-500mW or 10W drive). 2·9dB Noise figure.
T1296/144LN 1·5dB NF at £175.

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Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

25–120ft, post, base plate, wall, fixed base or mobile (on high-speed trailer) versions.

Price of towers are for the *complete package* – tower sections, mounts, telescopic and luffing gear, guys, head unit and winches.
AS APPROPRIATE FOR ANY PARTICULAR MODEL

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STANDARD 13M20 SERIES

Post Mounting 13M20			
P25	25'	Tower	£236.20
P40	40'	Tower	£323.60
P60	60'	Tower	£392.70
Fixed Base 13M20			
FB25	25'	Tower	£175.60
FB40	40'	Tower	£262.40
FB60	60'	Tower	£332.20
Socket Types 13M20			
SP	25'	Tower	£274.60
SP40	40'	Tower	£361.50
SP60	60'	Tower	£431.30
Base plate 13M20			
BP25	25'	Tower	£276.00
BP40	40'	Tower	£361.90
BP60	60'	Tower	£431.20
Wall Mounting 13M20			
W25	25'	Tower	£190.20
W40	40'	Tower	£277.00
W60	60'	Tower	£346.80

HEAVY DUTY 16M20 SERIES

Post Mounting 16M20			
P40	40'	Tower	£476.60
P60	60'	Tower	£541.10
Fixed Base 16M20			
FB40	40'	Tower	£382.20
FB60	60'	Tower	£446.70
Socket Types 16M20			
SP40	40'	Tower	£528.50
SP60	60'	Tower	£592.70
Base plate 16M20			
BP40	40'	Tower	£496.30
BP60	60'	Tower	£560.70
Wall Mounting 16M20			
W40	40'	Tower	£390.30
W60	60'	Tower	£449.50

80-85-100-120' & MOBILES PRICES ON APPLICATION

'30ft': 10ft SECTION

P30 £249
BP30 £295.50

BP = Baseplate mount
P = Post mounting

Capable of supporting a HF beam or several VHF Ants. The head unit accepts 2" tube and provides for a rotator. Operation is easy with single winch system.

ALL PRICES EXCLUDE VAT (15%) AND DELIVERY

HANSEN

IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 1·8–440MHz

FT710:
PEP
AUTO-SWR
RMS LEVEL

FS710H: 1·8-60MHz. 15,150, 1·5kW
FS710V: 50-150MHz. 15,150W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50-52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 3½"
Time Const: PEP follow 4 second

FS710 £68

FS500 £53

PEAK READING LEVEL RESPONSE
FS500H 1·8-60MHz 20, 200 & 2kW
FS500V 50-150MHz 20 & 200W
Power ±7% FSD. SWR 1:1-5:1
Size: 8 × 4 × 5½"

FS600 £39

PEAK READING LEVEL RESPONSE
FS601M 1·8-30MHz 20 & 200W
FS601MH 1·8-30MHz 200 & 2kW
FS602M 50-150MHz 20 & 200W
FS603M 430-440MHz 5 & 20W
Power ±10% FSD. SWR 1:1-3:1
Size: 6¼ × 2¾ × 4¼"

FS300 £35

LEVEL RESPONSE, LARGE METER
FS300H 1·8MHz 20, 200 1kW,
FS300V 50-150MHz 20, 200W FSD
Power ±10% SWR 1:1-3:1 ±10%
Size: 8 × 4 × 5½"

FS7 £31

VHF/UHF WATTMETER & BRIDGE
FS7 145MHz & 432MHz 5, 20, 200W
Power RMS ±10%. SWR 1:1-3:1
Power Max: 144MHz, 200W
432MHz 20W
Size: 6¼ × 2¾ × 4¼". 'N' type sockets

FS711 £28

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FSD711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10%. SWR 1:1-3:1 ±3%
Indicator 5 × 2¾ × 1½"
coupler 3½ × 2½ × 1¼"

FS5E £28

INDEPENDENT TWIN METER
FS5E 3·5-150MHz 20, 200 & 1kW
Power RMS ±10%. SWR 1:1-5:1
Power Max: 1kW 3·5-30MHz
50W 50-150MHz
Size: 7 × 3 × 3½". 'On the Air' LED

FS300M £27

LEVEL RESPONSE, POWER & SWR
FS301M 1·8-30MHz 20, 200W
FS301MH 1·8-30MHz 200, 2kW
FS302M 50-150MHz 20, 200W
Power ±10%. SWR 1:1-3:1 ±3%
Size: 6¼ × 2¾ × 4¼"

SWR3S £20

WIDE RANGE POWER & SWR
SWR3S 3·5-150MHz 20 & 200W
Power RMS ±10%. SWR 1:1-3:1
Power Max: 200W 3·5-30MHz
50W 50-150MHz
Size: 6 × 2¼ × 2½". Antenna/switch

SWR50B £20

TWIN METER, RELATIVE POWER
SWR50B 3·5-150MHz Scaled 1kW
Power RMS ±20%. SWR 1:1-3:1
Power Max: HF 1kW 1:1, 300W 3:1,
VHF 50W
Size: 6 × 2¾ × 2½". 'On the Air' LED

NB: PRICES EXCLUDE VAT (15%)
BUT INCLUDE POST AND PACKING

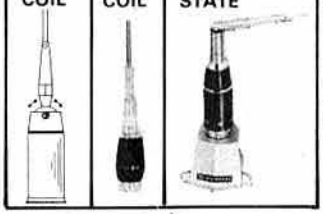
SMC-HS

INTERCHANGEABLE ELEMENT MOBILE ANTENNAS

SMC HS Mobile antennas, tabulated below, feature an in-built PL259M connector which mates with the SO239M of the cable assembly (fits a ⅜" hole in car body or the cast chromed gutter mount) or the magnetic base (recommended for smaller antennas only). This arrangement is ideal for easy removal (element change, car wash and anti-vandal), tests and portable operation.

MODEL	BAND	GAIN	TYPE	POWER	LENGTH
20SE	14MHz		(½λ)	100W	1·72m
15SE	21MHz		(½λ)	130W	1·72m
10SE	28MHz		(½λ)	100W	1·27m
4E	70MHz	0dB	¼λ	150W	1·03m
2NE	144MHz	3dB	⅝λ	150W	1·30m
78F	144MHz	4·5dB	⅞λ	100W	1·75m
78B	144MHz	4·5dB	⅞λ	150W	1·72m
258	432MHz	5·5dB	2 × ⅝λ	100W	0·94m
358	432MHz	6·3dB	3 × ⅝λ	100W	1·36m

BALL BASE COIL | FOLD BASE COIL | BASE COIL 'FOLDED' STATE



PRICES

20SE	£12.00
15SE	£10.00
10SE	£10.00
4E	£6.50
2NE	£5.50
78F	£10.00
78B	£11.00
258	£10.00
358	£12.50

MAGNETIC BASE

SMCSOMM

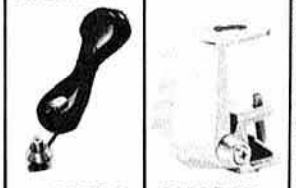
C/w 4M RG58 & PL259 plug

Models have either a locking fold-over joint (for easy garage entry) or an in-built ball (in case the cable assembly is fitted askew).

The cable assembly (SOCA) is available in two versions—4 or 6 metres of cable.

The ½'s are particularly recommended as the actual system gain, if the antenna is poorly sited, is usually very substantial.

CABLE ASSEMBLY | GUTTER MOUNTING



SMCSOCA | SMCGCD

C/w 4M RG58 & PL259 plug, "L" 6M

Adjustable, cast, chrome

PRICES

SOMM	£TNA
SOCA	£3.00
SOCAL	£3.35
GCD	£3.00

CARRIAGE
Complete antennas £1.00, or £0.50 for accessories, any quantity.

NB: PRICES EXCLUDE VAT (15%)

SOUTH MIDLANDS COMMUNICATIONS LIMITED

S. M. HOUSE, OSBORNE ROAD, TOTTON, SOUTHAMPTON SO4 4DN, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton

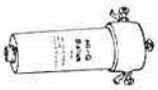
SOUTH MIDLANDS

VHF LINEAR AMPLIFIERS
12V; Switch SSB/FM, Low noise pre-amp
B108 80W out 10W drive **£105.00**
B3016 160W out 30W drive **£142.50**
B1016 160W out 10W drive **£165.00**
RC1 Remote unit, 18' cable **£15.00**

VHF LINEAR AMPLIFIER
160W out for 15W maximum drive. 145MHz. 12V DC (circa 18A). RF or manual switching. SSB/FM. Excellent heat sink—over temp. trip out/reset.
PA 15-160BL (Post free) **£171.30**

RF SPEECH PROCESSOR
Audio to audio via SSB. Bar LED display of clipping 4-pin socket c/w power unit
SMCSP4 (p&p £1.00) **£60.00**

HF/VHF SWR METER
Twin Meter. 3·5 to 170MHz. SWR. Calibrated to 3:1. 50 ohms. Relative Power. SO239 sockets
T3-107L (p&p £0.60) **£10.30**



HF BALUN TRANSFORMER
1:1 Ratio. 3-40MHz. SO239 Socket 5½" × 1½" D. 7½ oz. "Hang up type" High power
H1Q (Post free) **£8.70**

DUMMY LOAD
52 ohms. 1kW for 3min. 300W continuous. Oil filled 1·2:1 VSWR @ 150MHz
SMCDL1000 (p&p £1.95) **£34.65**

VHF/UHF SWR METER
Power 10W on 50, 144, 432 MHz VSWR. Calibrated to 3:1 50 ohms. Detachable RF head/indicator unit
UH74 (p&p £0.60) **£12.65**

POWER SUPPLY
12V DC regulated supply, 240V 50/60Hz input 3 Amps cont. 5 Amp peak 3 × 4½ × 6". 3½lb
ODR123C (Post free) **£13.65**

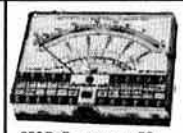
POWER SUPPLY
12V DC. 200mA. 240V 50/60Hz 2·1mm +ve centre plug.
SMCP12002 (p&p £0.60) **£4.35**

COAXIAL RELAYS (12V DC)
0·5GHz. (All models are post free) 50 ohms. 1kW PEP @ 30MHz. 50dB isolation at 1GHz. 0·2dB loss at 0·5GHz
CX540D 3 BNC sockets **£18.00**
CX530D 2 BNC + 1N **£18.00**
CX520D 3 N sockets **£18.00**

VHF MONITOR RECEIVER
12 Chan. FM Monitor, 2½ × 1½ × 4½" 8oz. 12kHz BW. 130-170MHz
HF12 c/w Accessories **£50.00**
HF12A12 c/w S(20, 23), R(0-7) **£70.00**
HF12M9 c/w 16, 6, 8, 10, 67, M, 12, 14 **£67.00**

COAX SWITCH
50 ohms 2 in 1 out. Shorting type, 60dB @ 300MHz & isolation. SO239's. Low VSWR. High power.
SMCS2 (p&p £0.70) **£6.95**

COAX SLIDE SWITCH
50 ohms. SO239 sockets. 2 in 2 out. Ganged
TWS220 (p&p £0.40) **£9.35**



MULTIMETERS
(p&p free)
20K/ohms per volt. 1000X overload on ohms. Plug in range selection.
80 Microtest, 40 Ranges **£16.50**
680G Super, 48 Ranges **£24.50**
680R Supertest, 80 Ranges **£32.00**

COAXIAL SWITCHES
(p&p free)
High quality, shorting types.
KSW3 1 in 2 out **£10.30**
KS23 1 in 3 out **£19.35**
KS24 1 in 4 out (ills.) **£25.65**

NORMAL PRICES (ABOVE) *EXCLUDE* VAT 15%. CARRIAGE AS INDICATED

YAESU "FORCE 9" SALE (NORMAL PRICES IN BRACKETS)

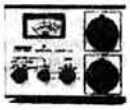
FT301D	Transceiver	(£676.20)	**£499**							**YC221**	Digital Readout	(£83.37)	**£49**
YO301	Monitor Scope	(£192.05)	**£139**	**FR101S**	Receiver	(£454.25)	**£379**	**FTV250**	2M Transvertor	(£212.75)	**£119**	**FT200**	Transceiver	(£362.25)	**£279**
YO101	Monitor Scope	(£194.93)	**£139**	**FR101SD**	Receiver Stan/Dig	(£595.25)	**£479**	**FTV650B**	6M Transvertor	(£178.25)	**£139**	**FP200**	AC Power Supply	(£74.75)	**£59**
FL101	Transmitter	(£500.25)	**£379**	**FR101D**	Receiver Deluxe	(£707.25)	**£579**	**FT620B**	6M Transceiver	(£316.25)	**£249**	**DC200**	DC Power Supply	(£97.75)	**£59**

BARGAIN BASEMENT (NORMAL PRICES IN BRACKETS)

VHF MOBILE ANTENNAS
¼λ. DC short. Tapered whip. Shock springs. Snap-in mount. C/W cable **£11.00**
½λ. Tapered whip. Hinged top. C/W gutter clip and cable..... **£12.00**

CUSHCRAFT ANTENNAS
ARX450 7cm, 6dB colinear "Ringo Ranger" **£17.00**
ABW144. 2m, 0dB, horizontal Omni "Big Wheel" **£15.00**
SQ2M + SQ2 2m –3dB "Squalo" + Mobile mast..... **£19.00**

AERIAL ROTATORS
AR30 dial and push. Silent control box. CDE made **£45.00**
2010 Dial up direction control with readout. Stolle made..... **£49.00**

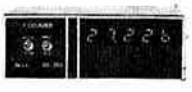


ANTENNA COUPLER LEADER
3·5-30MHz. Metered coax and single wire to 50Ω. To 500W PIP
LAC895 (£105.80) **£89.00**

LINEAR AMPLIFIER. AMPERE
70cm. R.F. sensing. 12V DC. 10W drive 45W out. 433MHz. 2½" × 5½" × 7½" **APB57A** (£117.59) **£99.00**

DIGITAL MULTIMETER
1-1000 scale. 10MΩ. AC (V/mA) DC (V/mA) Auto zero and polarity.
ME521
(£50.60) **£45.00**

WATTMETER LEADER
LDM880. Absorption 1·8-500MHz. 5, 20, 150W
LDM880 (£90.85) **£85.00**



FREQUENCY COUNTER
100kHz to 30MHz. 12V DC. 5 × 7 segment display. (10Hz) **RT75D**
(£50.60) **£45.00**

FM BOOSTER
88-108mHz pre-amp Type 4·5dB N.F. 20dB gain.
T203 (£10.25) **£8.00**

SALE PRICES INCLUDE VAT 15% AND CARRIAGE

COMMUNICATIONS LTD

SMC

HF ANTENNAS

GEM QUAD PRODUCTS		
GQ2E	2 Ele antenna	£124.00
GQ3E	3 Ele antenna	£187.00
GQ4E	4 Ele antenna	£249.00
GQCK 1	Con kit 1 ele	£63.00
GQCK 2	Con kit 2 ele	£125.00
GQSPIDER	Centre piece	£26.25
GQSPIDER	Spreader arm	£9.85
HV GAIN HF ANTENNA		
12AVQ	Vertical 10-20m	£37.50
14AVQ/WB	Vertical 10-40m	£52.50
18AVT/WB	Vertical 10-80m	£76.00
14RMQ	Roof mount kit	£19.50
18V	Vertical 10-80	£27.80
18HT	"HY Tower"	£225.00
103BA	3 Ele Yagi 10m	£51.00
105BA	5 Ele Yagi 10m	£92.00
153BA	3 Ele Yagi 15m	£62.75
155BA	5 Ele Yagi 15m	£117.50
203BA	3 Ele Yagi 20m	£117.50
204BA	4 Ele Yagi 20m	£155.00
205BA	5 Ele Yagi 20m	£205.00
402BA	2 Ele Yagi 40m	£158.00
DB10/15A	3 Ele 10-15m	£115.00
TH3JNR	3 Ele 10-20m	£113.50
TH2MK3	2 Ele 10-20m	£109.75
TH3MK3	3 Ele 10-20m	£157.00
TH5DXX	"Thunderbird"	£178.30
TH6DXX	"Thunderbird"	£205.00
HYQUAD	2 Ele Quad	£169.00
BN86	Balun ferrite 1:1	£13.50
LA1	Lighting arrest	£39.50
JAYBEAM HF ANTENNA		
VR3	Vert 10-20m	£34.00
TB3	3 Ele 10-20m	£135.00
MINIBEAM ANTENNA		
C4	Vert miniature	£42.15
HQ1	"Mini" quad	£83.85
MOSLEY HF ANTENNA		
TA32JRE	2 Ele beam	£78.00
TA33JRE	3 Ele beam	£116.00
TA33JRHPE	3 Ele c/w balun	£132.00
Mustang 2	2 Ele beam	£117.00
Mustang 3	3 Ele beam	£145.00
RD5	Dipole ham	£35.00
SWL7	Dipole B.C.	£35.00
SMC TRAPPED DIPOLE		
SMCTD/S	Standard 14swg	£26.50
SMCTD/HP	Hi power 14swg	£29.50
SMCTD/P	Portable ant	£32.50
SMC-HS ANTENNA		
SMCHF5V	Vertical 10-80m	£35.00
SMCHF5R	Radial kit loaded	£25.65
G WHIP HF MOBILE		
GW BASE	Base Standard	£3.90
Tribander	Antenna 10-20m	£21.50
LF40-160	Loading coil each	£5.70
LFWHIP	Telescope whip	£2.90
Multimobile	Antenna 10-20m	£25.00
MM40-160	Loading coil each	£5.70
MMWHIP	Telescopic whip	£2.90
Flexiwhip	Antenna 10m	£15.00
FF15 160	Loading coil each	£5.70
HY GAIN MOBILE ACCS.		
415	Bumper strap	£10.80
499	Body mount	£10.80
511	Spring H.D.	£9.50
417	Spring medium	£8.20
SMC—HS MOBILE		
SMC15SE	Ele 15m 1·72m	£11.00
SMC10E	Ele 10m 1·27m	£10.00
SMC10SE	Ele 10m 1·72m	£11.00
SMCSOCA	Cable assembly	£3.00
SMCGCD	Gutter clip	£3.00
MX913/M	Dust cover	£0.40

VHF ANTENNAS

HIDAKA VHF ANTENNA		
LT606	50-500MHz log	£75.95
JAYBEAM 4 METRE		
4Y/4M	Yagi, 4 element	£18.00
PMH2/4M	Harness, 2 way	£10.60
JAYBEAM 2 METRE		
HO/2M	Halo, head only	£3.95
HM/2M	Halo, with mast	£4.70
UGP/2M	Ground plane	£8.80
C5/2M	Colinear vert.	£38.50
LR1/2M	Colinear	£21.00
5Y/2M	Yagi, 5 element	£9.80
8Y/2M	Yagi, 8 element	£12.60
10Y/2M	Long Yagi 10 ele	£27.00
14/2M	Long Yagi 14 ele	£32.00
D5/2M	Yagi, 5 over 5	£15.90
D8/2M	Yagi, 8 over 8	£21.60
PMB10/2M	10 Ele parabeam	£29.20
PMB/14/2M	14 Ele parabeam	£39.00
Q4/2M	Quad, 4 element	£20.60
Q6/2M	Quad, 6 element	£27.30
5XY/2M	Yagi, 5 ele cros	£19.80
8XY/2M	Yagi, 8 ele cros	£24.70
10XY/2M	Yagi, 10 ele cros	£32.80
PMH2/C	Harness, cir.	£6.50
PMH2/2M	Harness, 2 way	£8.60
PMH2/2ML	Harness, 2 way	£9.60
PMH4/2M	Harness, 4 way	£21.10
JAYBEAM 2M/70CM		
X6/2M/X12/706	Ele 2, 12, 70	£33.50
JAYBEAM 70CM		
C8/70	Colinear, vert.	£43.50
D8/70	Yagi, 8 over 8	£18.00
PBM18/70	18 Ele para	£22.00
MBM48/70	Multi, 48 ele	£25.00
MBM88/70	Multi, 88 Ele	£34.20
8XY/70	Yagi, 10 Ele X	£29.70
12XY/70	Yagi, 12 Ele X	£36.80
PMH2/70	Harness 2 way	£7.40
PMH4/70	Harness 4 way	£15.70
JAYBEAM 1296MHz		
D15/23	Yagi, 15 over 15	£26.90
SMC VHF ANTENNA		
GP2U	Ground plane	£4.35
SMC-HS VHF ANTENNA		
SMCGDX1	80-480MHz	£36.00
SMCGDX2	50-480MHz	£41.70
SMCVHFL	65-520Hz Rx	£14.65
SMCGP144W	2m Colinear 6dB	£21.70
SMCG432X	70cm Colinear 7dB	£24.35
BANTEX MOBILE ANTENNA		
42SS	Ele stainless 42"	£2.00
40GF	Ele glassfibre 40"	£3.65
20SS	Ele stainless 20"	£1.35
18GF	Ele glassfibre 18"	£3.00
B5	Ele ⅝ glass 2m	£7.65
BGASS	Ele ½ stain 2m	£7.00
BAGAGF	Ele ½ glass 2m	£8.65
B5U	Ele ⅝ stain 70cm	£2.65
UCL	Ele coln. 70cm	£8.35
UDL	Ele coln. 70cm	£14.00
BM	Base standard	£2.00
BC	Base trunk lip	£6.65
BMM	Base Magnetic	£12.35
SMC-HS MOBILE ANTENNA		
SMC2HPL	Helical 2m PL259	£3.00
SMC2H/BNC	Helical 2m BNC	£3.85
SMC4	Ele 70MHz ¼λ	£6.50
SMC2NE	Ele 144MHz ⅝λ	£7.50
SMC78F	Ele 144MHz ⅝λ	£10.00
SMC78B	Ele 2m ¼λ "Ball"	£11.00
SMC25B	Ele 70cm col.	£10.00
SMCSOCA	Cable assembly	£3.00
MX913/U/M	Dust cover	£0.40
SMCGCD	Gutter clip	£5.00

CABLES & CONNECTORS R.F.

COAXIAL 50 OHM CABLE (Metres)		
URM95	Solid centre 2·3mm	£0.20
UR43	Solid centre 5·0mm	£0.20
UR76	Stranded core 5·0mm	£0.22
RG5BU	Stranded core 5·0mm	£0.22
RG213	Low loss 10·2mm	£0.48
UR67	Low loss 10·2mm	£0.52
COAXIAL 75 OHM CABLE		
307EP	Economy type	£0.16
UR70	Stranded light 5·7mm	£0.24
UR39	Medium duty 7·8mm	£0.36
YR57	Low loss 10·2mm	£0.57
BALANCED TWIN CABLE		
302	75 Ohm Light duty	£0.14
306	300 Ohm Ribbon	£0.15
2X21	240 Ohm Dual foam	£0.11
BNC COAXIAL PLUG 50 OHM		
UG88	Stranded type 5·5mm	£0.64
UG959	Large Type 11·2mm	£2.60
BNC COAXIAL SOCKET 50 OHM		
UG90	Standard, 4 hole type	£0.66
UG1094	Nut fixing type	£0.62
UG89	Free cable end 5·5mm	£0.82
BNC COAXIAL COUPLER 50 OHM		
UG914	Back to back female	£0.93
UG491	Back to back male	£0.93
UG274	"T" 2 female 1 male	£1.44
	"T" 3 female	£1.74
UG306	Elbow male/female	£1.62
BNC CABLES 50 OHM		
BNC18BNC	1·5' RG58 BNC ends	£2.22
BNC38BNC	3·0' RG58 BNC ends	£2.30
BNC36CROC	3·0' RG58 BNC/clips	£2.17
UHF COAXIAL PLUG		
PL259	Std. type 11·2mm	£0.48
PL259P	Push on type 11·2mm	£0.69
UG175	Reducer 5·0mm	£0.12
UG176	Reducer 5·6mm	£0.12
PL259R	Reduced type 5·0mm	£0.58
PL259A	De-luxe type 11·2mm	£0.98
PL259B	De-luxe type 5·0mm	£0.98
PL259SS	"Solderless" 11·2mm	£0.55
PL259SL	"Solderless" 5·0mm	£0.55
PL259E	Angle type 5·0mm	£0.83
PL259M	Metric type standard	£0.65
PL259PM	Panel mount 4 hole	£0.93
UHF COAXIAL SOCKET		
SO239F	Standard 4 hole fix	£0.42
SO239F31000	4 Hole ptfe Ag plate	£0.84
SO239T	2 Hole fixing type	£0.42
SO239NI	Nut fix inside type	£0.51
SO239NO	Nut fix outside type	£0.51
SO239E	Free angle type 5·0mm	£0.88
UHF COAXIAL ADAPTORS		
PL258	Back to back female	£0.79
PL274	Back to back chassis	£0.93
PL258M	Back to back male	£1.20
M359	Elbow male/female	£0.93
M358	"T" 2 female 1 male	£1.20
M358AF	"T" 3 female	£1.48
M458	"X" 3 female 1 male	£1.85
UG255	UHF socket/BNC plug	£1.53
UG273	UHF plug/BNC socket	£1.53
SO/FP	UHF socket/F plug	£0.60
SO/25	UHF sckt 2·5mm jack	£0.69
SO/35	UHF sckt 3·5mm jack	£0.69
UHF CABLES		
PL36PL	3·0' RG58 PL259 ends	£1.61
N COAXIAL PLUG		
UG536	Small type 5·6mm	£2.35
UG21	Std. type 11·2mm	£1.15
N COAXIAL 50 OHM		
UG58	Standard 4 hole fix	£0.82
UG1052	Free cable end 5·5mm	£2.49
UG23	Free cable end 11mm	£1.48

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ANTENNA WIRE (in metres)		
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CU14SWG108	HD Copper 33m coil	£4.78
CU14SWG132	HD Copper 40m coil	£5.87
CU7/029H	Hard Drawn Strand	£0.16
CU7/036	CAD Copper Strand	£0.22
CU7/044	CAD Copper Strand	£0.29
CU/TER	CU/Terylene Braid	£0.14
CU7/029S	Soft Copper Strand	£0.15
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BN86	HY-Gain 1 to 1	£13.50
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PORC3	Porcelain 3"	£0.48
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EG38	Porcelain Egg 1·5"	£0.35
EGG51	Porcelain Egg 2·1"	£1.85
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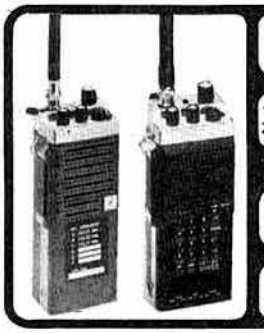

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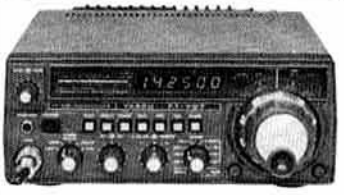

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RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE
Telephone 01-837 8688

Founded 1913. Incorporated 1926. Member society, International Amateur Radio Union

PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

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.

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
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RSGB SUNDAY NEWS BROADCASTS

These broadcasts are made every Sunday morning on hf and vhf, giving almost complete coverage of the British Isles. All stations broadcasting these news bulletins use the callsign GB2RS, and information regarding them is given in the table below.

The purpose of these news broadcasts is to provide an outlet for amateur radio news items which, by virtue of their topicality or urgency, cannot wait for the next issue of *Radio Communication*. The bulletins are compiled on Wednesday mornings, and items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone before 10am on Wednesday. No guarantee can be given of inclusion, in whole or in part, of any item submitted and, once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Frequency: 3·660MHz. Mode: ssb			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7·0475MHz. Mode: a.m.			
UK (from Northern Ireland)	GI3GGY	GI2DHB	0900
UK (from N Midlands)	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: ssb (horizontal polarization)			
SW from the Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G4IAL	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G8DVD	G8OAU	1030
SE from Lincoln	G8OFQ	(Vacancy)	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV	GM3ZBE	1030
W from Bristol	G4CJZ	G3ZWY/G8NNU	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz. (S21) Mode: fm (vertical polarization)			
Cornwall	G2ABC	G3NPB	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG	0930
Leeds	G3SPX	G8XGN/G3PSM	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	G4GWJ	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G8OGQ	(Vacancy)	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Jersey	GJ8KNV	GJ4ICD	1100

A MESSAGE FROM THE SOCIETY'S PRESIDENT

It is with great pride and a deep sense of responsibility that I assume the office of the Society's 47th President. There are many distinguished names among those 46 predecessors. During the next 12 months I shall try to justify my name being added to the list.

It is my good fortune to be elected to this office during a period of outstanding progress in the administration of the Society, and when the membership is growing at an unprecedented rate. While looking upon this with satisfaction, it is worthwhile to try to pin-point the underlying reasons. Much of the credit must be given to the hard-working general manager and supporting staff. In this context tribute must also be paid to those who made the, then, difficult decision to install the data processing equipment at headquarters. That and good management has enabled the Society to expand in so many ways without a commensurate increase in staff.

Many of the benefits of membership are provided by a small army of volunteers whose praises need to be sung. I take this opportunity to say "thank you" to all those who make such a vital contribution to the Society's well-being. The following quotation appeared on one of the recently returned GB2RS survey forms: "The greatest donation man can give—HIS TIME".

Every year brings its own problems, and 1981 is unlikely to be an exception. Some of the problems are predictable, others not so. Whatever they are, please be assured that the team consisting of Council, supporting volunteers and staff will be doing their best to help you, the members; not always an easy task in amateur radio, which has such a diversity of specialized interests.

May the coming year bring some, at least, of the things we wish.

Basil O'Brien, G2AMV

QTC
Amateur radio news

USA phone bands

At a recent ARRL board meeting it was directed that a petition should be filed with the FCC requesting that the 14MHz voice sub-band be increased by 50kHz, with an Extra Class sub-band of 14,150 to 14,175kHz and an Advanced/Extra sub-band of 14,175 to 14,225kHz. The petition will also request that Extra Class voice operation be permitted at 7,075 to 7,100kHz without eliminating cw and rtty use by other licensees.

The RSGB view is presented in the following letter sent to the ARRL:

The President
The American Radio Relay League, Inc
Newington
Connecticut
USA

30 October 1980

Dear Mr President,

I write concerning Bulletin No 79 from ARRL HQ in which your board has directed the filing of a petition to the FCC requesting that the 14MHz phone band be increased by 50kHz, and, that Extra Class voice operation be permitted between 7·075 and 7·100MHz.

This matter is of serious concern to amateurs world-wide; if accepted by the FCC the amount of the 20m phone band free from USA signals will be halved—also approximately 40 per cent of the IARU Region 1 phone band on 7MHz will be in use by USA amateurs.

Whilst fully appreciating the principle that the Board of ARRL has to cater for the needs of its members, my letter is prompted by the effect that the proposals would have on band occupancy and communications by amateurs outside the USA.

I realize, of course, that the Federal Communications Commission will accept and consider submissions from other organizations.

Nevertheless my view is that insufficient consideration has been given to the effect of these proposals and that, in the best spirit of amateur radio, consultation with other societies should take place before final decisions of this nature are made.

In the interest of amateur radio communication world-wide.

Yours sincerely,
Peter Balestrini, G3BPT,
President RSGB.

70MHz across the Atlantic

The first transatlantic 70MHz to 50MHz QSO took place on 17 November at 1627utc between G4BPY and VE1ASJ. The received signals from Canada were 5 and 9, while the cw from the UK was 339 in Canada. Congratulations to both stations concerned.

COUNCIL ELECTION RESULT

The result of the ballot to fill four vacancies in Council from 1 January 1981 was as follows:

ORDINARY MEMBERS

Dr E. J. Allaway, G3FKM	3,794
Mr J. Bazley, G3HCT	3,405
Mr F. A. Fear, G8CVR	800
Mr K. Fisher, G3WSN	2,454
Mr I. Lundegard, G3GJW	1,135
Mr J. A. McFall, G4HFX	729
Mr C. J. Reed, G8MFP	1,094
Mr F. Rose, G2DRT	1,031

ZONE A MEMBER

Mrs J. Heathershaw, G4CHH	382
Mr W. R. Parkinson, G3FNM	351
Mr D. Smith, G4DAX	347
Total number of votes accepted	4,789
Votes not accepted as a result of being spoilt, late, unidentified or duplicated	137

Dr E. J. Allaway, Mr J. Bazley, Mr K. Fisher and **Mrs J. Heathershaw** were accordingly elected to serve on Council for the three years 1981 3.

Cross-band working

The Home Office has once again confirmed that hf to vhf cross-band working between Class A and Class B licensees is not permitted under the terms of Amateur Licence B. However, an exception is made for communications through amateur satellites where both hf and vhf frequencies are used to complete a link.

National VHF Convention 1981

Reactions to the decision to hold the 1981 National VHF Convention at Sandown Park have been very favourable, both from the membership and the trade.

Plans for the lecture programme are well advanced, and as in the past there will be three streams: one of general interest, one on propagation by the Propagation Studies Committee, and the third on microwaves by the Microwave Committee. Speakers will include John Morris, G4ANB, ("Locator systems"); J. H. Nelson, G4FRX, ("Use and abuse of transmitting tubes of the 4CX250 series"); Charles Newton, G2FKZ, ("Auroral propagation"); Barrie Chambers, G8AGN, ("Microwave propagation"); Charles Suckling, G3WDG, ("Microwave eme"); and H. D. Griffiths, G4CNV, and Mrs P. Suckling, G4KGC, ("Making a start on 10GHz").

The trade show is also being planned, with members of the VHF and Rally & Exhibition committees working together. There is some 10,000ft² of space, which will ensure a less-crowded but more comprehensive display.

The popular Second Foundation Modern Dance Band including Bob (Boogie) Burns, G3OOU, will play in the evening, and there will be a substantial buffet supper. For those not wishing to dance or enjoy the music there will be a separate space for conversation. There will be a bar in each area.

Our aim is to have an attendance in excess of 1,000, so make a note of the date now:

Saturday 11 April 1981, at Sandown Park Racecourse, Esher, Surrey.

Mr D. E. Baptiste retires

Mr D. E. Baptiste, an assistant secretary, and head of the Radio Regulatory Division of the Home Office, retires at the end of January 1981. He joined the Post Office in 1950, transferring to the Ministry of Posts & Telecommunications when the radio regulatory functions became the responsibility of the latter ministry. In 1974 the Home Office assumed these functions from the MPT.

Mr Baptiste has been the leader of many UK delegations which have taken part in the conferences of the International Telecommunication Union. The success of the UK in achieving their targets at these conferences has been largely due to the continuing efforts of Mr Baptiste in the promotion of cordial international relations. His rapport with the Soviet Union authorities eased many problems before they reached the conference floor. He has always supported the amateur service, and the amateur satellite service virtually owes its existence to his efforts at the Space Conference in 1971. His support at WARC 79 was an instrumental factor in the satisfactory results obtained for the amateur service.

We would like to express our appreciation of the co-operation received over many years, and to join his many friends throughout the world in wishing Mr Baptiste a long and happy retirement.

Radio Amateur Old Timers' Association

The address of the honorary secretary of RAOTA, Miss A. M. Gadsden, is now 19 Drummond House, Font Hills, Long Lane, London N2, to which all correspondence should now be sent.

A Boys' Brigade net

Anyone interested in the formation of a BB radio amateur swl club, to include a regular net which would feature in the Boys' Brigade's centenary celebrations, is asked to please contact GM4HYF, QTHR.

Solar flare "hotline" service

A "hotline" designed to inform the public of solar flares erupting on the sun during this year's peak cycle of activity has been inaugurated at the National Aeuronautics & Space Administration Goddard Space Flight Centre in the USA. The Solar Max hotline service is being provided jointly by NASA and the National Oceanic & Atmospheric Administration (NOAA) through the latter's Space Environment Services Centre in Boulder, Colorado.

Information on sunspots, solar flares, geomagnetic storms and the impact of the sun's behaviour on radio transmissions will be provided in daily recorded messages from Goddard. The telephone number is (010-1) 301-344-8129.

The daily recordings will originate in the Solar Maximum Mission's Experiment Operations Facility. Information provided by the recordings is expected to serve as a valuable source to astronomers, ground observers, amateur radio operators, geologists and other scientists interested in the sun's activity.

The Amateur Computer Club

The ACC is one of the oldest amateur computer clubs in the world, founded in 1972 to promote interest in amateur computing. The ACC is a national organization to promote amateur computing activities, to facilitate the exchange of information and ideas, and to help members with their home computer systems. The ACC normally produces six issues of *Accumulator* (the club newsletter) per annum, and runs software and general information libraries, currently based on the 6800, Z80/8080 and 2650 microprocessors but to be extended. In addition the ACC has several local groups holding their own meetings and lectures.

Membership subscription is £4.50 per annum. Details and membership forms, sae please, from the membership secretary, Jim MacDonald, 1 Carlton Court, Studley Grange Road, London W7 2LU.

Duke of Edinburgh's Award Scheme

To mark the 25th anniversary of the scheme, a number of activities are planned to take place during 1981—one of them being an amateur radio exhibition station. It is hoped to establish such a station on board *HMS Belfast* in London on 6-8 February, the scheme's 25th birthday.

Any radio amateurs who hold, or who have held, one of the scheme's three awards, or who are actively involved as adult helpers, and live in the London area and are willing to assist in running the station, are asked to contact Mr P. Carey, G3UXH, QTHR; tel Medway 0634 250562.

VERON "Day for the Amateur"

This annual event in the RAI-Congress centre in Amsterdam on 8 November was attended by RSGB President Peter Balestrini, G3BPT, and immediate past-President John Bazley, G3HCT, who represented the Society as guests of VERON.

Can you help?

John Butler, who is an old soldier and a collector, has recently acquired a crystal set manufactured by Metropolitan-Vickers Electrical Co Ltd and named the Cosmos Radiophone. The set is not for sale, but he would be grateful for any information about the date of manufacture (he thinks it would be about 1923-5) and the price of the set when new. His address is 151 Clarence Gate Gardens, London NW1. Tel 01-486 4376.

Stolen equipment

On 31 October from a car parked in Hopeton Street, Edinburgh: Trio TR2300 serial No 921335, and charger. Any information to GM8IIO, QTHR; tel 031-441 7666, Mondays to Fridays between 7 and 9pm.

From parked van: FT277R with 25kHz and scanner board, scribed "G8PML" inside and outside; Lunar 10/160W linear amplifier, preamp board removed. Information to G8PML, QTHR. Reward offered for recovery.

Accommodation required

T. Weber, HB9BIX, is seeking accommodation with a radio amateur in Cambridge during July 1981. He will be attending the New School of English, 52 Bateman Street. Please contact Th Weber, Dickelen 17, CH-4460 Gelterkinden, Switzerland.

S. Bordais, F6AID—39 years old with a 13-year-old daughter and an 11-year-old son—wishes to contact a vhf-active amateur living on south coast who has a similar family, with a view to exchange holidays between children. His address is Box 3, 14540 Bourguebus, France; located close to Caen.

The RX80 Mk2

A 3·0 to 4·0MHz ssb/cw receiver and tunable i.f. for a complete hf receiver

(Part 1)

by A. L. BAILEY, G3WPO*

Introduction

Readers may recall a review of the "Oscarbox" [1] which covered the kits for a 3·5MHz tunable i.f. and hf converters with which various receiver combinations could be constructed, suitable for both general amateur band and Oscar satellite reception. Due to the considerable popularity of these kits, especially for their general use as an hf bands receiver, a Mk2 version has been developed, with increased coverage and facilities. The hf multiband converter has now been redesigned as a small single-band board, each band using a separate converter, thus enabling optimization for each of the 1MHz bands and removing the restriction on the number of bands which may be covered.

The first part of this article deals with the construction of the main RX80 Mk2 3·0 to 4·0MHz receiver and tunable i.f.. Subsequent parts will cover the construction of the converter and also the case illustrated, together with details of the dfm, a "huff and puff" type vfo stabilizer for synthesizer stability, a dc-controlled rf attenuator, an fm i.f. and a suitable power supply. With these modules, a compact, reliable and easy-to-construct receiver, which can be aligned with an absolute minimum of test equipment, can be produced at an economical price. To further assist the beginner for whom this may be a first receiver, all the components and a prepared printed circuit board are available from one source.

Design criteria

For the beginner to the hobby, or to someone who needs an hf receiver but has not got the cash to acquire one of the many commercial receivers advertised, there is little choice but to search for a secondhand receiver, of possibly unknown history, or to construct a suitable receiver. The latter course of action represents a major venture for a beginner, which may result in frustration and loss of interest, while for the more experienced constructor there are few designs available which will give all the information required, or are easily reproducible.

With these thoughts in mind, the available literature was searched for ideas, and a series of articles by K4DHC in *Ham Radio* [2, 3] provided the basis for the RX80 design. The heart of the K4DHC designs was the LM373 multifunction ic, now no longer available. This fact, together with a number of aspects of the design superseded by modern technology, resulted in the evolution of the present receiver which takes as much advantage as possible of modern, easily available components. The design criteria which had to be met were:

(a) easily reproducible design, which made a pcb mandatory;
(b) no coil winding—always a problem even if one can get hold of the correct formers, cores and wire;
(c) minimum component count consistent with good performance;
(d) all components readily available and unlikely to become obsolete;
(e) expandable design with a choice of i.f. filters for selectivity;
(f) varicap diode tuning with good stability; and
(g) coverage of one amateur band, but usable as a tuneable i.f..

The receiver meets these criteria and is accommodated on one single-sided pcb size 140 by 70mm.

Circuit description (Figs 1 & 2)

RF stage

Signals from the antenna input are applied to gate 1 of TR1, a dual-gate Mosfet type 3SK51/3SK60, via the input transformer T1. In common with the other inductors and transformers used, this is a ready-wound inductor from the Toko range of components, which are used widely throughout this design. Tracking is accomplished by D1a, one section of a triple varicap diode type KV1225. These diodes are ideal for this type of design with a capacitance swing of typically 500pF for a tuning voltage change of 1 to 25V, obtained by ion implantation techniques. Each section of the diode package is matched to within 1·5 per cent. Capacitors C1, 2 and 57 provide trimming facilities, with the control voltage for D1a derived from the front panel tuning potentiometer RV5.

RF gain adjustment is via the source of TR1, using RV1. Further rf selectivity is provided by T2 in the drain circuit of TR1, tracking via D1b, C7, C8 and C58.

Mixer

Conversion from 3·0–4·0MHz to the 455kHz i.f. is made by the double-balanced mixer IC1a, part of a Toko KB4412 multifunction ic. This ic is the heart of the receiver, providing, in addition to this mixer, another identical mixer which is used as the product detector and the main i.f. amplification. It also has facilities for delayed rf agc, but this is not used in this application. Output from the mixer to the main i.f. filter is on pin 15, with oscillator injection derived from the vfo at approximately 3·5 to 4·5MHz. AGC is also applied to this mixer via pin 3.

VFO

A Colpitts oscillator is used for the vfo, TR2, covering 3·45 to 4·46MHz. The combination of the electrical characteristics of the transistor used (BF274) and a high capacitance circuit improve the thermal stability of the system; typically within ±100Hz/h after initial warm-up. High stability polystyrene capacitors and a small proportion of N150 ceramic, together with the thermal characteristics of the varicap diodes and transistor, maintain the required vfo stability. D1c provides the tuning capacitance via the tracking capacitor C36. The vfo inductor sets the lower frequency limit, while a cermet preset, RV10, can be adjusted to set the upper limit. The vfo buffer, TR3, prevents any pulling of the vfo frequency by the following mixer. An output point is also provided for a digital frequency display which can be used with the receiver.

IF filter

A choice of filters is available to determine the i.f. bandwidth, depending on both the depth of the constructor's pocket and the overall receiver performance required. The basic filter, priced at well under £1, is a two-

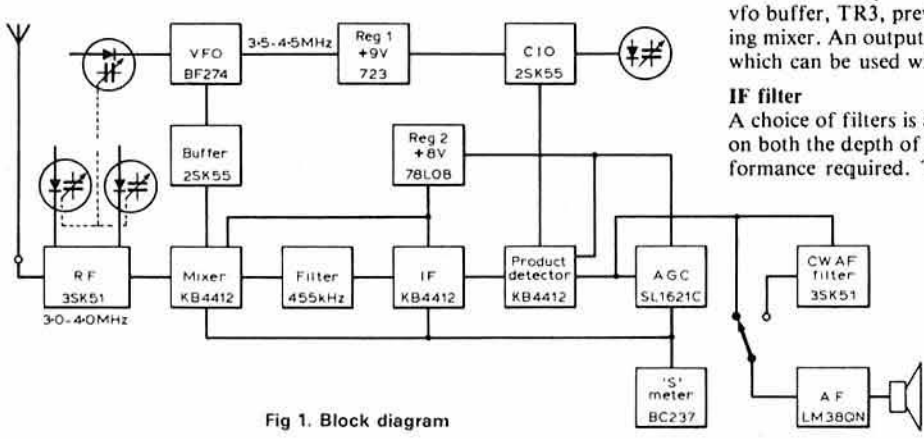


Fig 1. Block diagram

* 9 Alberta Walk, Worthing, West Sussex BN13 2SG.

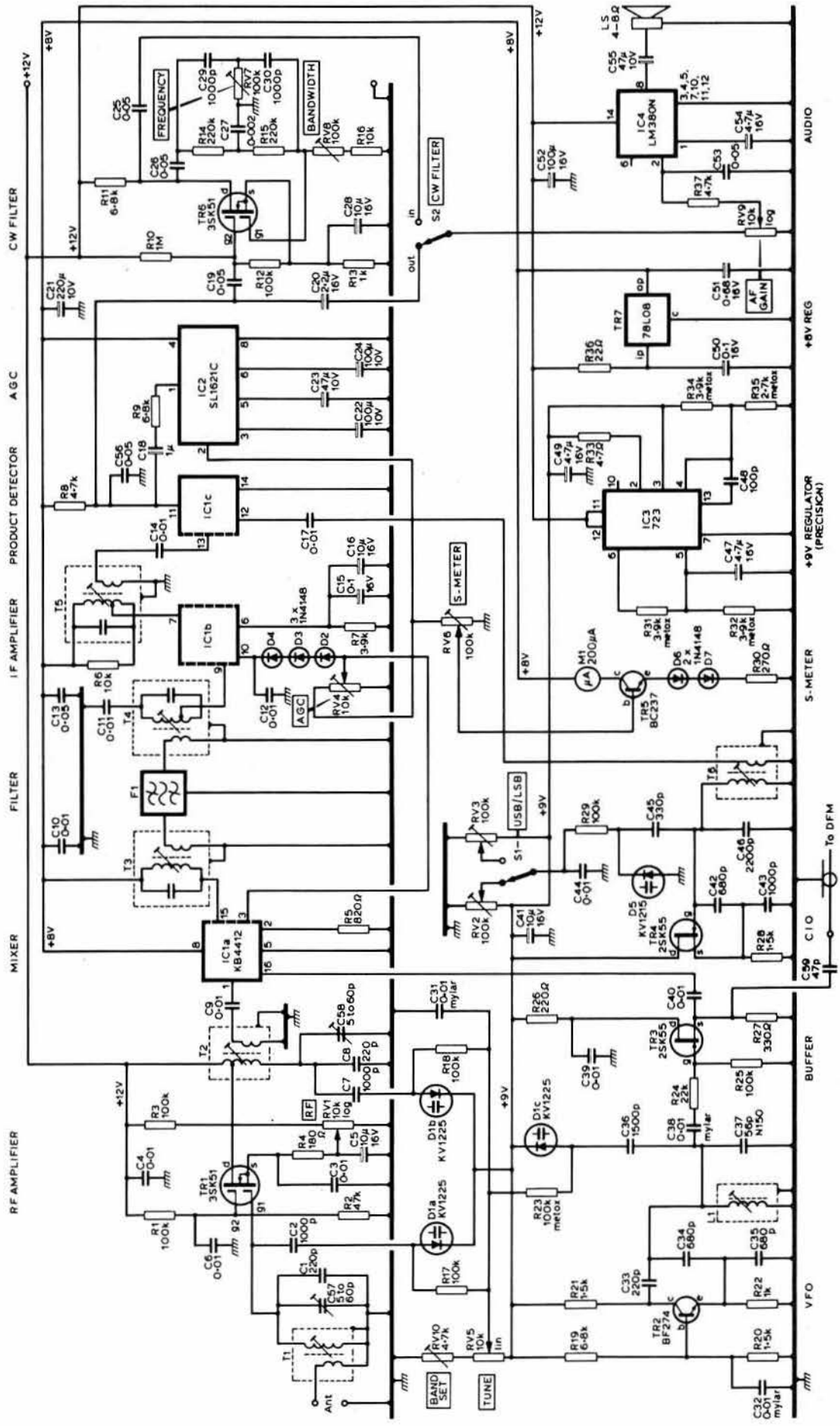


Fig 2. Circuit diagram of RX80

section Toko mechanical filter type CFM2455A with a −6dB bandwidth of 4kHz. While adequate for a start, this filter is not recommended for serious ssb communications reception, but can easily be changed at a later date. For full ssb specification filtering, the pcb will accept several types of filter. The Toko MFL455 mechanical filter, which had been discontinued, is now available again and will provide a typical −6dB bandwidth of 2·1–2·4kHz and shape factor of 2·4:1 (6:60dB). Alternatively, the Kokusai MF455 series will give a shape factor of 2:1 (6:60dB) and a −6dB bandwidth of nominally 2·3–2·4kHz. For cw addicts, Kokusai also supply a suitable cw filter with a −6dB bandwidth of 500Hz. If interest is shown, a small pcb which will provide switching between the two cw and ssb filters will be made available.

Intermediate frequency
A further section of the KB4412, IC1b, is used for the main i.f. amplifier with an agc controllable gain of 55dB. Output is taken from pin 7 to matching transformer T5 damped by R6. AGC is applied to pin 10 via preset RV4 and diodes D2–4.

Product detector
The other double-balanced mixer in the KB4412, IC1c, originally intended for frequency conversion in a double-conversion receiver, provides the product detector. Carrier injection at the i.f. frequency is derived from the carrier insertion oscillator (cio).

CIO
A fet oscillator, TR4 (2SK55/BF256) at approximately 455kHz generates the required injection voltage for the product detector. Tuning is effected by a further varicap diode, D5, a single KV1215 in a high capacitance circuit, again designed to minimize drift effects due to the thermal characteristics of the circuit. Switching between the frequencies required for lsb/usb is by selection of one of two presets (RV2, RV3) which can be set to provide the correct control voltages for the varicap diode for each mode. A tuneable bfo could equally well be provided by using a front panel control to replace the presets, or with the provision of an extra switch, as an additional control, as has been done in the prototype illustrated.

AGC
A Plessey SL1621C ic provides the audio-derived agc voltage, taking its input from the product detector output via C18 and R9. This ic was specifically designed for this application and provides fast attack agc, with a "hang" feature suitable for ssb reception, where the agc level is retained during short speech pauses. Short-lived pulses of agc are also produced to suppress noise bursts, while not affecting the pre-noise agc level. Its output voltage to the i.f. amplifier and mixer is adjustable by RV4. C21 provides a reservoir for the rapidly-charging agc capacitors.

S-meter
TR5, a BC237 or similar bipolar transistor, amplifies the agc voltage to a level suitable for signal strength indication. Sensitivity can be adjusted by RV6.

Audio output
An LM380N is used to provide about 1W of audio with a minimum of external components. C53 prevents hf instability and adjusts the frequency response to a suitable level.

CW filter
A twin-T audio filter is used around the 3SK51/3SK60 mosfet, TR6, to give a switchable filter facility for cw reception. The filter response frequency is adjustable to suit the user via RV7, and the filter bandwidth can be varied by RV8.

Power supplies
The receiver is designed around a supply voltage of 11–14V dc at approximately 70mA, depending on audio demand. This voltage is used directly for the rf and af stages, and for the cw filter. Those circuits requiring a highly stable reference voltage (vfo and cio) are fed from a precision voltage regulator (IC3) at approximately 9V. The varicap diodes used have a frequency swing in this circuit of over 1MHz for a voltage change of 9V. Related to vfo frequency, this means 1mV = 133Hz, hence it is vital that the main tuning voltage is kept completely stable and noise free. The remaining sections of the circuit are fed from a separate 78L08 voltage regulator (TR7), to avoid any possibility of interactions with the main tuning voltage. Metal oxide resistors are used in the voltage regulator and varicap tuning line to reduce noise to a minimum.

Printed circuit board

All of the above circuitry, with the exception of the af, rf and main tuning control and one resistor, is contained on a single-sided pcb (Fig 3). This can be reproduced by any of the normal methods, from photographic to hand drawing. In the latter case, a steady hand is needed, but all of the author's prototypes are prepared in this way. If making a photocopy of Fig 3, do not use a rotary photocopier as it will produce a distorted image along the axis of the drum; instead, use a flat-bed copier. Centre punch through all of the hole positions onto a clean piece of copper-clad board. Then drill, using a No 58 or 1/32in high-speed drill, deburr, and prepare the surface by using something like liquid Ajax, which will provide a good key. A Dalo or similar pen containing etch resist ink can then be used to draw in carefully all the tracks before etching in ferric chloride solution (see references for more details on pcb preparation). Some of the holes will need to be enlarged for the larger pinned components (Fig 4). Alternatively, a ready-drilled pcb with screened component positions is available, as is a complete set of components.

Components

The printed circuit board is designed to accept the types shown in the components list, and it is recommended that these are adhered to both for reasons of reproducibility and for physical size. Tantalum types are specified for most of the high value capacitors and are necessary for C15, 16, 18, 22–24, 47, 49, 50 and 51 for their low leakage. Those remaining can be substituted for small electrolytics if desired. 40673 mosfets can replace the 3SK51s, although the latter are superior; and almost any small signal npn bipolar for the BC237. It is not recommended that the vfo transistor is substituted, as stability may suffer. The tuning potentiometer RV5 should be of good quality; if a 10-turn version is used, it must be of good quality with precious-metal wiper and capable of good resolution, otherwise the tuning is likely to be erratic and unstable. The same comments apply to the switch used for lsb/usb switching. Metal oxide resistors must be used for

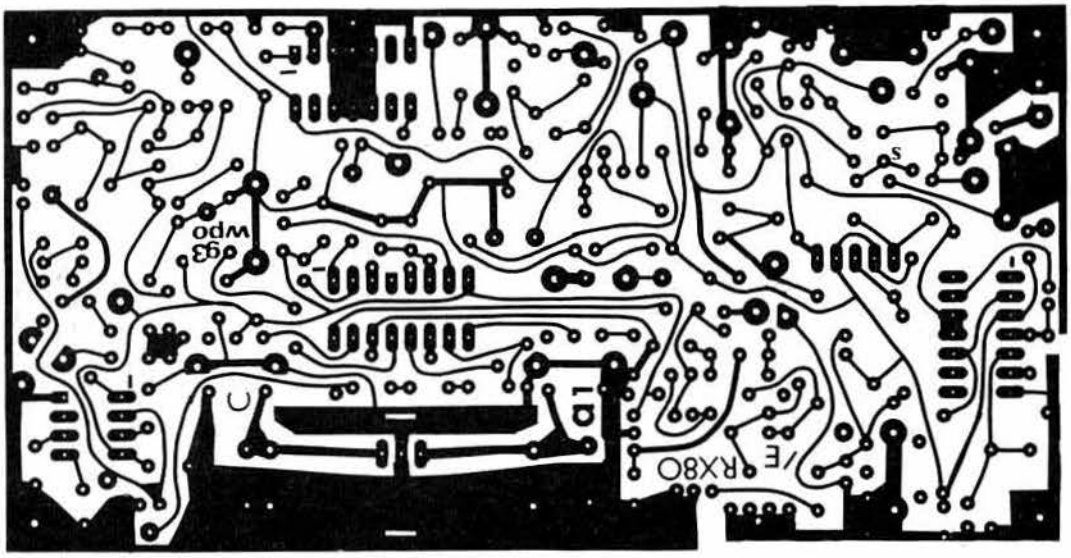


Fig 3. PCB circuit diagram

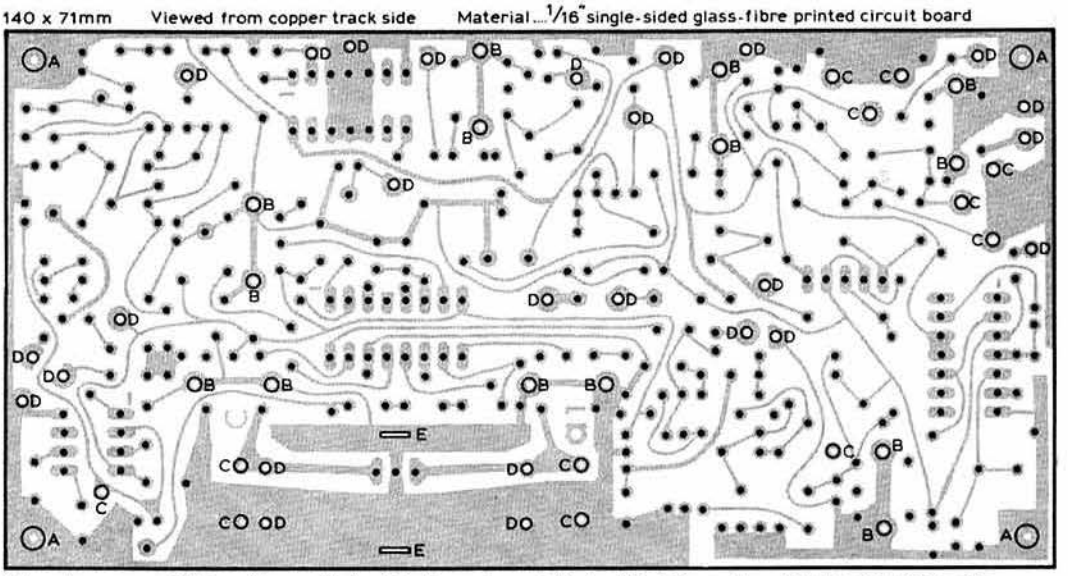


Fig 4. PCB drilling plan

R23, 31, 32, 34 and 35. An ic socket is not used for the KB4412, as this could lead to instability.

General construction notes

For the beginner with little or no experience of printed circuit construction, this section is probably the most important and is therefore fairly comprehensive. Those with more experience can probably afford to ignore some of the following, but the general order of assembly should be followed.

A minimum toolkit for assembly should consist of a pair of small sidecutters, 22swg Multicore solder (18swg is not desirable for this type of work) and a good, clean, hot soldering iron with a tip size of 0·125in or less and preferably temperature controlled. All of these represent a good investment for future construction.

None of the components used is particularly sensitive to heat, or needs any special precautions, provided that soldering is completed in the minimum time required to achieve a satisfactory joint. Do not be afraid to resolder a joint if it does not look satisfactory. Special care should be taken to avoid solder bridges between tracks or ic pins. A solder sucker will clear these, or a lead pencil drawn between the offending tracks while the solder is molten will have the desired effect.

General comments: Resistors, diodes, transformers, ics and the preset variable resistors, unless otherwise indicated in the instructions, mount flat against the top surface of the pcb. Capacitors should mount as close as possible to the pcb surface but without deforming the leads at the body entry. Do not allow the components to stand more than 5mm from the pcb surface. Polystyrene capacitors should be mounted as close to the board surface as possible. Be careful to observe polarities and correct positioning of electrolytic and tantalum capacitors, and that ics are inserted correctly (see Fig 7 for component outlines if in doubt).

Order of construction

1. Check the track side of the pcb for any solder bridges or "whiskers" from the roller tinning process (if the ready-made pcb is being used).

2. Insert the 22 connection pins at the positions indicated by the solid black circles. Each pin should be pushed in with the aid of a hard surface. Solder.

3. Insert and solder the three ic sockets (IC2, 3 and 4) and carefully press in the ics, ensuring correct orientation of the pin 1 identifier on each package. Initial insertion of these will help identify positions of the other components if a plain pcb is being used. Insert and solder IC1, ensuring correct orientation.

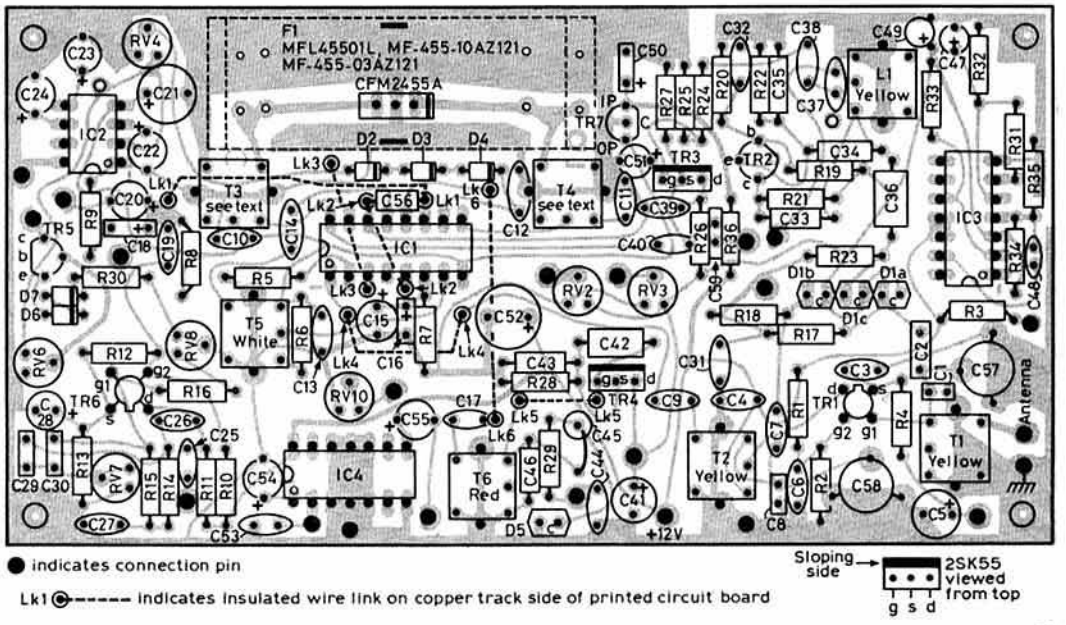


Fig 5. PCB component layout

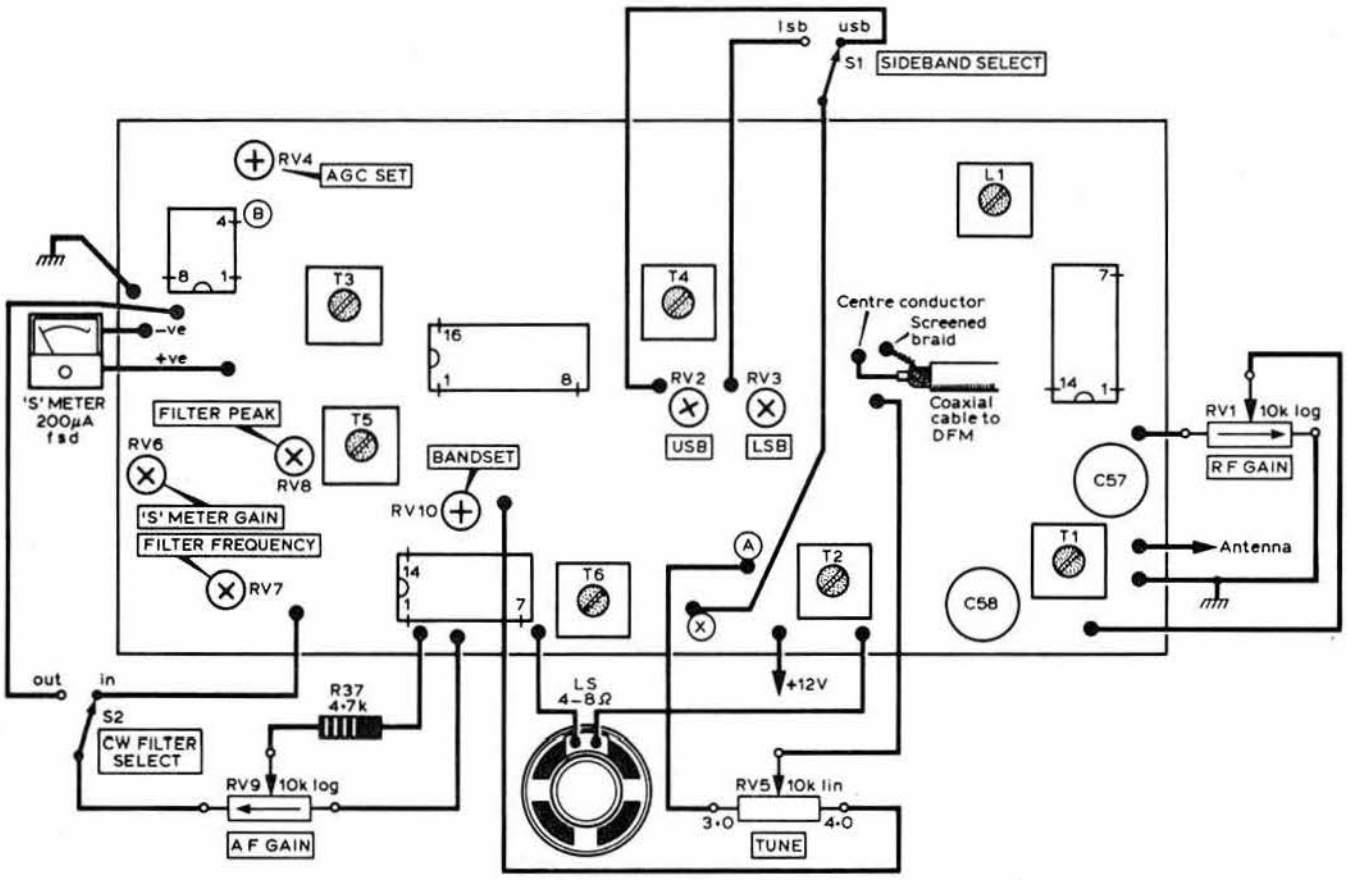
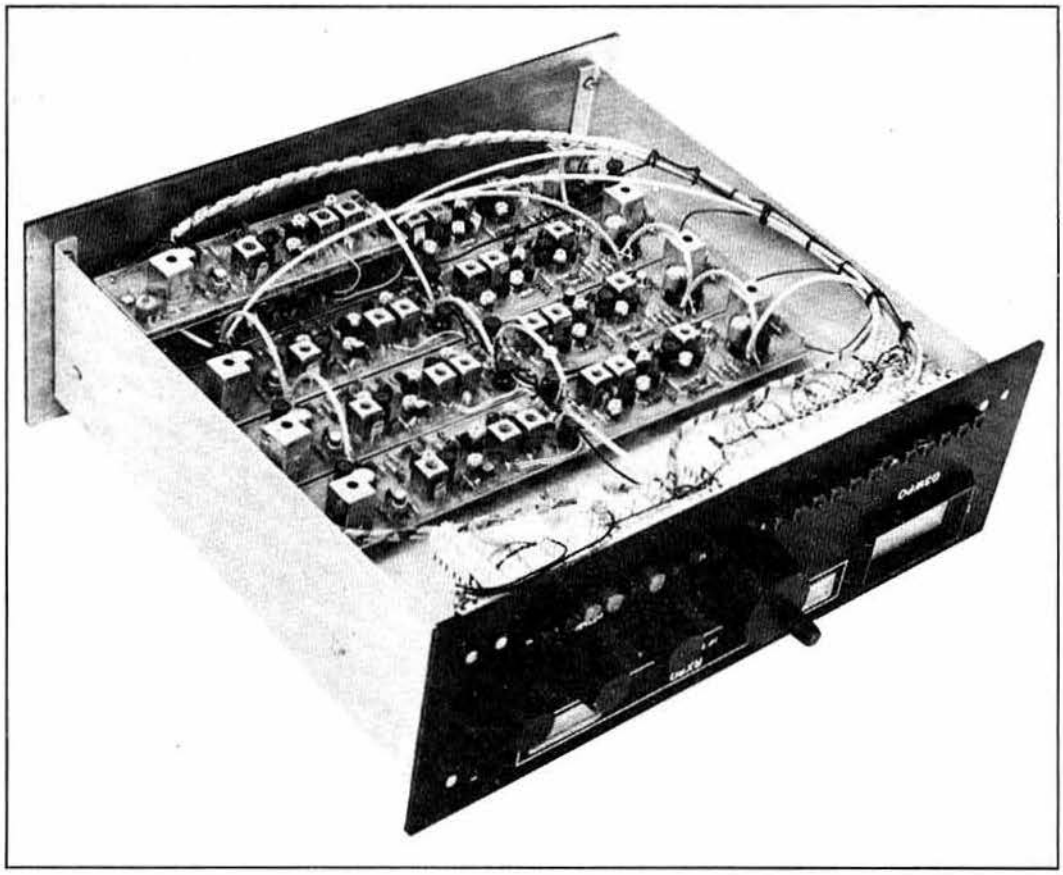


Fig 6. Wiring diagram



Underside view of the RX80

Components list

R1,3,12, 17,18,25, 29	100kΩ	
R2	47kΩ	
R4	180Ω	
R13,22	1kΩ	
R5	820Ω	
R6,16	10kΩ	
R7	3·9kΩ	
R8,37	4·7kΩ	
R9,11,19	6·8kΩ	
R10	1MΩ	
R14,15	220kΩ	
R20,21,28	1·5kΩ	
R23	100kΩ	metal oxide
R24	22kΩ	
R26	220Ω	
R27	330Ω	
R30	270Ω	
R31,32,34	3·9kΩ	metal oxide
R33	4·7Ω	
R35	2·7kΩ	metal oxide
R36	22Ω	
RV1,9	10kΩ	log track
RV2,3	100kΩ	cermet alps preset
RV4	10kΩ	Alps preset
RV5	10kΩ	linear track or multi turn
RV6,7,8	100kΩ	Alps preset
RV10	4·7Ω	cermet alps preset

All fixed resistors are 0·25W 5% carbon film types unless otherwise stated.

L1	KANK 3334R (Toko-yellow)
T1,2	154FN 8A 6439 (Toko-yellow)
T3,4	Varies - for CFM2455A = YHCS1A 590R (white) for other filters see data sheets
T5	YHCS1A590R (Toko-white)
T6	KANK3333R (Toko-red)
F1	CFM2455A (4kHz basic filter (Toko)) MFL45501L (ssb Toko) MF-455-10AZ121 (ssb (Kokusai)) MF-455-03AZ121 (cw (Kokusai))
S1,2	SPCO miniature toggle
M1	200μA fsd
Optional	Digital lcd frequency display type DFM7B

C1,8	220pF	ceramic
C2,7	1,000pF	ceramic
C3,4,6,9, 10,11,12. 14,17,39, 40,44	0·01μF	disc ceramic
C5,16,28 41	10μF	tantalum 16V min
C13,19, 25,26,53, 56	0·05μF	disc ceramic
C15,50	0·1μF	tantalum 16V min
C18	1·0μF	tantalum 16V min
C20	2·2μF	tantalum 16V min
C21	220μF	electrolytic 10V min
C22,24	100μF	tantalum 10V min
C23,55	47μF	tantalum 10V min
C27	0·002μF	disc ceramic
C29,30,43	1,000pF	polystyrene 50V
C31,32,38	0·01μF	mylar
C33	220pF	polystyrene 50V
C34,35,42	680pF	polystyrene 50V
C36	1,500pF	polystyrene 50V
C37	56pF	N150 ceramic (Mullard) (Orange tip)
C45	330pF	polystyrene 50V
C46	2,200pF	polystyrene 50V
C47,49,54	4·7μF	tantalum 16V min
C48	100pF	ceramic
C51	0·68μF	tantalum 16V min
C52	100μF	electrolytic 16V min
C59	47pF	ceramic
C57,58	5-60pF	film dielectric trimmer

Capacitors should preferably be 0·2in spacing types, and electrolytics pcb type

IC1	KB4412	(Toko)
IC2	SL1621C	(Plessey)
IC3	μA723	(various manufacturers)
IC4	LM380N	(National)
TR1,6	3SK51/3SK60/40673	
TR2	BF274	
TR3,4	2SK55/	BF256
TR5	BC237	
TR7	78L08	
D1	KV1225	(Toko)
D2,3,4, 6,7	1N4148	
D5	KV1215S	(Toko)

Miscellaneous
22 off 0·1in push-fit pcb connecting pins
Trimming tool for transformer cores
1 off 8-pin dil ic socket
2 off 14-pin dil socket

Toko components, Alps preset variable resistors and the filters are obtainable from Ambit International. The majority of the remainder of the components are obtainable from any of the component advertisers in this magazine.

In addition, a complete set of parts and a screened, drilled pcb are obtainable from Ambit International, including the trimming tool, connecting wire, S-meter and a choice of filters. An SAE is essential with all enquiries.

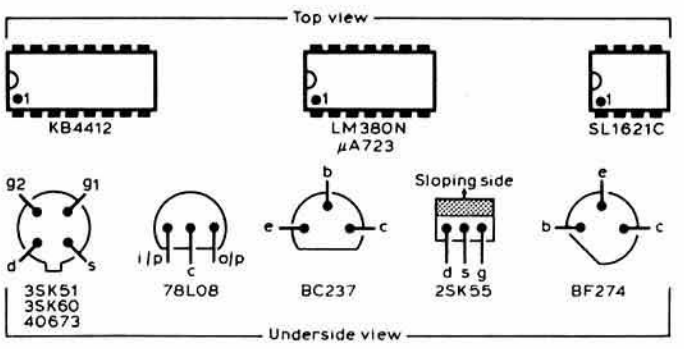


Fig 7. Component pin-outs

4. Insert all fixed resistors, taking care that R23 (100kΩ), R35 (2·7kΩ) and R31,32,34 (3·9kΩ) are metox types. These resistors have a different coding to carbon film, with an extra digit (100kΩ = BR, BLK, BR, OR; 2·7Ω = RD, VL, BLK, BR; 3·9kΩ = OR, WH, BLK, BR). Gentle bending of the leads close to the body will give the correct 10mm lead spacing for easy insertion into the pcb. Start at the top-left-hand corner of the pcb, working across and down, soldering each in turn. Do not bend the leads over against the track as this will make later removal of the component difficult, should this be necessary. Solder the two leads, then cut off the excess leads close to the joint. One resistor, R37, which is external to the board, will remain.

5. Insert and solder the following polystyrene capacitors flat against the pcb surface: C43 (1,000pF); C34, 35, 42 (680pF); C36 (1,500pF); C33 (220pF); C45 (330pF); C46, (2,200pF).

6. Insert and solder the remaining polystyrene capacitors (C29, 30, 1000pF) which mount vertically.

7. Insert and solder the triple KV1225 varicap diode package, with the side marked "225" facing T1 position.

8. Insert and solder the single KV1215 varicap diode (D5) with the side marked "215" facing the near edge of the pcb.

9. Insert and solder the 0·01μF ceramic capacitors C3, 4, 6, 9, 10, 11, 12, 14, 17, 39, 40, 44. Insert and solder the 0·01μF mylar (green) capacitors C31, 32, 38.

10. Insert and solder the 0·05μF ceramic capacitors C13, 19, 25, 26, 53, 56.

11. Insert and solder the remaining ceramic capacitors: C1, 8 (220pF); C2, 7 (1,000pF); C27 (0·002μF); C37 (56pF); C48 (100pF); C59 (47pF).

12. Insert and solder all the tantalum capacitors, taking care that the polarity is correct (+ on layout to match + on capacitor): C5, 16, 28, 41 (10μF); C15, 50 (0·1μF); C18 (1·0μF); C20 (2·2μF); C22, 24 (100μF); C47, 49, 54 (4·7μF); C23, 55 (47μF); C51 (0·68μF).

13. Insert and solder the two trimming capacitors C57 and C58.

14. Insert and solder whichever filter is to be used, ensuring the orientation is correct. The CFM2455A has a line on one end which faces T4—the other filters have orientation on their data sheets.

15. Insert and solder the 1N4148 diodes D2, 3, 4, 6, 7.

16. Insert and solder the preset variable resistors: RV2, 3, 6, 7, 8, (100kΩ); RV4 (10kΩ); RV10 (4·7kΩ) (coding 100kΩ = 104, 10kΩ = 103, 4·7kΩ = 472). The blue trimmers must be used for RV2, 3, (100kΩ) and RV10 (4·7kΩ).

17. Insert and solder the transistors. Use the case outlines to get the correct orientation. In the case of TR3, 4, the shaded half of the drawing is the sloping side.

18. Insert and solder T1 (large yellow core), T2 (large yellow core), L1 (small yellow core), T6 (dark red core) and T5 (white core). T3 and T4 depend on the filter selected. For the CFM2455A, T3 and 4 are YHCS1A590R (white core). For the other filters the correct transformers are supplied with the filter and the data sheet will indicate which is input and output (T3 is input, T4 output).

19. Insert and solder the two electrolytic capacitors (C21, 220μF and C52, 100μF) ensuring polarity is correct (invariably the negative side is marked rather than the positive!)

20. Using some thin insulated connecting wire, connect up the six links (indicated by dashed lines) on the *underside* of the pcb. Use the shortest route possible for each link, but position those under IC1 so that they do not foul its pin.

21. All components should now be on the board, with the exception of R37, 4·7kΩ.

22. The last chance to avoid an expensive error now occurs—**double check the positioning of all components**, especially the ics and semiconductors, and **carefully check the pcb tracks** for solder bridges and odd bits of wire against Fig 3. If not already done, trim off all the excess lead lengths.

At this point, if the constructor's workbench is anything like that of the author, remove all the bits of wire and solder blobs before alignment commences and one of the wires shorts out the 12V supply to the wrong place!

Alignment

It is possible to align the receiver without any test equipment, but the services of a multimeter and signal generator will be of great help.

First, make all the external connections to the pcb using insulated and, preferably, flexible connecting wire following Fig 6. If sufficient colours are available, colour code the connections to help locate the leads in their correct positions. The connections to and from the af amplifier do not need to be screened provided their length does not exceed 6in or so; however, the speaker leads should be run in screened cable. Do not apply any power yet. If available, connect a milliameter (200mA minimum) in

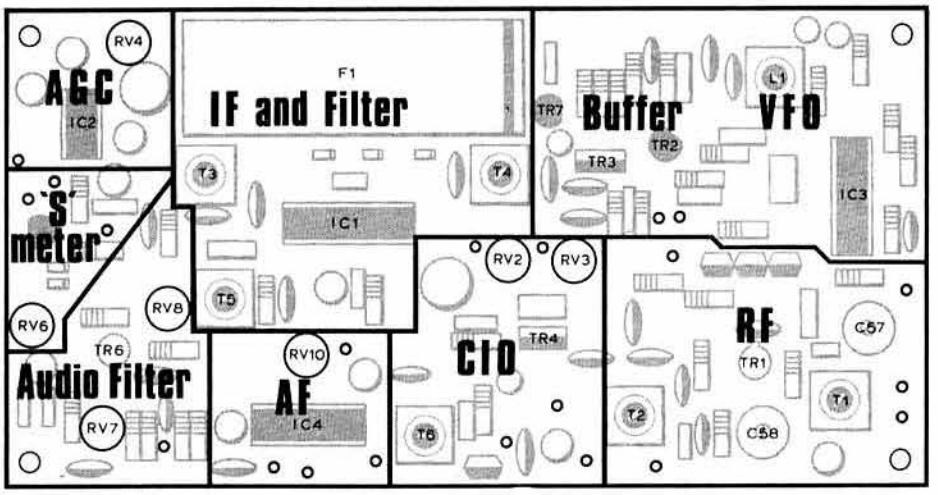


Fig 8. Plan layout of circuit functions

series with the +12V lead. Set the af filter to OUT and the sideband selection to LSB. Connect a temporary link across the break in the earth track running around the edge of the pcb, adjacent to C32.

Now follow these steps:

1. Preset transformer cores as follows (preferably using a proper flat-bladed trimming tool) starting with the tops of the cores flat against the top of the transformers:

L1	5·5 turns into former
T1	2 turns into former
T2	2 turns into former
T3	2 turns into former
T4	2 turns into former
T5	1·5 turns into former
T6	level with top of former

2. Preset potentiometers as follows:

RV1	fully clockwise (earthy end)
RV2	one-eighth turn clockwise
RV3	one-eighth turn clockwise
RV4	one-eighth turn clockwise
RV5	to voltage end of travel (anticlockwise)
RV6	fully clockwise
RV7	fully clockwise
RV8	fully clockwise
RV9	to earthy end of travel (anticlockwise)
RV10	fully anticlockwise

3. Preset C57 and C58 to half capacitance.

4. Apply +11 to 14V dc. Check that the power consumption does not exceed 80mA. If so, remove the power and look for a short circuit or a component mounted incorrectly.

5. Check that the voltage at point "A" (adjacent T2) is 9V±0·5V, and at point "B" (pin 4, IC2) 8V±0·5V. If these voltages are not met, remove the power and ascertain the cause before proceeding further.

6. Turn up the af gain (RV9) approximately a quarter turn.

7. Slowly screw in the core of T6 (dark red) with a trimming tool until the carrier insertion oscillator (cio) is heard to come into the passband of the filter, and adjust for a noise frequency of 1-2kHz for the moment. The trimming tool will affect the frequency slightly.

8. Peak T3, T4 and T5 for maximum noise.

9. Couple a signal generator at 2·990MHz to the antenna input and adjust the core of L1 until the signal is heard. This will need to be repeated a few times as the trimming tool markedly affects the vfo frequency. If the digital frequency meter accessory is being used, this can be employed to set the frequency accurately (display 2·990MHz). Alternatively, if neither is available, set RV5 to half travel and, with an antenna connected, find the lower end of the 3·5MHz amateur band and listen for cw signals, where the frequency will be between 3·5 and 3·60MHz. Another way is to find a strong commercial cw station on 3·650MHz, which sends regular machine-generated morse code every evening between about 1945 and 2200gmt.

Using one of these guides will give an approximate frequency setting which can be tidied up later. If this method is used, return RV5 to its original setting afterwards.

10. Reduce the output of the signal generator to a low level (reduce RV1 rf gain setting if required, or use a shorter antenna) until the signal is at a low level, and peak the cores of T1 and T2 for maximum signal strength. Repeak T3, T4 and T5.

11. Turn RV5 tuning control to the other end of its travel (around 4MHz) and peak a weak signal with C57 and C58 trimmers.

12. Retune RV5 to 3MHz and repeak T1 and T2 cores. Again retune to 4MHz and peak C57 and C58 again. This completes alignment of the tracking.

13. If a signal generator or dfm is available, set the upper end of the tuning range to 4·01MHz by adjusting RV10. This completes alignment of the frequency coverage.

14. Connect an antenna, turn RV1 fully clockwise (earthy end) and find an amateur ssb signal around 3·6-3·8MHz (these will be lower sideband transmissions, which are required at the moment). Once the signal has been found, alternately carefully adjust the tuning control (RV5) and the core of T6 for the most natural sounding voice characteristics.

15. To set the upper sideband position, select the other position of S1 and either (*a*) remove the antenna and turn the usb trimmer RV2 clockwise until the frequency of the noise has gone to a low pitch and is rising again—at this point turn S1 backwards and forwards, at the same time adjusting RV2 so that the noise is as near as possible the same pitch in both positions of the switch—or (*b*) tune RV5 around the coverage until an unintelligible ssb station is found (usually commercial ship-to-shore). This is, or should be, a usb transmission which can then be resolved using RV2 in the same manner as the lsb transmission.

16. The agc control RV4 should be advanced on a strong signal just enough to prevent overload and distortion. It will probably not need much adjustment from its original setting. If the setting is over-advanced, the agc action will be impaired with noticeable "pumping" effects on strong ssb and cw stations. If one is not used to this type of agc circuit, the action may seem strange at first (on cessation of a signal the agc stays at its most recent level for about 1s, and if the signal does not reappear within this time the agc voltage is immediately dropped to 0V and the receiver gain goes to maximum) but the system is very effective.

17. If the S-meter is connected adjust RV6 until the meter reads fsd on a strong signal. (A 200μA meter is preferred; meters up to 1mA fsd will work but will tend to read fsd on most signals.)

18. To adjust the audio filter, switch into circuit after finding a medium to weak-strength cw signal. RV7 controls the frequency at which the filter will peak signals, and RV8 the bandwidth of the filter. These should be adjusted to suit personal preference. Too much advancement of RV8 will cause the filter to start "ringing" and eventually to oscillate at the peaking frequency. The two controls interact to some extent during adjustment. If the basic 4kHz filter is being used it is possible to improve the selectivity to some extent on ssb by leaving the cw filter in circuit all the time but on a relatively wide bandwidth setting.

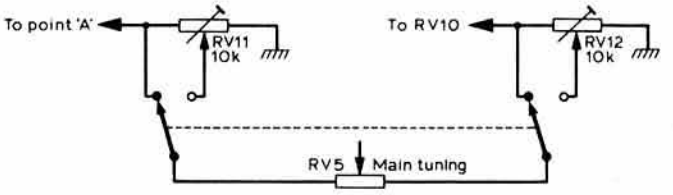


Fig 9. Range switching diagram

Table 1. Voltage check chart

Voltages measured with rf gain set at maximum – no signal input or af output and a 12V supply. All voltages measured with a high impedance dvm. If an instrument of 20kΩ/V or less is used, then some of the high impedance measurements will be reduced, especially the mosfet gate voltages.

PIN	IC1	IC2	IC3	IC4
1	2·9	1·0	0·1	6·3
2	0·1	0	9·0	0
3	0	0·9	8·9	0
4	4·8	7·9	3·6	0
5	0	1·0	3·6	0
6	0·7	0·5	7·3	0
7	7·9	0	0	0
8	7·9	0	0·1	5·4
9	2·1		2·3	0
10	0		8·9	0
11	5·1		12·0	0
12	5·7		12·0	0
13	3·5		10·3	0
14	0		0·1	12·0
15	7·9			
16	5·0			

Transistors	Base	Emit	Coll	Gate 1	Gate 2	Source	Drain
1				0	4·0	1·0	12·0
2	1·4	0·1	7·8				
3				0		0·5	8·5
4				0		1·1	8·9
5	0	0·1	7·8				
6				0	1·8	0·9	6·3

19. When the receiver is installed in a cabinet, remove the temporary earth link adjacent to C32, when the mounting screws will provide the necessary connections.

Problems

The receiver should now be fully functioning. If any problems are experienced, first look for shorted pcb tracks by comparing the reverse of the board with Fig 3. Reference to Table 1 will help locate possible faults in the semiconductors. Interchanged components may also lead to incorrect voltages being obtained.

Any power supply capable of delivering up to about 200mA (on audio peaks) at 11–14V dc will suffice to power the receiver. Although the circuit is relatively tolerant of supply voltage variations due to its on-board regulators, a simple stabilized supply is preferred, using, say, a 7812 (properly decoupled) regulator chip. An inadequately smoothed supply will result in hum modulation of the vfo, manifest as rough cw, or auroral sounding ssb, signals.

Should the rf amplifier tend to oscillate at full rf gain, a 0·01μF ceramic capacitor connected on the track side of the pcb between the source of TR1 (marked "S") and the nearest earth lug of the T1 will cure the problem.

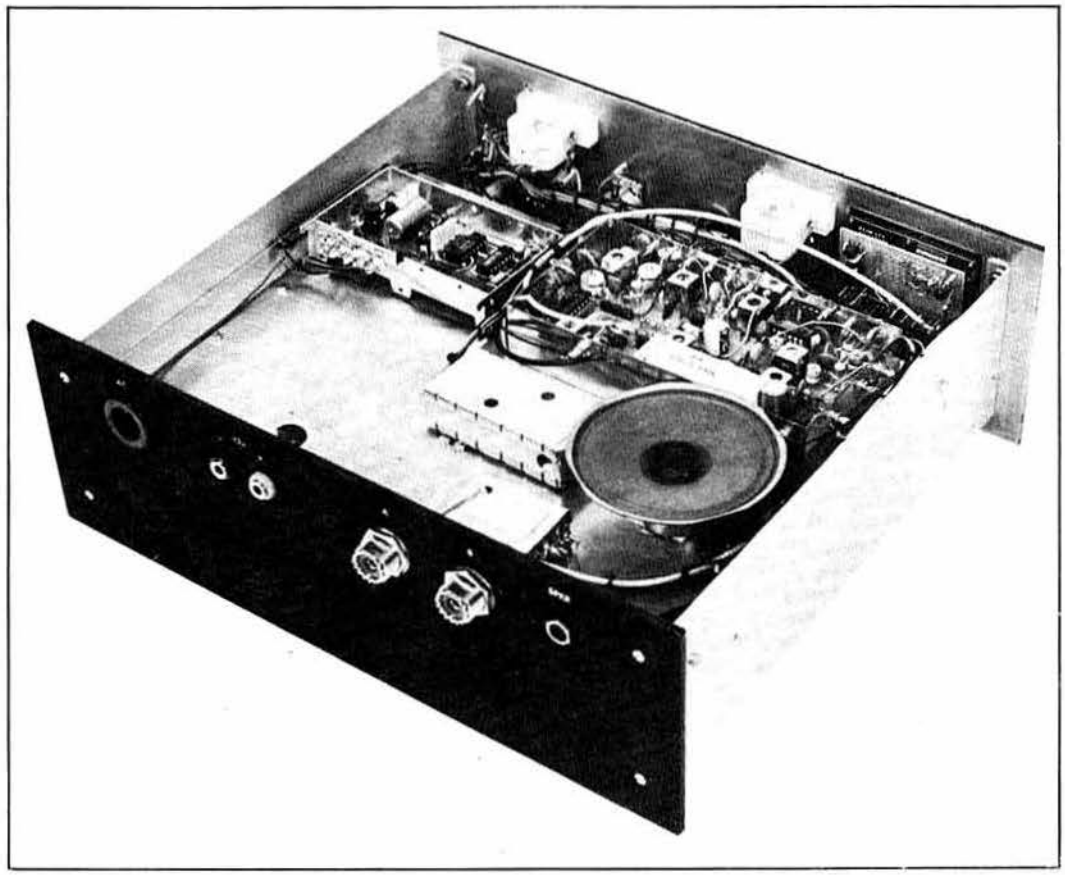
Any instability in the LM380N af amplifier can be removed by adding a Zobell network (0·1μF in series with 2·2Ω) between pins 8 and 12 on the track side of the pcb.

Housing the receiver

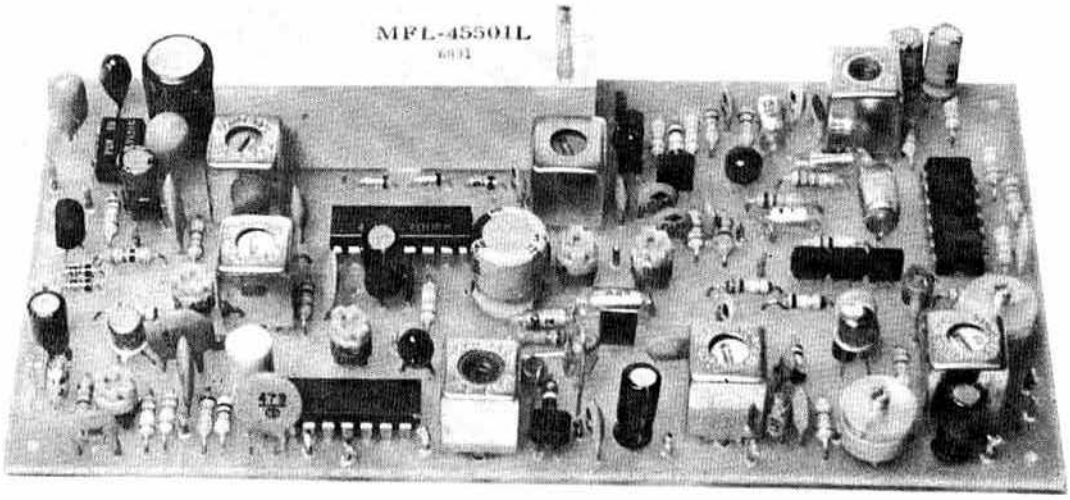
One of the joys of varicap diode tuning is that the constructor is not limited by placement of a mechanical vfo tuning capacitor. The tuning potentiometer, together with the dial, can be mounted anywhere convenient on the front panel. Concerning the dial, if a standard 270° potentiometer is being used, then some form of reduction drive will be required. The small 6:1 (or dual 36:6:1) types with the facilities for attaching a circular scale are suitable; constructors with more inventive minds can probably provide a slide-rule type scale. A more up-to-date method is to use a digital frequency display which will overcome problems of calibration and mechanics of mounting. A capacitive tap is provided from the vfo buffer for driving such a display. A small, pcb-mounted module with lcd display is obtainable for this receiver, and will give a frequency readout from 3·0 to 4·0MHz with 1kHz resolution. Full constructional details of the case illustrated will appear in Part 2, although any similar case could be used. If a mains power supply is used, this should be situated as far from the module as possible to prevent unwanted coupling and thermal effects.

Varying the receiver coverage

As it stands, the receiver covers 3·0–4·0MHz, plus at least a 10kHz overlap at each end of the scale. This is very useful with an hf bands converter as it enables coverage of 28–30MHz in two bands, which itself facilitates coverage of the 144 and 432MHz amateur bands with additional converters. However, there are cases where a reduced coverage would be useful, say 3·5–3·8MHz for the UK 3·5MHz amateur band, or, with a



Top rear view of the receiver showing the main RX80 module behind the speaker, with the huff and puff stabilizer to its left. At the side of the speaker is the fm i.f., and the rf attenuator can just be seen in front of it



The receiver board, top view

converter, 29·3-29·5MHz for the various Oscar satellites. One of the other joys of varicap tuning is that with the aid of a switch and two preset variable resistors (either standard type or multiturn) any coverage can be obtained, with instant switchback to the full 1MHz span. Fig 9 gives the circuit with RV11 setting the low end and RV12 the upper end of the bandspread range. This idea could be extended to use a multiway switch for various bandspread ranges—more details in subsequent parts. One word of caution—the switch and presets used have a direct bearing on the vfo frequency stability, so use only good quality components (cermet trimmers if possible).

Acknowledgements

The author would like to thank Roy Stevens, G2BVN, for help and advice with the article, and William Poel and Steve Taylor, of Ambit International, for assistance with the Mk2 version of the receiver.

Grateful acknowledgement is also made to Roger Parker, G8SUU, who supplied the photographs on the front cover and pages 36 and 39, and to Frank Harrop, G3VDL, for the photograph on this page.

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TO BE CONTINUED

OSCAR NEWS

Ariane LO2 launch

The failure of the Ariane LO2 launch on 23 May 1980 was due to combustion instability at a high frequency (above 2,000Hz) that occurred on one of the four first-stage engines 5·75s after ignition. This extremely violent phenomenon, lasting 0·3s, abruptly altered the characteristics of the injector, whose degradation led to the destruction of the engine at Ho + 64s. The fire which then broke out in the propulsion bay caused the vehicle to be destroyed 108s after lift-off.

Much meticulous work was needed to narrow down the range of hypotheses and finally to reproduce on the test-stand the behaviour of the faulty engine. This involved analysing the telemetry recordings, inspecting the damaged hardware recovered from the sea, static firings of engines, acoustic simulation and an investigation of manufacturing and inspection processes. In particular, it has been proved that the cause of the engine failure could not have been external to the engine itself, and the hypothesis of the presence at ignition of a foreign body (eg an identification tag or filings) has been eliminated. Furthermore the interaction of acoustic effects between the vehicle and the ground during lift-off was slight, being comparable to that observed during the ground qualification tests.

Work by SEP, ONERA, SNIAS and CNES specialists has led to the conclusion that the high-frequency combustion instability of engine "D" was caused by a dispersion of the characteristics of the system for injecting fuel into the combustion chamber. This dispersion most probably resulted from slight variations in the manufacture of successive units with respect to certain geometrical characteristics, whose sensitivity did not come to light in the numerous development tests (nearly 200) of the engines, for which, in the light of the results obtained, it had not been considered necessary to impose stricter manufacturing tolerances. A prolonged effort of research into some 30 groups of parameters on each injector and correlation with the development tests did indeed reveal the influence of the suspect characteristics.

In order to solve this problem, ESA and CNES have jointly decided, at the suggestion of SEP and with the agreement of a review group made up of experts independent of the project, to adjust the manufacturing tolerances for the injectors and to select the latter by means of static firings on the engine test-stand. Provided that the tests scheduled are satisfactory, this programme should enable the Ariane LO3 vehicle to be equipped with injectors thus selected, and create the right technical conditions for a launch in the second fortnight of March 1981.

Accordingly, the fourth and last test flight would be scheduled for June 1981, leading to a first operational launch in October, which would therefore not affect the subsequent operational programme.

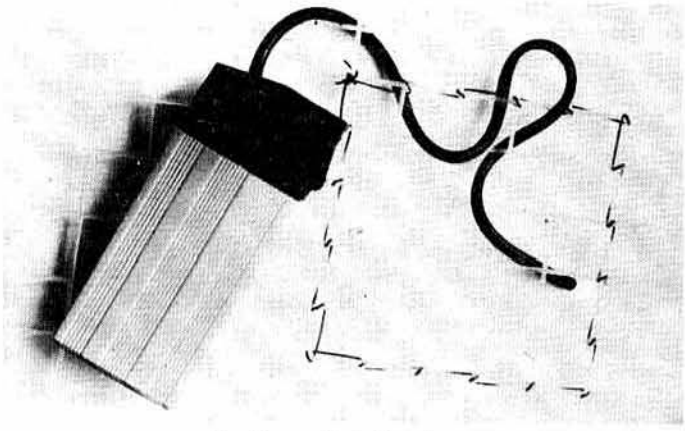
The Best of Oscar

The Best of Oscar has been published by AMSAT-UK price £1.25 plus 27p for p&p. Volume 1, comprising 60 pages in A5 format, contains articles and data from back issues of *Oscar News*, the quarterly journal of AMSAT-UK, obtainable from R. J. C. Broadbent, G3AAJ, secretary, AMSAT-UK, 94 Herongate Road, Wanstead Park, London E12 5EQ. Please make remittances payable to AMSAT-UK.

NEW PRODUCTS

Fibre-optic light probe

Edward Fletcher and Partners announce a new, British-made, light probe. Comprising a small hand-held torch and a 229mm long, 3mm diameter, flexible fibre-optic light guide, the light probe can be used for illumination and inspection in inaccessible areas, or wherever a direct light source will not penetrate. By using fibre optics, the light from the torch is transmitted along the fibres and can be "bent" round corners as required. If necessary, the fibre-optic light guide can be detached and the torch used in the conventional manner. A small magnet can be attached to the end of the light guide for retrieval of metal objects in hard-to-reach places.



The fibre-optic light probe

The price of the light probe is £1.99 incl p&p and VAT. Batteries—two HP7 type—are not included. The light probe is only available from the manufacturers: Edward Fletcher & Partners, 25 West Park Road, Kew, Richmond, Surrey TW9 4DB.

Thandar TM353 bench/portable dmm

The TM353 3·5 digit lcd multimeter is the latest addition to the Thandar range of low-cost, portable test instruments. Of all-British design and manufacture, the TM353 uses lcd and low power lsi circuitry, giving over 3,000 hours battery life. The TM353 has a full measurement capability of ac and dc volts, ac and dc current, resistance and diode check, which permits measurement of voltages from 100μV to 1,000V (750V ac), current from 100mA to 2A, and resistance from 1Ω to 20mΩ. The basic accuracy of the TM353 is within 0·25 per cent.

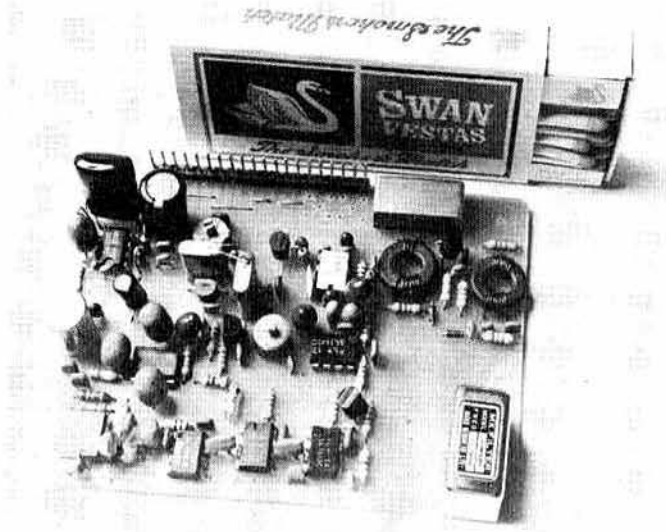
The Thandar TM353 dmm

Supplied complete with test lead set and alkaline batteries, and a full one-year warranty, the TM353 costs £84 plus VAT. For further information contact: Sinclair Electronics Ltd, London Road, St Ives, Huntingdon, Cambs PE17 4HJ. Tel 0480 64646.

Ambit transceiver building block

Ambit's 91600 receiver is based on an SL1600 series Plessey application design modified to accept an eight-pole 10·7MHz ssb crystal filter, to enable the frequency offset of the system to be used with the Ambit DFM7 lcd frequency readout module for 1kHz resolution in the hf bands.

By using the correct first mixer, the range 10 to 100kHz may be spanned—although for most users the standard 1–500MHz range is quite sufficient. The unit provides approximately 10mW of ssb in transmit mode, and a complete ssb receiver with 1W output stage. An external local oscillator and bandpass filter/preselector is required to cover the frequency band desired—full usb/lsb switching is provided on the board. Priced around £40 (in kit form), the 91600 offers a versatile basis for ssb transmit/receive systems for hf to uhf. Further information from Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG. Tel 0277 230909.

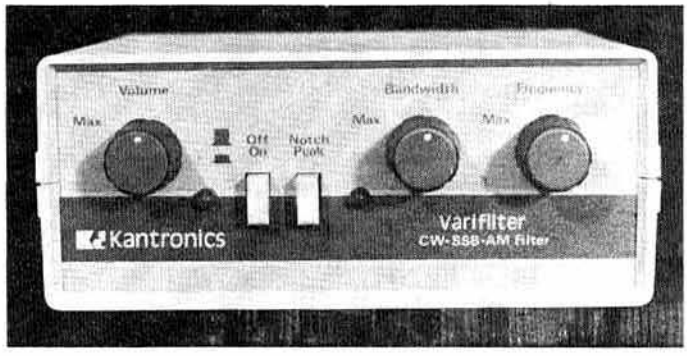


The Ambit transceiver building block

Kantronics Varifilter

A feature of the Kantronics Varifilter™, a new addition to the "family-design line" of products, is that the frequency and bandwidth can be varied. The instrument can be set to maximize one signal (peaking) or to minimize an interfering signal (notching), and it works with cw, ssb and a.m. signals. The circuitry is designed to provide optimum results without ringing, oscillating or instability.

The bandwidth is variable from less than 30Hz to over 1,000Hz, and the frequency range runs from less than 150 to over 3,000Hz. Once it has been set, the bandwidth will remain constant regardless of changes in the frequency range setting. This feature has not been readily available in variable filters until now.



The Kantronics Varifilter

The Varifilter has its own internal power supply which is switchable from 115V to 230V ac; it is also able to run from 12 to 18V dc. Each unit has a tuning eye to indicate when the required signal has been filtered.

A full-year warranty backs the Varifilter, and it is available from Kantronics dealers and from the factory, Kantronics, Inc, 1202E 23rd Street, Lawrence, KS 66044, USA. The suggested retail price $139.95.

TECHNICAL TOPICS

Pat Hawker, G3VA

"PROGRESS means deterioration" was a dictum of the late Patrick Hutber. *The Perpetual Pessimist* has it that "What we call progress is the exchange of one nuisance for another nuisance". More hopefully Herbert Spencer believed "Progress is not an accident but a necessity".

Anyone who writes a column that from time to time casts a critical eye on technical progress has to balance carefully optimistic and pessimistic views on the ways in which our equipment is developing. If he leans even slightly too far towards the view that everything new is not necessarily better (or to the long-term benefit of the hobby) he is in danger of being mistaken for the character that, 2,000 years ago, Horace described as "Testy, querulous and given to praising the way things were when he was a boy". It is indeed a tight rope which we have to walk!

Microcomputing

Recently, for the new seventh edition of *Amateur Radio Techniques (ART7)*, I put together a "Quick Guide to Microprocessors" attempting in about 4,000 words to outline the basic purposes and developing role of the microprocessor (μp or mpu) and microcomputer, as applied to amateur radio, and to provide some information on how these fiendishly-clever devices work, together with an introductory guide to the terminology of the digital technologies. A few of the points made in those pages are regurgitated this month to serve as a preface to some recent ideas on using microprocessors in hf transceivers and swr meters.

In essence, the development of large scale integration (lsi) whereby very large numbers of circuit elements can be formed on a single silicon chip has made possible a dramatic and far-reaching reduction in the size and cost of miniature multifunction computers. These can equal in computing power and flexibility many of the early giant computers which were built about 25 years ago and introduced us to the concept of the so-called "electronic brain" and "intelligent machine".

A microcomputer can be considered as consisting of a central processing unit, comprising a logic control unit and an arithmetic logic unit (Fig 1(a)), with an associated "memory" and various input and output devices. A microprocessor can now be a single ic capable of providing a complete central processor unit including the arithmetic function, and able to select and read instructions from the data store or from input devices. It can then carry out these instructions by electronic digital computation, and control the flow of data to output devices or return data to associated external stores. The μp may work entirely under a system of *wired logic* and real-time data without an additional memory store; however, when associated with a significant amount of electronic storage it becomes a more flexible, general-purpose computing system capable of acting under a variety of stored programs (ie *software* stored in the memory) and with buffers and input/output devices. It then becomes a *microcomputer*, and today it is possible to incorporate sufficient memory within a μp chip for this to be regarded as a microcomputer, although it is more common for the memory to take the form of additional devices. Fig 1(b) shows a typical μp system.

It will be appreciated that any digital computer is basically a machine which will perform a series of mathematical or selective operations at high speed under the control of a set of instructions that can be changed by the user (unless in the form of wired logic). To carry out an operation, the instructions are written as a logical sequence of commands (programming). Very high computing speeds are possible because once the system has been given the necessary instructions, these can be obeyed without further action by the user: in other words, repetitive mathematical processes do not require separate instructions. The computer itself makes the decision when it can proceed to the next step in the calculation (hence the term *intelligent* machine).

Using a μp together with associated input and output devices, it is possible to design systems which can code or decode signals automatically (morse, teleprinter, ASCII etc) or convert from one code into another. This can already be seen in such applications as receiving cw, rtty and data signals, and displaying the messages on a tv screen as conventional alphanumeric characters; or a receiver can be programmed to scan required channels or frequencies, or the manual tuning rate can be varied; specific frequencies or channels can be memorized so that a receiver can retune to them automatically; it can be arranged so that when the frequency is changed, for example, the correct bandwidth and mode is selected; it is also possible, as can be seen in a number of recent vhf equipments, to carry out channel selection, scanning etc by means of a keypad rather than conventional control knobs.

Microcomputer systems could, if required, go far beyond the applications mentioned above (all of which can be found already in some amateur or professional equipment). A receiver can be programmed to take action on receipt of the user's callsign (ie selective calling), so that an rtty terminal can be unattended yet print out only messages intended for the station; it would be possible to arrange for automatic logging of contacts, production of QSL cards, rotating a beam antenna to a direction suitable for the prefix of the incoming signal, etc.

But it should be recognized (although marketing pressures may well blur the issue) that the human brain remains (at present) even more flexible and adaptable than the μp, though more prone to make errors when tired—and far better at processes involving "pattern recognition". There is—or at least so it seems to me—a stage beyond which "automation" of an amateur station becomes pointless, since much of the enjoyment of amateur radio operating surely stems from the development of human rather than machine skills. It is my feeling that the true role of the μp in our hobby is for computer-assisted and not fully computer-controlled systems.

The microprocessed transceiver

The above notes may serve as an introduction to an article "The μp: the key to an advanced frequency-sythesized hf ssb amateur radio transceiver" by Robert Groh of Heath Zenith (*IEEE Transactions on Consumer-Electronics*, Vol CE-26, August 1980, pp 234–46). This paper provides background notes to the design philosophy in what would appear to have been a prototype successor to the Heath SB104 transceiver, although at the time these notes are being written the design may still be in the final development stage.

The author points out that "Today's customer demands for more value (as measured by performance, operating ease, cost etc) are being met by the increasing use of microprocessors. Frequently the μp not only proves to be essential to the achievement of product design objectives from a marketing standpoint but also gives the engineer several advantages . . ." Cynical readers may interpret this as meaning that because customers are coming to expect to see the word "microprocessor" in product advertising, the designer has no alternative but to try to provide some actual advantages in using one! However, Robert Groh attempts to deal with this

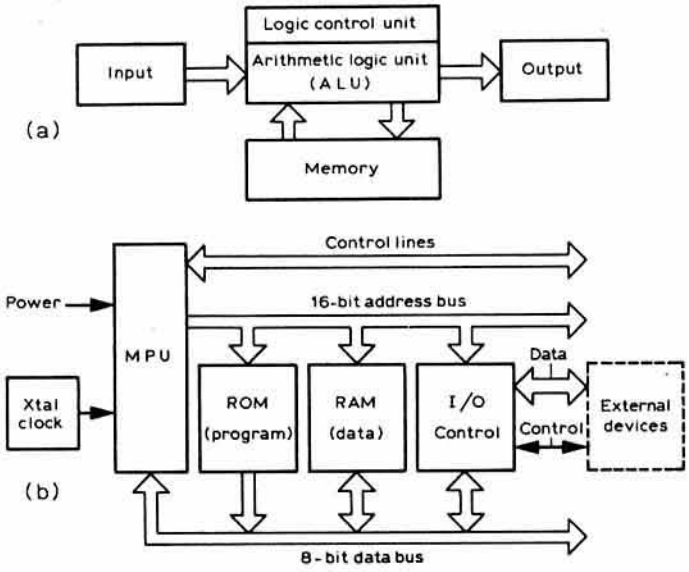


Fig 1. (a) Basic arrangement of a digital computer. The arithmetic logic unit and logic control unit (together with limited internal memory) form the central processing unit and can comprise a single microprocessor ic. (b) Standard form of microprocessor system with both read-only (rom) and random-access (ram) memories

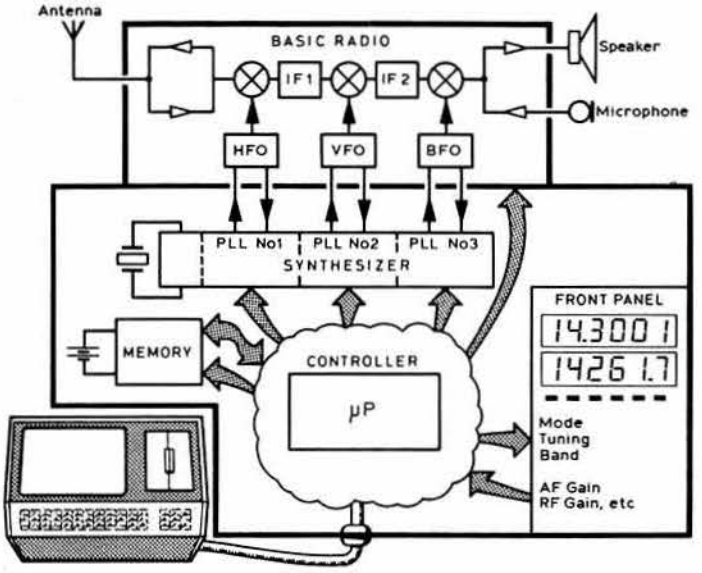


Fig 2. System block diagram of microprocessor-based hf ssb transceiver with full frequency synthesis, dual six-digit display plus memory for simplex and split operation, internal error checking and some capability of interfacing with a computer or terminal

criticism by listing areas where the μp *can* provide advantages:

(1) An enhanced ability to deal with "change". Change in product definition or changes caused by design errors/oversights found during the development cycle (an example could be the incorporation of new bands etc).
(2) A more cost-effective design—frequently with fewer parts.
(3) Fewer design constraints between submodules due to the integrating capability of a μp.

Some disadvantages are also admitted, such as the need for designers to learn to use a new part/process with its attendant learning curve, and the need for proper tools and resources. My personal worry is that in some cases the wish to use a microprocessor appears to have taken priority over the wish to improve the basic specification of the equipment in such areas as signal handling, intermodulation, spurii, hum reduction etc.

It has been said of engineering that amateurs built the *Ark*, professionals the *Titanic*, and that if you are going to make a mistake then you should make a nice, new original one. Designers seek an ideal world, a sort of mathematician's paradise where everything happens as it does in textbooks. This is perhaps an unduly harsh view of some current equipment designs where users are reporting that, for all the convenience of operation, when it comes down to practical communication there was a lot to be said for some of the old designs.

But at least it would seem from Robert Groh that the flexibility of the μp will allow designers to overcome mistakes without imposing the need to go right back to the drawing board. And I must emphasize that my criticisms are not intended to apply to this particular design.

Fig 2 shows the system block diagram of an hf ssb transceiver built around a μp and designed to provide "a superior level of operating power, ease and flexibility" with full digital frequency synthesis; dual six-digit frequency displays plus memory for simplex and split operation; internal limits on allowable transmit frequencies; a degree of error checking for proper circuit operation with "out of lock" displays etc; and some capability of interfacing with an external computer or terminal. The frequency synthesizer has three digital phase lock loops for hfo, vfo and bfo.

The ability to cope with changes such as extra band allocations was seen as a valuable advantage of the μp approach. The article discusses choice of μp from the available 6800, 8080A, Z80, 3870 and F8 devices; in practice for this design the older multichip F8 family was adopted.

Microprocessor swr meter

In a final "blue sky" section of his paper, Robert Groh considers some other ways in which the μp may soon influence equipment design. Potentially one of the most useful would appear to be an rf power/vswr meter of the general form indicated in Fig 3. This is described by the author as follows:

"The rf sensing head outputs two small dc voltages (derived via diode detectors from the rf voltage and current on the transmission line) which

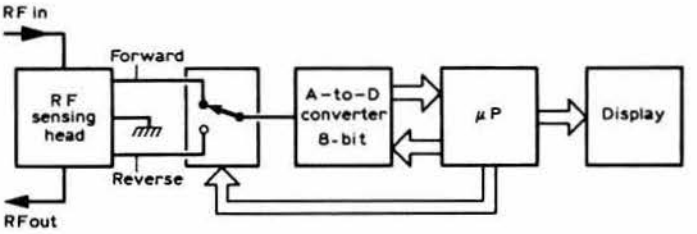


Fig 3. Digital rf power/vswr indicator with digital ±3 per cent accuracy, autoranging, ability to measure peak or average power, true vswr and power

represents the forward and reverse power flow in the transmission line as the sum of the voltage and current on that line. This voltage is then displayed on a dc meter as either power or as standing wave ratio. The problems arise because the desired quantities (power and swr) are not expressed as sums but as products and quotients. That is, power is the product of the voltage and current and swr is the quotient of the sum and difference of the forward and reverse power. Normally the multiplication is handled simply by the proper non-linear scale on the meter, and swr is handled via the internal arrangement of the sensor head, a front panel operator adjustment on the meter (which must be made every time the power changes) and a suitably-calibrated (non-linear) meter scale. All of this plus the nominal two per cent accuracy of the meter mean relatively poor accuracy and considerable operator inconvenience.

"On the other hand, with the use of the μp we could actually *calculate* both the power and the swr and display the result digitally. The performance and operating advantages for the operator would be substantial:
(*a*) digital readout with one per cent plus sensing head accuracy;
(*b*) no operator controls needed for vswr or power level;
(*c*) fast response time;
(*d*) choice of peak or average power readings;
(*e*) use of more than one rf sensing head with automatic selection of activated unit."

Battery-saving for the pll filter etc

Jan Martin Noeding, LA8AK, notes that while the type of single-ended af amplifier used in the ZL1AN pll cw filter (*TT* November 1980, pp1154-5) and found also in many receiver accessories—including sidetone units—is satisfactory when used in conjunction with mains power supply units, for batteries it represents an excessive drain.

A very useful degree of battery economy can be achieved in many similar applications with the form of af cmos circuitry shown in Fig 4 as applied to the ZL1AN filter (*Philips Data Handbook: Signetics integrated circuits*, 1976). He has tested this arrangement for several applications and finds it capable of delivering a considerable volume of sound to a 250Ω moving coil loudspeaker (possibly not suitable for low-impedance speakers unless a transformer is used).

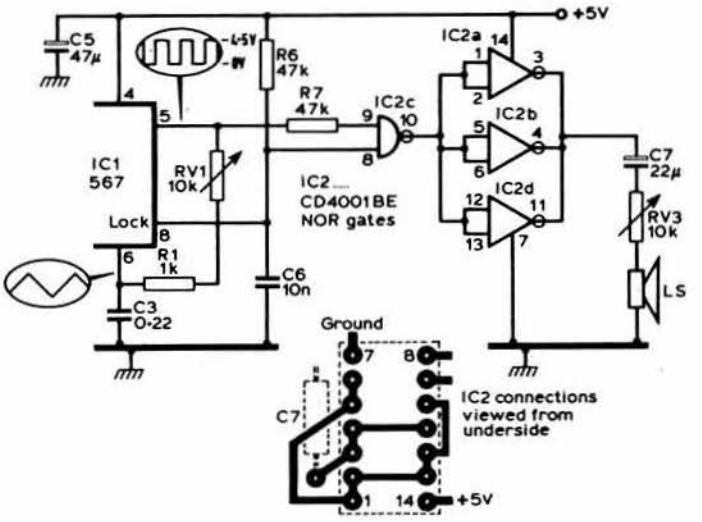


Fig 4. Battery-saving audio amplifier circuit as applied to the ZL1AN pll cw filter, but equally suitable for other similar applications

LA8AK also comments that since the current to the NE567 pll device will vary between 6 and 11mA, some further power may be saved by using an emitter-follower regulator instead of the simple zener diode arrangement as used by ZL1AN. These modifications, of course, would hardly be necessary where the unit is fed from a mains psu.

Chip capacitors

In my survey of the various main types of fixed capacitors in the October *TT*, I made no mention of a rather special type that is becoming valuable at uhf and vhf, the "lead-less" or "chip" capacitors which are very suitable, for example, for by-passing and similar applications in strip-line and other forms of construction, where it is possible to take advantage of the absence of any unwanted lead inductance that cannot be avoided in many other forms of conventional capacitors.

Jan Martin Noeding, LA8AK, points out that although these chip capacitors are not always readily available from distributors, they are increasingly being sought after by vhf/uhf enthusiasts. In Norway the usual source is discarded and/or defective tv tuners, while in Holland, the Dutch society VERON (which runs a marketing service for specialized or hard-to-come-by components) has added this type of capacitor to its range.

He has found such capacitors in values from 5 to 1,000pF, although values are normally unmarked and often have to be ascertained with the aid of a capacitance meter. Values between 220 and 1,000pF are of most interest at vhf/uhf, and he notes that the 220pF capacitors tend to have higher voltage ratings than the 1,000pF types. Tolerance is wide, about ±30 per cent. LA8AK writes:

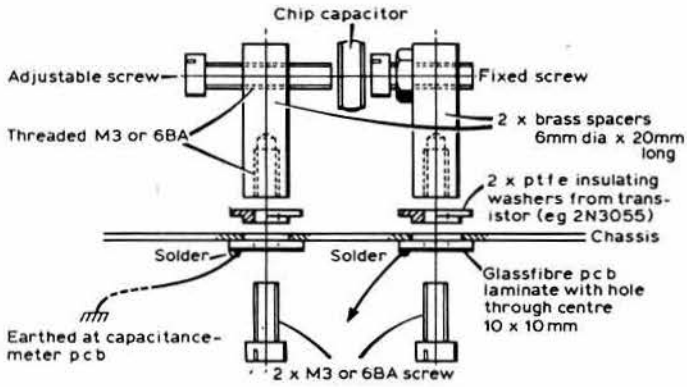


Fig 5. Homemade connector to facilitate measuring the values of "lead-less" chip capacitors, connected in parallel to an existing standard connector. Note this will add approximately 20pF additional capacitance to the meter, and this should be "neutralized" or otherwise taken into account

"When you are trying to measure the value of the capacitors it can prove a tedious procedure to solder leads to each component. Fig 5 shows an arrangement which I use with my capacitance meter (which is based on two NE555 devices). The fixed screw is attached to the hot-end terminal, and the variable screw to the cold-end. This prevents the instrument from peaking when the screws are tightened.

"Experience shows that only very little pressure is needed when tightening up the screws in order to get a reasonably accurate reading. The extra connector can add about 20pF capacitance to the instrument, and this has to be taken into account and suitably neutralized.

"With the aid of a pair of pliers to pick up and position the capacitors on the meter attachment, a whole batch can be checked in very little time."

Drift and the vfo

A few years ago many of us began to feel that the age-old problem of oscillator drift was at last being overcome. The keys to the solution appeared to be: (1) the much quicker reaching of thermal stability with a transistor compared with the long warm-up period of the thermionic valve; (2) the recognition by Peter Martin, G3PDM (many editions of *ART*) that taking very great care over the mechanical and thermal characteristics of all components, the use of ultra-sonic cleaning etc really paid dividends; and (3) the recognition that the noise sidebands of an oscillator can directly affect the performance of transceivers, and that fet devices are usually better in this respect than bipolars.

Nevertheless it is evident that in practice not every user is satisfied with the current standard of vfo stability of some modern equipment. Indeed vfo drift was listed as "worst feature" by about 13 per cent of the users of the Atlas mobile rig and "vfo drift/shift" given as a problem by seven out of 186 users of the FT101 transceivers in the recent *Ham Radio Horizons* surveys (though to complete the picture it should be added that 8·1 per cent of FT101 users gave "stability" as a best feature compared with 3·6 per cent who listed it as a worst feature).

In the December *TT* attention was drawn to the use of a length of miniature coaxial cable as the frequency determining element in a low-drift oscillator intended for use in conjunction with a counter and including a divide-by-10 arrangement.

However, there is another point that becomes important if any attempt is made to key a semiconductor oscillator (and which can be a problem in some other circumstances): compared with a thermionic valve, a transistor is more affected by current and temperature changes, while the internal capacitances change with any difference in bias and supply voltages/currents. It is for this reason that it is highly desirable to make the frequency depend as much as possible on the frequency control element, whether this is an LC circuit tuned by either variable C or variable L, or by a transmission line. In other words the frequency control should be isolated to the maximum possible extent from the device parameters. These points are well brought out in a long and comprehensive article "Variable-inductance variable frequency oscillators" by Richer Silberstein, W0YBF, in *Ham Radio* July 1980. W0YBF also points out that, despite the current availability of equipments based on frequency-synthesizers rather than vfos, there continues to be a need to develop oscillators that are "smaller, more economical and more stable" than in the past. His main objection to frequency synthesis as a complete solution is that this may result in a portable unit requiring over 1A from a 12V source even on "receive standby" (one could also point to problems of frequency jitter and noise when it is a question of high-performance equipment).

He advocates variable-inductance (ie permeability tuning) rather than variable capacitance for the following main reasons: (1) inexpensive variable capacitors can result in noise and frequency jitter when tuned; (2) even a good variable capacitor (when available in this modern age) may need to be large and heavy by present-day standards and is likely to be expensive; (3) a variable-inductance tuning system can be of low cost and lends itself to linear bandspread tuning; and (4) they can be used with the few backlash-free vernier dial drives still available (W0YBF mentions specifically Jackson Bros of the UK, although adding that some Japanese units are satisfactory).

Much of W0YBF's long article is taken up with describing various methods of constructing variable-inductance systems. However, among his other notes he makes the following points: (*a*) mosfet oscillators should preferably be based on gate-protected devices (eg 40673 or 3N211); (*b*) it is preferable to power a vfo from its own 9V battery rather than use elaborate voltage regulators with a single common power source (rf shielding is also improved by putting the battery in the shield box); (*c*) drain current should not exceed about 2mA, and can sometimes be lower provided that this does not result in a noisy or slow-starting oscillator; (*d*) for oscillator keying, low current is particularly desirable to minimize chirp due to transistor heating when the key is depressed (however, this

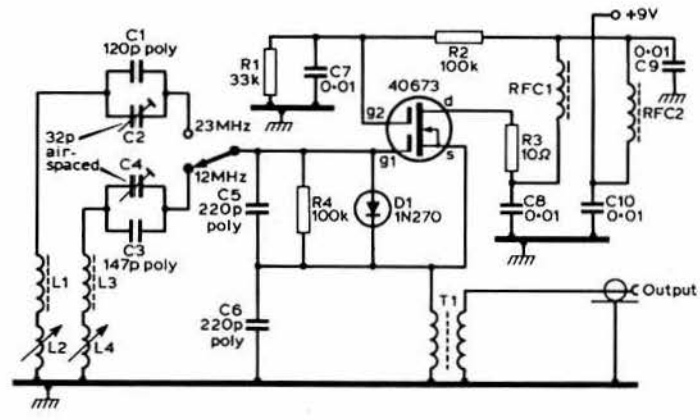


Fig 6. A couplet (variable inductance) tuned vfo operating on 12 and 23MHz for a 21 and 28MHz receiver with 9MHz i.f. L1 9½t No 18 (1mm) wire on T50-6 core; L2 1½t No 16 (1·3mm) wire close to couplet; L3 21t No 20 (0·8mm) wire on T50-6 core; L4 4½t No 18 (1mm) wire close to couplet. T1 primary 19½t No 30 (0·25mm) wire; secondary 4t No 24 (0·5mm) wire on FT37-63 form or equivalent. RFC 1,2: 23½t No 32 (0·2mm) wire on FT37-63 form or equivalent. Note that one form of tuning couplet took the form of a powdered-iron toroidal core placed opposite a brass slug (nut) and in the same plane. The whole couplet is rotated by a formica shaft so that the effect is similar to the old magic tuning wands in which an iron slug increases inductance while a brass slug decreases it (ie the toroid is either coupled closely to a stationary coil, increasing its inductance, or the brass nut decreases it)

may mean closer coupling of the transistor to the LC circuit which, as noted above, tends to be counter-productive); (*e*) a further problem with a keyed oscillator is that the time constant of the click filter can produce chirp due to transients; (*f*) powdered-iron toroid inductors, although usually better in this respect than ferrites, can still have an excessive temperature coefficient (W0YBF favours the air-cored toroid though even this is not without temperature problems); (*g*) he also favours small polystyrene fixed capacitors rather than attempting temperature-compensation using ceramic types; and (*h*) he notes that small variable capacitors can be affected by humidity in some circumstances.

Fig 6 shows a couplet-tuned vfo for a 21 and 14MHz receiver, although for full constructional details of the variable inductances (couplets) produced by W0YBF, reference should be made to the original article.

Getting ready for 10, 18 and 24MHz

The item from Bill Kitchen, G4GHB, on modifying the FT101 in readiness for transceive operation on 10MHz (*TT* November 1980, p1159) stirred up quite a lot of interest and some alternative suggestions. For example, M. J. Grierson, G3TSO, writes:

"I have completed a similar modification to my own FT101, enabling it to transmit in the 10MHz band, in what would seem to be an even simpler manner. No extra components are required, there are no holes to drill, and it does not affect the performance of the equipment on any of the other bands.

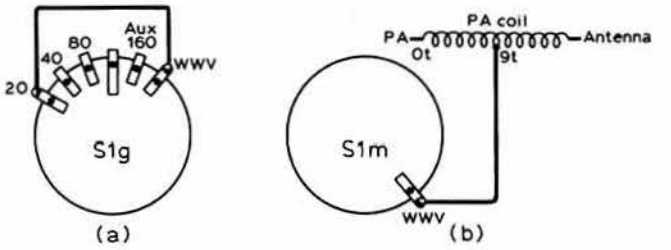


Fig 7. Modifications to S1g and S1m wafers of an FT101 to provide transmit operation on 10MHz

"My modification was based on a leaflet bearing the Yaesu stamp which initially was intended primarily to facilitate the addition of the 1·8MHz band to early FT101 models by using the 'auxiliary' switch position. Since I had already completed this modification, I used the information to adapt the 'WWV' band for transmit operation as follows:

"Remove base and lower cover of the pa compartment. Locate switch wafer S1g (seventh wafer from front) and then link the WWV position to the 14MHz position as shown in Fig 7 (a). This permits tuning of the driver anode, 4–5 on preselector. Then locate the S1m ceramic wafer at the rear of the switch. Link the WWV position to turn 9 on pa tank coil, measured from pa end (Fig 7 (b)). This permits final tuning.

"Use of the Yaesu operating manual will help in finding the correct switch wafers."

G3TSO adds: "Addition of either the 18 or 24·5MHz band could be achieved by using the "27MHz" switch position. Although I have not tried this myself the following details may act as a guide.

"For 18·0 to 18·5MHz tuning, a 24·02MHz crystal would be required. Locate S1e, S1c and S1g (5th, 3rd and 7th wafers from front). Cut link joining 27MHz positions to 28A, B, C and D position, link 27MHz position to 21MHz position on all three wafers. Then connect 20pF capacitor across TC20 on S1b. Locate S1m ceramic wafer, remove link to 27MHz position on pa tank coil and reconnect to turn 5 from the pa end.

"For 24·5 to 25MHz tuning, a 30·52MHz crystal would be required. It can then be expected that the 27MHz tuning range will cover this band without further modifications."

G3TSO also calls attention to the "very worthwhile" modification to the FT101 featured in *Rad Com* some time ago, consisting of replacing the existing receiver mixers with doubly-balanced types. He comments: "This modification can be done without surgery and greatly improves the receiver. I have found that very few amateurs are prepared even to consider carrying out this particular modification for fear of devaluing the equipment. The only comment I would make is that my modified Mk1 FT101 when placed alongside an FT101E appeared marginally better, and there is no difference between the FT101 and my new FT707. So much for progress!"

Exposure to rf—another dose

In November 1979 some of the controversy surrounding the question of safe levels for continuous exposure to non-ionizing radiation was described in *TT*, but different viewpoints are still emerging. From an article "Non-ionizing radiation—effects on humans and exposure limits" by M. Anderson of CBC, I notice that the "Health and Welfare Canada" standard limits long-term exposure to rf to power densities of 1mW/cm^2 (compared with the UK/USA standard of 10mW/cm^2) for frequencies in the range 10MHz to 1GHz, and 5mW/cm^2 for frequencies above this (curiously the citizens band lobby claims that frequencies around 900MHz are more harmful than at lower frequencies!). In Canada, time-limited exposure is also allowed at frequencies below 1GHz for power densities up to 25mW/cm^2. The limit for up to one hour is calculated from 60/Pmin where P is the power density in mW/cm^2. Curves of power absorption versus frequency for the average man, as published in the Canadian article, show a significant peak between about 60 and 100MHz (where the height of a man represents roughly a $\lambda/2$ dipole). Below about 40MHz absorption drops away fairly rapidly, though this is much less marked for frequencies above 100MHz.

The Canadian writer takes the view that "the only proven effect of non-ionizing radiation on the human body is heating". While this certainly remains true as far as most Western countries are concerned, some of the current research in the USA using small animals is apparently producing some rather curious and so far unexplained results. For example, if you dose a rat with dexadrine amphetamine while exposed to rf at power densities down to about 1mW/cm^2 it seems to increase the stimulating effect on the animal. There is also the theory, mentioned a few years ago in *TT*, that rf radiation may even have a prophylactic effect in respect of some diseases (quite apart from the conventional use of rf diathermy for internal heating). It is thus still a subject surrounded by mystery, but, in the meantime, the simple precautions outlined in November 1979 and included in the latest edition of *A Guide to Amateur Radio* should more than adequately provide full protection to you, your family and your neighbours.

Semi-break-in valve keyer

At the risk of raising some eyebrows, it seems worth including details of a keyer that was first described almost 20 years ago: "Another keying system", *CQ* June 1961, p59. But the author, old-timer Ed Mariner, W6XM, (former W6BLZ) still reckons it to be "the best method of semi-break-in keying that I have ever run across". He adds that a 6AS7 carries more current than a 6BX7, though it is thought that these are the only two low-perveance types suitable in this application.

The system (Fig 8) provides electronic keying of a power amplifier valve while also providing adjustable sequenced relay switching of the vfo, receiver muting, antenna switching etc as required. The basic idea is that the relay-controlled circuits remain "on" unless there is a distinct pause in the sending and with the transmit sequence initiated by depressing the key (this type of facility was used in the KW2000 series of hf transceivers). For

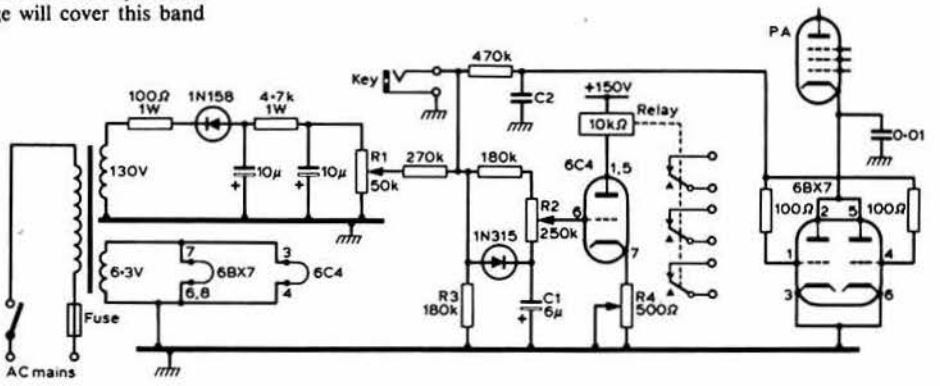


Fig 8. Delayed (semi) break-in keying system. C2 adjustable from 0·001 to 0·005μF to suit keying characteristics. Power transformer suitable for about 150V at 20mA. R1 500Ω 2W

spark suppression a 200Ω resistor in series with a 1μF capacitor may be connected across the key contacts. Operation was described as follows:

"When the key is depressed, several things happen. First, the blocking bias is removed from the control grids of the 6BX7. This voltage is from 90 to 100V as set by R1. The decay time of the 6BX7 grid voltage determines the keying characteristics and may be controlled by varying the value of C2. Second, the grid voltage on the 6C4 is removed when the key is depressed, causing the valve to conduct heavily, thus activating the relay. Control R1 should be adjusted initially so that the rated relay current flows under key-down conditions.

"The length of time the relay is held closed after the key is released is determined by C1, 6μF, and the setting of R2. Control R2 can be adjusted from a quite fast break-in to a 2s or so delay. Capacitor C1 discharges through the 1N315 diode and R3 only when the key is depressed. This path provides a short time-constant and therefore a rapid discharge occurs.

"When the key is released, C1 must recharge through R1, R2 and R3, and the long time-constant prevents the relay from being released too quickly. Just how quickly the relay drops out is determined by the setting of R2. The closer the arm of R2 is to C1 the longer it will hold in under key-up conditions."

At the time, W6XM wrote: "This sytem of keying solves all of the problems, and I feel it is much better than the heterodyne method with its complex mixing and the added possibility of improper tuning on spurious signals."

Four-transistor QRP transceiver

Although, as indicated in the December *TT*, a low-power single-band direct-conversion transceiver can be designed to provide all the facilities and much of the performance capabilities of its big brothers, there is still a lot of interest in seeing what can be done with extremely simple units. About eight years ago I drew attention to SM4BSN's "Optimist" fixed-channel hf transceiver which used just one transistor and one ic plus a few diodes to provide all the active devices. Now from Sweden also (Hans Lindstrom, SM6DWO, in the Swedish *QTC* Nr 9, 1980) comes another mini-rig: Fig 9. This uses two transistors as a two-stage crystal-controlled (or vxo) transmitter, which also fulfils the local oscillator requirement for the d-c receiver based on a homemade doubly-balanced quad mixer with a two-transistor af amplifier. The whole unit, including six 1·5V batteries, can be contained in a 120 by 65 by 40mm package. Despite the simplicity, SM6DWO reports that he has had some 100 contacts at distances up to 850km on 3·5MHz using a 42m long-wire antenna.

Microwaves and microphones

A visit to Plessey Research at Caswell, Towcester, provided a fascinating insight into current progress in the use of gallium arsenide (GaAs) and indium phosphide (InP) for the fabrication of microwave devices and for high speed logic and monolithic microwave analogue integrated circuits. While this work is aimed primarily at professional and military applications, there promises to be useful spin-off to amateurs; for instance in the series of Plessey GAT gasfets that are becoming widely recognized for moonbounce, etc. As G3YGF pointed out in *Rad Com* December 1980, the gasfet can be used either to provide extreme low noise or (with slightly higher noise figure) to provide a linear amplifier of wide dynamic range.

One aspect of the work at Caswell is the development of consumer-type receiver front-ends, in both discrete and integrated form, for 12GHz satellite broadcasting, so there is a real possibility that eventually volume production will bring down the cost of the devices (current low-noise gasfets tend to cost between about £20 and £50, or more). One gathers, however, that GaAs and InP are not easy materials to purify to the extent needed for semiconductor devices, so that it would be rash to forecast that they will ever become as cheap as some present-day silicon devices.

Latest in the GAT series is the GAT6, and this device has been used as a 12GHz rf amplifier to permit reception of the OTS satellite tv signals using a 1·2m dish antenna (G/T ratio 11·5dB) with a received s:n ratio better than 40dB.

On display at Caswell were power gasfet amplifiers providing 2W output with 4dB gain at 10GHz, and 5dB gain at 8GHz with 1W output, and broadband linear amplifiers covering 1 to 20GHz.

Millimetric wavelength devices included Gunn diode oscillators made in GaAs that provide some 250mW output at 40GHz and 10mW at 94GHz, with superior noise performance to the alternative Impatt diode approach. Avalanche devices made from silicon can now achieve 90mW output at 130GHz by using gold heat sinks. Pulsed Gunn oscillators using InP are achieving 15mW at 94GHz, and work is in progress to develop such devices for the 100–200GHz band.

To bring one's thoughts back rapidly from umpteen gigahertz right

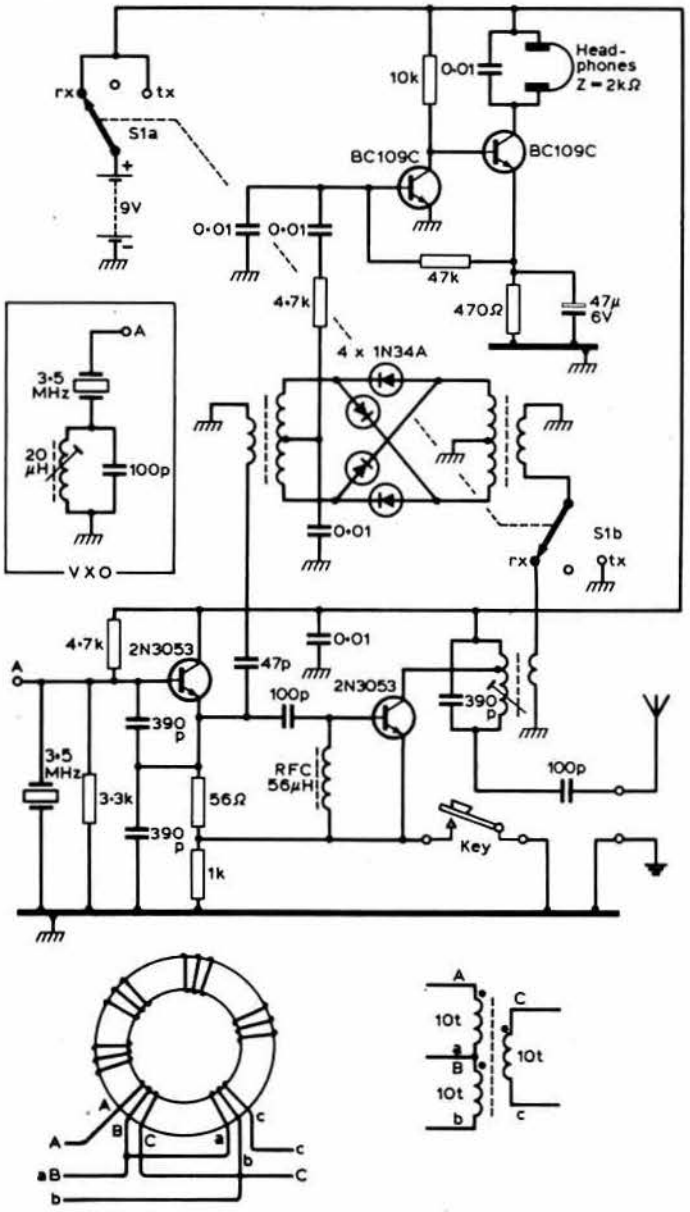


Fig 9. The SM6DWO four-transistor 3·5MHz transceiver. The pa tank coil is about 30t on 8mm diameter former and 20mm long, with collector tap at 5t with 4t link coupling coil

down to af, there is also interesting work at Caswell on piezoelectric effects in plastic films such as polyvinylidene fluoride (pvdf). Thin (9–30 μm) films of pvdf can combine the functions of a diaphragm and acousto-electric transducer. Several forms of low-cost microphones have been developed, including a Plessey design that is currently competing with "electret" microphones in British Telecom evaluation trials aimed at finding a successor to the traditional carbon microphones used throughout the telephone system. Plastic transducers (originally reported from Japan) can also be used for such applications as noise-reducing microphones, headphones and even for cooling "fans" to remove unwanted heat from equipment.

Comment

Geoff Denby, G3FCW, technical director of LAR Modules Ltd, has made the valid comment that although it is a myth to believe that a moderate swr, even on coaxial cable, implies significant power loss (indeed as pointed out elsewhere a very low swr may need to be viewed with suspicion) nevertheless it is now often very important to ensure that a transmitter is "looking" into a reasonably well-matched load. This is because many of the all-solid-state designs now incorporate protection circuits that begin to cut down power output from the transmitter as soon as it "sees" an swr of about two or so. □

MICROWAVES

Charles Suckling, G3WDG*

Using passive reflectors to work obstructed paths

One technique which has been used for making contacts over otherwise unworkable obstructed paths is to bounce signals off reflecting objects which are commonly visible to both stations, as shown in Fig 1. A number of contacts have been made in this way on 10GHz. For example, G3UKV and G8VZT use a gasholder to enable them to work the heavily obstructed path between their home stations, and G3WDG/P (Andover) heard G8DEK (Winchester) some years ago by reflection from the Fawley oil refinery. Also, F1AQS has carried out some successful tests (see *DUBUS* 4-79, p260).

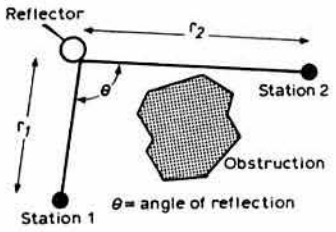


Fig 1. Geometry of a reflection path

G3NAQ has investigated this method theoretically and has come up with two important conclusions. First, contrary to what might be expected, the optimum position for a reflector is near to one station or the other, and the worst place is midway along the path. In the far-field region of the antennas, the inverse square law predicts that the signal power received over a reflection path is proportional to $\frac{1}{r1^2.r2^2}$. This function has a minimum value when r1 = r2, ie when the reflector is located symmetrically between the stations.

The second consideration is the "aspect" of the reflector, ie the greatest possible area of the reflector must be visible from both stations. For a cylindrical reflector, assuming that the reflection coefficient does not vary with the angle of reflection θ, the reflected power decreases as $\cos(\frac{\theta}{2})$. Thus the greater the value of θ, the weaker the signal.

In conclusion, therefore, objects to look for as candidate reflectors should be close to one of the stations, and preferably away from, or in the opposite direction to, the direct path, so as to provide the strongest signals. Of course, if more than one reflector is available, it is worth experimenting to see which provides the best signals.

1·3GHz eme news

The October 1·3GHz eme sked weekend produced the highest level of eme activity so far on this band. No doubt the anticipation of a big signal from the Kiruna (SK2GJ) group's 32m dish had something to do with this! SK2GJ had planned to be active for the entire weekend, but problems with the antenna tracking computer limited operation to only a few hours. Nevertheless they did make two-way contacts with PA0SSB, G3LTF, G3WDG, DJ4AU and VE7BBG. The best signal heard was from W6YFK, who was given a 57 report on ssb! The Kiruna group's own echoes peaked some 25dB out of the noise (in 1·5kHz bandwidth). The system parameters measured by SM2BYA were: transmitter power 30-40W, antenna gain 50dBi (!) and overall receiver noise temperature 100K.

Unfortunately their hopes of working modestly-equipped stations did not materialize, mainly due to lack of time and low transmitter power. Nevertheless they were heard by VK1ZT who had a 10ft dish and a 4dB nf receiver, and they copied ZL2ARW and ZL1BJB/ZL1THG at 5-7dB above noise; both New Zealand groups had 10ft dishes and 80-100W.

The Oxford group was active during these tests, and was surprised to hear QRM for the first time on 1·3GHz eme! In all, seven stations were worked: VK5MC, PA0SSB, G3LTF, DJ4AU, SK2GJ, W6YFK and VE7BBG. The group also took time off to do some radioastronomy for the first time on 1·3GHz with its 20ft dish and new 0·7dB nf GAT6 preamplifier. Using a 1MHz wide 30MHz i.f. amplifier built especially for the purpose by G4CNV, signals were detected from two radio sources, Cassiopeia A (0·45dB) and Cygnus A (0·35dB), as well as 0·15dB thermal noise from the moon.

G3LTF reports excellent results with his newly-rebuilt 18·8ft dish on 1·3GHz. During the October activity weekend he worked SK2GJ, VE7BBG, W6YFK and PA0SSB, and copied good signals from DJ4AU. Signals from PA0SSB and W6YFK were especially good, both being Q5 on ssb.

Operating news

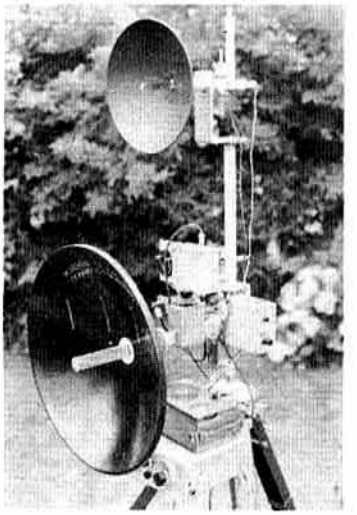
G3FYX (Bristol) sent news of his 1·3GHz and 3·4GHz activities. He has a 1·3GHz ssb sked most evenings with G2AKQ (Ringwood) at 1800gmt which has worked very reliably over the past two years. He is running 50W to a 27-el Yagi, while G2AKQ has 100W out to two loop Yagis. On 3·4GHz his equipment is now working well, with 2W output of cw or phase modulation to an 18in dish, and an interdigital converter. Recent two-way tests with GW3PPF/P over a 47km path from the Mendip hills to south Wales have been very successful.

G8PSF reports that he is now listening on 1·3GHz, using Mu-Tek equipment—NE64535 low noise preamplifier, MRF901 second stage, image rejection filter, and converter into an IC202S. A number of stations have been copied, and he is keen to try one-way tests until the transmitter is completed.

A new group of 10GHz stations has become active in the Chelmsford area. G8MKX writes that he, G4EAT and G8MDG have recently got equipment going, and initial tests over a 0·5km path have been very encouraging. Equipment in use consists of GM3OXX transceivers, one with a 14in dish, and the other with a small horn which is soon to be replaced by a 28in dish. They are looking forward to being active during the 1981 10GHz Cumulative Contest, so please look out for them.

Photo feature

This month's photograph shows G3FYX's 10GHz and 24GHz equipment which are mounted together on the same support structure. This method of mounting 24GHz is strongly recommended, since it enables beam headings to be set up very accurately first on 10GHz, where antennas are somewhat easier to point. Roy's 24GHz equipment consists of a Plessey GDO33 oscillator, cross-coupler, wavemeter and 1N26 mixer, all as described last year in *Microwaves*. His best contact so far has been over a 35km path with GW3PPF/P, with excellent signals.



G3FYX's 10 and 24GHz equipment

Using the IC202 with microwave equipment

Two recent items from the *Microwave Newsletter* may well be of interest to users of the IC202 144MHz cw/ssb transceiver for microwave purposes.

Several stations using the IC202 as a tunable i.f. for 1·3GHz have noted a spurious signal in the beacon band. This occurs at about 1,296·86MHz, tunes very quickly, and is most noticeable when the IC202 is near to the 1·3GHz antenna. It is caused by the 87th harmonic of the IC202's fundamental.

(continued on page 51)

*31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

4-2-70

John Morris, G4ANB*

Happy new year

The month under review has been unusual on vhf and uhf, with a lot of activity, but seemingly little of it actually taking place on the air. The main issues being discussed are locator systems and ssb repeaters, but more of these later. Requests for information of one sort and another feature regularly in the *4-2-70* mailbox, and the first issue of a new year in a new format publication would seem an ideal time to deal with some of these.

Tropospheric openings

In what looks like the final parting shot of a vintage tropo season, the bands opened up again on 1, 2 November. Extracts from the log of G3NAQ reveal contacts with F1CBL (ZE18a), F1FXW (AD22a), F6KMC/P (AE44c), EA2LP (ZD15g) and EA2CR (XD32d) on 144MHz, and with F1FHI (ZH63d) and F1CKX (ZI17e) on 432MHz. G3NAQ also heard Normandy stations working into Italy and Scandinavia.

The lift coincided with the November 144MHz CW Contest, a 24h event in many parts of Europe, so there were several well-sited portable dx stations at the bottom of the band keen to make as many contacts as possible. As the RSGB contest ran for only the last six of the 24h, several intending UK entrants found themselves in something of a dilemma. The first option was to work the dx before the RSGB contest started, with the knowledge that the European stations would not be interested in a later contact, which would for them be a duplicate. The second choice was to hold back until the start of the UK contest, with risk that the dx might by then be inaudible, due to falling conditions and local QRM.

Repeater news

The Repeater Working Group is busy collating the repeater proposals to go into vhf Phase 5. Careful planning is required now that the 145MHz network is nearing complete coverage of the UK. For example, two low-power fill-in units have been proposed for Birmingham, but it is thought that this could cause difficulty in finding a channel for a possible central Wales vhf repeater. The RWG is still discussing the viability of these, and will be making a careful study of the expected coverage maps provided by the proposing groups.

The RWG has recommended that the next uhf repeater channel to be allocated should be RB15, when and if it is proved necessary. Introduction of this channel is not, however, envisaged for quite a while, as the RWG believes that eight channels are adequate at present and another should not be brought in until synthesizers become more common on 433MHz.

The site change for GB3NX has been completed, and the unit is now operational on Ch RB2 from near Crawley.

SSB repeater proposal

The publication in November's *4-2-70* of the new proposal by Tony Whitaker, G3RKL, for an ssb repeater, GB3SF, brought several letters frothing at the pen. A typical reaction was that of Tim Scrimshaw, G8RGQ: "The concept is interesting, but do we, as amateurs, really need such a device? Rigs will need to be modified to produce 600kHz shifts and tonebursts for sideband use, and—horror of horrors—a carrier! Will people please accept that if you want to go mobile on 'two' there is a large network of fm repeaters available (or use a simplex channel). Two metres is possibly the most popular band in this country, and it is very crowded."

Robert Maskill, G4JDL, in Solihull, also sees no need for an ssb repeater: "I can, under flat conditions, work anywhere in England and Wales, as can most of the people I know, so I cannot see what use the repeater would be. I do not think that even mobiles would be better off in the long run, because if a mobile uses 5λ/8 whip it will be no use for normal ssb working, and if a halo is used it will be no good for the repeater."

In defence of the project, G3RKL has made several points, including a criticism of what he calls the ". . . erroneous idea that ssb doesn't 'need' a repeater. This concept is the hardest to overcome—that ssb is some magic form of transmission that can, and should, only be used for dx simplex, and using it for a repeater is some kind of sacrilege". On the technical aspects G3RKL has emphasized that the proposed specification is only an experimental one: "Although at this stage I have proposed the pilot carrier system, the pilot tone still has its merits—a case of six of one and half-a-dozen of the other. Modifying existing black boxes on transmit for pilot carrier should not be all that difficult, either by unbalancing the balanced modulator or leaking carrier round the filter. On the other hand, if pilot tone were used, a completely external box could be added in the microphone lead, with the possibility of locking the receiver via the irt with a minimum of modification."

In a final comment G3RKL regretted that: "no mention was made of the main reason for introducing it, ie elimination of co-channel interference due to the potential five-times increase in channels!"

No doubt this debate will continue for some months. Future developments will be fully reported in *4-2-70*.

50MHz

The 50MHz band continued to prove interesting during the autumn. Brian Bower, G3COJ, noted that the somewhat disturbed conditions often seemed to lead to better propagation over north-south rather than east-west paths, an effect also noticed in autumn 1979, together with strong backscatter signals from European stations.

A brief opening on 16 October at 1357gmt brought 50MHz signals from VE1AVX to John Branegan, GM4IHJ, in Fife. Sadly, the signals faded very rapidly and no contact was completed. Fortunately DK1PZ could hear VE1AVX, and these two stations went on to complete the first 50 to 28MHz crossband contact of the season.

John Baker, GW3MHW, was ready some time earlier, but the first 50MHz signals he heard were on 20 October, when a voice with a distinct USA accent was briefly audible. On the same day at 1350gmt GM4IHJ heard EI6AS working VE1AVX on 50·097MHz.

The first crossband contact of the season for GW3MHW was with WA1UQC in Connecticut. Since then GW3MHW has made nearly 100 50/28MHz contacts with stations in the W1, 2, 3, 4, 8 and 9 call areas of the USA. The best day was 6 November, when K0GUV could be heard for over an hour sending on automatic. Unfortunately, K0GUV himself was not in the shack for the first time in several days. Other crossband contacts for GW3MHW included EL2FY (for a claimed "first" between Wales and Liberia), EL2AV, KP4EOR, and VP2VGR (possibly for another "first").

GW3MHW has provided a list of some of his 1979 28/50MHz contacts, which he believes are "firsts" from Wales: VE1AVX on 1 November; WB2CUS on 1 November; KP4Q on 7 November; VO2AG on 29 November; and W4UWH/KV4 on 3 December. Are there any earlier claims?

The QSL information for EL2FY is PO Box 3521, Monrovia, Liberia, or via his home call, JH0KAI. EL2FY will also forward cards to EL2AV.

GM4IHJ heard strong African and Asiatic Russian television signals on 24 October. On 25 October he had crossband contacts with EL2AV and 5B4AZ. At 1520gmt auroral Arctic television signals were heard, and at the same time a weak aurora was apparent on 144MHz but with no readable signals. GM4IHJ describes himself as a confirmed optimist, as he is regularly looking for JA, HM, VS6 and VK stations during the early mornings!

G3COJ worked EL2FY on 26 October, and also heard ZS3E and ZS6PW. Earlier in the day he heard EI6AS working KP4EOR direct, with, unusually for 50MHz, both sides of the contact audible. Other recent crossband contacts of interest include G4JCC/P, in Humberside, with EL2FY on 23 October and EL2AV on the following day, and G3FXB to EL2AV, EL2FY, VP2VGR and WA7UWE/KP4, all on 2 November.

Locator systems

The article "Locator systems for vhf and uhf" in the November issue of *Rad Com* brought a generally favourable response, with just two dissenting letters having arrived to date. Edmund Ramm, DK3UZ, was quite vehement in his comments. One of the quieter passages of his letter reads: "For my part I do not see any need whatsoever to change a well-established system which has served the European vhf world well for 30 years. In fact, I heavily resent any attempt at introducing something new which completely re-identifies the present QTH locator squares, and is even less accurate at that!"

Derek Poulter, G3WHK, is worried about the time and confusion involved in any changeover: "Being an operator who enjoys contest working I can predict chaos when any change is made to locator or QTH

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information that must be exchanged during a contest. Stations who are only 'giving a few points' will not bother to convert their locators, and thus an accurate log will be difficult to produce.

"Also, having not spent hundreds of pounds on a computer, I have done what many others have done: bought a scientific calculator and produced, after many hours of hard work, lists of distances related to QRA squares based on my home location. A new system involving new subdivisions of squares would require complete recalculation—a very daunting task."

A letter from J. Phillipson, G4BEZ, is typical of those in favour of a change: "I am entirely in favour of changing to a new system. Your suggested system seems to be just about ideal—I wonder if there would be any advantage in putting the origin at longitude zero? The sooner it is introduced the better."

To answer this last point, the original proposal did have the origin at longitude zero, but the overwhelming majority of the national society delegates to the vhf managers meeting at Maidenhead last year was in favour of moving the origin to 180°, so avoiding a "discontinuity" in the middle of Europe.

Wally Blanchard, G3JKV, is also in favour of abandoning the QRA: "Belatedly as it may be, I am very glad it has at long last been recognized officially that the QRA has serious shortcomings, and that my little campaign in favour of Georef some 12 years ago was not misplaced." G3JKV does, however, have some doubts about the accuracy of the proposed system, and has suggested some changes in the way the squares are divided into sub-squares.

The main argument in favour of the change has been summed up by the Swedish vhf manager, SM5AGM: "Suppose you are a novice in 1990. What would you prefer: (1) To have a world locator in use on all continents, the construction of which is clear and logical; or (2) to have the QRA still in use in Europe and no locator at all on other continents, or even worse, a number of different locators?"

Determining a QRA locator

Whatever the outcome of discussions of locator systems within the RSGB, and at the forthcoming IARU Region 1 meeting, the QRA will be with us for at least another year. Several correspondents have reported difficulty in calculating their QRA locator, and others have commented on how easy it is to make mistakes. Indeed, one very successful vhf/uhf contest group has gone to the length of using a sophisticated computer program to compare the QRA locator and QTH received during each contest contact. In an alarmingly high number of cases the locations specified by the two methods differ considerably—occasionally by over 100km!

With many new operators being welcomed daily to the bands, and plenty of dx and contest operating to look forward to in 1981, it is worth publishing details of how to calculate the QRA locator of a station. The way in which Europe is split into squares and sub-squares by the QRA system has been described several times in *Rad Com*. The method outlined here is a step by step approach to determining the QRA locator of a station without any sophisticated computing equipment.

The first stage is to determine the latitude and longitude of the station, using an Ordnance Survey map—the 1:50,000 or old 1in to the mile series are quite adequate. Note that the grid lines on these maps do not run directly north-south and east-west, and should be ignored when latitude and longitude are required. Instead, a long straight edge (or taut piece of string) may be held over the map to read off the scales at the edges. The left- and right-hand scales give latitude, and those at the top and bottom longitude, in each case in intervals of 1min of arc.

The longitude should be rounded to the nearest whole minute to the west, and the latitude to the nearest half-minute to the south. The following procedure should then be followed:

(a) If the longitude is west of Greenwich, as will be the case for most of the UK, subtract it from 52° to get a new longitude figure.

(b) If the degrees part of the longitude is odd, subtract one from it and add 60 to the minutes part.

(c) Divide the degrees part of the longitude by two and add one. The result gives the first letter of the QRA locator on the basis of A = 1, B = 2, and so forth up to Z = 26.

(d) Subtract 39 from the degrees part of the latitude. The result of this gives the second letter of the locator, in the same way as above.

(e) Multiply the minutes part of the latitude by two, and then divide by 15. Make a note of the result and remainder from this division.

(f) Divide the minutes part of the longitude by 12, and make a note of the result and remainder.

(g) Subtract the result of the division in step (e) from seven, and then multiply by 10. To this add the result of the division in step (f), plus one. The result gives the two numbers of the QRA.

Table 1. Determination of the last letter of the QRA locator

h	a	b	10 to 14	Remainder
g	j	c	5 to 9	from
f	e	d	0 to 4	step (e)
0 to 3	4 to 7	8 to 11		

Remainder from step (f)

(h) The final letter of the QRA may be found from Table 1 using the remainders from steps (e) and (f).

The following example illustrates this procedure for a latitude of 51°31·5′N, and a longitude of 2°33′W:

(a) Longitude is west, so take new longitude of 52° − 2°33′ = 49°27′.

(b) Degrees part of the longitude is odd, so take new longitude of 48°87′.

(c) 48 ÷ 2 + 1 = 25; so the first letter of the QRA is the 25th letter of the alphabet, which is Y.

(d) 51 − 39 = 12; so the second letter of the QRA is L.

(e) 31·5 × 2 = 63; 63 ÷ 15 = 4, remainder 3.

(f) 87 ÷ 12 = 7; remainder 3.

(g) 7 − 4 (from step (e)) = 3; 3 × 10 = 30; 30 + 7 (from step (f)) + 1 = 38. The figures part of the QRA is 38.

(h) With remainder 3 from step (e) and remainder 3 from step (f), Table 1 gives the last letter of the QRA locator as f.

The final QRA locator is thus YL38f.

1981 *RSGB Callbook*

The latest edition of that most useful of accessories, the *RSGB Amateur Radio Callbook*, is now available. The new edition contains 4,217 new entries and 3,572 amendments to the 1980 edition. While serving a stint on the RSGB stand at the ARRA exhibition at Leicester, your scribe was amused to note the differing reactions of various groups of people to the new publication. Regular vhfers saw the new callbook and straight away purchased a copy, while several of those more interested in the lower bands surreptitiously checked their own entry for correctness and then faded quietly into the crowds. This phenomenon illustrates that the callbook truly is a useful adjunct to operation on vhf and uhf.

Awards winners

From time to time appeals are made for the publication of lists of the winners of the various RSGB vhf and uhf awards. The latest request came from John Hill, G8HUY: "So as to do justice to those who have obtained awards I would like to see a printout of all of them by award, call, QRA, date etc".

A full list is ruled out by sheer bulk. The list below gives the numbers of awards claimed to date in the various categories of FMD and 4-2-70 squares awards. A quick calculation indicates that several whole pages of *Rad Com* would be needed to print just the award numbers and callsigns of all of the award-winning operators. Rather than regularly devoting a large amount of space to long lists of award winners, which it is thought few people would read, the policy of *4-2-70* has been to detail the awards as and when they are issued. Lists of the winners of the very top awards will be published from time to time as and when space allows.

Award	Number	Award	Number	Award	Number
70MHz Standard	138	432MHz Standard	154	1,296MHz Listener	1
70MHz Senior	45	432MHz Senior	70	Supreme	32
144MHz Standard	556	432MHz Listener	6	70MHz squares	1
144MHz Senior	155	1,296MHz Standard	23	144MHz squares	44
144MHz Listener	40	1,296MHz Senior	3	432MHz squares	5

AGCW-DL CW Contest results

In the AGCW-DL 144MHz Contest held on 27 September, Class A (more than 25W) was won by DK1ZA/P with 14,504 points; Class B (less than 25W) by DL6WT/A with 21,546 points, and Class C (less than 3·5W) by DL1BU with 27,040 points. In Class B G4AHN (ZL56c) came 25th with 2,100 points, and G4GGV (ZL37g) took 32nd place with 644 points.

The AGCW-DL organization issues several awards for cw operation, including one for vhf. The requirement is 125 cw contacts on any band from 144MHz upwards in any year from 1971 onwards. All propagation modes, including Oscar, are valid. Non-members of AGCW-DL may claim the award by submitting a list giving the total number of cw contacts achieved in each year to which the claim relates. The list must be signed by two licensed radio amateurs or be confirmed by the claimant's local radio club. The fee is US$2 or equivalent in ircs. Applications should be sent to: The Secretary, AGCW-DL, Otto A. Wiesner, DJ5QK, Freudenheimer Str 14, D-6900 Heidelberg 1, Federal Republic of Germany.

IARU 144MHz BAND PLAN with UK usage

	144·000	
	144·000	Spot frequency (UK use forbidden)
CW only	144·000–144·010	Moonbounce
	144·050	CW calling frequency
	144·100–144·110	Random cw ms (5min)
	144·145–144·150	Random cw ms (1min)
	144·150	
	144·200–144·210	Random ssb ms
	144·250	Used for GB2RS and slow morse transmissions
SSB and cw only	144·260±	Used by Raynet
	144·300	SSB calling frequency
	144·500	
	144·500	SSTV calling frequency
	144·540	Spot frequency (UK use forbidden)
	144·550	Data
	144·600	RTTY calling frequency
	144·600±	RTTY working (fsk)
All modes non-channelized	144·650	AM calling frequency
	144·700	FAX calling frequency
	144·750	ATV calling and talkback
	144·800	Raynet
	144·825	Raynet
	144·850	Raynet
	144·875	Raynet
	144·900	
UK beacons	144·900–144·990	
	145·000	
	145·000 R0	
	145·025 R1	
	145·050 R2	
	145·075 R3	
FM repeater inputs	145·100 R4	
	145·125 R5	
	145·150 R6	
	145·175 R7	
	145·200	
	145·200 S8	Raynet
	145·225 S9	Used by Raynet
	145·250 S10	Used for slow morse tone modulated transmissions
	145·275 S11	
	145·300 S12	RTTY-afsk
	145·325 S13	
	145·350 S14	
	145·375 S15	
FM simplex channels	145·400 S16	
	145·425 S17	
	145·450 S18	
	145·475 S19	
	145·500 S20	FM calling channel
	145·525 S21	Used for GB2RS fm newscasts
	145·550 S22	Used for rally/ exhibition talk-in
	145·575 S23	
	145·600	
	145·600 R0	
	145·625 R1	
	145·650 R2	
	145·675 R3	
FM repeater outputs	145·700 R4	
	145·725 R5	
	145·750 R6	
	145·775 R7	
	145·800	
	Satellite service	
	146·000	

NOTES

Operation on the two spot frequencies is not permitted in the UK by the terms of the Home Office licence—see licence footnote No 4.

The beacon and satellite service bands must be kept free of normal communication transmissions to prevent interference with these services.

The use of the fm mode within the ssb/cw section and cw or ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they should never be used for dx communication. FM stations wishing to work dx should use the all-mode section, taking care to avoid frequencies allocated for specific purposes.

UK 432–440MHz BAND PLAN

	432·000	
CW only	432·000–432·010	Moonbounce
	432·050	CW calling frequency
	432·150	
	432·200	UK ssb calling frequency
SSB and cw only	432·300	IARU ssb calling frequency
	432·500	
	432·600±	RTTY working (fsk)
All modes non-channelized	432·600	RTTY calling frequency
	432·700	FAX calling frequency
	432·800	
	Beacon sub-band	
	433·000	
	433·000 RB0	
	433·025 RB1	
	433·050 RB2	
	433·075 RB3	
	433·100 RB4	
	433·125 RB5	
	433·150 RB6	
FM repeater outputs in UK only	433·175 RB7	
	433·200 RB8/SU8	Used by Raynet
	433·225 RB9	
	433·250 RB10	
	433·275 RB11	
	433·300 RB12/SU12	RTTY repeater and rtty afsk working
	433·325 RB13	
	433·350 RB14	
	433·375	
	433·375 SU15	
	433·400 SU16	
	433·425 SU17	
FM simplex channels	433·450 SU18	
	433·475 SU19	
	433·500 SU20	FM calling channel
	434·600	
	434·600 RB0	
	434·625 RB1	
	434·650 RB2	
	434·675 RB3	
	434·700 RB4	
	434·725 RB5	
FM repeater inputs in UK only	434·750 RB6	
	434·800 RB8	
	434·825 RB9	
	434·850 RB10	
	434·875 RB11	
	434·900 RB12	RTTY repeater-afsk
	434·925 RB13	
	434·950 RB14	
	435·000	
	434–440	Sub-band devoted to UK atv-frequencies chosen so as to avoid interference to other band users and in particular, the amateur satellite service
	435–438	Amateur satellite service sub-band
	440·000	

UK 70MHz BAND PLAN

	70·025	
CW only	70·025–70·150	
	70·150	
SSB and cw only	70·200	SSB calling frequency
	70·260	
	70·260	National mobile calling frequency
All modes	70·350–70·400	Raynet
	70·475	
FM simplex only	70·500	FM calling frequency
	70·525	
All modes	70·560	RTTY calling frequency
	70·675	
	Beacon sub-band	
	70·700	

Band plans

With so many activities taking place on vhf and uhf, the band plans—published in this issue—are necessarily complex affairs. The main aim of the band plans is to separate incompatible transmission modes, and so let everyone get on with the business of communicating by his chosen method. The outlines of the 144 and 432MHz band plans are laid down by international agreement after much débate and discussion. The UK versions, like those of other countries, are based on this skeleton and fleshed out with extra allocations for national interest groups such as Raynet.

Although the band plans are purely voluntary arrangements, it is in the interests of everybody to keep to them. Calling CQ on cw on 145·7MHz is quite legal within the terms of the amateur licence, but is very unlikely to result in a contact, and certainly will not make any friends. Similarly, the beacon sub-band may seem to be completely empty and an ideal spot for a QSO, but even a short transmission there could well cause serious annoyance—and even temporary deafness—to somebody many miles away who is intently listening in the noise for a distant beacon. There is room on the bands for all of the many activities, provided a little care, consideration and respect for the interests of other operators is shown. The band plans act as a guide in this. For example, by having a specific calling frequency for rtty, teletype operators can concentrate their listening on a known frequency, and avoid interference both to and from other modes.

Some of the problems of operating outside the band plans have recently been discovered by the French, who have several repeaters with inputs below 145MHz in the all-mode section of the band, in direct contravention of internationally agreed convention. During recent lift conditions these repeaters have been suffering interference from operators in the UK and elsewhere who unwittingly, but quite legitimately, have been using the input frequencies for simplex contacts.

One of the most common complaints levelled against the 144 to 146MHz band plan is of overcrowding on the simplex channels, S20 to S23. It should be remembered that there are another 10 channels available below S20, which for some reason are much less used than the higher channels. Owners of synthesized or vfo rigs should use S10 to S19 whenever possible, so reducing the chance of their contact being disrupted, and at the same time leaving the more popular channels to those restricted to a few crystalled frequencies. "Rock-bound" operators are advised to equip themselves with crystals for some of the lower channels, for the same reasons. □

Microwaves

(Continued from page 47)

F6DLA has supplied details of a modification to the IC202S to reduce its power output when driving 10GHz transverters. The modification consists of shorting gate 2 of the first 144MHz transmit amplifier to earth, as shown in Fig. 2. This lowers the output power to approximately 100mW, which reduces the IC202 battery drain considerably, and eases the design of the attenuator required between the IC202 and the 10GHz mixer diode.

F6DLA recommends fitting two small sockets, one to one of the 100kΩ resistors (after removing the paint), the other to the screening nearby. A small jumper lead is used to provide the short circuit, which can then easily be removed to restore the IC202 to full power. If employing this modification, do not forget to change over to the low-power mode before using the IC202 with a transverter, or damage to the mixer diode could result! □

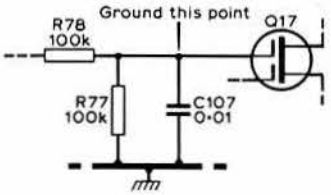


Fig 2. Modification to IC202S to reduce rf output to 100mW

RSGB QSL BUREAU SUB-MANAGERS

(At 1 December 1980)

G2 calls:	C. H. Adams, RS10906, 4 Park Gate Gardens, East Sheen, London SW14 8BQ.
G3AA-ZZ: G4AA-ZZ: G5 calls:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G6AA-ZZ: G8AA-ZZ:	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham, Glos GL50 2SS.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham, Glos GL51 5BT.
G3EAA-HZZ:	S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.
G3IAA-KZZ:	P. Lumb, G3IRM, 14 Linton Gardens, Bury St Edmunds, Suffolk IP33 2DZ.
G3LAA-NZZ:	J. G. Holland, G3GHS, 26 Grand Avenue, Berrylands, Surbiton, Surrey KT5 9HU.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-TZZ:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G3UAA-VZZ:	M. J. Newton, G3UKW, 53 Derwent Avenue, Garforth, Leeds LS25 1HN.
G3WAA-XZZ:	F. G. Rylands, G2VF, 39 Parkside Avenue, Millbrook, Southampton, Hants SO1 9AF.
G3YAA-ZZZ:	I. Batley, G8TKU, 3 Folldon Avenue, Fulwell, Sunderland, Tyne & Wear SR6 9HP.
G4AAA-AZZ:	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, West Midlands B67 6NG.
G4BAA-BZZ:	R. F. Rawlings, G3WBV, 74 The Lindens, Fieldway, New Addington, Surrey CR0 9EL.
G4CAA-CZZ:	P. Jobson, G3HLF, 41 The Avenue, Gravesend, Kent DA11 0NA.
G4DAA-DZZ:	D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.
G4EAA-EZZ:	P. C. Barry, G8OPA, 32 Rutland Avenue, Sidcup, Kent DA15 9DZ.
G4FAA-FZZ:	Mrs A. R. Burchmore, G8LXK, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
G4GAA-GZZ:	L. Craven, G4EQI, "Grass Moor", Radford Road, Alvechurch, Birmingham B48 7DT.
G4HAA-HZZ:	Mrs J. Brakespear, G8RZO, "Baytrees", Little Sutton Lane, Slough, Berks SL3 8AN.
G4IAA-IZZ:	C. J. Webb, G4JFF, 153 Apsley Road, Oldbury, Warley, West Midlands B68 0QT.
G4JAA-JZZ:	K. Baker, G3WTV, 33 Ashdown Drive, Borehamwood, Herts WD6 4NA.
G4KAA-KZZ:	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G4LAA-LZZ:	C. Lennox, G8NVP, 65 Westover Road, Bramley, Leeds LS13 3PB.
G6AAA-CZZ:	Mr and Mrs D. R. Brooks, G4IAQ/G4IAR, 28 Avon Vale Road, Loughborough, Leics LE11 2AA.
G8AAA-CZZ:	F. J. T. Harris, G4IEY, 4 Merestones Drive, The Park, Cheltenham GL50 2SS.
G8DAA-OZZ:	I. Batley, G8TKU, 3 Folldon Avenue, Fulwell, Sunderland, Tyne & Wear SR6 9HP.
G8PAA-RZZ:	Mrs C. Pope, G4CMM, 136 Ridgeway Drive, Bromley, Kent BR1 5DD.
G8SAA-SZZ:	K. Baker, G3WTV, 33 Ashdown Drive, Borehamwood, Herts WD6 4NA.
G8TAA-TZZ:	K. Draycott, G3UQT, 175 Oliver Road, Kirk Hallam, Ilkeston, Derbyshire DE7 4JW.
G8UAA-VZZ:	C. Lennox, G8NVP, 65 Westover Road, Bramley, Leeds LS13 3PB.
GB calls:	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs BL8 3HL.
GD calls:	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI calls:	R. P. Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP.
GJ calls:	H. J. Chater, GJ2LU, 106 Rouge Baullion, St Helier, Jersey, CI.
GM 2-letter calls: GM5AAA-ZZZ: GM8AAA-ZZZ:	D. R. Macadie, GM6MD, 11 Marchmont Road, Ayr KA7 2SB.
GM3AAA-ZZZ:	J. Johnston, GM3LYY, "The Dolphins", Montgomerie Drive, Fairlie, Ayrshire.
GM4AAA-ZZZ:	J. Sey, GM8MJ, 34 Penilee Terrace, Glasgow G52 4BS.
GU:	W. E. Butt, GU2FZC, "Meo Voto", Green Lanes, St Peter Port, Guernsey, CI.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff CF4 2SS.
BRS and A:	D. Borne, G4CYW, "Roughways", Chub Tor, Yelverton, Devon PL20 6HY.

THE MONTH ON THE AIR

John Allaway, G3FKM*

Very best wishes to all readers for 1981.

THIS is the time of year when plans for holidays and overseas visits begin to be made, and many amateurs make arrangements for obtaining reciprocal licences. Two examples of delay in obtaining these have recently come to the writer's attention and are worth noting by others who may be similarly affected. GW3CDH reports that when he applied for a USA licence last year the FCC quite properly asked for evidence that his GW licence would be valid *at the time of his intended visit* to the USA. This meant that he had to apply for its renewal *before* the normal due date. It was more than two months before he received the necessary receipt, and he only just obtained his reciprocal licence in time. The other case involved an American amateur who had previously held a G5 call on several occasions, and who applied in (what he considered) plenty of time for its renewal. His authorization arrived after his return to the USA.

The message from these incidents is that applications should be submitted *at least two months* in advance—and preferably more.

Sincere apologies to Maurice French whose VP5 call was given in two incorrect forms in November *MOTA*. It should have appeared as VP5TCI but your scribe's ageing grey matter decided otherwise!

News from overseas

Old-timers will be very familiar with the callsign ZE3JO—held by Mal Geddes who lives in Salisbury, Zimbabwe. Mal has worked over 300 countries, but at present is experimenting with an HW7 which gives 1W output and with which he has worked 45 countries in a few months, including ZL, VK, VE, PY, 3A and FC. He became a radio amateur 46 years ago with the callsign 2AKA, and went to ZE in 1950. His other equipment includes an HW32A, an HW101 and a TA33Jr beam. There are some Novice licensees now in Zimbabwe, and also a few who have restricted licences and use the /R suffix. For the record, Mal has also held the calls G2SO, VQ1JO, VQ3JO, VQ4JO, ZE3JO/ZD6, ZE3JO/VQ2, ZE3JO/ZS8, ZD6JO and ZS8JO.

Willi Rass, A7XE, has supplied the RSGB with a copy of a letter which he has sent to ARRL. He points out that during his absence from Doha during the period 13 June to 10 September 1980 an illegal operation was carried out using his callsign. He contacted DL2MY and requested that she ask the illegal operator to stop, and also asked for incoming cards and log sheets to be sent to him and for QSLs for the pirate not to be printed. It appears that these requests were not met and in fact by the time he returned to Qatar the pirate's equipment had been confiscated. ARRL has been asked not to accept for DXCC credit any QSL from "A7XE" for alleged contact during his period of absence. QSLs for the genuine A7XE should be sent to DF4NW, Willi's home call.

Bob Williams, G4AGM (and also DA2XW, DJ0HY and VP8JR), will be operating from Oman for the next two or three years as A4XIZ. He is located near Seeb International Airport and has a Drake TR7, and uses cw and ssb on 14, 21 and 28MHz. He hopes to run rtty during the coming months, and will be looking for contacts with the UK—especially with London and Torquay, and also with Morocco. QSLs go to the address in "QTH Corner".

Gavin Payne, G8WMO, contacted your scribe shortly before leaving for Nigeria, where he operates as G8WMO/5N3 from Sapele. He has an FT101ZD and ZL-special antenna but hopes to improve his equipment soon. He should be found between 28,300 and 28,700kHz especially after 1500. Guest licences are now available in Nigeria—a prerequisite being that the applicant must be a member of the national society, NARS. In late November there were around 60 registered amateurs in Nigeria.

LABRE has notified RSGB HQ that following the creation of a new Brazilian state—Mato Grosso do Sul—the prefix PT9 has been issued for amateurs who are located there. there are now 27 "regular" Brazilian prefixes, which are as follows: PP1, Espirito Santo; PP2, Goias; PP5, Santa Catarina; PP6, Sergipe; PP7, Alagoas; PP8, Amazonas; PR7, Paraiba; PR8, Maranhao; PS7, Rio Grande do Norte; PS8, Piaui; PT2, Brasilia; PT7, Ceara; PT8, Acre; PT9, Mato Grosso do Sul; PU8, Amapa; PV8, Roraima; PW8, Rondonia; PY1, Rio de Janeiro; PY2, Sao Paulo; PY3, Rio Grande do Sul; PY4, Minas Gerais; PY5, Parana; PY6, Bahia; PY7, Pernambuco; PY8, Para; PY9, Mato Grosso; and PY0, Ilhas (Oceanic islands).

DX news

5X5FS has been heard on the bands again. However, *DX News Sheet* says that QSLs for ex-5X5FS should be available from an address in Germany (see "QTH Corner"). The original holder of the callsign was EI9G. Recent operation from Uganda by Carl and Martha Henson, WB4ZNH/5X and WN4FVU/5X, resulted in about 10,000 QSOs.

G3JKI/5A has continued to cause some speculation on the air, and ARRL is still awaiting his licence details. According to the *DX Bulletin* he ceased operations on 5 November and has no plans to return.

N4HX is in Benin and hoping to become N4HX/TY9. He has a TS120S and dipole. J5KJ is also CT4KJ when at home in Portugal. K5LBU/ST0 will be in Southern Sudan for three years and is acquiring a linear amplifier and beam antenna. He may perhaps be using a new call—ST0CF—by now. His wife is also licensed and hopes to become ST0JF. Favourite frequencies to find Frosty are around 28,750kHz between 1100 and 1230. Those looking for Ethiopia might find ET3PG near 14,240kHz between 0400 and 0630.

Iris and Lloyd Colvin completed their /SV5 operation on 13 November and left for Israel. Iris performed a rapid ssb WAZ by working 4Z4DT, EA9IE, SP5XM, W2LU, VK2BVD and YV5HAT in the space of 3min on 2 November. While on Rhodes, 6,500 QSOs were made with 135 countries.

Stations in Jordan used the JY7 prefix from 13 to 19 November to honour HRH King Hussein's birthday, and a special award is available to those who worked at least seven JY7s during the period.

Tim Chen, BV2A, is believed to be found regularly on Wednesdays between 1400 and 1430 on 14,025kHz, and later on 14,218, 14,255 or 14,250kHz. He also appears on 28,550kHz on Saturdays.

KA6HIQ/KH3 is occasionally active in the 14,175–14,185kHz area from 0500 to 0700, 28,620kHz at 0600, 14,275kHz at 0630, 21,110kHz at 0800 and 28,110kHz at 1900. N2KC/KH4 will be on Midway Is for an extended period and will be using his KW linear on 3·5 and 7MHz as well as on the higher frequency bands.

Ian Doncaster, VK4NIC, is working in Guinea for six months on a geodetic survey, and has a transceiver with him. He has been heard as VK4NIC/3X on 28,505kHz after 2100, and QSLs should be sent via W4FRU. He also joins in the 21MHz VK Net.

Dxpeditions

DL1VU, accompanied by OE6BVG and/or DJ0FX, should be still in the Pacific area until the beginning of March. Activity from FW, ZK2 and FK is still due to take place, and operation will be mostly cw, about 5kHz above lower band edges—no zero beat calls will be answered. QSLs (plus sae and ircs) should be sent to DL2RM.

The last stops on N2KK's expedition will be ST0 (Southern Sudan) from 22 December to 15 January, then from Lebanon (as OD5KK) until 4 February, and finally from Cyprus as 5B4KK until 11 February. QSL all contacts to K2FV.

6O0DX was due to leave Somalia on 20 November, but left his gear as he should be returning twice during 1981. He will also be training a Somali operator while at home in Italy. Joe's first return visit may be this month or next.

The future of the Heard Is expedition seemed to be in some doubt at the time of writing. Jim Smith, P29JS, was reported to have moved to Norfolk Is and to be on the air as VK9NS, and another of the operators, K6LPL, was reported to be travelling elsewhere.

The *DX Bulletin* reports that VK2BJL and VS5JB intend to visit Kingman Reef and Palmyra Is during April aboard the yacht "Banyandah". About 30 days will be taken over the trip, and additional operators are sought—anyone interested is asked to contact KB7KQ.

South Sandwich activity by VP8PP and others may already be over by the time this reaches readers, but a four-day expedition as VP8SSI was being planned for early January.

Those who missed H11RCD, from Beata Is, are promised further activity one weekend this month.

The Wiesbaden ARC group is said to be planning a week's expedition to Tunisia, possibly during February.

*10 Knightlow Road, Birmingham B17 8QB

IARU REGION 1 HF BAND PLAN

Band (MHz)	Type of emission
3·5–3·6	cw (2)
3·6 ±20kHz	rtty (1)
3·6–3·8	cw and phone (2, 3)
7–7·04	cw
7·04 ±5kHz	rtty (1)
7·04–7·1	cw and phone
Band (MHz)	**Type of emission**
14–14·1	cw
14·09 ±10kHz	rtty (1)
14·1–14·35	cw and phone
21–21·15	cw
21·1 ±20kHz	rtty (1)
21·15–21·45	cw and phone
Band (MHz)	**Type of emission**
28–28·2	cw
28·1 ±50kHz	rtty (1)
28·2–29·7	cw and phone

Notes

(1) For rtty, recommended section of operation shared with cw.
(2) 3,500–3,510 and 3,790–3,800kHz reserved for intercontinental working.
(3) 3,635–3,650 is used by USSR stations for intercontinental working.
(4) For sstv recommended operating frequencies are: 3,735, 7,040, 14,230, 21,340, 28,680kHz, all ±5kHz.
(5) For beacons, 28·2–28·3MHz is recommended.
(6) For the downlink of amateur satellites, 29·4–29·55MHz is recommended.

28MHz BEACONS

28,175kHz	VE3TEN, Ottawa.
28,200kHz	Common frequency.
28,205kHz	DL0IGI, Mt Predigtstuhl, W Germany.
28,207kHz	WD4MSN, Florida.
28,210kHz	3B8MS, Mauritius.
28,215kHz	GB3SX, Crowborough.
28,220kHz	5B4CY, Zyyi, Cyprus.
28,225kHz	VE8AA, Lake Contwoyto, Canada.
28,230kHz	ZL2MHF, Mt Climie, New Zealand.
28,235kHz	VP9BA, Bermuda.
28,237kHz	LA5TEN, Oslo.
28,240kHz	OA4CK, Lima (not IBP and not yet operating).
28,242kHz	ZS1CTB, Cape Town (not yet operating).
28,245kHz	A9XC, Bahrain.
28,247kHz	EA2HB, San Sebastian.
28,252·5kHz	VE7TEN, Vancouver.
28,257kHz	DK0TE, Konstanz.
28,260kHz	VK5?, Adelaide (not yet operating).
28,275kHz	VE3TEN, Ottawa. (Reserve frequency).
28,277kHz	DF0AAB, Schleswig Holstein.
28,280kHz	YV5AYV, Caracas.
28,284kHz	VP8ADE, Adelaide Is, Antarctica.
28,290kHz	VS6HK, Cape d'Aguilar, Hong Kong.
28,888kHz	W6IRT, N Hollywood, (not IBP).
28,894kHz	WD9GOE (not IBP).
28,992kHz	DL0NF (not IBP).

Mal Geddes, ZE3JO (see text)

Beacons

G3DME, IARU Beacon Project co-ordinator, has kindly provided the up-to-date list of 28MHz beacons shown on this page.

Two transequatorial propagation experimental stations in South Africa —ZS6PW on 28,275kHz, and ZS6DN on 28,315kHz—are not normal beacons.

Alan Taylor says that VE8AA is operated by VE7XR/8 at the site of a beacon used for aircraft navigation run by the Pacific Western Airlines; IBP is particularly grateful to their director of radio, Mr T. H. Toy, VE7HE, for his co-operation.

W6IRT and WD9GOE are probably run by the Ten-Ten Association.

The G-QRP Club

The full programme of activities during 1981 arranged by the G-QRP Club has been forwarded by G4BUE. The popular QRP CW Activity Weekends this year will be on 28 February–1 March and 12–13 September. Each weekend will be split up into periods as follows: 0900–1000, (on and around) 3,560kHz; 1000–1100, 14,060kHz; 1100–1200, 21,060/28,060kHz; 1200–1300, 7,030kHz; 1400–1500, 14,060kHz; 1500–1600, 7,030kHz; 1600–1700, 21,060/28,060kHz; 1700–1800, 3,560kHz; 1900–2000, 7,030kHz; 2000–2100, 21,060/28,060kHz; 2100–2200, 14,060kHz; and 2200–2300, 3,560kHz. All amateurs interested in low power working are invited to join in, and reports on results would be welcomed by Chris Page, G4BUE, "Alamosa", The Paddocks, Upper Beeding, Steyning, W Sussex BN4 3JW.

In addition to the above, members of the G-QRP-Club have a weekly activity period on Sundays from 1100–1230 and from 1400–1530 on the international QRP frequencies (3,560, 7,030, 14,060, 21,060 and 28,060kHz). All amateurs interested in QRP are invited to join in.

Enquiries regarding membership of the club should be directed to the secretary, Rev G. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37 7QX. The club publishes an excellent quarterly magazine called *Sprat*, and also promotes an extensive awards programme for low power achievements.

Amateur radio in Malaysia

Paul Willimant, 9M8PW, has responded to the request for information on licences in other countries with information on the situation in Sarawak. First of all he says that British citizens with Class A licences should apply through Ercik Mohd Saufi Bin Eda, Jabatan Telekom, Jalan Were, Kuching, Sarawak. They should enclose: (a) a copy of their UK licence, (b) evidence of British nationality, (c) full details of equipment to be used, and (d) M$10 (the annual fee). Before the licence is issued a "declaration of secrecy" must be signed in the presence of a magistrate or justice of the peace. Equipment must be type approved; in August 1980 only the FT101 series and the FT7 and FL110 had received this clearance. Manuals for non-type-approved gear must be submitted to Jabatan Telekom in Kuala Lumpur, and approval can take up to four months to arrive. HF bands and power limits are similar to those in the UK, but the 3·5MHz band extends up to 3,900kHz, and the maximum input for /M activity is 25W dc.

The Malaysian Amateur Radio Transmitters Society is very welcoming indeed, and operates a number of nets and useful services. Full details may be obtained from Malcolm Westwood, 9M2MW, PO Box 13, Penang, W Malaysia. On 1 August 1980 there were eight Sarawak licences in force. The active stations were Paul and Tony, 9M8RY. Paul is happy to work into the UK and keeps a daily schedule with G4DXC at 0830 near 14,258kHz. He also tries to be on several days a week between 0600 and 0700 between 21,150 and 21,200kHz, and should be in 9M8 until at least 1983.

BYLARA

Further to the item headed "Calling GI YLs" which appeared in November *MOTA*, the committee of BYLARA wishes to point out that GI8SXN is trying to attract local members, who should apply in the usual way for membership of the main organization through Diana Hughes, G4EZI, 3 Primley Park Crescent, Leeds LS17 7HY.

Odd comments

A challenge to the marathon run of contacts between G2FQP and ZL3UY has been submitted by Graham Layzell, G3AMM. By mid-October he had concluded 3,177 contacts with F2IC. Their first QSO was on 13 June 1958, and they have kept schedules on 14MHz daily since then.

David Morton, of Bristol, came across a copy of the November 1958 issue of *Short Wave Magazine* recently in which was an article about a family of five licensed amateurs—father (ZE3JW), two daughters (ZE5JB and ZE8JP), and two sons (ZE1JN and ZE7JO).

Ron Smith, G3SVW, who was formerly VP8LK in Antartica, has written to say that the rtty activity from that area by VP8NS in 1974 was not in fact the first. He regularly kept schedules with G3MWI on rtty during 1971, mainly for passing QSL information to his QSL manager. It would be interesting to know whether there was any earlier activity.

Finally, a note from G3YY, who while working K5RQ in Dallas was found to be causing tvi to his own television set, on which his wife was watching "Dallas".

Contests

CQ WW DX 160 Contest

2200 23 January to 1600 25 January.

CW only. Exchanges consist of RST and serial number (from 001). Contacts with own country count two points, and with others five. QSOs with the USA and Canada count 10 points. The multiplier is the number of USA states, Canadian provinces, and DXCC countries added together, but please note that W or VE does not count as a country because the first

contact with either is also the first with that state or province. Cover sheets and sample log forms may be obtained from G3FKM, (sase please). Logs must be posted before 28 February to CQ 160 Contest, 76 North Broadway, Hicksville, NY, 11801, USA.

The 1981 French Contest
0000 31 January to 2400 1 February (CW).
0000 28 February to 2400 1 March (Phone).
Single-operator entrants may only operate for 36 hours. Exchanges consist of RS/T plus serial number (from 001). Contact should be made with the Francophone countries—ie the 95 departments of metropolitan France, DA1 and DA2 stations in Germany using /FFA suffixes (French forces), and French overseas territories. Contacts with stations in one's own continent count three points, and outside it 10 points. The multiplier is the number of "units" of the areas mentioned plus any of the following: FB8W, FB8X, FB8Y, FB8Z, FG, FG (St Martin), FG (St Barthelemy), FH, FK, FK (Loyalty Is), FK (Chesterfield Is), FM, FO (Iles-du-Vent), FO (Iles-sous-le-Vent), FO (Marquesas), FO (Gambier), FO (Rapa), FO (Iles Australes), FO (Tuamotu), FO (Clipperton), FP, FR, FR/E, FR/G, FR/J, FR/T, FW, FY and YJ. Each counts once per band. Send logs and summary sheet (with multiplier list for each band) to REF French Contest, Sq Trudaine 2, 75009 Paris, France.

The PACC Contest
1400 14 February to 1700 15 February.
1·8 to 28MHz, cw and ssb (but cross-mode QSOs not allowed). IARU Region 1 band plans must be adhered to. Single- and multi-operator and listener sections. Exchanges consist of RS/T plus serial QSO number (from 001), and Netherlands stations will also send two letters to indicate their province—DR, FR, GD, GR, LB, NB, NH, OV, UT, YP, ZH or ZL. Each contact with the Netherlands counts one point, and a station may be worked once on each band on either cw or ssb. Listeners score one point for each PA/PE/PI station heard and should log the code group sent and the callsign of the station to whom it is being sent—the multiplier is the same as in the transmitting section, ie one per province per band (maximum $12 \times 6 = 72$). Send a summary sheet with log (photocopies available from G3FKM), and post logs to PACC Contest, F. T. Oosthoek, PA0INA, PO Box 521, 4330 AM Middleburg, Netherlands, no later than 30 March.

In the 1980 PACC-Contest **G3ESF** was top British scorer with 5,760 points, followed by G2HLU (1,475), G4IQM (1,276), **GM3KLA** (540), **GD4GWQ** (405), GM5AXY (350) and G3FAS (192). In the listener section **RS15822** scored 4,680 points and RS42876 350.

The QRP Winter Contest
1500 17 January to 1500 18 January.
1·8 to 28MHz, cw only. Organized by the AGCW-DL Group. There are four classes: A (below 3·5W input), B (below 10W input), C (below 10W input multi-operator, and D (QRO—to contact QRP stations only). Single-operator stations must take a six-hour rest. QSOs with own country count one point, with own continent two points, and with dx three points. Multiplier is one for each DXCC country and each dx QSO (areas in W/VE/JA/ZS and VK count as countries). Further details are available from AGCW Secretary, DJ5QK, O. A. Wiesner, Feudenheimer Str 12, D-6900 Heidelberg 1, W Germany.

ARRL CW DX Contest
0000 21 February to 2400 22 February.
ARRL Phone DX Contest
0000 7 March to 2400 8 March.
It is understood that these contests have reverted to their traditional format, and that the USA will be working the rest of the world again. No rules had been received from the ARRL at the time of writing.

Awards

The Worked All Malaysia Award

Issued by MARTS to any licensed amateur or listener who submits proof by log extract (endorsed by two other amateurs but—preferably by an awards manager of a radio society) of contact with 10 9M2, two 9M6, and two 9M8 stations on any band/mode. Send list and 10 ircs to: Hon Secretary, MARTS, PO Box 777, Kuala Lumpur, Malaysia.

Worked All Britain Awards

WAB Counties Award

For contacts since 1 May 1974 with stations in at least 55 counties/regions of the UK (Class 2) or in 76 counties/regions (Class 1). For Class 1 all the counties/regions of England, N Ireland, Scotland, Wales, Isle of Man, Guernsey and Jersey are needed. Claims should list county, date, time, and callsign and also signal reports exchanged. The fee is £1.

QTH CORNER

A4XIZ	c/o Royal Omani ARS, PO Box 981, Muscat, Sultanate of Oman.
A6XJA	Jan Keur, PO Box 5708, Dubai.
CR9B	via WA3HUP, M. Crider, RFD 2-Box 5-A, York Haven, Pa, 17370, USA.
J73A	via K2TJ, E. Schmidt, 33 Shore Av, Monahawkin, NJ, 08050, USA.
J73PP	34 Greens Lane, Goodwill, Dominica.
W6QL/SV5 **W6KG/SV9**	via YASME Foundation, Box 2025, Castrop Valley, Cal, 94546, USA.
TA2TAT	T. Turgay, PO Box 133, Ankara, Turkey. (Do not mention callsign.)
VK9NS	J. B. Smith, PO Box 103, Norfolk Is, 2899, Australia.
VP1DN	PO Box 98, Dangriga, Belize.
VP1EEH	PO Box 111, Orange Walk, Belize.
VP5TCI	M. French, c/o Cable & Wireless, PO Box 78, Grand Turk Is, Grand Turks & Caicos Is.
ZK1AXE	PA0GMM, G. M. M. van den Berg, Tweeboomlaan 117, Hoorn 1900, Netherlands.
ZK2BM	see ZK1AXE.
3D2GM	see ZK1AXE.
G8WMO/5N3	G. Payne, PO Box 666, Sapele, Nigeria.
ex-5X5FS	Miss A. Blohm, Nobelring 17-A Hannover-Buchholz 3, W. Germany.
WB4ZNH/5X **WN4FVU/5X**	via K4PHE, Bob Smith, 549 Southwind Drive, Lilburn, Ga, 30247, USA.

RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD.

The WAB Large Squares Award

For contacts after 1 January 1973 with stations in each of the 100kHz squares (ie the lettered Ordnance Survey squares SK, SP etc). The initial certificate requires contact with stations in 30 different squares (Class 3), and costs 50p. Stickers for Class 2 (40 squares) and Class 1 (55 squares) are free in exchange for sae or irc.

The Benidorm Spring Forever Award

This is an annual award and will be made to those who make the requisite number of contacts with stations in Benidorm and county. Europeans need 10 different stations, and others six. Listeners may also apply. Each year's awards will be numbered and a ballot will be held in the following February. The winner will receive a free holiday for two in Benidorm. Send QSLs and log details, plus US$5 or 10 ircs to Benidorm Primavera Constante, Apartado No 0, Benidorm, Alicante, Spain.

The Slovenska Award

European applicants need contact with at least 20 okres (counties), and others 10 okres in Slovakia (OK3). All modes/bands. All contacts must have been made after 1 January 1946, and a certified list of QSLs plus five ircs should be sent to CRC, Box 69, 11327 Praha 1, Czechoslovakia. There are 38 okres in Slovakia.

Band reports

Once again a most interesting period. G8KG's summary reads as follows: "For those interested in the higher bands, including 50MHz, the sun was kinder in November than could reasonably have been expected. On 6 November the daily solar flux reached 302 sfu, a value only exceeded during this cycle during November 1979. With a few days of data still to come, it looks as if the monthly mean solar flux will prove to have been about 220 sfu, which is only slightly lower than the corresponding figures for May 1980 and November 1979.

"This high activity was accompanied by a considerable number of flares which gave rise to several disturbed periods, but in spite of these the conditions on the higher bands were generally very good and there were several excellent openings to North America on 50MHz, during one of which the first 70/50MHz crossband contact between UK and Canada was achieved. The month also saw openings on 50MHz into Australia.

"At the time of writing it looked as if solar activity would continue to be high in December with flux values well above 200 for the first half of the month."

Conditions on the lower frequency bands have also been excellent at times, and the 7MHz loggings could well be a list of 14MHz activity.

Many thanks to the following who contributed to this section this month: G5JL, G3s, GVV, IKW, IMW, GM3ITN, G3KSH, GM3LYY, G3NWG, GM3PPE, G3RUR, G4s AXD, EHQ, JSV, GW4KGR, G8s WEE, WQS, and RSs 1066, 25429 and 31301.

Stations listed in italics were using cw.

3·5MHz. **0000** UK7AAK, *UA0ABG.* **0100** *LU9EIE, UA0.* **0400** JY4MB, W1-W4. **0600** *CN8AD, FP0GAQ,* FP0GBG (QSL to W8AH), HI8LAP (QSL to W3HNK), J73PP, N7RK (Ariz), VP2MCK, W9LY, 9Y4XX (QSL to WA6KZI). **0700** EA9EO, K3OY/VP9, W2-W3, W0MJ, YV1DQU. **0800** ZL1AMO/C. **2100** UI8ZAC, UL7JCK. **2300** UK9AAN, UL7DAA.

7MHz. **0000** AP2KS, PY0AA, XT2AW, *UA0.* **0200** *G0DYM/FS7.* **0500** *W6-W7.* **0600** *FP8GAD,* T3AY, *W6-W7, ZL.* **0700** FK8s CR, DH, FO8FO, H44s DX, SH, KH6T, T3AC, VL9NJ, ZL1AMO/C, ZS3ME. **0800** J73PP, KL7, T3LAA, VP2MCK, *W6QVV,* VE7. **0900** FM0FJE, Ws 1-4, 8-0, YV7GR. **1000** W1-4. **1400** *VS6DO.* **1500** *JA, VK6HD, W6-W7,* 3B8RS, 8Q7KK, *9M2KC.* **1600** JA. **1700** AP2SA, S79MC, ZS5BK, 9K2FU. **1800** H44SH, VK2WC, VU2RAK, ZS5BK, 8Q7AZ. **1900** JA2BAY. **2000** *CR9B, JW2CBS, VQ9MM, ZB2EO, W6QL/SV5;* **2100** *JA,* KB7IJ/KH2, VK6LK, **2200** JY7YJ, 6O0DX. **2300** LU3ZY, DF2NZ/ST2, VS6DO, *4U1UN.*

A group of visiting amateurs from the USA at the QTH of G3GIQ. L to r: K1MEM, K1MM (of 1S1DX, CE0ZH, FO0DX, FR0MM, VS5M, KG4MM and PJ8NA fame), G3MCS, G3GIQ, W1UQ, and K1YL (G4EZH, wife of W1UQ)

Keen dx enthusiast GM3ITN appears in the Honor Roll with 344 countries confirmed. Les was licensed in 1962 and favours 14MHz cw; he also collects stamps and covers from the VP8 area

14MHz. **0000** FG0GBL/FS7, *HL9TS,* PY0DX, VP5TCI. **0700** *FO0DX* (QSL to K1MM), *T3AT,* VK, *VY,* ZL. **0800** AH8A, VK9NS, VK, VR6TC, ZL, *ZL1AMO/C.* **0900** *A35VU* (QSL to DL2RM), *FY7AM, KH6, KL7, 3D2WW.* **1400** BV2B, S2XQL (more information needed ?). **1700** AP2MQ, 8Q7KK. **1800** *UPOL22,* 4K1A. **1900** A7XAH, 6O0DX, 9Q5CRI. **2000** *P29EJ,* SU1ER (Box 33, Airport, Cairo), *W6QL/SV5.* **2100** J6LOU (Box 93, Casries), VP8s *AI,* PP, *VQ9NN, 4K1A, 4K1OC, G4EKF/5N8.* **2200** *N7ET/DU6,* JY7YJ, *TR8IG.* **2300** *HH2VP* (QSL to N4XR), VP1DN, *W6.*

21MHz. **0000** VP8ML. **0800** JA, VK, ZL. **0900** H44DX, *KH3AB,* VS6, YJ8NPS, ZL, 9V1VV. **1000** HL4YJ, K5LBU/ST0. **1100** FK8DH, H44JB, JA, YJ8. **1200** *VP2MFL.* **1300** KL7JAA. **1400** JW9RH. **1500** *DJ1US/ST3,* G3JKI/5A. **1600** S79NLB. **1700** A6XJA. **1800** KH3AB, TN8AJ, 5R8AL. **1900** KL7, PY0s OD, ZDX. **2000** HK0BKX, KH6GB/KH3. **2100** FR0FLO, *VP8AI.* **2200** J73AF, VP1FB, W7, ZD7AL, 5V7HL.

28MHz. **0700** *CN2AQ, JA, ZS3CL, 3B8DB.* **0900** *CR9B,* UI8, UL7, HL9QK, HS1BG, JA, TU2ID. **1000** ED8RC, HM0U, HZ1HZ, JA, KL7Y, VK, YJ8NPS, ZL, 6T1YP, 8Q7KK. **1100** H44DX, *TA2TAT, VK5,* VU, YK1AO, *ZD8TC, W6KG/4X.* **1200** A7XD, AP2ZR, *FP0FSZ,* J3AH, J73PP, JT0YFU, JY5AR, WB4ZNH/5X. **1300** C6ANI, FG0DYM/FS7, FR0FLO, VP9AD, VS6FI, YB0AAG. **1400** FP8HL, W6–W7. **1500** VK5, W6–W7, G3JKI/5A. **1600** TI, W6–W7, XL3LON, 5N0DOG. **1700** VE6–VE7, W6–W7. **1800** J6JIR, KH6IBA, VE6–VE7, VP2MPB, VP8SB, ZF1AK. **1900** C5AAS, KL7D, OX3PT, PY0ZDX, KA4EIN/TI4. **2000** VP8PP, ZF2BP, 3B8DB.

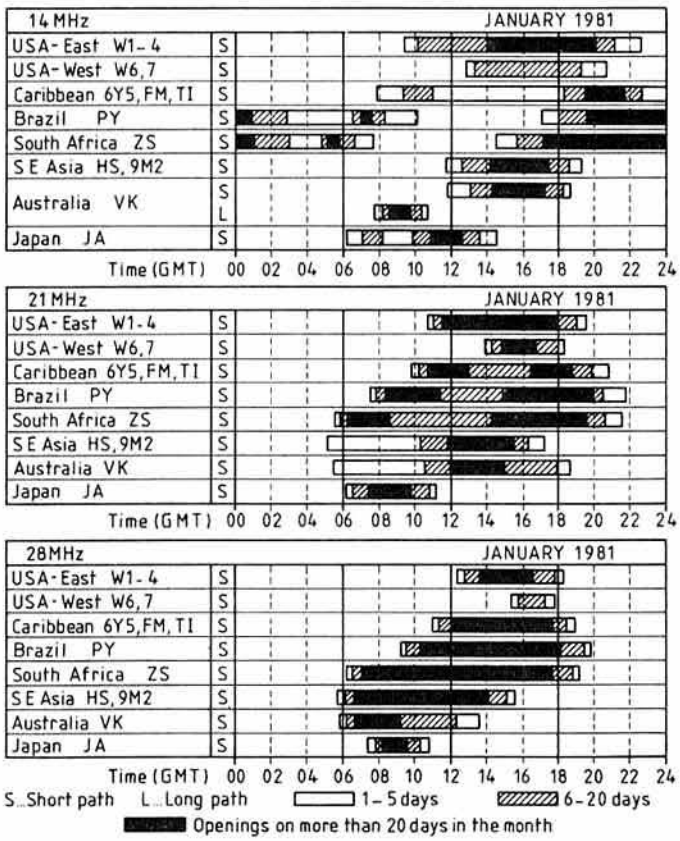
Your scribe is very grateful to all who contributed to this month's column, and also to the following for information: *DX'press* **(PA0TO),** *CQ Magazine* **(W1WY),** the *Ex-G Radio Club Magazine* **(W3HQO),** the *DX Bulletin* **(K1TN),** the *Long Island DX Bulletin* **(W4UL/W2IYX),** *DX News Sheet* **(Geoff Watts),** *Long Skip* **(VE3FRA),** and *QRZ DX* **(K5FUV).**

Please send all contributions for **March** issue **to reach G3FKM** no later than **30 January,** and for **April** by **7 March.** □

Propagation predictions

Conditions during January will differ little from those of the previous month. Towards the end of the month the hf bands will remain open a little longer. Predictions given for December will also prevail during January. It is pointed out again that the graphs for 28, 21 and 14MHz use the gmt time-scale; this makes it easier to convert into local time of the various dx regions.

The provisional sunspot number for October 1980 from the Swiss Federal Observatory was 162·9. On several days during the first half of the month the daily number exceeded 200. The predicted smoothed numbers for February, March and April are 133, 131 and 128 respectively.



HF propagation study

Predicted hpf + luf in megahertz for January 1981

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	1713	1813	1511	1107	1905	3208	3909	3708	3006	2006	1511	1613
Wellington (s)	1613	1513	1312	1409	2705	3708	4009	3608	2805	1707	1411	1513
Osaka	1508	1311	1211	1710	3406	2808	1609	1408	1405	1403	1102	1505
Hong Kong	1407	1210	1212	2312	4410	4308	3509	2508	1805	1603	1302	1003
Sydney (s)	1413	1213	1213	2412	4008	3708	3909	4108	3105	1703	1307	1411
Moscow	1101	1001	802	1503	3405	4705	4706	4305	3104	1702	1101	1001
Bangkok	1406	1210	1312	2713	4911	5709	5309	4708	3205	1803	1402	1402
Singapore	1407	1211	1313	2813	4212	4509	4409	4608	3305	1903	1402	1403
New Delhi	1402	1205	1309	2811	5012	4810	4509	3608	2305	1403	1402	1402
Perth	1510	1313	1313	3013	4112	3909	3709	3608	3605	2203	1603	1506
Teheran	1502	1302	1305	3009	5211	5511	5209	4608	3405	2103	1602	1502
Colombo	1503	1308	1311	3012	5313	5511	5309	4808	3606	2203	1602	1502
Bahrain	1702	1402	1406	3010	5412	5112	4710	4508	3406	2403	1802	1602
Cyprus	1501	1402	1103	2405	4908	5309	4908	4607	3804	2502	1801	1502
Aden	1902	1602	1406	3010	5413	5213	4911	4708	4006	2903	2302	1903
Seychelles	1902	1705	1409	3012	3613	3613	4011	3908	3406	2903	2302	1902
Mauritius	2002	1806	1410	2912	3713	4413	4411	4108	4106	3103	2502	2102
Nairobi	2102	2002	1506	2810	4613	4113	4412	4510	4206	3403	2802	2302
Malta	1201	1201	901	1403	3605	4406	4106	3905	3503	2402	1701	1301
Salisbury	2302	2103	1506	2611	3613	3713	4013	4011	4007	3803	3202	2602
Cape Town	2502	2303	1606	2210	3612	3613	4313	4212	4310	4105	3502	2902
Lagos	2602	2402	1702	1905	4810	5612	5013	4712	4809	4205	3602	3002
Suva (l)	2613	2413	1711	1708	3406	3409	3310	2909	2706	3007	3411	3013
Gibraltar	1001	1101	901	801	2603	3805	3806	3505	3404	2502	1701	1201
Ascension	2502	2302	1802	1504	3808	4712	4013	3813	4112	3808	3404	3002
Wellington (l)	2413	2313	1811	1409	3206	3109	2810	2409	2207	2508	2911	2912
Dakar	2302	2202	1802	1303	3706	5510	5212	4712	4811	4207	3403	2802
Adelaid Is	2307	2205	1805	1305	3207	3609	3610	3711	3812	3612	3410	2809
Las Palmas	1601	1602	1401	1102	3104	4907	4808	4508	4407	3604	2702	2001
Falklands	2205	2103	1803	1203	3105	3709	3811	4212	4813	4312	3411	2708
Rio de Janeiro	2102	2002	1802	1202	2706	3910	3812	3513	3713	3912	3309	2705
Buenos Aires	2003	1902	1802	1202	2905	3308	3712	3613	4113	4313	3311	2608
Sydney (l)	1813	1713	1813	1211	2408	3008	2709	2409	2106	2304	2608	2511
Lima	1804	1602	1802	1202	2105	2308	5209	5412	5013	4413	3212	2409
Barbados	1702	1602	1803	1202	1305	3108	5409	5412	4813	4412	3210	2405
Bogota	1703	1602	1802	1202	1505	2008	5109	5512	4913	4413	3111	2307
Jamaica	1703	1602	1802	1202	1505	1908	4309	5511	5312	4413	3011	2207
Bermuda	1702	1602	1802	1202	1405	2608	4709	5511	5312	4311	3009	2204
New York	1702	1602	1802	1202	1405	2008	3809	5309	5210	4210	2808	2105
Mexico	1706	1602	1802	1203	1605	1508	2009	4608	5211	4113	2812	2110
Montreal	1702	1702	1802	1202	1405	2108	3809	5208	5110	4109	2807	2104
Denver	1705	1703	1702	1202	1505	1408	1409	3008	4509	3710	2510	1908
Los Angeles	1707	1704	1702	1202	1505	1608	1109	1908	4008	3611	2411	1910
Vancouver	1706	1804	1702	1202	1505	1707	1309	1708	2906	3208	2109	1708
Iceland	901	1001	901	601	1503	2904	3705	3804	3303	2102	1201	901
Honolulu	1712	1810	1705	1203	1505	1308	1609	1208	1606	2707	1811	1612
Fairbanks	1706	1804	1603	1103	1605	2005	1909	1908	2106	2405	1706	1606

First two digits are hpf, last two luf; luf 00 indicates data not available.

SWL NEWS

Bob Treacher, BRS32525*

The new format of *Rad Com* means that your scribe has 40 per cent more space to fill. It is hoped that the encouraging increase in reports will continue. As a real bonus, the feature has been afforded a "final copy" date in line with *4-2-70* and *MOTA*. This means that there will be two dates for copy in 1981. The bulk of contributions must still reach your scribe by the third Monday in the month **(this is important)** but those with short items of late news can use this new facility.

A reminder about the new table; entries over 200 will be included when there are sufficient to justify inclusion of the table. Another reminder, about the lower frequency band challenge laid down last month (page 1311).

New swl contest

As mentioned in the November *SWL news*, a new swl contest, sponsored by the White Rose RS, has been arranged, and full rules appear in "Contest news" this month. The event is timed to coincide with almost peak conditions on the lower frequency bands, and it is hoped that there will be sufficient activity and interest to attract a bumper entry.

While on the subject of swl contests, the Cray Valley RS hopes to have the results of its 1980 contest available by the time this reaches members. Full results will be published in due course.

News from overseas

John West, VS6-001, is RSGB member ORS44958. He uses a DX300 receiver which gives satisfactory results. Some of his recent loggings include KC6ZR on 7MHz; HB9FK, HK3AXT and S83W on 28MHz, and LU7FBS on 14MHz. John reports many G stations—and other Europeans—on 28MHz about 1000 daily. He passed on the information that no VS6 licences have been issued after VS6JZ.

DX news

No matter what rumours may be heard to the contrary, P29JS reports that his proposed trip to Heard Is is still on. It is certainly the most eagerly awaited trip since that to Bouvet Is. It will be a very expensive expedition and your scribe makes no apology for referring readers to page 1048 of the October *MOTA*, which gave a detailed insight into the hopes of the group and also asked for support.

At the time of writing, N2KK was on his travels around the Indian Ocean. His itinerary had already included stops at 4S7KK and 8Q7KK, and he was known to be moving to J28, probably signing J20KK, in early December. He was mainly interested in working the lower frequency bands, and had been heard at around 1700 on 7MHz—and even earlier on 3·5MHz—hopefully giving many lower frequency dx enthusiasts a new country or two and a new zone for the H/WAZ Award. QSLs for the trip should go via K2FV, with at least two ircs, for an airmail reply for one card.

Activities from Chatham Is were scheduled for late November, and St Peter and Paul Rocks for early December, and at the time of writing there were strong rumours concerning a trip to Kermadec Is.

Other news

Derek Casson, BRS41992, took the RAE in December, and as a result his listening habits declined somewhat before that big event. His best catch of the period was HK0FBF. Ernest Stannard, BRS44936, wrote a couple of times from Ipswich to provide a lengthy list of callsigns logged with his Trio R1000 receiver. He uses an SR9 receiver on 144MHz. Harold Moss, BRS18529, was pleased to have reached the magic 500 mark and thus be eligible for the All-time table. He mentioned HZ1AB on 3·5 and 7MHz, plus FR7FN, NP2AE, G3JKI/5A, and 9G1RG on 14MHz. Harold noticed that there appeared to be many stations active from XE, a country which had previously eluded him.

Mark Mullins, RS42604, may be in A7 (Qatar) when this piece is read.

*79 Granby Road, Eltham, London SE9 1EH

1980 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	207	231	242	142	117	34	963	ssb
RS42604	207	234	195	162	122	36	956	ssb
A8808	168	196	181	91	92	30	758	ssb
ARS8841	146	170	225	105	89	9	744	ssb/cw
BRS43475	147	185	207	94	79	18	730	ssb/cw
BRS18529	79	102	180	78	61	18	518	ssb
ARS42503	75	132	133	98	57	3	498	ssb
BRS35943	97	97	93	76	85	5	453	ssb
BRS41992	73	92	154	38	51	13	421	ssb
A9191	92	109	127	57	24	10	419	ssb/cw
BRS1066	83	108	108	53	40	12	404	ssb/cw
BRS43273	112	119	105	34	20	0	390	ssb
BRS40705	100	109	105	40	23	0	377	ssb
BRS44395	62	131	90	51	29	12	375	cw
ARS42591	52	89	129	31	64	0	365	ssb
BRS42559	55	79	113	38	31	5	320	ssb
BRS20185	81	85	94	20	27	2	309	ssb/cw
BRS40293	56	94	97	30	23	0	300	ssb
BRS40634	31	101	68	20	17	0	237	ssb
ARS43457	39	61	76	27	24	1	228	ssb/cw
ARS43261	54	50	75	20	18	0	217	ssb
BRS43135	24	48	74	22	30	9	207	ssb
BRS40814	42	21	57	26	15	4	165	ssb
ARS43496	1	38	66	22	21	2	150	ssb

He may be going there with his father, and he is hopeful of taking a receiver, but any countries logged woud not count for either table. Mark certainly seems to miss very little of the dx which appears on the bands. He must be by the receiver every minute of the day! He adds the following to the 7MHz dx mentioned earlier—J73PP, FK8CR, H44SH, VK9NS and FO8FO—and provides KC6IN, WA2BVB/KH2, SU1AL, 4S7KK and 7X5AB for 28MHz.

Due to other commitments, David Hawes, A9191, has not spent much time at the rig. However, he did manage to eavesdrop on the CQ WW Contest which provided the additions to his score. He was to follow in the footsteps of W6KG and W6QL and take a holiday in SV9, but obviously he would not be so popular!

Brad Bradbury, BRS1066, has been listening on ssb as well as on his usual cw mode, and now has 149 countries heard. He had a blitz on trying to find the more common European countries to improve his table score. He reports QSL returns from A4XIH (via G4GIR), W6KG/SV9 (that sounds familiar!) and 4U35UN (celebrating the 35th anniversary of the United Nations).

Ian Le Breton, ARS41386, wrote after a long absence caused by A-level examinations. He also took the RAE in December, after tuition from GJ3RAX.

Paul Tittensor, A8808, just caught the deadline to up-date his table score. He had been able to monitor the bands on a friend's Drake R4A, which provided superb results. However, Paul did not fare particularly well during the CQ WW Contest as far as new countries were concerned, although he did manage a good number for the 1980 table.

Last, but not least, our two most regular contributors, Robert Small, ARS8841, and Dave Whitaker, BRS25429—both reported A7XD on 3·5MHz ssb for a new one, while Dave also offers fresh scalps in the shape of VK2NDK/LH and CE9AF on 28MHz. It is amazing how many heard UK8MAF and UI8LAG on 1·8MHz during the big contest, and also heard was PJ2CC. This was Dave's 50th country on ssb on the band, a feat which did not seem possible until the UAs were allowed to use the band. Robert, on the other hand, comments on 14MHz conditions, and offers WB4ZNH/5X, 5W1BZ, A35BG and VK9NL. On 21MHz KH6GB/KH3 seems to have been his best catch. KA5BPE/VP2A (ex VP5WJR) and G3JKI/5A provided new ones for him on 28MHz.

7MHz—the band of the month

Whether it was due to poor conditions on the higher bands, the WAZ Award chasers, or just good conditions on 7MHz, the band was certainly full of dx during November. Your scribe was one of those lucky enough to be in the right place at the right time. DX was audible until 0930 from the USA, and in the afternoons as early as 1530 from the Far East. Some choice morsels were reported: 0600 FK8DH, H44DX, T3AY; 0700 6Y5WS; 0800 ZL, W6, W7, KL7RA; 0900 W1-5, 8-0, VE1-3; 1600 FR0FLO, 3B8RS, 8Q7KK; 1700 JA, S79MC, VU, ZL, ZS5BK; 1800 UF6FER, 9L1SF; 2000 JA, JY7MM, VP2MCK; 2100 KB7IJ/KH2, VK6LK; 2200 LU3ZY (South Sandwich Is). With so much good dx reported so early in the season, prospects are bright for an outstanding winter season on the band.

Finale

Please help by contributing the bulk of copy for the March issue, including final table scores, by **Monday 19 January 1981**, but for those with late news items, copy *must* be with your scribe no later than 27 January. □

CONTEST NEWS

General rules for vhf/uhf/shf contests 1981

The rules governing all RSGB vhf/uhf/shf contests to be held in 1981 will be selected from the following general rules, which will be referred to by number. Some changes have been made to those previously published, in order to allow the VHF Contests Committee greater freedom to make the calendar more varied and interesting, and possibly avoid it ever becoming an exercise purely in "number swapping". Contestants are advised to read the rules carefully when planning their entry for each event. Supplementary rules will be added for the more complex events, such as VHF NFD.

Please read these rules carefully

Cover and summary sheets and up to 10 log sheets can be obtained from the contest adjudicator. If you are entering a contest it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose a large sae. All stationery is A4 size (30 by 21cm); envelopes which hold flat sheets will carry far more than those which require the sheets to be folded. Larger quantities of log sheets may be purchased from RSGB Publications (Sales). Queries on vhf contests should be made to Roger Taylor, G4BEL, tel Ely 740355.

1. Date and time; see individual contest details.

2. All entries must be sent to the adjudicator at the address given with rules for the contest.

3. All operators must be members of the RSGB or have a membership application in progress.

4. Sections
(a) All classes of stations with no separate sections.
(b) Fixed stations only.
(c) Portable stations only.
(d) There will be two sections:
Section S—Single-operator
Section M—Multi-operator.
(e) There will be two sections:
Section F—Fixed stations
Section O—All other stations.
(f) There will be four sections:
Section S—Single-operator fixed station
Section A—Single-operator portable or alternative address
Section M—Multi-operator fixed station
Section P—Multi-operator portable or alternative address.
In fixed station sections, the station must be located at the main address as shown on the licence.
Single-operator stations are those operated by an individual operator who received no assistance whatsoever with the operating or log keeping during the contest.
All equipment, including antennas and masts, for portable stations must be installed on site during the 24h preceding the contest, or during the contest itself. This does not apply to storage of equipment, or to its prior installation more than 1km away from the contest operating position. Portable stations may be required to provide proof of permission to use a site.

5. Locations
(a) Entrants may not change the location of their stations during the contest.
(b) Entrants may change the location of their stations during the contest on one occasion provided that only the highest scoring contact with a given station is claimed in the event of a repeat contact. Repeat contacts must be clearly marked as such in the contest log.
(c) In multiband events all stations forming one entry must operate from within a circle of 1km radius.

6. Modes
(a) Contacts may be made on all permitted modes.
(b) Entrants may transmit only A1 (cw) or F1 (fsk) and contact only other stations transmitting these modes.

7. Scoring system
(a) Contacts made between the distances shown in the table will score as indicated. Contacts on borders between scoring rings score low.

Km	Points	Km	Points	Km	Points
0-50	1	200-250	9	350-400	15
50-100	3	250-300	11	400-450	17
100-150	5	300-350	13	and pro rata	
150-200	7				

Note that: *(i)* all radial rings are 50km wide; *(ii)* all possible scores are odd numbers.
(b) Contacts will be scored at one point/kilometre.

8. Final tabulation of multiband contests
(a) The final tabulation showing the overall results will be formed by taking the simple sum of the scores achieved on each band.
(b) The final tabulation showing the overall results will be formed by taking the sum of the points gained by dividing the scores achieved on each band by the leading station's score on that band and multiplying by 1,000.

ie Points for each band: $\frac{\text{Score achieved from Rule 7}}{\text{Band leader's score from Rule 7}} \times 1{,}000$

9. Awards
In each section there will be an award to the highest scoring station. An award will also be made to the runner-up in each section in which there are 10 or more entries. In multiband events a certificate will be awarded to the highest scoring station on each band which has not qualified for either the overall winner's or runner-up award. Additional awards will be made when appropriate.

10. Crossband contacts
(a) Crossband contacts do not count for points.
(b) Half-points may be claimed by both stations for a crossband contact if two-way communication cannot be established on the same band.

11. Repeat contacts
(a) Only one scoring contact may be made with a given station on each band covered by the contest (ie callsigns that are fixed, /A, /P or /M, or the same set of equipment used, by a non-competing station, under a different callsign, all count as one station). If a station has moved location and is contacted a second time, only the higher scoring contact may be claimed.
(b) One contact may be made with a given station (as defined in 11a) during each activity period. Only three out of seven activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purpose of checking. To be eligible for an award an entrant must take part in a minimum of three activity periods. Serial numbers start at 001 for each activity period and advance by one for each contact.

12. Contest exchange
The contest exchange shall consist of:
(a) Both callsigns, RS or RST report followed by serial number, both QTH locator (the standard five-symbol location system) and QTH.
(b) Both callsigns, RS and RST report followed by serial number, and QTH locator (the standard five-symbol location system).
Serial numbers start at 001 and advance by one for each contact. For multiband single-callsign events, the serial number advances by one independent of changes of band, but each band must be tabulated on separate log sheets for the purpose of submitting an entry.
For stations operating within the British Isles (excluding Eire) the QTH must be given as a point identifiable on an Ordnance Survey route planning map (scale 1:62,500) or as a direction and distance up to 25km from such a point to the nearest kilometre. For a station operating from outside the British Isles (excluding Eire), the QTH must be readily identifiable.
In multiband contests, when required as part of the exchange, the QTH must be given in a different form on each band used.
No points will be lost if a non-competing station being contacted by an entrant is *unable to supply* a QTH locator or does not give QTH or a serial number, but the receiving operator must obtain enough information to be able to calculate the claimed distance score.
Contacts with stations whose callsign appears on the station cover sheet(s) will not count for points.

13. Log keeping
Entrants must keep their own log records in accordance with licence requirements. The logs for contest entries must be made out on current RSGB contest log sheets or, if computer readout sheets are to be submitted, these must be cut to A4-size format and be line spaced to contain approximately 30 contacts per sheet, or less. Separate logs are required for each band used in the contest.
Logs must be tabulated as follows:
(a) Date/time (gmt)
(b) Callsign of station worked
(c) My report on his/her signals and serial number
(d) His/her report on my signals and serial number
(e) QTH locator received
(f) QTH received
(g) Points claimed.

14. A station must operate within the terms of his/her normal licence. (This excludes high power permits).

15. A station must not engage in more than one contact concurrently.

16. Stations using telephony in the recognized cw sub-bands 70·025–70·150MHz, 144·00–144·15MHz, 432·00–432·15MHz and 1,296·00–1,296·15MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants should observe the provisions of the IARU/RSGB band plans.

17. Stations that persistently radiate poor quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation, (see p57), are liable for disqualification or loss of points.

18. Special event callsigns (eg GB) may not be used.

19. Contacts made via a repeater, man-made satellite or moonbounce will not count for points.

20. Proof of contact may be required.

21. Entries
(a) All entries must be accompanied by a current RSGB vhf/uhf contest cover sheet (Form 427) for each band used. The cover sheet must be completed correctly and the declaration signed. In multiband events entrants must also complete a multiband summary sheet (Form 4422).
(b) All entries must be postmarked not more than 15 days after the end of the contest.
(c) All entries become the property of the RSGB and cannot be returned.
(d) Gross errors in log keeping render the entrant liable to disqualification.

22. Portable stations must permit inspection of their station by members of the VHF Contests Committee, and give site access information if requested to do so. Failure to allow inspection will result in disqualification or loss of points.

23. Failure to comply with any of the rules given for a particular contest may result in loss of points or disqualification.

24. The ruling of the Council of the RSGB shall be final in all cases of dispute.

General rules for RSGB listeners' vhf/uhf contests

1. The following rules from the general rules for vhf/uhf contests published in this issue shall apply: 1,2,3,4a,5a,7a,8a,11a,19,21,23,24.
2. Listeners' contests are open to all non-licensed members of the RSGB. Only the entrant may operate the receiving station.
3. Logs must show in columns: (a) date/time (gmt), (b) callsign of station heard, (c) my report on his/her signals, (d) report and serial number sent by station heard, (e) callsign of station being worked, (f) QTH locator given by station heard, (g) QTH given by station heard (where appropriate), (h) points claimed.

On 144MHz the callsign in column (e) may occur only once in every 20 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hanson Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 1 March and 7 September 1981.

Code of practice for vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.
2. Take all possible steps to ensure that a site is not going to be used by some other group or club. Check with the local club and last year's results table to see if any group used the site last year (QTH locator). If it is going to be used by another group, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.
3. All transmitters generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from the home station may well be found excessive by nearby stations (up to 25 miles or even farther).
4. Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.
5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur-band spurious radiations, including noise modulation, to a level of −90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.
6. Above all, be gentlemanly at all times. Be helpful and inform all stations apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! If asked to close down by a government or Post Office official, do so at once without objectionable behaviour. If the site owner requests your station to close down, accede to his request without hostility.

General rules for RSGB hf contests 1981

The general rules for all RSGB hf contests are given below. For each contest throughout the year a specific set of rules will be published which must be read in conjunction with the general rules.

1. Entrants must operate in accordance with the terms of their licences.
2. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Proof of contact may be required.
3. Unless otherwise stated, only single-operator entries will be accepted. A single-operator station is one manned by an individual operator who receives no assistance whatsoever during the contest period.
4. When multi-operator entries are specifically allowed, such entries will be accepted only if:
(a) The declaration is signed by one operator, who will be regarded as the entrant, and
(b) the operator's callsign is given for each contact.
5. Operators of stations located within the British Isles, ie within the call areas G, GD, GI, GJ, GM, GU and GW, must be fully paid-up members of the RSGB.
6. A contact consists of an exchange and an acknowledgement of an RS report on telephony or of an RST report on telegraphy, and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest period, irrespective of the band or mode in use. Serial numbers, when sent, must be recorded from non-competing stations.
7. Entries must be clearly written or typed on one side only of RSGB hf contest log sheets (Form HFC1) or international A4 size paper using blue or black ink. *Separate log sheets must be used for each band.* Logs must be kept and entries submitted in gmt.
8. Each entry must include a cover/summary sheet (eg Form HFC2) incorporating a signed declaration.
9. Entries must be addressed to the adjudicator, whose address will appear in the specific rules for each contest, with the name of the contest marked in the top left-hand corner. All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required, British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.
10. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.
11. For scoring purposes, aeronautical mobile and maritime mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.
12. Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates. When possible, awards are presented at the RSGB AGM following the contest.
13. Certificates of merit are normally sent to the three leading stations in each section of a contest.
14. Entrants may be disqualified for failure to observe the general rules or the specific rules.
15. Points are deducted for errors in the logs. For unmarked duplicate contacts for which points have been claimed, additional penalty points may be deducted (eg five times the claimed score for the contact).
16. Small quantities of RSGB hf contest log sheets (Form HFC1) and cover/summary sheets (Form HFC2) may be obtained from RSGB HQ on receipt of a large stamped addressed envelope. Larger quantities may be purchased.

General rules for RSGB hf receiving contests 1981

1. To claim points, a station may be logged once only on each band whether fixed, portable, mobile, or alternative address.
2. A receiving station log must show in columns: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, bonus points, total points. The band in use must be shown at the top of each log sheet.
3. A cover/summary sheet (eg Form HFC2) must be submitted with the logs. The signed declaration must include the words "I certify that I do not hold a transmitting licence".
4. The following rules from the transmitting general rules also apply to receiving contests: 3,5,7,9,11,12,13,14,15 and 16.

Code letters for use in RSGB contests

County/Region	Letters
Alderney	ALD
Antrim	ATM
Armagh	ARM
Avon	AVN
Bedfordshire	BFD
Berkshire	BRK
Borders	BDS
Buckinghamshire	BKS
Cambridgeshire	CBE
Central	CTR
Cheshire	CHS
Cleveland	CVE
Clwyd	CWD
Cornwall	CNL
Cumbria	CBA
Derbyshire	DYS
Devon	DVN
Dorset	DOR
Down	DWN
Dumfries & Galloway	DGL
Durham	DHM
Dyfed	DFD
Essex	ESX
Fermanagh	FMH
Fife	FFE
Mid Glamorgan	GNM
South Glamorgan	GNS
West Glamorgan	GNW
Gloucestershire	GLR
Grampian	GRN
Guernsey	GUR
Gwent	GWT
Gwynedd	GDD
Hampshire	HPH
Hereford & Worcester	HWR
Hertfordshire	HFD
Highlands	HLD
Humberside	HBS
Isle of Man	IOM
Isles of Scilly	IOS
Isle of Wight	IOW
Jersey	JER
Kent	KNT
Lancashire	LNH
Leicestershire	LEC
Lincolnshire	LCN
Greater London	LDN
Londonderry	LDR
Lothian	LTH
Greater Manchester	MCH
Merseyside	MSY
Norfolk	NOR
Northamptonshire	NHM
Northumberland	NLD
Nottinghamshire	NOT
Orkney	OKE
Oxfordshire	OFE
Powys	PWS
Salop	SLP
Sark	SRK
Shetland	SLD
Somerset	SOM
Staffordshire	SFD
Strathclyde	SCD
Suffolk	SFK
Surrey	SRY
East Sussex	SXE
West Sussex	SXW
Tayside	TYS
Tyne & Wear	TWR
Tyrone	TYR
Warwickshire	WKS
Western Isles	WIL
West Midlands	WMD
Wiltshire	WLT
North Yorkshire	YSN
South Yorkshire	YSS
West Yorkshire	YSW

First 1·8MHz Contest 1981 rules

1. **Aim of contest.** To encourage the use of the 1·8MHz band.
2. **Eligible entrants.** Single-operator stations only. British Isles entrants must also be members of the RSGB.
3. **Period.** 2100gmt Saturday 14 February to 0100gmt Sunday 15 February 1981.
4. **Sections**
   (a) British Isles stations.
   (b) Overseas stations including EI.
5. **Frequencies/mode.** 1·8-2·0MHz cw only. British Isles stations should note that overseas stations may be allocated different parts of the band; eg Austria 1·823-1·838MHz, France 1·826MHz only, Netherlands 1·825-1·835MHz, USSR 1·850-1·950MHz.
6. **Contest call and exchange.** CQ test, RST plus serial number starting at 001. British Isles stations must also give their county code as published in this issue of *Radio Communication*.
7. **Scoring**
   (a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region, and the first contact with each new country outside the British Isles.
   (b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county/region.
8. **Logs.** Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points.
9. **Declaration.** Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".
10. **Address for logs.** RSGB HF Contests Committee, c/o D. S. Booty, 139 Petersfield Avenue, Staines, Middlesex TW18 1DH, England.
11. **Closing date for logs.** Logs must be postmarked no later than Monday 2 March 1981.
12. **Awards**
   (a) The Somerset Trophy will be awarded to the winning station in the British Isles section, and certificates of merit to the second and third placed entrants.
   (b) The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the Second 1·8MHz Contest 1980.
   (c) Certificates of merit will be sent to the first three stations in the overseas section, and to the leading entrant from each overseas country.
   (d) A certificate of merit will be awarded to the highest-placed entry from a station which has not entered a First 1·8MHz Contest before. Candidates for this award should mark their entries "First-time Award".
   (e) A certificate of merit will be awarded to the highest placed entrant in the British Isles section who has reached pensionable age on or before 14 February 1981. Candidates for this award should mark their entries "Senior Citizen's Award".

March 144/432MHz & SWL Contest rules

1600-1600gmt 7 and 8 March 1981

The following general rules, published in this issue of *Rad Com*, will apply: 1, 2, 3, 4d, 5a and c, 6a, 7a, 8b, 9, 10a, 11a, 12a, 13-24.

Only one callsign may be used (ie concurrent working of bands is not permitted).

Single-operator stations, as defined in Rule 4 of the general rules, must break for six consecutive hours.

All entries and check logs to: VHF Contests Committee, c/o Mr W. J. McClintock, G3VPK, Maple Leaf, Great Braxted, Witham, Essex CM8 3EJ.

RSGB European Meteor Scatter Contest, 11/12 August 1980, results

Support for the second RSGB European Meteor Scatter Contest was most disappointing, with only seven entries from the whole of Europe. As last year, none was received from Germany, Sweden, Czechoslovakia, France or Italy, although stations were known to be active in these countries.

The scoring system was ambiguous and, in consequence, was interpreted by the competitors in several ways. The scores have been amended, therefore, to be consistent.

Conditions were not as good as last year, although several stations reported some long bursts during the early hours of 12 August.

Congratulations to the Belgian team, ON5FF, ON4UG and G8RNM, who operated EI2VAH; also to HG1YA who had to be satisfied with second place yet again.

G2HIF

Posn	Callsign	Points	QSOs	QTH squares	QTH locator	Best dx	Km
1	EI2VAH	85,206	33	25	UN10c	I4EAT	2,127
2	HG1YA	74,856	29	28	IH63b	UA30G	1,998
3	HG8ET	20,148	7	7	KG22j	GM4COK	1,922
4	GJ4ICD	19,139	9	8	YJ70j	HG5KDQ	1,645
5	HG6KNB	17,366	8	8	JI69c	G8VR	1,439
6	HG4KXG	13,566	5	5	JG05j	LA6HL	1,601
7	PA0HWM	6,634	3	3	CK09d	SM0IME	1,214

RSGB October 1980 UHF Contest results

This event attracted nearly twice the number of entries as last year's contest.

Conditions were described by most as good, which enabled many groups to make some dx contacts on 432MHz into southern France; although, as the French do not have the same 1·3GHz band as ourselves, the contacts on that band were not of the same standard.

It was also encouraging to see the entries coming in for the 10GHz section, which was the first time it had been included in this event, and therefore the first time any 10GHz logs had been forwarded to the IARU.

Congratulations go to the winners and runners-up in all sections. *G4BEL*

432MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	GJ4ICD	32,702	106	YJ70	390	EA3AIR/P	836
2	G4KBC	13,938	70	AL34	250	DL9GS	541
3	G3TDG	10,218	88	AL51	35	GM3SPJ/P	487
4	G8GXE	9,437	80	ZL48	50	F6CIS/P	672
5	G8IEM	8,961	32	ZK05	20	F1AUB/P	853
6	G8TFI	6,946	50	ZL38	200	F6CIS/P	660
7	G8KAX	6,309	62	AL32	90	F6CIS/P	667
8	G8IFT	3,505	26	YM50	20	PE0MAR/P	420
9	G3VCT	2,241	22	ZL37	6	DJ9DL	720
10	G5UM	2,029	23	ZM35	10	GM3SPJ/P	343
11	G8ART	2,028	15	ZM45	400	PE0MAR/P	340
12	G8LXY	1,902	28	ZL09	50	F1ELL/P	210

432MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G4BPO/P	51,196	208	AM67	400	F6CIS/P	721
2	G8ECN/A	39,712	145	AM27	200	F1AQC/P	741
3	GW3UNU/P	38,828	180	YN75	400	DJ3ZU	673
4	G4JAR/P	34,381	161	AL47	150	F6CIS/P	636
5	G8PMH/P	32,735	165	AM51	300	F6CIS/P	755
6	G8HVY/P	30,722	122	YK28	400	F1AUB/P	875
7	G3NNG	25,691	142	ZL23	300	ON5UR/P	654
8	G4ALE/P	20,527	95	AL16	70	F6CIS/P	708
9	G3ULT/P	16,493	180	ZL54	10	F6CIS/P	673
10	GM3SPJ/P	11,717	39	XO10	90	F6CTT/P	602
11	G4DDC/P	10,827	105	ZL18	60	PA0ERW	415
12	G4IGY	7,912	39	ZN10	100	F9FT/P	591
13	G4GFX	7,469	56	YM79	10	PE0MAR/P	440
14	G8EDG/P	5,843	43	YM49	8	GJ4ICD	360
15	G3XWZ/P	5,350	42	ZN65	10	F6CTT/P	310
16	G4DDL	3,910	41	ZL47	10	PE0MAR/P	342
17	G8LMW/P	2,503	27	ZM26	3	F1ELL/P	297
18	G8ABI/A	2,126	29	ZL39	80	PE0MAR/P	276

1,296MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G4KBC	5,241	26	AL34	100	DL9GS	452
2	G3TDG	4,671	43	AL51	35	GM3SPJ/P	488
3	G3VCT	2,526	35	ZL37	50	PE0MAR/P	333
4	G8GXE	1,303	23	ZL48	4·5	G8SDS/P	157
5	G8ART	1,045	14	ZM45	35	G8SDS/P	210
6	G8IFT	985	10	YM50	20	G4GLN/P	219
7	G8KAX	876	13	AL32	1	G8SDS/P	209
8	G8IEM	622	8	ZK05	4	G4GLN/P	172

1,296MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3XDY/P	10,457	51	AM67	120	DK1VC/A	437
2	G3PMH/P	8,782	54	AM51	70	DJ3ZU	447
3	GW4CBW/P	7,444	41	YN75	100	G3LQR	315
4	G3NNG	7,165	46	ZL23	35	PA0EZ	466
5	G8SDS/P	6,004	31	YK28	250	PA3AZK/A	597
6	G4GLN/P	5,857	45	AL16	330	PA0VTW	344
7	G4ANT	4,850	26	AM27	50	DK2UO	410
8	G4GZI/P	4,821	42	ZM73	30	PA3AZK/A	489
9	G3AKF/P	4,069	36	ZL54	35	PA0EZ	456
10	GM3SPJ/P	3,396	13	XO10	100	G3TDG	488
11	G4ARD/P	2,056	32	ZL18	40	G4ANT	161
12	G8LMW/P	1,587	20	ZM26	1·5	G3TDG	190
13	G8ABI/A	522	12	ZL39	1·5	G4GLN/P	100
14	G3XWZ/P	509	6	ZN65	1	G3NNG	170
15	G4EKT	453	4	ZN10	2·5	G3NNG	271

2,304MHz SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3XDY/P	1,414	10	AM67	10	PA0WRC/P	299
2	G4KBC	685	5	AL34	40	PA0EZ	314
3	G4CDJ/P	277	2	ZL54	3	G3XDY/P	198
4	G8DDC/P	112	3	ZL18	2	G4CDJ/P	79
5	G3RQZ/P	80	3	AL16	3	G3XDY/P	41

10GHz SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3YGF	364	5	ZL14	10	G3JVL	113
2	G4CNV/A	294	4	ZL14	1	G3JVL	113
3	G3WDG/P	222	5	ZL74	0·007	G3YGF	81
	G4KGC/P	222	5	ZL74	0·0005	G3YGF	81
5	G8ADP	115	4	ZL65	0·003	G3YGF	70
6	G8RHI	46	2	ZL35	0·001	G3YGF	25

432MHz LISTENERS SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km
1	BRS32525	231	79	AL41	OR7HP	296
2	BRS15822	77	35	ZL40	GW3UNU/P	263

1,296MHz LISTENERS SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km
1	BRS15822	58	3	ZL40	G3WFM	26

1980 SSB Field Day results

This contest attracted a total of 47 entrants, with 18 of these in the Restricted section—eight more than last year. It is difficult to compare the scores with previous contests because of the change in scoring, but this year some of the entrants had openings on 28MHz, notably the Guernsey group, which worked 164 USA stations in the first hour.

It is obvious from the logs that a certain amount of confusion was caused by the large number of German stations signing /A during the contest; most of the entrants claimed two points for these QSOs but some claimed them as portable stations and five points. We are hoping at a later date to be able to publish an IARU Region 1 results table, and because of this the HF Contests Committee decided to score German /A QSOs as five points. As a result, the majority of logs have been rescored.

The Guernsey group, GU3HFN/P, repeated its 1979 success by winning the Open section, achieved mainly on the hf bands. In second place was the Gravesend club, G3GRS/P, which improved on its last year's position of ninth. In third place was RAF

Scampton, G4GI/P, which in 1979 was the winner of the Restricted section.

The winner of the Restricted section was Shefford & District, G3FJE/P, with Kingsway Technical College, GM4AAF/P, in second place and Swansea ARS, GW5ZL/P, in third place. Very few of the entrants in this section seemed to spend much time on 28MHz, and the bulk of the contest exchanges was, as expected, on the lower frequency bands.

Comments from competitors were equally divided on the question of the new scoring system, but this will be discussed by the committee again before the 1981 rules are formulated.

One thing certain from the comments is that the weather became worse the farther north one went, with the GM stations really suffering.

Entrants are reminded to take extra care when writing-up their logs, as in a few cases entrants were not on the bands suggested by their logs!

Subject to Council approval the Northumbria Trophy will be awarded to the Guernsey group, with certificates being awarded to G3GRS/P and G4GI/P in the Open section and to the first three in the Restricted section. *G3KDB*

OPEN SECTION

Posn	Callsign	Group	Number of QSOs 3·5	7	14	21	28	Multipliers	Points
1	GU3HFN/P	Guernsey	58	60	460	778	204	107	521,411
2	G3GRS/P	Gravesend	190	187	522	439	18	86	388,548
3	G4GI/P	RAF Scampton	100	268	405	497	–	81	333,072
4	GW3EOP/P	Port Talbot	175	94	314	453	50	92	330,740
5	G4AAX/P	Northumbria	179	78	354	553	1	86	330,240
6	G3WAS/P	Lichfield	49	238	388	320	31	96	321,120
7	G3XEP/P	White Rose	132	115	201	614	–	90	309,060
8	G3KLH/P	Wiltshire	168	74	543	552	5	68	292,740
9	G6CW/P	Nottingham	114	123	525	277	11	73	257,398
10	G4IRC/P	Ipswich	309	212	328	16	14	83	245,763
11	G3WSC/P	–	115	44	538	248	29	73	233,089
12	G3RCV/P	Cray Valley	149	173	147	336	13	75	215,250
13	G3NJA/P	Torbay	43	84	481	125	–	63	152,585
14	G4HRS/P	Horsham	48	163	357	81	12	64	143,616
15	G3AHD/P	Liverpool	98	133	237	231	–	56	138,992
16	G2ASF/P	Coventry	93	15	193	237	66	59	118,413
17	GI6YM/P	Belfast	108	46	183	189	5	58	109,678
18	GM6UC/P	Border	102	43	71	181	85	63	102,564
19	G3OHM/P	S B'ham	88	72	131	210	10	55	99,000
20	G4BFW/P	Redifon	110	162	53	38	18	60	89,760
21	G3ZPR/P	Poole	130	–	131	230	2	51	81,243
22	GM3TKV/P	Moray Firth	107	120	94	45	–	54	77,059
23	GM4AGG/P	W Scotland	104	60	131	125	9	47	75,247
24	G3VGG/P	Bromsgrove	78	78	103	33	20	50	58,450
25	G3GHN/P	Clifton	145	81	53	16	1	45	54,270
26	GM4HEL/P	Helensburgh	53	76	208	14	–	38	51,946
27	G3ASR/P	Edgware	47	119	76	15	8	46	48,735
28	G3NNR/P	Wirral	61	56	182	14	–	42	42,630
29	G3VCP/P	Crystal Palace	–	107	–	13	–	18	8,748

RESTRICTED SECTION

Posn	Callsign	Group	Number of QSOs 3·5	7	14	21	28	Multipliers	Points
1	G3FJE/P	Shefford	204	184	69	41	–	52	98,332
2	GM4AAF/P	Kingsway	164	122	93	8	–	51	86,241
3	GW5ZL/P	Swansea	68	63	143	56	16	57	77,406
4	G4GTA/P	–	333	98	25	17	–	43	75,852
5	G8JC/P	–	179	132	43	12	–	46	66,746
6	G4CDD/P	Denby Dale	175	67	43	23	3	49	56,252
7	G4AYM/P	Gloucester	139	110	63	5	2	44	55,572
8	G4BVY/P	Malvern Hills	84	135	47	20	–	45	51,975
9	GM3NEQ/P	–	86	132	76	13	–	39	48,087
10	G6UQ/P	Stockport	155	127	44	8	–	40	47,800
11	G5GX/P	Hornsea	185	159	7	3	–	34	47,566
12	G3IXH/P	Lincoln	76	92	37	41	–	47	47,188
13	G3RAL/P	Loughborough	153	78	31	15	–	46	45,540
14	G3GIZ/P	Cheston	217	67	31	11	–	36	43,128
15	G3YRC/P	Yarmouth	169	59	33	17	2	38	42,902
16	G3LRS/P	Leicester	157	119	39	1	–	28	38,416
17	G6OI/P	Stourbridge	70	22	97	–	–	23	16,468
18	G3BPK/P	Douglas Valley	39	34	55	9	3	35	15,890

The ROPOCO Contest 1980 results

The first ROPOCO Contest attracted a fairly small entry. However, almost all comments received with the logs reflected enthusiastic support for the originality of this type of event. The exchange of postcodes on a "chain-letter" principle produced some interesting variations by the end of the contest, and put one in mind of the old story concerning the military call for reinforcements to support an advance producing the message "send three and fourpence we are going to a dance"! The exchange "RM2AP" must have had listeners reaching for their DXCC lists! It was apparent in checking that the rule concerning valid post codes received was not practical, so account was taken of the code mutilations if points were deducted.

In the two hours allocated, most stations managed to work each other, so the results were very close. More publicity will be arranged for the next two ROPOCO contests, to be held on 5 April 1981 and 30 August 1981, and it is hoped that this will produce a larger entry.

Comments: "Format successful, puts more ZIP into the contest!" "Strange to hear distorted forms of my postcode, a bit like telegraphic Chinese whispers!" "I felt sorry for the station trying to explain the rules to a PA0!" "What a superb idea for a contest!"

G3MXJ

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	G3YMC	390	9	G3CCZ	320	17	G3KKQ/P	246
	G4BUO	390		G3SNX	320		G3SHY	246
3	G3IAS	380	11	G2VJ	314		G8PR	246
4	G3YCP	374	12	G3WRR/P	296	20	GM3OXC	230
5	G3NOM	362		G4IFB	296	21	G4HZF	224
6	G3CWI	358	14	G3AWR	266	22	G4FAS	192
7	G4HIU	348	15	G4DDX	258	23	G4JMY	60
8	G3UAA	338	16	G4EBK	250			

A check log from G4IP is acknowledged with thanks.

Contests calendar

4, 10, 18, 24 January	Cumulative Activity Periods (3·5MHz) *(Rules in December issue)*
5, 13, 21, 29 January	Cumulative Activity Periods (1·8MHz) *(Rules in December issue)*
11 January	Affiliated Societies Team 1981 *(Rules in December issue)*
17-18 January	QRP Winter 1981 *(Rules in January issue)*
18 January	70MHz CW *(Rules in December issue)*
23-25 January	CQ WW DX 160 *(Rules in January issue)*
24, 25 January	White Rose RS SWL First SWL Lower Frequency *(Rules in January issue)*
31January-1 February	French 1981 (CW) *(Rules in January issue)*
31 January, 8, 16, 24 February, 4, 12, 20 March	BATC Activity *(Rules in January issue)*
7-8 February	7MHz (Phone) *(Rules in August/September issues)*
8 February	432MHz Fixed *(Rules in December issue)*
14, 15 February	PACC 1981 *(Rules in January issue)*
14, 15 February	First 1·8MHz *(Rules in January issue)*
21-22 February	ARRL DX (CW)
28 February-1 March	7MHz (CW) *(Rules in August/September issues)*
28 February-1 March	French 1981 (Phone) *(Rules in January issue)*
7-8 March	ARRL DX (Phone)
***7, 8 March**	March 144/432MHz and SWL *(Rules in January issue)*
14-15 March	Commonwealth *(Rules in December issue)*
21-22 March	Bermuda 1981
21-22 March	CARF (Phone) Commonwealth
21-23 March	BARTG Spring RTTY
28-29 March	CQ WW WPX SSB
4 April	1,296MHz Trophy & SWL
5 April	432MHz Trophy & SWL
5 April	Ropoco 1
12 April	Low Power
26 April	144MHz CW
***2-3 May**	144/432/1,296MHz & SWL
17 May	Region Round-up (CW)
24 May	144MHz Low Power & SWL
7 June	70MHz & SWL
13-14 June	HF NFD
27, 28 June	Summer 1·8MHz
4-5 July	VHF NFD & SWL
19 July	3·5MHz Field Day
2 August	144MHz QRP & SWL
11-12 August	Meteor Scatter
16 August	70MHz Trophy & SWL
30 August	Ropoco 2
5, 6 September	SSB FD
***5-6 September**	144MHz Trophy & SWL IARU VHF (144MHz)
***3-4 October**	RSGB UHF/SHF IARU UHF/SHF
October/November	432MHz Cumulatives 1,296MHz Cumulatives
11 October	21/28MHz (Phone)
18 October	21MHz (CW)
25 October	70MHz Fixed
***8 November**	144MHz CW
14, 15 November	Second 1·8MHz
6 December	144MHz Fixed

**IARU co-ordinated date*

BATC Activity Contest 1981 rules

Dates: 31 Jan-8, 16, 24 Feb-4, 12, 20 March.

Time: 2000-2300gmt each day.

Scoring. Logs have to be entered per band operated – a maximum of four sessions will count for points – if you operate on more please enclose details for checking purposes.

(A) Two-way QSO on 432MHz: 2 points/km.
(B) Two-way QSO on 1·3GHz: 8 points/km.
(C) Two-way QSO on 10GHz: 16 points/km.

Multi-operator stations may only use one callsign.

Crossband QSOs must be entered in the log for the transmit band.

Exchanges. The following data is to be exchanged.

(1) Code group, which consists of four digits, individually chosen by each entrant, ie 1,865 or 9,732. The code group must be exchanged in video only.
(2) Call, QTH locator, report, serial number starting at 001 each session; this data to be exchanged via video or phone.

Should one of the stations fail in receiving the picture of the other, the scores of both stations are to be halved.

144·75, 144·80 and 144·17MHz are well known atv calling channels.

Please QSY from these frequencies as soon as a QSO is established.

Contacts: The same station may only be contacted once per band on each night.

Logs: Must include postal address, locator, and station details and be mailed not later than 3 April to: G. Shirville, G3VZV, 18 Church End, Milton Bryan, Milton Keynes, Buckinghamshire MK17 9HR.

White Rose RS First SWL Lower Frequency Contest rules

1. From 1500gmt 24 January 1981 to 0900gmt 25 January 1981.
2. The contest is open to anyone in the world and there will be two sections, phone and cw. No mixed-mode entries.
3. The 1·8, 3·5 and 7MHz bands are to be used.
4. The practice of logging a series of contacts made by one station is deprecated. Log entries must not include the same callsign in the "Station worked" column more than 20 times on each band.

5. The object of the contest is to log as many stations in as many countries as possible. Scores should be compiled as follows: one point for each station heard on each band from one's *own* continent and five points for each station heard on each band *outside* one's continent. Total points to be multiplied by the number of different countries heard on each band added together. A list of countries heard must be furnished, and a separate log must be submitted for each band.
6. The call areas of the USA, Canada, Australia and New Zealand will each count as a separate country, ie: W1-0; VO1-2; VE1-8; VY1; VK1-8; and ZL1-4. All other countries will be determined by the official RSGB Countries List.
7. No CQ, QRZ or similar call will be allowed to count for points. /AM or /MM stations are not to be included in the entries.
8. Log sheets to show the following information: date, time gmt, band, station heard, station being worked, report at swl QTH. Points may only be claimed for stations actually heard, and the callsign must be shown in full. If points are claimed for both stations the callsign of each must appear in the station heard column.
9. Entries should be sent to Mr D. MacGregor, G4IDJ, Contest manager, White Rose RS, 8 Manor Court, Shadwell, Leeds LS17 8JE, to arrive not later than 17 March 1981.
10. Certificates of merit will be awarded at the discretion of the White Rose RS, and its decision will be final.

YOUR OPINION

CHRISTIAN AND SOCIAL REHABILITATION

The Editor,
Radio Communication

Sir—Could we use your pages to offer thanks to the following companies and persons who have helped us so much in the last six months in the setting up of our radio shack. We are involved in the care and rehabilitation of young men who wish to be helped with their drug, alcohol or other problems. We use electronics and amateur radio as one of our hobby projects, it encourages diligence and co-ordination, and brings our lads into contact with people all over the world.

A Trio 9R59DS was kindly donated by Lowe Electronics. Another receiver, the RX80, was designed by A. L. Bailey, G3WPO; it has a crystal-controlled front-end providing band selection, and the output from this board is fed into a 3·5–4MHz board which acts as a tunable i.f. We also hope to build a digital frequency readout when the plans for this project become available. The RX80 circuitry was donated by Roy Stevens, G2BVN. Decca and Cable & Wireless donated equipment and funds to enable us to erect a very efficient antenna system using an 18AVQ vertical and a 108ft trap dipole. Ammcom Services provided the atu, Heathkit Ltd provided the morse oscillator, and the wide-band preamp was given to us by C. Bowes. We have been greatly encouraged by Mr Tong's gift of a Datong morse tutor, and by Mr F. L. Curtis's gift of the G3SVK morse course.

We would also like to thank the RSGB and *Shortwave Magazine* for their generous donations of books and subscriptions, and last of all, but not least, Mr Geoff Stone, G3FZL, and all the other radio experts who have helped us so much.

Two of this household are attending evening classes at Ferndale College, Brixton, and hope to sit for the RAE next May.

Thank you all for your very valuable help.

Arthur (BRS44147) and Susie McBryan, house parents, Pye Barn Ltd

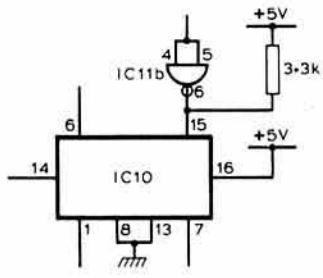
"MODERN FREQUENCY COUNTER"

The Editor,
Radio Communication

Sir—I noticed that the design for the frequency counter by Mirko Voznjak, YU1AD, (*Radio Communication* June/July) involved mixing both ttl and cmos devices. While this practice is normally alright, it should be noted that a logic "1" for ttl can be as low as 1·4V, corresponding to a cmos logic "0". Therefore it is advisable to connect a "pull-up" resistor to any ttl output driving a cmos gate, 3·3 to 4·7kΩ being a suitable range of values. This simple addition makes the logic switching much more reliable; part of Fig 4 on page 603 would be modified as shown below.

G. A. Farmer, BRS44159

The author of the article comments:
Mr Farmer is absolutely right, but in practice I did not experience any difficulties in that respect. I have since built six more counters based on the same principle, ie using the same control logic, and no difficulties have been experienced. A pull-up resistor in ttl/cmos interfacing might be crucial at the upper end of the frequency spectrum, generally applicable for cmos, but at the low speeds it may not be too important. The cautious constructor can, however, easily add a small resistor to the pcb to complement what is recommended.



M. Voznjak, YU1AD

CRYSTAL EXCHANGE

The Editor
Radio Communication

Sir—Several replies have now been received regarding the suggested scheme for a crystal exchange and information bureau. The following suggestions have been made:

1. Any such scheme should be run as a club insomuch as anyone requesting information as to where he can obtain a particular frequency and/or style of crystal should first submit a list of crystals he has in his own junk box. (Assuming, of course, that he has some.)
2. The intention of the scheme is to provide information only, and to put a person requiring crystals in touch with someone who has suitable devices to spare.
3. The scheme is intended primarily for the constructor, and is not intended to take away any business from the commercial market.
4. The running of this scheme would be an ideal project for someone with a home computer, who has run out of things to do with it. Any volunteers, or anyone with further ideas, is welcome to contact GM4HQR at his /A QTH of 34 Cawdor Drive, Glenrothes, Fife KY6 2HN.

Kenneth W. Turner, GM4HQR

OLD CALLSIGN "5FZ"

The Editor
Radio Communication.

Sir—We refer to our letter in the August issue of *Radio Communication*. At the date of writing, the response has been almost overwhelming, some 24 replies having been received from licensed amateurs and short wave listeners, who have sent along information on the old callsign and the Lincoln Wireless Society, gleaned from their old records. We thank these amateurs most sincerely for their efforts to help us, and especially those who included photocopies of early call lists which they hold. We believe that we now have enough information to submit to the Home Office in support or our claim to have the old call re-activated and issued to the club.

Through your columns we would like to mention the following amateurs who have given of their time and goodwill so generously to further this project: G2s AK, QY and ZT; G3s KP, BAC, HWR, LKJ, PAZ, RRK and XY; G4s HXK and GLX; G5s AS, HN, UM and YU; G6s HL, JP, LJ and NR; G8VG; BRS5477 and RS40458.

Many thanks and best wishes to all,

Mike Wells, G4JES, Secretary, Lincoln Short Wave Club

OBITUARIES

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

Mr W. L. Griffiths, GW3REQ
Bill Griffiths died on 29 September 1980, aged 62. Although active on most hf bands in recent years he concentrated on 144MHz (fm and ssb). He was a member both of the Bridgend and District ARC and the local Raynet group.

Mr G. W. A. Illingworth, G8QC
Gerry Illingworth, a long-time member of the RSGB and RAOTA, died on 29 October. A keen cw operator and constructor, he was a member of the Civilian Wireless Reserve and the RSS during the war. He became chairman of the Ainsdale Radio Club in 1957 and was held in great esteem by all members, young and old, for his large experience.

Mr J. W. Mathews, G6LL
Jimmy or "Double-L", who died on 18 November, will be remembered to the older members as "Mr Ten Metres". He was first licensed in 1924 and joined the Society in 1926. He soon became well known in the Society, especially for his work on crystal control and 28MHz. Although not a great enthusiast for dx, he made his mark by being the first British station to contact the USA on 28MHz on 21 October 1929.

Jimmy frequently contributed articles to the *T & R Bulletin*, gave lectures to the Society, and from 1929 to 1933 was a member of the Editorial Committee. He served on Council in 1929, 1932–4, 1938–40 and 1946–8. He was elected a vice-President of the Society in 1951.

Always interested in technical matters, and a meticulous equipment constructor, Jimmy was in every sense a "professional amateur". He joined the Technical Committee (now the Technical & Publications Committee) to which he contributed considerable time and effort. He contributed "A Sensitive Harmonic Indicator" in 1961, at a time when tvi was a new problem for hf transmitters, and later published an advanced design for a reflectometer for vhf use. For several years he compiled the *RSGB Amateur Radio Call Book*. His interests were wide and varied, and in his later years he enjoyed regular communication on 144 and 3·5MHz. His 3 o/c net was enjoyed by all who joined it, and he gave to, and derived pleasure from, newcomers and handicapped operators. His good nature and pleasant manner will always be remembered.

Mr R. J. Tinning, G3FIX
John Tinning died on 1 October. He had just returned to the hf bands after some years' absence, although he had always maintained a keen interest in amateur radio.

Mr E. J. Toy, G3BFE
Eric Toy died on 14 September, aged 65. His amateur activities began at Oxford in 1946, but lapsed when he married in 1948. On retirement he passed the RAE and reclaimed his old callsign. He was a very competent cw operator on the hf bands, 3·5 to 28MHz, with the occasional excursion to ssb, being a very active member of the RNARS cw nets. He was also a member of RAFARS and RAIBC.

Mr J. A. Wood, G3AWD
Mr Wood died on 3 April 1980. He had been a member of the RSGB since 1943. He was always willing to give help and advice to anyone starting out in the hobby, and was a former member of the Clifton Club, later joining the Cray Valley Radio Society.

We have also been advised of the death of:

Dr L. Pennelegion, G8FIO, on 10 October.

Mrs F. Bradbury
The Society also records with regret the death of Mrs Flo Bradbury, wife of Mr C. A. Bradbury, BRS1066, on 21 June 1980. She was well known to many members as a result of the support she gave her husband in connection with the QSL Bureau.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock time	Callsign	MHz	Mode	Town	Notes
Sundays					
0915	G3LEQ	144·225 145·250 1·950 29·250	A1/A3J F2/F3 A2/A3 F2/F3	Knutsford, Cheshire	[9]
0930	G3WNR	145·450	F2/F3	South Shields, T & W	[1]
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos	
1030	G3OHM/A	144·180	A1/A3J	Birmingham	
1100	G2FXA	1·910	A1/A3/A3J	Stockton-on-Tees	
1100	G3XJJ	3·535	A1/A3J	Northampton	
1100	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
1130	G3BLS	145·375	F2	Osney, Oxford	[1]
1200	G3HVI	144·750	A2/A3	Stoke-on-Trent, Staffs	[1]
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
1400	G3LZV	145·250	F2/F3	Manchester	[3]
1800	G3WNR	145·450	F2/F3	South Shields, T & W	[1]
1815	G3LEQ	144·250 145·250 1·950	A1/A3J F2/F3 A2/A3	Knutsford, Cheshire	[9]
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks	
1830	GM4HIG	3·550 145·550	A1/A3J F2/F3	Aberdeen	[1]
1900	GW3WSU GW4GSH	145·250	F2	Barry, S Glam	[1][10]
1930	G3LDW	144·160	A1/A3J	Halesowen	[1]
2000	G3LZV	145·250	F2/F3	Manchester	[3]
2000	G4JBB	145·425	F2	Birmingham	[11]
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs	[7]
Mondays					
1100	G4IRI	3·550	A1/A3J	Bolton, Lancs	
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
1300	G3VHE	3·525	A1	Swindon, Wilts	
1330	G3VHE	145·350	F2	Swindon, Wilts	[1]
1830	GM4HIG	144·250	A1/A3J	Aberdeen	[2]
1900	G3VHE	145·350	F2	Swindon, Wilts	[1]
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs	
1930	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
1930	GI3SXG	144·100	A1/A3J	Newtownards, Co Down	
2000	G3LZV	145·250	F2/F3	Manchester	[3]
2000	G4IRI	3·550	A1/A3J	Bolton, Lancs	
2030	G3ASR	1·875 144·175	A1/A3J A1/A3J (lsb)	Harrow, Middlesex	[1][4]
2030	G2FKO	145·525	F2	Bideford, Devon	
Tuesdays					
1830	G4CWN	144·100	A1/A3J	Stoke-on-Trent, Staffs	
1900	G4RS	3·565 145·525	A1/A3J F2/F3	Catterick, N Yorks	[1]
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall	[5]
1930	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
2030	G3IRM	1·975	A1/A3	Bury St Edmunds, Suffolk	
2030	G4FFC	144·390	A1/A3J	Pertenhall, Beds	[6]
2030	G3OHM/A	144·180	A1/A3J	Birmingham	
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex	
2030	G2FKO	145·525	F2	Bideford, Devon	
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs	[7]
2200	G3AWL	144·110	A1/A3J	Easington, Co Durham	[8]

Clock time	Callsign	MHz	Mode	Town	Notes
Wednesdays					
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
1830	G3WNR	145·450	F2/F3	South Shields, T & W	[1]
1900	GW3WSU GW4GSH	145·250	F2	Barry, S Glam	[1][10]
1900	G2ABC	145·250	F2/F3	Truro, Cornwall	
1900	G3ULY G4EXD	1·960 145·475	A1/A3J F2/F3	Culgaith, Cumbria	[1]
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall	[5]
1930	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
2000	G3SWP	144·180	A2/A3J	Doncaster, South Yorks	[1]
2000	G3LZV	145·250	F2/F3	Manchester	[3]
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex	
2030	G2FKO	145·525	F2	Bideford, Devon	
2100	G3HVI	144·750	A2/A3	Stoke-on-Trent, Staffs	[1]
Thursdays					
1100	G4IRI	3·550	A1/A3J	Bolton, Lancs	
1900	G4BNA	3·590	A1	Swindon, Wilts	
1900	G3BLS	145·375	F2	Osney, Oxford	[1]
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs	
1900	G4RS	3·565 145·525	A1/A3J F2/F3	Catterick, N Yorks	[1]
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall	[5]
1930	G3ASR	1·875 144·175	A1/A3J A1/A3J (lsb)	Harrow, Middx	[1][4][12]
1930	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
2000	G2ACZ	1·808	A1	Mablethorpe, Lincs	
2000	G3LZV	145·250	F2/F3	Manchester	[3]
2000	G4IRI	3·550	A1/A3J	Bolton, Lancs	
2030	G2FKO	145·525	F2	Bideford, Devon	
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs	[7]
Fridays					
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
1830	G4CRI	3·525	A1	Helston, Cornwall	
1830	G4ILW	145·450	F2/F3	Gateshead, T&W	[1]
1900	G4FIM	145·550	F2/F3	Leeds, Yorks	
1930	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
2000	G3WQK	144·775	F2	Hailsham, Sussex	
2030	G2FKO	145·525	F2	Bideford, Devon	
2200	G3AWL	144·110	A1/A3J	Easington, Co Durham	[8]
Saturdays					
0915	G3LEQ	144·250 145·250 1·950	A1/A3J F2/F3 A2/A3	Knutsford, Cheshire	[9]
1100	G3LZV	145·250	F2/F3	Manchester	[3]
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
2000	G3LZV	145·250	F2/F3	Manchester	[3]
2000	G4JBB	145·425	F2	Birmingham	[11]
2030	G2FKO	145·525	F2	Bideford, Devon	

Notes

[1] Omnidirectional
[2] Horizontal to SW
[3] Vertical to S
[4] Vertical
[5] Vertical to E
[6] Horizontal to S
[7] To SW
[8] To S
[9] Slant polarized to WNW
[10] To NE
[11] To NNE
[12] First and third Thursdays in each month

Mobile rallies calendar

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

12 April—White Rose Rally, West Park Girls High School, Spen Lane, Leeds 16, 11am. Usual attractions, good food a speciality. Further details from rally manager R. Hughes, G4DZI, QTHR.

26 April—Drayton Manor Mobile Rally, Drayton Manor Park, on A4091, nr Tamworth, Staffs. Organized by Midland ARS and Stoke-on-Trent ARS. Start 11am. Attractions include trade stands, Post Office, BM/CB Repeater Group, Raynet, flea market and bring and buy sale etc. Radio talk-in on 144 and 432MHz. Further details from N. Gutteridge, G8BHE, QTHR.

26 April 1981—Southend & DRS Mobile Rally, Southend Airport Exhibition Centre, Aviation Way, Southend-on-Sea, Essex. Many attractions, including licensed bar, refreshments, parking for 300 cars, aircraft museum, talk-in station, bring-and-buy stall. Details from F. Thorogood, G8ORV, QTHR, tel Southend-on-Sea (0702) 616239.

28 June—Longleat Mobile Rally, Longleat Park, Warminster. Preliminary enquiries, G4FRG, QTHR. Tel 0272 848140.

12 July 1981—Worcester & DRS Rally, formerly Upton Rally. **New venue:** Droitwich High School, Droitwich, Worcs, three miles from M5, junction 5. Further information will be announced later. Details from Tony Blisett, G8NSL, QTHR, tel Worcester 620507 or Mike Tittensor, G4EKG, QTHR, tel Evesham 41105.

19 July—Sussex Mobile Rally, Brighton Raceground, Racehill, Brighton, Sussex, 11am. Special event station GB2SMR will be in operation. Many attractions including free minibus trips to Brighton beach. Free parking for 4,000 cars. Further details from A. K. Barker, 38 Elphick Road, Newhaven, Sussex BN9 9SY.

Looking ahead

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

10 January—RSGB Presidential Installation, Queen Hotel, Chester.

29 March—Northern Radio Societies Radio and Electronics Exhibition, Belle Vue, Manchester.

11 April—RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.

CLUB NEWS

FORTHCOMING CHANGES

Commencing with the March issue, the frequency and style of "Club News" will be changed. It will then become a monthly feature of club **NEWS**, and not, as at present, a bi-monthly compilation of basic club information plus meetings and other news. Over the past year, of the average seven to eight pages of "Club News" published every two months, the amount of unchanged information has been the equivalent of three to four pages. This space will therefore be better utilized for monthly news. *Unchanged* basic information about clubs; ie date, time and place of meeting and the name of the person to contact, will in future be published in January and July only.

All RSGB affiliated societies and clubs, and RSGB groups, are invited to submit news items; programmes of meetings and details of changes to basic information without delay to their regional representatives (not to the editor), in order that they may be published in the first possible issue after receipt.

Information for publication in the **March** issue should reach RRs by **18 January**.

REGION 1—RR W. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT.

Ainsdale (AARC)—Tuesdays, fortnightly, commencing 6 January. Ainsdale Scout HQ. Full details from G2CUZ. Please note change of day for meetings.

Barnoldswick (Rolls Royce ARC—Barnoldswick)—First Wednesday in each month. Rolls Royce Sports & Social Club, Barnoldswick. CW class, Mondays, 7.15pm. RAE course, Tuesdays, 7pm. Bar, refreshments. Visitors welcome. Hon sec Leslie G. Logan, G4ILG, 19 Fenton Avenue, Barnoldswick, Colne, Lancs BB8 6HB.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Blackburn, Sec F. Hill, G3YWH.

Blackpool (B&DARS)—First Monday in each month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—First, third and fourth Wednesdays in each month. Horwich Leisure Centre, Horwich, Bolton. Sec Alan Hartley, G8PRH, tel Bolton 46023.

Bolton (BTCARC)—newly affiliated club—no other details available.

Bolton (Edbro RC)—Details from sec, c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)—12 January ("Contests", "Repeaters", "Antennas", "Mobiles", short talks on each subject, primarily for new licensees, by G4BVE, G8GTP and G4JAG), 9 February ("The good old days", by G2AKR), 7.30pm. Informal meetings other Tuesdays for constructional projects, "noggin and natter" sessions. Mosses Community Centre, Cecil Street, Bury. Club membership now over 100 and still growing. RAE course has over 30 participants. Further details from club publicity officer, Chris Marcroft, G4JAG, 24 Lancaster Avenue, Ramsbottom, Bury, tel Ramsbottom 2168.

Carlisle (C&DARS)—Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD.

Chester (C&DARS)—Tuesdays, 8pm, except first Tuesday in each month. YMCA, Chester. Sec D. Cutts, tel Gresford 3344.

Douglas (IoMARS)—Mondays, fortnightly. Keppel Hotel. Cregny-Baa, Nr Onchan. Sec GD4FWQ, tel Douglas 22295.

Eccles (E&DARC)—Tuesdays, 8.30pm. White Swan, Worseley Road, Swinton. CW class each week. Sec Chris Harrison, G8KRG, 15 Cockey Moor Road, Starling, Bury BL8 2HD, tel 061-797 0031.

Leyland (LHARG)—Second Monday in each month. Rose and Crown, Ulnes Walton, Leyland. Club very active, membership now over 30. After 11 years G3XII is retiring as secretary. New sec Arthur Jolly, G4JCO, 30 Crawford Avenue, Chorley, Lancs.

Liverpool (L&DARS)—6 January (Surplus sale), 13 January ("Video studio techniques", by Neal Philips), 20 January ("Flying", by P. Myers, G4AHS), 27 January ("Some aspects of vhf antennas", by G3WOH), 3 February (Quiz), 10 February (Mystery guest speaker), 17 February ("Canal cruising", by B. Emmanuel), 24 February (Surplus sale), 8pm. G3AHD cw practice sessions, Thursdays, 8.30pm on 144·250MHz. Conservative Association Rooms, Church Road, Wavertree, Liverpool. New secretary, R. Simmons, G3PNS, 62 Daneville Road, Liverpool L4 9RG.

Liverpool (North Liverpool RC)—For details of meetings please contact R. Porter, G3VXK, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD, tel 051-928 1610.

Liverpool (UoLARS)—Lunchtimes. Shack in Reilly Building, open any time. Callsigns G3OUL and G8JUL active 1·8 to 432MHz. Would prospective members please contact Paul Broadhurst, G8LGL, UoL, 2 Bedford Street North, Liverpool L7 7BD.

Macclesfield (M&DRS)—Second Tuesday in each month, 7.45pm. For details of venue and programme contact Mary Roberts, 15 Park Brook Road, Macclesfield, tel Macclesfield 24383.

Manchester (M&DARS)—Wednesdays, 7.30pm. Newton Heath Community Centre, 203 Droylesden Road, Newton Heath, Manchester. Sec G8OWY.

Manchester (MUARS)—Wednesday afternoons and most lunchtimes in the radio shack (Manchester University Union, top floor). CW and RAE classes etc available. G3VUM active on hf, rtty, etc. Also with UMIST on Thursday evenings in UMIST union bar! Visitors always welcome. Details from J. Lenartowick, G8RQZ, c/o Radio Society, Manchester University Union, Oxford Road, Manchester 13.

Manchester (South Manchester RC)—16 January (Natter nite), 23 January ("Travels in W/VE Part 2", by Roland Parkinson, G3FNM), 30 January (Technical forum), 6 February ("Simple transistor circuit design", by C. Ward, G4HON), 13 February (Surplus equipment sale), 20 February (Tape slide lecture), 27 February (Mystery lecture), 6 March (Night df), 8pm. Informal meetings, Mondays, 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, 32 Woodville Drive, Sale M33 1NF, tel 061-973 1837. Visitors always welcome.

Manchester (UoMISTRS)—Wednesday afternoons. Radio Shack, L Floor, Main building. Thursdays, 9pm. UMIST Union Bar. All staff, students and visitors welcome. Call signs G3CXX/G8FOT active on 1·8-432MHz. For further information contact Nigel Allison, G8KHE, c/o UMIST RS, UMIST Union, PO Box 88, Sackville Street, Manchester M60 1QD, tel 061-236 9114.

North Western Repeater Group—Third Thursday in each month (Informal), 8pm. Globe Club, Willows Lane, Accrington, Lancs. Details from sec, G3RXH.

Ormskirk (OARC)—Tuesdays, 8.30pm. "Over 60's" Hut, Liverpool Road (opposite Christ Church). For details contact either G4HDU, tel Aughton Green 423062; or sec G4IGX, tel Ormskirk 75546. Club interests include vhf, uhf, hf, rtty, contests, film and slide shows.

Penrith (Eden Valley RS)—Third Thursday in each month. Two Lions Hotel, Great Dockray, Penrith, Cumbria. Sec G4HYJ, *Herald* office, 14 King Street, Penrith, Cumbria. Full programme. Visitors welcome.

Preston (PARS)—Alternate Thursdays. St Mary Magdalene Church Hall, Farringdon Lane (Ribbleton Lane), Preston. Hon sec G. Earnshaw, G3ZXC.

St Helens (StH&DARC)—Thursdays, 7.45pm. YMCA, North Road, St Helens. Hon sec Paul Gaskell, G8PQD, 131 Greenfield Road, St Helens, tel St Helens 25472. Club net Sundays 11.30am, 145·575MHz (S23).

Salford (Dial House RS)—Wednesdays, 5.30-9.30pm. Dial House, 21 Chapel Street, Salford, Lancs. Net channel 145·25MHz fm—the club station G3WDH monitors this frequency every club night for any other station. Details from sec G8JCL, c/o M43 at above address.

Stockport (SRS)—Second, third and fourth Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road (corner of Bramhall Lane), Stockport. Club net 3,692kHz, 11am, Sundays, SRS International, 28·430MHz, 10am, Sundays. Hon sec, G3FYE.

Thornton Cleveleys (TCARS)—7 January ("Another look at the early days", by G6DN), 21 January (Film—"Manufacture of transistors"), 4 February (Sale of equipment of the late G5TH), 18 February (Natter night), 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to Gardener's Arms), Thornton. RAE classes available to club members. Details from sec A. Parr, G3IWP, 43 Argyle Road, Poulton le Fylde, Lancs.

UK FM Group (Western)—First Thursday in each month, 8pm. Grappenhall Community Centre, Grappenhall, Nr Warrington. Sec G3LEQ, tel Knutsford 4040.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec G3MMD, tel Lymm 3533.

Wigan (Douglas Valley ARS)—First and third Thursdays in each month. Shevington Conservative Club, Shevington, Wigan. Details from G4EHK, tel Appley Bridge 3320.

Winsford (Mid-Cheshire ARC)—This club has amalgamated with ICLRC and now meets every Wednesday, 7.30pm. ICL Sports and Social Complex, Newton Park, near Winsford. Facilities comprise a meeting room, classroom, shack and canteen. New members should note all club members *must* be associate members of ICL Sports and Social Club and membership is limited. For details please contact M. Barry.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Hon treasurer G. O'Keeffe Wilson, 20 South Drive, Upton, Wirral, Merseyside.

Wirral (W&DARC)—14 January (AGM), 28 January (RSGB tape/slide lecture—"The Human machine as a radio operator"), 11 February (Talk/demonstration by Microwave Modules), 25 February (RSGB tape slide lecture—"Aerials"), 8pm. Sports Concourse, West Kirby, Wirral. Hon sec Ian Brooks, G8PMW, 28 Paignton Road, Wallasey, tel 051-639 5666.

Many thanks for the extra information received for this edition of "Club News", and for all the details supplied during 1980. Keep up the good work and please remember the deadline dates, these *are* important. *RR1.*

Region 1 Trophy winners 1980

For HF NFD: RR's Cup, G3LWQ Rosebowl, and 80m "Tent"—Stockport RS

For VHF NFD: G2AMV Trophy—Stockport RS

For Region 1 VHF Contest: G2CIP Shield—PACT/G4BVE; G3SMM Shield—G4HGT

Congratulations to all concerned and thanks to G2CUZ for managing the Region's trophies.

To all amateurs, swls, and all others interested in amateur radio, RR1 sends his best wishes for 1981.

On January 10, G2AMV will be installed as the RSGB President at an evening function at the Queen Hotel, Chester.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094 786 333.

Bradford (UoBARS)—Thursdays, 7.30pm. N10, Main Building. Sec G8GOV, 30 Moorfield Drive, Baildon, Shipley, West Yorks. Net frequency 145·275.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Pie Hall, Denby Dale. Sec J. Clegg, G3FQH, has written to tell me that the club has decided to hold a rally next year at Shelley High School, Shelley, nr Huddersfield, on Sunday, 5 July. Give Jack a shout if you are interested.

Doncaster (DMIofHEARC)—Details from sec Robert Lane, G4AWU, Kelston, Doncaster Road, Bawtry, Doncaster, S. Yorks. Club call G3UER.

Goole (G&DARS)—Fridays, 7.30pm (during school term only). Goole Grammar School. Details from chairman G3VBI.

Halifax (Northern Heights ARS)—Wednesdays, 7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. Sec G8NUC. There is an interesting survey of 144MHz handhelds in the latest newsletter, and some members' ads which I wish I had seen earlier! Marcus (G8NUC) tells me that there is quite an ambitious programme of public events organized for this year. The saga of the interfering police transmissions still continues, the next layer of authority having been involved at the time of writing.

Hornsea (HARS)—Wednesdays, 8pm. The Mill, Mill House, Attic Road, Hornsea. Sec Mrs J. Heathershaw, G4CHH.

Hull (H&DARS)—Fridays, 8pm. RAE classes are held at 9pm each Friday. Kingston Community Centre, Fountain Road, Hull. Sec G8GLM, 27 Trafford Road, Willerby, Hull HU10 6AJ. I heard this club working JOTA and had a long chat with Tom, G3RDM, who told me that they have quite a few prospective RSGB members. Their RAE classes seem to be very popular.

Hull (HUR&ES)—Tuesdays, 1.15pm. Room 313B, University Union Building, Cottingham Road. Enquiries to G8RPZ. All amateurs welcome.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Sec G4GDL. I visited this club and enjoyed the lecture on computers. A very friendly crowd, and a first-class club shack. Preparations for the White Rose

Rally are well advanced and it is hoped to have the identity card machine in operation on a stand there.

Leeds (L&DARS)—Mondays, 8pm. Note new address—Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. A letter from chairman Neville Barker, G4FIM, informs me that this new club is going from strength to strength. Their new hq is a first class radio site and it is hoped that they will have a shack there eventually. They are getting some lectures lined up, and it looks as if they are going to have a busy summer. Details from G4FIM, tel Leeds 564703.

Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street, Otley. Sec Jack Annakin. Jack is trying to get a lecture on microprocessors organized. Contact G8DFZ for details.

Pontefract (P&DARC)—The new club premises are in use. Details from sec, G4DTO, 43 Red Hill Drive, Airdale, Castleford, Yorks. Good beer served at this club, I enjoyed my visit. *RR2.*

Scarborough (SARS)—Mondays, 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ.

Sheffield (SARS)—Third Monday in each month, 8pm. Sheaf House Hotel, Bramell Lane, Sheffield. Sec G4APV, 321 Fulwood Road, Sheffield S10. Visitors and swls particularly welcome.

Sheffield (British Steel Corporation ARS)—Wednesdays, 7.30pm. Tinsley Sports and Social Club, Bawtry Road, Sheffield. Details from G3XSI, tel Sheffield 51417.

UK FM Group (Northern)—Royal Hotel, Church Street, Barnsley. Sec G8PLJ. A good attendance at their AGM in November was told of quite a successful year of operation. Finances seemed quite sound, (but if you use a repeater regularly it seems only fair to me that you make some contribution towards its upkeep), and the equipment seems to be kept nicely up to scratch by their technical manager. Some slight changes were made to their constitution. It was a good AGM (and I like the beer they serve there too!).

Wakefield (W&DARS)—13, 27 January, 10, 24 February, 10, 24 March, 8pm. Holmfield House, Denby Dale Road, Wakefield. For up-to-date details listen to GB2RS, or telephone the sec, Rick Sterry, G4BLT, (not QTHR) on Wakefield 255515.

Wharfedale Repeater Group—New entry from this group. They run GB3WF on RB14. Details from sec Jack Burgess, G3KKP.

York (YARS)—Fridays except third in month, 7.30pm. United Services Club, 61 Micklegate, York. Details from sec K. Cass, G3WVO.

Many thanks to those who came to see me at Leicester, it's nice to put a face to the callsign, and interesting to hear members' comments. We do listen to them, honest we do. Not a lot of news this month, it's time to chase your secretaries again! *RR2.*

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—20 January, 17 February, 8pm. Room 118, University of Aston, Gosta Green, Birmingham. Sec G8BHE, tel 021-422 9787.

Birmingham (Slade RS)—First Friday in each month, 7.45pm. The Kingsbury Road Community Centre, 75 Kingsbury Road, Erdington, Birmingham B24 8QH. Sec G4FGF, tel 021-770 3474.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 4 February (Stereo vision demonstration by Derek Brown, G4GZJ), 4 March (Video tape lecture—venue to be announced), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104.

Birmingham (University of Birmingham ARS)—Lunchtimes and Thursdays during term, 7.30pm. Tuesdays (RAE classes), 7.30pm. Club room, second floor Students' Union (above shop). Sec G8VNC.

Bromsgrove (B&DARC)—9 January, 13 February, 13 March (AGM), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4HFP, tel Stourport (02993) 3818.

Burton-on-Trent (BoT&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.

Cannock Chase (CCARS)—First Thursday in each month (Formal); other Thursdays (Informal); 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, Cannock. Sec G4IDK, tel Penkridge (078571) 2067. Visitors and new members welcome.

Coventry (CARS)—Fridays, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G8SEQ, tel Coventry (0203) 598186. Visitors welcome.

Coventry (CTCARS)—Mondays, 7pm. Winfray Annexe of the college. Sec G8ISJ.

Coventry (UoWARS)—Wednesdays during term, 7pm. Cryfield Farm, University of Warwick. Talk-in on S20, or contact G4BXI or G4DCW, Hurst Flat 40, Cryfield Village, University of Warwick.

The 1980 Jamboree-on-the-air station, G4GEP/A, representing Harbury Scout Group, being operated by Martin Chapple, G8XQS

Dudley (DARC)—Second and fourth Tuesdays in each month, 7.45pm. Central Library, Dudley. Sec Norman Rock, 28 Conway Close, High Acres, Kingswinford, Brierley Hill DY6 8PT.

Hereford (HARS)—First and third Friday in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. 14 February (Annual dinner—see sec). Sec G4CNY, tel Hereford (0432) 3237.

Kidderminster (K&DARC)—Mondays (Informal), 9.30pm. Bellman's Cross, Shatterford. 20 January (Ham evening), 3 February (Talk and demonstration of interference detection by a local inspector), 17 February, 3 March, 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Lichfield (Chad RC)—Alternate Wednesdays, commencing 28 January, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK.

Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. Swan (bar), Lichfield. Sec G3NLY, tel Burntwood (05436) 71447.

Malvern Hills (MHRAC)—Second Tuesday in each month, 7.30pm. The Foresters' Arms, Wilton Road, Barnards Green, Malvern. Sec G8JAO, tel Malvern (06845) 63270.

Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8RZR, tel Warwick (0926) 496453.

Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT.

Rugby (RATS)—Wednesdays, 7.30pm. Cricket pavilion entrance to B Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec G4ECQ.

Shrewsbury (Salop ARS)—15 January (Natternight), 22 January ("Video", by Ken Walker, G8DIR), 29 January (Natternight), 5, 12, 19, 26 February, 5, 12 March, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3VWH, tel Shrewsbury (0743) 51833. New members and visitors welcome.

Solihull (SARS)—20 January ("Air traffic control and navigation", by Ken Parkes, G8AIR), 17 February ("Air-call", by Chris Kirby, G4FZN), 7.30pm. The Manor House, High Street, Solihull. Club net (G3GEI), Fridays, 9.30pm on 1,960kHz. Sec G4JDL, tel 021-745 3098. Morse classes available. New members and visitors welcome.

Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month (Lectures, etc), other Mondays (Natternights, Raynet and club station, G4BEM), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec G8ORU. New members welcome.

Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4IMV, tel Newcastle (0782) 613207.

Stourbridge (StARS)—19 January (Annual construction contest), 26 January (Annual dinner—see G4JBV), 2 February (Constructional evening), 16 February, 2 March (Constructional evening), 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G4IEB, 7 Hanbury Hill, Stourbridge, West Midlands DY8 1BE. Tel Stourbridge (03843) 2006.

Stratford-upon-Avon (SuA&DARC)—No regular meetings but occasional events. Help always given to new amateurs and swls. Chairman/sec G3OOQ, tel Stratford (0789) 5973.

Sutton Coldfield (SCRS)—26 January (Natternight), 9, 23 February (Natternight), 9 March, 7.30pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Tamworth (TARS)—Second and fourth Mondays in each month, 7.30pm. White Lion, Lichfield Street, Tamworth. Other Mondays (Informal). Club shack. Sec G4FZN, tel Tamworth (0827) 69708. Club net Wednesdays 145·375MHz, 9pm. Visitors welcome.

Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G3UKV, tel Telford (0952) 55416. Visitors welcome.

Walsall (WARC)—Alternate Wednesdays, commencing 21 January, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G4GKC, tel Walsall (0922) 31675.

Willenhall (W&DARS)—Alternate Wednesdays, commencing 21 January, 8pm. Three Crowns, Stafford Street, Willenhall. Sec G4FAP. New members welcome.

Wolverhampton (WARS)—Mondays, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV6 9PH. Sec G8EDG, tel Wolverhampton (0902) 763617.

Worcester (W&DARC)—2 February ("CW operating", by Ray Dobdinson, G3RGD), 16 February (Skittles evening), 2 March ("Check your spec—vhf", by Roger Allan, G3TQZ), 8pm. Old Pheasant, New Street, Worcester. Sec G4EKG, tel Evesham (0386) 41105. New members and visitors welcome.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Derby (D&DARS)—7 January (Junk sale), 14 January (Year in retrospect), 21 January (Sugiyama equipment by Zycomm), 28 January (Night on the air), 4 February (Junk sale), 11 February (Slide show, G8KSW), 18 February (Natternight), 25 February ("Line transmission", by Peter Neal), 7.30pm. Morse classes, Tuesday and Thursday, 7pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby (0332) 556875.

Derby (Nunsfield House ARG)—Fridays, 7.30pm. Nunsfield House, Bolton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby (0332) 71875 or 799452.

Glenfield (Leicestershire Raynet Group)—Meetings monthly, County Hall, Glenfield. Sec M. G. Barker, G8CAC, tel Desford 3026.

Grimsby (GARC)—First and third Thursday in each month, 8 January (RTTY), 15 January (Oscar), 8pm. New Alexandra Social Club, Cleethorpes. Sec Trevor Matthews, G3RGC, tel Grimsby 884060.

Hinckley (HAR&ES)—For details contact P. A. Wheatley, G8SHH, tel Hinckley 613987.

Ibstock (IARC)—13 January (Visit by Daventry club), 27 January (Interference by G8SOZ), 10 February (Night df hunt), 24 February (Talk by G8POS), 7.30pm. Ram Inn, High Street, Ibstock. Sec Ted Bowen, G4JKQ, tel Ibstock 60396.

Leicester (LRS)—Mondays, 7.30pm. Club House, Gilross Estate Cottage, off Groby Road, Leicester. Sec J. W. Moore, G4GVC, tel Leicester 895911.

Leicester (LPARS)—Mondays, Wednesdays, Thursdays and Fridays, lunchtime during term. Leicester Polytechnic. Sec G3ORY.

Leicester Repeater Group—for details contact sec M. G. Barker, G8CAC, tel Desford 3026.

Lincoln (LSWC)—Second and fourth Wednesdays in each month. Lincoln Corporation Social Club, Waterside South, Lincoln. Sec G4JES, 4 Horner Close, Brant Road, Lincoln.

Loughborough (LFARC)—Fridays, 8pm. Brush Sports and Social Club, Fennel Street, Loughborough. Sec G8BUB.

The opening of the Ibstock Radio Club station. Front, l to r: G4JKQ, hon sec; Deborah Robinson, Leicestershire Coal Queen; G8UZO. Back, l to r: G8SUN, G8WIO. *Photo:* Deryk Wills, G3XKX

Louth (L&DARC)—Eastgate Union Church, Eastgate, Louth. Sec R. M. Padbury, G4GAB.
Mansfield (MARS)—First Friday in each month, 7.30pm. New Inn, Westgate, Mansfield. Sec G4AAH, 223 Southwell Road, Mansfield.
Matlock (Derwent Valley ARS)—First Monday in each month. Chatsworth House, Matlock Training College, Chesterfield Road, Matlock. Sec Steve Boiler, G8VEF, c/o Lowe Electronics Ltd.
Melton Mowbray (MMARS)—Fridays, 16 January ("Intruder alarm systems", by G4HTH and G8RBY), 20 February (Raynet, G3STG), 7.30pm. St John's Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec G3NVK, tel Melton Mowbray 3369.
Nottingham (ARCoN)—1 January (Activity night), 8 January (Forum), 15 January (Test your rig night), 22 January (Activity night), 29 January ("How to organize a dxpedition", by G3YUT), 5 February (Forum), 12 February (Junk sale), 19 February (Activity night), 26 February (Demonstration of equipment by Zycomm). Sherwood Community Centre, Mansfield Road, Nottingham. Sec M. Shaw, G4EKW.
Nottingham (Trent Polytechnic RS)—Mondays, 7pm. Ninth Floor, Newton Building. Sec P. M. Bond, G8TIS, via Students' Union.
Nottingham (NURC)—Tuesdays and Thursdays, 1pm. Shack behind Union Shop. Sec C. Coleman, G4HCW. Theatrical Mechanics, extension 2146.
Scunthorpe (SARC)—Tuesdays, 7.30pm. RAE class, Thursdays, 7.30pm. Morse class, Thursdays, 9pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Joe Sheardown, G8TIY, tel Scunthorpe 732438.
Spalding (S&DARC)—First Friday in each month, Pinchbeck Teachers Centre, Pinchbeck, Spalding. Sec Gordon Parker, G4EMK, tel Bourne 2649.
Wigston (WRC)—Fridays, 7.30pm. United Reform Church, Wigston, Leicester. Sec Steve Parker, G8TLC, tel Leicester 61541 (daytime).

REGION 5—RR R. E. G. Kendall, G8BNE, 19 Willow Green, Needingworth, Huntingdon PE17 3SW. Tel St Ives (0480) 67538.
Following information is latest received.
Bedford (B&DARC)—First Wednesday in each month. Other Wednesdays (Informal), 8pm. Club shack, Ravensden, Bedford. Sec G8PZZ/G4JTJ, tel 0234 47818.
Cambridge (C&DARC)—Fridays, 7.30pm. Coleridge Community College, Radegund Road, Cambridge. For information contact sec G8JKV, tel Swavesey 31120.
Cambridge (CUWS)—Mondays. St John's College bar. Details from Chris Budd, G8OPB, St John's College.
Corby (CARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. Sec G8MLA.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South, Dunstable. Sec G8ASP.
March (M&DRAS)—Tuesdays, 7.30pm, 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thornton Park, Kingsthorpe, Northampton. Details from sec I. P. A. Scott-Iversen, 35 Milverton Crescent, Abmington Park, Northampton.
Peterborough (GPARC)—Fourth Thursday in each month, 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec G4FDF.
Peterborough (PR&ES)—For details contact G3EEL.
St Neots (SN&DARC)—Recently formed club. Alternate Mondays, 7.30pm. Ernulf Community School, Eynesbury, St Neots. Details from Paul Herrod, G8TQI, tel St Neots 74642. New members very welcome.
Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Hon sec G4DAQ.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.
Arborfield School of Electronic Engineering (REME) RC (G3IHH)—Tuesdays, 7.30pm. Sec Peter Matthews, G8LBM, tel Arborfield Cross 760957, after 7pm.
Banbury (BARS)—Last Friday in each month, 7.30pm. St Paul's Church Hall, Warwick Road, Banbury. Sec G. Reason, G4EBF, tel Croughton (0869) 810794.
Bracknell (BARC)—For details of current activities contact D. Sargeant, G3YMC, tel Bracknell 21006.
Burnham Beeches (BBRC)—First Thursday in each month, 8pm for 8.15pm start. St John Ambulance, Serena HQ, Slough. Contact Janie Britton, tel Windsor 61723.
High Wycombe (Chiltern ARC)—28 January (AGM—all members please attend). Details from sec, G4IWC, tel Great Missenden 4504.
Maidenhead (M&DARS)—First Thursday and third Tuesday in each month, 7.45pm. Red Cross Hall, The Crescent, Maidenhead. Sec J. Patrick, G3TWG, tel Bourne End (06285) 25275.
Mid-Thames RDF Club—Details from sec C. Gage, Lowfield House, Bolter End Lane, Lane End, High Wycombe, Bucks HP14 3NB, tel High Wycombe (0494) 881842.
Newbury (N&DARS)—Second Tuesday in each month. Newbury Technical College. Details from sec G8LTD, tel Newbury 46078.
Newport Pagnell (Milton Keynes ARS)—Second Monday in each month, 8pm. Lovatt Hall, Silver Street, Newport Pagnall, Bucks. Sec D. White, G3ZPA, tel Shenley Church End 310.
Oxford (O&DARS)—Second and fourth Wednesday in each calendar month, 7.30pm. Civil Service Social Club, Marston Road, Oxford. New sec C. Marshall, G4IOK, 9 Mountfield Drive, Whitney, Oxon, tel Whitney 4867.
Oxford (OURS)—Wednesday evenings during term. Further details from Simon Pike, G8KRD, Brazenose College.
Reading (RARC)—Details from sec Chris Young, G4CCC.

Clubs and club secs in my region, please update your news and send it to me. *RR6.*

REGION 7—RR D. A. G. Pedder, G3LFX, 97 Elgar Avenue, Tolworth, Surbiton, Surrey KT5 9JS. Following information is latest received.
Addiscombe (AARC)—Tuesdays, 9.15pm. Prince of Denmark, 152 Portland Road, South Norwood. Sec G3SJX, tel 01-656 9054. New members and visitors most welcome.
Ashford (Echelford ARS)—Second Monday and last Thursday in each month, 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G8LEL, tel Byfleet 46847.
Bexley Heath (North Kent RS)—Second and fourth Thursdays in each month, 8pm. St Mary's Institute, 2 North Cray Road, Bexley. Sec Dr C. P. Conduit, G4KCZ, 49 Baldwyns Park, Bexley DA5 2BE.
Brixton (Ferndale RS)—Wednesdays, 6.30pm. Brixton College, Ferndale Road, London SW4. Sec G4GTO, tel 01-660 2532.
Coulsdon (CATS)—Sec A. R. Bartle, G6HC, tel 01-684 0610.
Cray Valley (CVRS)—First and third Thursdays in each month, 7.30 for 8pm. Christchurch Centre, High Street, Eltham, London SE9. For details of morse classes run by the club contact sec, G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec G4FFY, tel 01-642 9871.
Crystal Palace (CP&DRS)—Third Saturday in each month, 8pm. Emmanuel Church Hall, Barry Road, London SE22. First Tuesday in each month (Open house), members' QTHs. Sec G3FZL.
Guildford (G&DRS)—Second and fourth Fridays in each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Guildford (U of Surrey E&ARS)—Informal meetings, lunchtimes during term. Lower Bar, Union House, G8AHK is active on vhf, and G3IGQ on hf. Skeds and QSOs always welcome. Sec G8MIO, tel Guildford 71281.
Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. For details contact Sec R. Pellatt, RS41392, tel 01-399 8113.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling.
Redhill (Reigate ATS)—Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill. First Tuesday in each month. Marquis of Granby, Hooley Lane, Redhill. Sec G3XSZ.
Sutton & Cheam (S&CRS)—For meeting details contact hon sec G. W. Brind, G4CMU, tel Burgh Heath 54497.
Thames Ditton (Thames Valley ARTS)—Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.
Tolworth (Decca ARG)—First Thursday in each month, 8pm. Decca Sports and Social Club, Kingston Road, Tolworth. Sec G3NFV, tel Leatherhead 72587.
Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon. Sec J. W. Todd, tel 01-540 9031.

RR7 would be *very pleased* to receive clubs' entries before the copy date published at the beginning of "Club News"

REGION 8—RR D. N. T. Williams, G3MDO, Seletar, New House Lane, Thanington, Canterbury, Kent. Tel 0227 66586.
Brighton (B&DRS)—Details of events from J. Trimmer, G4JDM, 7 Dale Crescent, Patcham, Brighton.
Burgess Hill (Mid-Sussex ARS)—Alternate Thursdays, 7.30pm. Marle Place Further Education Centre, Leylands Road, Burgess Hill. Details from the sec, Jack Brooker, G3JMB, tel Hassocks 4965.
Canterbury (East Kent RS)—Further details of event from G8PFE, QTHR.
Chichester (C&DARC)—Details of future events from J. Chinn, 5 Shrubbs Drive, Middleton-on-Sea, Bognor Regis PO22 7SL, tel 2335.
Crawley (CARC)—Further information from D. L. Hill, G4IQM, tel 0293 882641.
Dartford (DHDFC)—Details of club events given on club net, 1930kHz Sundays at 10.30am and Tuesday evening net, 145·325 (S13). Please check with G4FYV for start details before every hunt. Further information from sec Alan Burchmore, G4BWV.

About 80 members and visitors attended an open evening held by the West Kent ARS in October last year, and a few are shown here watching G4JZP operating his Yaesu FT101 connected to a 67ft long wire plus counterpoise folded into the meeting room

Dover (South East Kent YMCA ARC)—Details from G8KEN.
Eastbourne (Southdown ARS)—First Monday in each month. Details from R. Jeffries, G8KQN, 84 Mill Road, Hailsham, Sussex BN27 2HU; or pro G3LFZ.
Gravesend (GRS)—Mondays, 7.30pm. Windmill Tavern, Shrubbery Road, Gravesend. Details from F. Donovan, G4ALD, 4 Rembrandt Drive, Northfleet, Kent DA11 8NG.
Hastings (HE&RC)—Fridays. 479 Bexhill Road, St Leonards-on-Sea, Sussex. Third Wednesday in each month, 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details of events from G4FET.
Horsham (HARC)—First Thursday in each month. Parish Rooms, The Causeway, Horsham. Details of future events from A. C. Wadswirth, G3NPF.
Kent Repeater Group—The group is responsible for GB3KR (Dover) and the proposed GB3KN (Mid-Kent), and for 432MHz repeaters GB3CK (Charing), GB3EK (Margate), GB3NK (Wrotham), and GB3SK (Folkestone). Information leaflet and membership details from G3XDV.
Maidstone (MYMCAARS)—First and third Fridays in each month, 7.30pm. Y Sports Centre, Melrose Close, Loose, Maidstone. Details from J. A. Hastie, G4IRV, tel Medway 251387.
Medway (MARTS)—Fridays, 8pm. Aurora Hotel, Gillingham. Newcomers and visitors welcome. For details of club meetings contact G4HJE, QTHR.
Sussex Repeater Group—Information from G4EFO. Treasurer G4GNX, 38 Elphick Road, Newhaven.
Tunbridge Wells (West Kent ARS)—First and third Fridays in each month. Adult Education Centre, Monson Road, Tunbridge Wells. Tuesdays following Fridays (Informal) at Drill Hall, Victoria Road. Details from Brian Castle, G4DYF, tel 0732 56708.
Worthing (W&DARC)—Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from G8MSQ.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY. Tel Stoke Fleming 505.

Camborne (Cornish RAC)—1 January ("Test gear", by Clive, G3OCB), 5 February ("Repeater construction", by Paul, G4BKI), 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net weekdays 10am on 3·715MHz and on Sundays, 11am on 3·682MHz. Visitors always welcome at club meetings. Full details from Spencer, G3VGO, tel Devoran 864255.
Exeter (EARS)—12 January ("Elementary microprocessors", by R. Joyce), 9 February ("Teleprinter working", by J. Savage, G3SCU), 7.30pm. Community Centre, St Davids Hill, Exeter. Club net on Tuesdays at 7.30pm on 144MHz band. Full details from Geoff Draper, RS44198, 1 Carlyon Close, Heavitree, Exeter EX1 3AZ.
Exeter (EUARS)—Every Sunday afternoon, 2.30pm, Room 225, Applied Science Building, Exeter University, North Park Road, Exeter. Anyone, "belonging" to the University or not, is welcome to attend. New hon sec Miss Anne Bellchambers, Exeter University Amateur Radio Society, Devonshire House, Stocker Road, Exeter EX4 4PZ.
Exmoor (ERC)—Second and fourth Thursdays in each month, 7.30pm. "Loughrigg", East Street, South Molton. Full details from Dave Stone, tel North Molton 377.
Exmouth (EARC)—Alternate Wednesdays, 7.30pm. Rolle College, Exmouth. Hon sec Mrs J. Nicholson, 35 Hollymount Close, Symonds Farm, Exmouth, tel 77263.
Newquay (N&DARS)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Full details from Ted, G3YJX, tel Wadebridge 2772.
North Devon (NDRC)—Second Wednesday in each month, 7.45pm. Pilton Community College, Barnstaple. Fourth Wednesday, 7.30pm. Bideford School, Abbotsham Road, Bideford. Full details from George,G4CG. Tel Barnstaple 3683.
Plymouth (PRC)—5 January ("Logic", by Trevor, G3ZYY), 19 January (Sale of surplus equipment), 2 February (Activity night), 16 February ("Teletext", by Bob Fisher), 7.30pm. Physics Lab, Tamar School, Paradise Road, Plymouth. Full details from Trisha Day, c/o G3ZYY, tel Saltash 5913. The thanks of all in the South West are due to Trevor, G3ZYY, for his excellent slow morse transmissions three times a week. *RR9.*
Plymouth (PPARS)—During term time listening facilities available on 3·5-28MHz and on 144 and 432MHz with ssb on 144 for 12 hours every day. Newcomers very welcome. For further details contact Jeff Key, G8VTW, Amateur Radio Society, Plymouth Polytechnic Students Union, Drakes Circus, Plymouth.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. Visitors always welcome. Full details from R. S. Pridham, G4BVB, tel Tavistock 832891.
St Austell (English China Clay RC)—Welcome to a newly affiliated club—English China Clay. Meetings on alternate Mondays, 7.30pm. Full details from Jack Redfearn, G8HSZ, tel St Austell 3647.
Torbay (TARS)—Every Friday with special meeting on last Saturday in each month, 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Torbay net on 3·756MHz on Mondays, Wednesdays and Fridays at 10.30a.m. and on Saturdays at 10a.m. Visitors most welcome at club meetings. Full details from Hugh Davies, G4DHZ, tel Paignton 523063.

A happy and prosperous New Year to all in Region 9 from Len, RR9.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Barry (BCoERS)—Thursdays, 8pm. Teachers Centre, Weycock Cross, Five Mile Lane, Barry, South Glamorgan. Details from GW8OPK.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Blackwood, Gwent. Details from GW8UCQ, 2 The Alders, Oakdale, Blackwood.
Bridgend (B&DARC)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4BDV.
Cardiff (CRSGBG)—11 January ("Introduction to synthesizers Part 2", by John Case, GW4HWR), 9 February (University challenge quiz, editor and questionmaster Don Green, GW3MRI), 9 March ("Further progress with home construction", by Dave Thomas, GW3RWX), 7.30pm. The Pantmawr Inn, Pantmawr Estate, Cardiff. Further details from sec Joe Brooke, GW3GHC.
Haverfordwest (H&DARS)—New club, details unknown, awaiting information from club secretary.
Loughor (LAR&EC)—Every second Monday, 8pm. Loughor Boating Club. Further details from sec T. Griffin-Thomas, GW8TYS, 77 Castle Street, Loughor, Nr Swansea, W. Glam, tel Swansea 893392. All amateurs, enthusiasts, and swls welcome.
Merthyr (Hoover ARS)—Mondays, 7.30. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.
Newport (NARC)—Mondays, 7.30pm. Adult Education Settlement, Brynglas Road, Newport. Details from GW4HYZ.
Newtown (PARC)—Thursdays, 7.30pm. College of Further Education, Newtown, Powys. Details from GW4DWX.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports & Social Club, Margam, Port Talbot. Details from sec GW4ESV.
Powys (PARC)—Thursdays, 7.30pm. The Cricket Pavilion, Montgomery. Club callsign GW4HVN. Further details from sec Mike Smith, GW4DWX, tel Welshpool 2068. New members especially welcome.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.
Swansea (SARS)—8, 22 January, 5, 19 February, 5 March. Technicians Common Room, Second Floor, College House, Swansea University. Club net each Sunday 1100gmt, 28·530MHz, net controller GW4BIQ. Further details from Roger Williams, GW4HSH, tel Swansea 404422.
Swansea (UCoSRS)—Thursdays, 7.30pm, during term. Room 801, Applied Science Building, University College of Swansea. Details from Tim Davies, GW4ADL, c/o Dept of Electrical Engineering.

RR10 requires up-to-date information for this feature. Club secretaries please note that if you do not correspond I cannot send in news. Incorrect and outdated information is of no use to anyone—so please write to your RR.

REGION 11—RR P. H. Hudson, GW3IEQ, Silhill, Dinas Dinlle, Caernarvon.
Following information is latest received.

Bangor (UCoNWARS)—Thursdays, 7.30pm. Small Lecture Theatre, School of Engineering Science, Dean Street, Bangor.
Conway Valley (CVARC)—Second Thursday in each month, 7.45pm. The Quaries, Llandulas, Colwyn Bay.
Rhyl (R&DARC)—Fourth Thursday in each month. Ambulance Station, Coast Road, Rhyl. Other Thursdays (On the air on 144MHz), 8pm. Newcomers and visitors welcome.
Towyn (T&DARC)—Newly formed club. More details from hon sec GW8SYX, Merion ARS, tel 0654 710402.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel 0307 67565.

Aberdeen (ARS)—Fridays, 7.30pm. 80 Guild Street, Aberdeen (next to Station Hotel immediately adjacent to railway station). Mail for the club should not be addressed to the club premises but to the secretary S. Sutherland, GM4BKV, 67 Greenfern Road, Aberdeen AB2 6TP.
Dundee (Kingsway TC ARC)—Tuesdays, 6.30pm, Electrical Laboratory, Kingsway Technical College, Old Glamis Road, Dundee. A full winter programme has been arranged. At the recent AGM the following club officials were elected: chairman, GM3ZXE; vice-chairman, GM8RTI; secretary, GM8YRT; treasurer, GM4AQM; committee, GM4FLP, GM4JCM; contest committee, GM4BAG, GM4FSB, GM4JCK, GM8BZX, GM8RDU; social convener, GM8YRB; caterer, GM2CPC; project manager, GM8VPT; student's representatives, GM8TXO, GM8VPT; QSL managers, GM4JCK, GM4JCM. Further details of club activities from sec Nick Stewart, GM8YRT, 23 Clive Road, Dundee.
Elgin (Moray Firth RS)—First Wednesday in each month at external venues. Other Wednesdays within

Elgin Technical College. Due to a small membership the arrangements may be varied. For full details contact GM4IZN or GM3KHH.

Invergordon (Easter Ross RC) – No updated information received.

Kirkwall – Members now meet on a few occasions each year. For details of meeting places and dates etc, contact GM3IBU, tel Kirkwall 3232.

Perth (P&DARG) – Every Tuesday, 8-11pm in new clubroom within Perth City Sports & Social Club, Leonard Street, Perth. The club is located within licensed premises and it has been reported that the meetings are no longer "dry"! Chairman, GM8JCR; secretary/treasurer, GM8RYZ, 75 Viewlands Road West, Perth.

Shetland (Lerwick RC) – Wednesdays, 7pm. Islesburgh House Community Centre. Members also use the club premises at other times. The club station GM3ZET is active on hf and vhf bands and on Wednesdays, Fridays and Sundays is active on the "Shetland Net" at 2000hr clocktime, on 3,775kHz, when all amateurs with an interest in Shetland are invited to join in. The club is also preparing new equipment to reactivate the Lerwick beacon, GB3LER, and it is hoped that the beacon will be operational once more early in 1981. Sec, GM4B8L.

RR12 thanks club secretaries who have submitted updated information and again asks that those secretaries who have not supplied information on their clubs, please do so as soon as possible. RR12 extends the New Year's greetings to all members in Region 12 and elsewhere, and "promises" that 1981 will be a better year for dx.

REGION 13 – RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Berwick-upon-Tweed (B&DARS) – First and third Fridays in each month, 7.30pm. Avenue Hotel, 122 Marygate, Berwick-upon-Tweed. Details from sec GM8IIO.

Borders Repeater Group – The group administers the two 144MHz repeater projects, GB3BT (Berwick-upon-Tweed), and GB3SB (Scottish Borders). Meetings are held in Kelso as and when necessary. Details, GM4CXP, tel St Boswells 2795, or G3HDT, tel Berwick-upon-Tweed 88260.

Dalgety Bay (Marconi Space & Defence Systems ARC) – Open to employees and ex-employees of the company. Tuesdays, 7.30pm. MSDS Social Club, Hillend Industrial Estate, Dalgety Bay, Fife. Details from GM3YND, tel Dalgety Bay 822678.

Dunfermline (DARS) – Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from GM3CIG.

Edinburgh (E&DARC) – Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from GM3RFQ.

Edinburgh (Ferranti Recreation Club AR Section) – Membership is restricted to company personnel. Details from GM8JKG, tel 031-441 5684. Visits by other clubs by prior arrangement.

Edinburgh (GB3ED Repeater Group) – Details, GM3GBX, tel 031-447 2611.

Edinburgh (Heriot Watt UARC) – Wednesdays, 2.30pm. Mountbatten Buildings, 31-35 Grassmarket, Edinburgh. Details, GM4JFS, tel 031-339 1104.

Edinburgh (Leith Nautical College ARC) – First and third Thursdays in each month, 7.30pm. Leith Nautical College, 24 Milton Road East, Edinburgh 15.

Edinburgh (Lothians RS) – Details from GM8BJF, tel 031-447 5527.

Glenrothes (G&DARC) – Wednesdays and third Sunday in each month: 18 January (Radio control of models), 15 February, 15 March, 7.30pm. Provosts Land, Leslie, Fife. Details, GM4HBG, tel Glenrothes 771057.

St Andrews (UoStAR&ES) – Details from Physics Department, North Haugh, St Andrews.

REGION 14 – RR C. W. Tran, GM3WOJ, 21 Richmond Avenue, Dumfries DG2 7JS.

Ayr (AARG) – Two Sundays in each month, normally second and fourth, 7.30pm. Community Centre, Wellington Square, Ayr. Details from sec, GM3THI.

Dumfries (D&GREC) – First and third Monday in each month, 7.30pm. Cargenholm Hotel, Dumfries. Details from sec, GM8TKA.

Falkirk (Stirlingshire ARG) – Details from sec, GM4DGT.

Glasgow (West of Scotland ARS) – Fridays, 7.30pm. 22 Robertson Street, Glasgow. Details from sec, GM4JDU.

Greenock (G&DARC) – Third Friday in each month (Informal meeting every Tuesday and Friday), 7.30pm. 22 Inverkip Street, Greenock. Details from sec, GM3XNJ.

Helensburgh (HARC) – First and third Wednesday in each month, 7.30pm. Clyde Street School, Helensburgh. Details from GM4FEO.

Motherwell (Mid-Lanark ARS) – Third Friday in each month, 7.30pm. Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from sec, GM4FKD.

Stevenson (Ardeer RCARC) – Thursdays, 7.30pm. Ardeer Recreation Club. Details from sec, GM8BOM.

Stranraer (SARC) – Newly-formed club, all new members welcomed. Details from sec, J. Keating, GM3DZG, 29 Corsewall Crescent, Stranraer.

A cheque for £500 being presented to Mr Eakin, father of the late Stan Eakin, GI3VFW, as a donation to the Stan Eakin Memorial Fund. The money represented the proceeds of the Parkanaur Mobile Rally held by the Mid-Ulster RSGB group on 18 May last year. L to r: GI8RJW, secretary; Mr Eakin, GI8KXU, chairman; and GI8TAX, pro

REGION 15 – RR I. J. Kyle, GI8AYZ, 2 Galgorm Gardens, Ballymena, Co Antrim BT42 1BA. Tel 0266 2024.

Ballyclare (East Antrim ARC) – Second Tuesday each month, 7.30pm for 8pm. Carntall Orange Hall, Carntall Road, Mossley. Sec GI4JXM.

Ballymena (BRC) – Tuesdays (Morse and RAE classes), 7.30pm. Thursdays (Natter night), 8pm. 16 January ("Microwaves", by GI8AYZ), 20 February ("Deviation and fm", by GI4BWM), 20 March ("Thick film devices", by GI4HCN). Venues for these talks on GB2RS. Other events at club premises, 70 Nursery Road, Gracehill. Secretary GI4HCN, QTHR.

Bangor (B&DARS) – First Friday in month, 8pm. Sands Hotel, 12 Seacliff Road, Bangor, Co. Down. Secretary, GI8RNE.

Belfast (BRSGBG) – Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. For details contact GI3USS.

Belfast (CoBYMRC) – Tuesdays, 7pm; Saturdays, 2.30pm. 12 Wellington Place, Belfast. Sec Paul McTaggart, 14 Thirlmere Gardens, Belfast BT15 5EF.

Belfast (Queen's UoBRC) – Tuesdays during term, 7pm. Morse and RAE tuition available. 37 Fitzwilliam Street, Belfast.

Coleraine (C&DARS) – Fridays, 8pm. QTH of secretary, GI8RPI.

Coleraine (NWARS) – Second Tuesday in each month, 8pm. BRC Rooms, Whitehall Buildings, New Row, Coleraine. Secretary GI8RME.

Lisburn (Lagan Valley ARS) – 12 January ("The QSL bureau", by GI3HXV), 9 February ("Building a hospital radio station", by GI8RKC), 9 March ("Meteor scatter", by GI4GID and GI4KSO). Rathvarna Teachers Centre, Pond Park Road, Lisburn. Secretary GI8SXN, QTHR.

Londonderry (North West Ireland ARS) – First Monday in each month. Technical College, Strand Road, Londonderry. Sec GI2DHB.

Magherafelt (MARS) – First Tuesday in each month. Morse class every Wednesday. 12 Garden Street, Magherafelt, Co. Derry. Secretary, GI8JNP.

Mid-Ulster (MURSGBG) – First Sunday in each month, 3pm. GI4BAC's QTH. For details contact GI4RJW.

North Ulster (NURSGBG) – Details from area representative, GI4HVI, QTHR.

Omagh, Co Tyrone – New club formed, for details contact GI8TST.

REGION 16 – RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.

Braintree (B&DARS) – First and third Mondays in each month: 19 January ("Nuclear Generation", illustrated talk by Mr Pike, deputy power station manager), 16 February (EME communications, to be confirmed), 7.30pm. Braintree Community Centre, Victoria Street, Braintree. Details from Alan Heritage, G4EOG.

Bury St Edmunds (BStERS) – Third Tuesday in each month, 7.30pm. Red Cross Headquarters, Mustow House, Eastgate Street, Bury St Edmunds. Details from John Munro, 29 Angel Hill, Bury St Edmunds.

Chelmsford (CARS) – 6 January (Annual film show), 3 February ("Top Band", – by G3KTF), 3 March ("The RSGB", – by G3ZNU, Region 16 Representative), 7.30pm. Marconi College, Arbour Lane, Chelmsford. Morse classes also available at the club. Details from Andrew Mead, G4KQE.

Colchester (CRA) – Thursdays, fortnightly, 7.30pm. Colchester Institute, Sheepen Road, Colchester. Details from Frank Howe, G3FIJ.

Felixstowe (FARC) – Tuesdays, informal, 8pm. Felixstowe Ferry Golf Club. Details from John Hobin, G3XIX.

Great Yarmouth (GYRS) – Last Thursday in each month, 7.30pm. 67 Southdown Road, Great Yarmouth. Details from Tony Besford, G3NHU.

Harlow (H&DRS) – Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Further details from hon sec A. C. Keeble, G4HPU.

Harwich (H&DRA) – Thursdays, 7.30pm. Harwich Adult Education Centre. Details from sec Tony Free, G4EYE.

Haverhill (H&DRS) – Fridays: 16 January ("The RSGB", by G3ZNU, Region 16 Representative), 30 January (Discussion of special event stations), 13 February (AGM), 27 February (Surplus equipment sale), 7.30pm. Steeple Bumpstead Road, Haverhill. Details from Chris Kitchener, G8IMI, tel Haverhill 2852, evenings.

Ipswich (IRC) – 14 January ("Construction Techniques", by G4FAW, 28 January ("The RSGB", by G3ZNU, Region 16 Representative), 11 February (Illustrated talk by Mr J. Hayward, chairman of the National Cactus and Succulent Society), 25 February ("The Oscilloscope – a most versatile piece of test equipment", by G3NYK, 7.30pm. Note that meetings will be held at the new club venue of the Club Room, Rose and Crown public house, Norwich Road, Ipswich. Morse classes are also available at the club. Details from Jack Tootill, G4IFF.

Loughton (L&DARS) – Fridays, fortnightly, 8pm. Loughton Hall, Rectory Lane, Loughton. Details from Barry Capon, G8UBH, 180 High Road, Loughton.

Lowestoft (L&DARC) – Fridays, 7.30pm. North Suffolk Teachers' Centre, Lovewell Road, Lowestoft. Details from Paul Godfrey, G8JBD.

Martlesham (MRS) – First Wednesday in each month, 7.30pm. British Telecom Research Laboratories, Martlesham Heath, Ipswich. Visitors always welcome but must first contact Simon Garrett, G4EVN, at the above address.

Norwich (Norfolk ARC) – Wednesdays, 7.45pm. Crome Community Centre. Telegraph Lane East, Norwich. Details from Andrew Kiddle, G4HVC.

Southend (S&DRS) – Fridays, fortnightly, 8pm. Church Hall, Sir Walter Raleigh Drive, Rayleigh, Essex. Contact sec G3YOA.

Stowmarket (S&DARS) – First Monday in each month, 7.30pm. Red Cross Hall, Stowmarket railway station. Details from Jim Lowe, G8SCB, 22 Bluebell Grove, Needham Market.

Thurrock (TARC) – First and third Tuesdays in each month, 8pm. Grays Park Hall, Orsett Road, Grays. Morse tuition available. Details from sec G3KMD. Club net on 144MHz S21/22, on second and fourth Tuesdays in each month, 8pm. New members and visitors welcome.

Vange (VARS) – Thursdays, 8pm. Main Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Following information is latest received.

Basingstoke (BARC)—Third Wednesday in each month, 7.30pm, Chineham House, Popley, Basingstoke. Sec, G4HTM, tel Basingstoke 23421.

Basingstoke (UK FM Group Southern)—First Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Chairman Mike Payne, G3ZRM, tel Aldershot 26108.

Bournemouth (BRS)—First and third Fridays in each month, 8pm. Dolphin Hotel, Holdenhurst Road, Bournemouth. Sec Glenn Lloyd, G8GTB, tel Poole (0202) 769317.

Fareham (F&DARC)—First and third Wednesdays in each month, 7.30pm. Porchester Community Centre, Room 9. Sec David James, G8GRV, tel Titchfield (03294) 45977.

Farnborough (F&DRC)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane (near M3 bridge), Farnborough. Sec Ivor Ireland, G4BJQ, tel Farnborough (0252) 43036.

Guernsey (GARS)—Tuesdays and Fridays. Details from sec GU8KUT, PO Box 100, St Peter Port, Guernsey.

Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Sec S. Jenkins, G4CHO, tel 0705 591788.

Jersey (JAEC)—Second Wednesday in each month, 7.30pm. The Quennevais, Communicare Centre, St Brelade's, Jersey. Hon sec Mrs M. Smith, tel 0534 23249.

Jersey (JARS)—Sundays, 10.30am. Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec R. H. Ford, Sanaldi House, Plat Douet Road, Bagot, St Saviour, tel 0534 31131.

Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Hon sec Phil Ciotti, G3XBZ, 214 Rossmore Road, Parkstone, Poole.

Portsdown Hill Repeater Group—Group net on GB3PH, Mondays at 7.30pm. Sec G8GNB, tel Titchfield (03294) 41456.

Portsmouth (P&DRS)—Thursdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3JZV.

Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G2FIX, 74 Victoria Road, Wilton, Salisbury.

Southampton (SUARC)—Tuesday evenings. Also informal meetings every lunchtime in the clubroom, Old Union Building. Sec A. C. Talbot, The Radio Club, JCR Post, The University, Southampton.

Southampton (SRSGBG)—Wednesdays. The Clubroom, Kent Road. 7.30pm. AR J. R. Compton, G4COM, tel Fair Oak 3017.

South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Civilian Canteen, Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.

Swindon (S&DARC)—Alternate Wednesdays, 7.45pm. Clubroom, Oasis Leisure Centre. Sec K. Clinch, G8OQY, 13 Pound Piece, Ashbury, Swindon.

Winchester (WARC)—Third Saturday in each month, 8pm. The Scout Log Cabin, Stockbridge Road, Winchester. Sec G3MCL.

REGION 18—RR W. A. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland. Tel Longhorsley 259.

Following information is latest received.

Durham (DURES)—During term. Physics Dept, Science Site, Durham University. Sec Miss Elizabeth Dean, 26 Almsford Avenue, Harrogate.

Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good pass record). Details from sec G4GXI. All welcome.

Great Lumley (GLAR&EC)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8HPW.

Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU.

Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact sec G8CDP.

Middlesbrough (Teesside Repeater Group)—Last Tuesday in each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and swls invited but first contact sec G8MBK.

Morpeth (Northumbria RC)—Thursdays. Old telephone exchange, Ellington. Sec G4GWB.

Newcastle upon Tyne (Tyne & Wear Repeater Group)—Arts Common Room, Claremont Tower Block, Newcastle University. Sec G4DOB, tel Newcastle 744444.

South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue.

Tyneside (TRS)—Mondays, 7.30pm. The Community Centre, Vine Street, Wallsend. Activity and interest in most bands. Club callsign, G3ZQM. Sec G4ILW. All welcome.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Barking (BR&ES)—Monday-Friday, 7.30-10pm. Westbury School, Westbury Road, Ripple Road, Barking, Essex. Morse on Tuesdays. Further details, Alan Sammons, tel 01-594 2471.

Central London (Post Office HQ ARG)—For Post Office members only. For details contact J. A. Clarke, Room 134, Cardinal House, Farringdon Road, London EC1M 3ND.

Cheshunt (CDRC)—Wednesdays. The Church Room, Church Lane, Wormley, Herts. Details from G8BVL, tel Waltham Cross 32198, or Jim, Ware 4316.

Chingford (Silverthorn RC)—7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Hon sec Chris Hoare, G4AJA, tel 01-529 2282.

Chiswick (Acton, Brentford & Chiswick RC)—20 January (AGM), 17 February (TV/dx reception), 7.30pm. Committee Room, Chiswick Town Hall, High Road, Chiswick. Hon sec W. Dyer, G3GEH, 188 Gunnersbury Gardens, Acton W3, tel 01-992 3778.

Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, London W13. Hon sec E. Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames. All welcome.

East London (ELRSGBG)—Third Sunday in each month, 18 January ("G3HUE—oscilloscopes", by A. Nehan), 3pm. Wanstead House, The Green, Wanstead E11 (200yd south of Wanstead Tube Station). All welcome. All details from Rod Holmes, G3PKQ, tel 01-558 2928, or G3AMF, tel 01-989 9224.

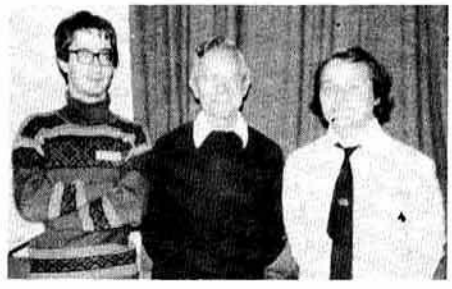
Edgware (E&DRS)—Second and fourth Thursdays in each month, 8 January (AGM), 12 February ("Radio aurora", by G2FKZ), 26 February (Informal), 12 March (Fibre optics). The Watling Centre, 145 Grange Hill Road, Burnt Oak, Edgware. Details from D. Lisney, G3MNO, tel 01-907 1237, or any committee member. Slow morse classes held on first and third Thursdays in each month, 7.30pm. All welcome. Edgware net, Mondays.

Harrow Weald (RSH)—2 January (No meeting), 9 January (Junk for you to flog), 16 January (AGM), 23 January (Informal/practical), 8pm. Harrow Arts Centre, High Road, Harrow Weald. Sec G4AUF, tel 01-868 5002.

Havering (HDRS)—Wednesdays, 8pm. Fairkytes Arts Centre, Billet Lane, Hornchurch. Further details from sec, A. Negus, tel Upminster 24059. All welcome.

St Albans (Verulam ARC)—Fourth Tuesday in each month, January (G3LHZ—Antenna systems), talk not yet confirmed. February (The G3PAO Memorial Lecture), March (G3VA—"The dc receiver"), 7.30 for 8pm. Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, Nr St Albans, Herts. Informal meetings October-April on second Thursday in each month at the RAFA Headquarters, Victoria Street, St Albans. Details from Hilary Clayton Smith, G4JKS, tel 0727 59318.

Shelburne (SRC)—Thursdays, 7pm. Shelburne Youth Centre, Hornsey Road, London N7. RAE courses available. Hon sec T. C. Clark, G4BZW, tel 01-249 1843. Sec would be pleased to hear from any prospective members. The club has a 2000E transceiver, and G5RV antenna for licensed members to use.



Frank Collet, G3OVT, president of the Stevenage and D ARS, with recently-elected vice-chairman Stephen Clarke, G8LXY, (l), and chairman Paul Leverington, G8WWI, right. *Photo:* **Trevor Tugwell, G8KMV**

Southgate (SRC)—Second Thursday in each month, January (Micromouse, the silycontrolled mouse), 7.45pm. The Scout Hut, Wilson Street, Winchmore Hill Green, N21. Contact sec John Fitch, G8EWG, tel 440 7353. All newcomers welcome.

South West Herts UHF Group—The building of GB3BH (1·3GHz/beacon/repeater) is progressing, and the group's 10GHz beacon, GB3SWH, is now operational. Reports are requested from as many amateurs as possible to evaluate GB3SWH's catchment area. Talks can be arranged for interested groups. Contact hon sec G8BBE.

Stevenage (S&DARS)—15 January (Talk on CEGB), 5 February ("Microwaves", by G4BGP), 19 February ("Lea Valley Watter", talk), 5 March (Home micro, bring yours), 8pm. Senior Staff Canteen (just inside the gate), Site B, British Aerospace, Gunnels Wood Road, Stevenage. Details, G8MCV, tel 0438 64624. Society net, Tuesdays at 7.30pm on 145·250fm.

West Drayton (LT District Line ARC)—Thursdays, 6pm. DLAA Sports Ground, Park Place, Gunnersbury Avenue W3 (Bar). This club requires the attendance of former members, who lost interest, to enable the club to survive. It would also like the assistance of local amateurs who could give talks on any radio topic. Hon sec R. Ball, G8JEB, tel 01-422 0414. Club net 144·250 ssb, 2000-2100 local.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.

Bridgwater (HPSSARS)—Second Monday in each month, 7.30pm, YMCA, Nr St John Ambulance Hall. Further details from G4ETN.

Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. RAE and morse classes. Club station, G3TAD, active hf and vhf. Visitors and new members most welcome. Hon sec G8GFZ.

Bristol (BRSGBG)—26 January (AGM), 23 February ("Modern electronics", by G8FNR), 7pm. Small Lecture Theatre, Queens Building, University Walk, Clifton, Bristol. Hon sec, G8GLQ.

Bristol (North Bristol ARC)—Fridays, 7.30pm. c/o Self Help Enterprise, Braemar Crescent (off Braemar Avenue), Northville, Bristol. RAE and morse classes. Club station, G4GCT, active hf and vhf. Hon sec, G2BSU.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. RAE and morse classes. Lectures, films and df hunts planned. HF and vhf station, G4AHG, active. New members welcome. Hon sec G4GTD.

Bristol (UoBAR&CS)—Club is re-organizing with G3KAC and G8CXH club calls. Further details from L. Mather, G8OKI, or c/o University of Bristol.

Brunel Technical College RS—welcomes licensed students to operate club station, G4FNB. Student swls welcome. Details from Students Union, c/o Brunel Technical College, Cabot House, Ashley Down Road, Bristol BS7 9BU.

Cheltenham (CARA)—First Thursday (Formal) and third Friday (Natter night) of each month at 7.30-8pm. The Old Bakery, Chester Walk, Clarence Street (rear of public library). Hon sec G4ILI, tel Cheltenham 43891. All visitors welcome.

Gloucester (GARS)—Thursdays, 7.30pm. First Thursday in each month (Society business followed by a talk). Other Thursdays, informal chat, operating club station, G4AYM, morse practice. Various events planned. Chequers Bridge Centre, Painswick Road, Gloucester. Hon sec, G3MA.

Mendip Repeater Group—GB3WR, GB3UB and GB3VS (70cm proposed—RB13, location Glastonbury). Subscriptions to hon treasurer, G8NNU. Information from hon sec, G8GMZ.

North Avon Repeater Group—Provisionally GB3AA (1·3GHz) at Alveston, Avon. Group meets on *ad hoc* basis. Information from G8NNU.

Taunton (TARS)—Fridays, 7.30pm. The Basement, The Mount, Taunton. Details from hon sec, G8TJF.

Weston-super-Mare (WsMARS)—Third Monday in each month, 7.30pm. Rugby Club, off Drove Road, Weston-super-Mare. Hon sec, G8IGB.

Yate (Y&DARC)—First Friday in each month, 8pm. G3RQN QTH. Further details from G8LGC. All welcome including swls.

Yeovil (Y&DARC)—Thursdays, 7.30pm. Building 101 Houndstone Camp, Yeovil (off A3088). Talks or lectures each week except last Thursday in month (reserved for committee meeting and natter night). Club calls, G3CMH and G8YEQ. Club nets: Sunday, 10.30am, 3·660MHz; Tuesdays, 8pm, S21; Wednesdays, 8pm. 3·560MHz cw. RAE and morse class. Details from hon sec, G3NOF, tel Yeovil (0935) 24956.

Club secretaries in my region—your updated information would be appreciated. *RR20.*

MEMBERS' ADS

CONDITIONS OF ACCEPTANCE

NEW ARRANGEMENTS

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Member's 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 acknowledgment 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 27MHz 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 £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 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.

No guarantee of inclusion in a specific issue can be given, other than the first possible issue after receipt. Closing dates in 1981 for issues in brackets, are: **22 January** (March), **26 February** (April), **23 March** (May), **23 April** (June), **20 May** (July), **18 June** (August), **16 July** (September), **27 August** (October), **24 September** (November), **22 October** (December), **19 November** (January 1982), **17 December** (February 1982).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising representative

FOR SALE

Drake R4B 160-10m 4·8, 2·4, 1·2, 0·4 filters, 19, 25, 31m commercial band xtals, T4XC 160-10m and psu, best offers. G4EQI. Tel 021-445 1347.

Atlas 215X 12V mobile tx/rx, 200W 160-15m, fits into glove box, hand mic, £325 ono. Matching mains, 16A, £50. Complete packet incl handbook, connecting cableware, £360 ono. Would separate. G3IES, QTHR. Tel Bristol 500742, evenings.

Swan 100MX solid-state tx/rx, 80-10m, 100W p.e.p./cw, rit, xtal calibrator, vox, noise blanker, semi break-in cw, used little, £410 ono, GW4JPC, QTHR. Tel Gareth, Gorseinon (0792) 896815.

EA12, revalved, realigned, handbook, JR599 Custom Special 50MHz and 144MHz converters fitted, service manual, both immac cond, £200 each ovno. GW8RZU, QTHR.

TS820S, Sherwood 350Hz cw filter, dc supply, service manual, £550 ono. G5CMX. Tel Penn 3956.

Transverter, Magnum Two, 10-2m, fb cond, offers around £50. G2JR, QTHR. Tel 0203 455021.

QM70 transverter, 1W, 28/30 10W 432/4, £70. QR666 batt/mains rx, £850. JXK 144/28 converter, £60. Standard C146A tx/rx, xtals, R6 pair, £2.50. G4ALV, QTHR. Tel 01-460 3852.

FT200/FP200, full 10m coverage, new finals, hand mic, £200 ono. Icom IC260A/E, brand new, £270 ono. Transformer, 2kV 1A, very heavy CD44 rotor, £65. Letters only after December 16, incl tel number, will call you. Possible delivery. G4COA, QTHR.

SP600, £100. Heathkit IO12U, £40. RF1U, £25. GD1U, £15. Marconi TF1152A power meter/load, £20. TF1066A generator, £60. Creed 54N, many extras, £35. 6S, £10. 3cm coupling flanges, £5 pair. Shack clear-out, hundreds of items. G3NNW, QTHR.

AR88D, wkg ok h/b o/p transformer, would be better with an original, £40 ovno. Buyer collects. G4FRV, QTHR. Tel Hoddesdon 64285, after 6pm.

44MHz xtals, S20-23, HC6U, 8·06666 HC6U, 8·025, 8·10, two approx 8·04 FT243, 0·7A meter, QQV03-10, all £1 each. Valves, ex-equip, pcb, 10·7/455kHz audio output, £10. G4GHB, QTHR.

14AVQ, new, £45. Vibroplex bug, perfect, £30. 800lb ratchet winch, £15. H/phones, £5. Drake mic, new, £10. Jaybeam 15in couplers, £3 ea. Junk box, approx 1cwt crammed, £25. Alloy poles, various lengths, UR67 coaxial 75Ω twin. GW3CBA. Tel Barry 741520.

Spacemark SRD1 fsk converter, believe ok but sold as seen, £15. KW E-Zee Match, £20. KW 103 pwr/swr meter, £20. KW three posn coaxial antenna switch, £10. 0975/2 low pass filter to match KW eqpt, £10. Microwave Modules 500MHz counter, £40. Free to first purchaser of any of above items, one DM350 mic, Creed teleprinter manuals, S.G. Brown phones. G3VVL. Tel Burnham-on-Sea (0278) 787069.

FT202R handheld, nicads, helical, S20-22, £80. FR50B, 80-10m rx calibrator, £75. LM14 freq meter, like BC221, charts, psu, £15. Pair unused 2N5643, 40W, 2m, data, £7.50 each. MK Products rtty tu, built, wkg, £7.50. Pair MBM46 70cm 46-el multibeams, with harness, £20. KW77 rx, £50. Marconi TF1300 valve voltmeter, with manual, £8. All prefer buyer collects. G3WIE, QTHR. Tel Southampton 556894.

Jaybeam Q4 2m 4-el quad, £15. G8ROX, QTHR. Tel 0925-76 2485.

Multi-mobile hf antenna, 10, 15, 20m, 160m, 80m coils, £25. UR67, 20m, unused, £8. Buyer collects. *Wanted:* MMC432/28S converter. G4IYU NOT QTHR. Tel Kidderminster (0562) 741080.

Eddystone 888 rx, £60. AR88D rx, £45. G2DAF tx with psu, £20. Avo electronic test meter, £7. Mini rack, suitable for linear, £5. 300V stabilized psu, £5. *Wireless Worlds,* 1947-56, offers. Wallis, 25 Anstruther Road, Edgbaston, Birmingham. Tel 021-454 5281.

Liner 2 with psu, £100 ono. Pye Cambridge U10B, wkg 70cm, £30. AM10D, needs attention, £15. G8JSF, QTHR. Tel Staines 56968.

TR2200GX, S20, S22, R0-9, nicads, charger, auto toneburst, manual, as new, case, £115. G8TXA, 303 Birmingham Road, Walsall, West Midlands. Tel 0922 28508.

FDK 2m multi palm size, 40 channels, charger, etc, exc cond, £100. G3RK, QTHR. Tel Wangford (Suffolk) 619.

Trio 2200G, S20-22, R1, R5-7, nicads, charger, orig packing, no mods, very clean, £90. 5/8 × 2m mobile whip, £5. GDO, new, £5. SWR meter, twin, £10. Gill, G4DTV. Tel 0202 623333, day, 0646 600869, evenings.

Creed 7B teleprinter, 6S6M tape reader, both 230V ac governed versions wkg, £20. Buyer collects. *Wanted:* BC348 rx, 16-el portable Tonna antenna. WWs, Oct 1966, pre-1938, G8PWO, QTHR. Tel Sevenoaks (0732) 62481, evenings.

IC202s, MEL 202-25 lin amp, £150. Tonna 16-el antenna, fixed, £20. FRG7, no mods, £150. Exch or p/exch any item for 70cm lin amp, w.h.y? G8BWR, QTHR. Tel Warwick (0926) 498388.

Philips pro tape recorder, ex-BBC, comp with headblock, amp, nab adapters, etc, in good cond, £75. G8OSF. Tel Chris, 01-393 9275.

Avo 8 Mk5, new cond, case, £80. Viceroy, ssb, wkg order, £50. Marconi Electra, old but good rx, £50. G4BLZ, 1 South Place, Lee-on-Solent, Hants.

Deceased amateur's equipment (G3FIX): FT101ZD, little used, in mint cond, mic, no extras, £475. Many other items, incl 18AVT, Heathkit 'scope, Codar AT5, BC221. G4GCU, QTHR. Tel Zyg, 0642 456292, evenings.

Zycomm Z5800 handheld, six months old, mint cond, with external mic, charger, etc, £175. G8PQB, QTHR. Tel 0775 67116.

FTDX560 160m, cw filter, fan, some spare tubes, £280. Yaesu FF50DX lpf, £10. Hi-mound twin lever paddle, marble base, £16. G4BUO, QTHR. Tel Gravesend 55167.

HF5 multi-band vertical, HF5R radial kit, 50ft UR67, only three months old, cost £70, accept £50 ono. GI4DOR, QTHR. Tel Belfast 610007, after 6pm.

KW202 hamband rx, exc cond, matching spkr, handbook, £170. G4JQN, G8EEN, QTHR. Tel Westbury (Wilts) 864478.

Multi U11 70cm, scanner, simplex, RB0-14, hardly used, orig box, owner into micros, £190 ono. G8NXM, QTHR. Tel St Austell (0726) 850818.

KW2000A, psu, handbook, £150. Heathkit HR10B rx, 10-80m, £30 ono. TY76000A QRO hf triode and suitably large blower, offers. G8NEY. Tel Wokingham 783987.

FT401, cw filter, 160m, matching spkr, Yaesu hand mic, spare valves, £300 ono. Yaesu FP4 4A 13·8V psu, £30. G4ARI, QTHR. Tel Markfield 2823.

Yaesu FTDX100, 80-10m, mic, spkr, manual, 240 ac or 12V dc, vgc, £155. Microwave Modules 144MHz, 100W linear amp, as new, £90. G4JXK, 5 Margarita Road, Fareham, Hants. Tel Fareham 288566.

Microwave Modules MMC144/28, £12. MMC432/28, £15. MMV1296, £18. Heath vtvm IM17U, rf probe, £20. Eight-pole fm filter YF107H15A, tv/uhf tuner, believed for 70cm, £5. Class D wavemeter, £8. Tel M. Hall, 0460 74433, daytime.

FRG7, mint, used little, no mods, £150. Tel Daventry 3677, evenings.

Pye Cambridge AM10B, vgc, fm/a.m., 14ch tx, fitted S14, S18-23, R0, R4-7, tunable rx, auto toneburst, wkd seven countries simplex, £65. Europa SS 2m transverter, rx ok, tx requires attention, offers? TR2200GX, immac, S18, S20-23, R2, R4-7, nicads, helical, charger, etc, boxed, £120 ono. MMD050/500 500MHz counter, perfect, £50. G4JCX. Tel Saltash 3503, evenings.

TRS80 level 2, 16k, psu, cassette CTR80, video monitor, program and data conversion tapes, games tapes, several books on computing, all manuals, hardly used, vgc, £350 ono. Tel Avon (0272) 826753.

VHF/uhf Trio 7200G/vfo 30G, £130, will split. Pye PF1, RB10, xtals RB6, no rx batts, with cases, £30. Pye Starfone on RB2, £30. G8WQV. Tel Medway 221061.

Rotator AR30, near new cond, £30. Transistor car radio, spkr, manual, positive or negative earth, push-button and manual tuning, used three weeks only, changed car, cost £19.50, sell £11. Sony ICF5500, sw/marine/fm/mw, s-meter, etc, cost £55, as new, sell £20. Harvard fm/air/a.m. rx handheld, £4.50. AOR240 handheld synthesized tx/rx, 2m, used two weeks /A, case, handbook, charger, cost £165, sell £110. Superb psu, 240 ac, 13·8 dc at 20A, crowbar protection, blower-cooled when on high amps, twin meters, 9 by 8 by 13in, smart job, £50. Cossor fm rx AD5 Mk11, miniature valves, built-in spkr, five xtals, S20-22, R3-4, excellent, £25. Russian multimeter, mirror scale, usual ranges, model 4313, handbook, £7. Transistor 4m converter, 3·1-3·7MHz i.f., £6. 2m Nuvistor converter 4·6MHz i.f., £12. G3VCJ, QTHR. Tel 042 43 4726.

Datong FL2 multimode filter, perfect, as new, hardly used, orig packing, etc, £84 ono. D. Mathews. Tel 01-876 7868. S W London.

TA33Jr at present in use, £60. Avo 8 Mk5, brand new, sealed, £80. Mobile hf tx/rx, Marconi H4000, 100W ac and dc psus, £85. G4BG, QTHR. Tel Salisbury 5379.

Complete swl stn: FRDX400 rx, 2, 4m; Datong UC1 up-converter; cassette tape recorder; headphones; spkr; spare valves; manual; Datong AD170 active antenna with power supply; sorry cannot split, package bargain, £250. G4FPK, QTHR. Tel 01-954 4084, 5-7pm (not Saturday).

FT200B, FP200, exc cond, comp with manual, packing, prefer buyer collects, £290. W. S. Craigen, G4GTX, 19 Nilverton Avenue, Sunderland SR2 7TS. Tel Sunderland 284435, 6-7pm.

Racal MA79G universal drive unit, 1-30MHz, usb, lsb, dsb, rtty, cw, a.m., matching RA117, has same vfo frequency, showroom cond, scarcely used, will sell or exchange FT7. *Wanted:* power unit for B2 tx/rx. G4GEN, QTHR. Tel 082571 2205.

Collins R390, £275. APR1 80-300MHz, £80. R278GR, 1,750ch 225-400MHz, £250. Military style TEK545, £150. AF gen, TS382, £40. RF gen, TS413A, £125. Weather radar, x-band, £70. USM140 scope, £150. Buyer collect/carriage at cost. Delanoy, G3FOQ, QTHR. Tel Cambridge 870882, late evening.

VFO520, vgc, suitable Trio 520 and others, £30. ZVC board, 80/20m, QX1246 ax filter, xtals, ic wkg rx, £20. G4GXU, 6 Spinney Bank, Kings Sutton, Banbury, Oxon OX17 3RL.

Comp wkg 4m a.m. system, base station, two mobiles, Base-Ultra Valiant F5AO with PO line remote control unit, rx, 25W rf tx, psu, line control unit, all in neat 19in cabinet, mic, Ultra MR4A6ABE boot-mounting mobile, tx 25W rf, dash unit, all accessories,

Pye Cambridge AM10D dash-mounting mobile, Jaybeam base antenna, all working 70·26MHz, handbooks, offers, comp or separate units. GW3MZY, QTHR. Tel 0248 680034.

FTDX560, Yaesu QRO hf base station, perfect cond, new pa valves fitted, below average use (see log), £220, or exchange Nascom 2. Creed 7D, 100 per cent ok, £20. ST5 rtty terminal, £25. Tel 07782 5224, evenings.

Galanti electronic organ X300, twin keyboard, rhythm section, pedals, stool, etc, vgc, £200. Buyer collects. Small qty BGY22 uhf modules, £10 each. G8RAM, QTHR. Tel 0702 524805, after 6pm.

FT200/FP200 tx/rx, in good cond, manual, five new valves, incl pa, £210 or offers. Lunar HF3100L hf linear, 200W p.e.p. for 10W input, solid-state, £80. Microwave Modules MMD050/500 frequency counter, 500MHz, £50. GM4HCO, QTHR Glasgow. Tel 041-334 2472.

FT707, new, with FP707, save money, almost unused, eight bands, going micro, £550 ono. FT200/FP200, exc cond, £230. G4GLB, QTHR. Tel Greenhithe 844726.

Hygain 18AVT/WB 10-80m vertical antenna, £40. Osker SWR200 power/swr meter, £20. Shure 444, £15. Collect only. G4CHK, QTHR. Tel Swindon (0793) 45269.

BC221 wavemeter, £10. Fedal 35mm camera telephoto wide angle lens, comp outfit, £40. Fedal camera only, £5. IRCs, 15p each. 3 × PL509 linear, *Radio Communication* design, 80-10m, needs valves, otherwise complete, £10. G4DBW. Tel Swanley 64356, after 6pm.

AR88D, manual, valves, vibrator, psu, all vgc, £60. Hammond Aurora Classic organ, £500 off rrp, or accept modern hf 2m/70cm rigs, Sony video camera, smaller organ, part exchange. G3THJ, QTHR. Tel Southport 65131.

Trio 2200G, eight channels, nicads, helical antenna, external 10W pa, £90 ono. TV camera, requires attention, but comp, offers. Branded ttl, op-amps, etc, sae lists. *Wanted:* UHF Starphone circuits to copy. Ellis, 57 Westmead, Woking, Surrey. Tel Woking 20435 (home), Weybridge 47262 (work).

AR240A synth 2m handheld tx/rx, nicads, charger, λ/4 whip, helical ants, ext mic, no carrying case, three months use, reason for sale, going QRT on vhf, £130 ono. G4FIG, QTHR. Tel Lancing (Sussex) 62134.

Exchange Fiat 500, 53mpg, MoT Sept 1981, tatty but reliable second car, value £200 approx, for 2m base station or mobile rig. Can deliver. G8LRD, QTHR. Tel Devizes 6682.

KW2000A ac psu, 201 mic, full service handbook, data, circuits, etc, vgc, reason for sale gone solid-state mobile, £180 cash ono. G3PHK, QTHR. Tel Eastbourne (0323) 53233.

FT200, FP200, 80-10m, good cond, boxed, £200 ono. Stolle 2010 rotator, control box, 100ft four-core cable, upper support bearing, £30 ono. G3VEH NOT QTHR. Tel 0761 70109.

IC21XT, fitted tone call, vfo, extra channels, mint cond, Cossor Companion handheld, uses IC21 tx xtals, three rx xtals, two deacs, the pair £100 ono. Will separate. G8BML, QTHR. Tel 05436 3131.

TS700G, mint, ex-G6BX, unused since, offers. G4GJ, QTHR. Tel 0274 562965.

FDK Multi 800D, built-in scanner, 30W o/p, £175. FT207R handheld, charger Sper nicad pack, spkr mic, few months old, not used by xyl, both boxed, £180. Tel Farnborough 516780, evenings.

IC22A preamp, R0-7, toneburst, S10, S13-23, S0, S24, £110. FRG7 gen cov rx, dust cover, instructions, mint, £150. Disco amp DJ70S, 70W, 4Ω, £30. C scope 950D metal detector, mint, £70. G4FQF, QTHR. Tel Romford 47998.

Lowe FS10 2m scanning rx, charger, soft case, helical, vgc, orig packing, £70. Mizuho APM1 audio processor, unused, all accessories, orig packing, £25. Buyer collects, or carriage at cost. P. Hicks, 48 Fairway Crescent, Allestree, Derby. Tel 0332 556218, weekends only.

FT200 80-10m without psu, £190. Pye Vanguard AM25T, modified for 2m fm, six channels, £25. 19 set, modified as rx only for 80m and 160m, £5. R1392 rx for spares, £3. GM8JJN, QTHR.

BC221 mains operated, charts, handbook, £20. Class D wavemeter, no charts, £5. Collins TCS12 rx, spare valves, £12. All collect or carriage extra. G3OXG, QTHR. Tel 0767 260462.

HC6U xtals, 44MHz rx, 8MHz tx for S0, S19-22, R3-7, £2 per channel. G4AYU, QTHR. Tel Leyland (07744) 53953.

TR9000 2m multimode, BO9 base system, few months old, £325. PS20 matching psu, £32. Datong FL1 audio filter, £42. AR30 rotator, £27. MMC 432/2m, £16. Tel Maldon (0621) 773528, after 6pm.

RSGB Bulletin 1951-6, 1962-7, *Radio Communication* 1968-76, *QST* 1948-57, 1963-76, complete, inclusive sequences, good cond, what offers? Kingston-upon-Thames area. Buyer collects. Tel 01-942 1230.

FRG7, mint cond, awaiting "A" licence, £150 ono. Tel Winchester 69155.

Icom IC280E synth 10W tx/rx, one year old, comp with scanner, remote kit, all in orig boxes, Revco 5/8 whip, mag mount, £210. G8PLO, QTHR (N Essex). Tel 0371 850342.

Trio JR599 Custom Special, 160-10m and 2m rx, all modes, all filters, manual, SP5DS spkr, both vgc, £140 ono. G4GYO, QTHR. Tel Northwood (09274) 21732.

Daiwa DR7500 rotator, DC7001A round controller, suitable 3-el tribander, £70. G4MH mini-beam, £45. Both as new. Px for 2m fm handheld. G3NQX. Tel 0539 28166, after 6pm.

Drake TR4C, MS4 spkr and psu, PB34 noise blanker, £325. Sommerkamp FT250, FP250 supply, many spares, £200. Can deliver. G8KAX, QTHR. Tel John Lemay, Chelmsford 67131, ext 254, daytime.

Standard 828M 2m fm tx/rx, xtalled on S0, S13, S18, S20-23, R1, R3-7, 15W output, compact 3 by 2in front panel, 9in deep, comp with spkr/mic, mobile bracket, £110. G3KLF. Tel Fareham 236906, weekends or evenings only please.

Drake TR4CW RV4C remote vfo, ac psu, spkr, Drake 7075 mic, good cond, £400. Tel 0474 534694.

Europa B, rpt, nbfm tx, G3LLLs discriminator, toneburst, all connections for FT101E, £85. 8-el Yagi, new, £8. Two 813 valve bases, £3. Filament transformer for 813s, 10V, 10A, £7. Carriage extra or collect. G4JMX, QTHR. Tel 0742 661295, after 6pm.

Quartz 16 2m fm tx/rx, S19-23, R2-7, mobile mount, £100 ovno. Liner 2 2m ssb 144·2-144·57, £95 ono. G3KIP, QTHR. Tel 0892 23836, evenings/weekends.

CPU2500R, keyboard mic, one year guarantee remaining, £250. G3LLL FT101E disc/nbfm units, £25. 2m converter, MMC 144/28LO, £15. Xtal 38·66666MHz, unused, £1. AR88D, handbook, £45. Slowscan 5FP7, unused, £5. Clean freq meter BC221Q, charts, psu, £25. All working 100 per cent. You collect heavies. Post extra. Tel York (0904) 706453, evenings.

FTDX401, 80-10m, 560W, 600Hz filter, fan, handbook, £250. FT75B 100W mobile dc psu, FV50B vfo, handbook, £150. G-whip multimobile, £15. BC221, £15. AR30 rotator, unused, £25. G4FQS, QTHR. Tel 01-253 0661, ext 18, daytime.

S51 scope, £35. Marconi TF801A sig gen, £20. Levell TM3, £15. 3X Burndept ITT uhf hand portables, no batt or gen, ITT AM7 mobile, offers. Other items, test equip, sae for list. G8BJL, QTHR. Tel 061-928 6631, evenings.

Nascom Two, HW8, Wood & Douglas 70cm tx/rx, Wood & Douglas MK1 2m synth, part-built *PW* Purbeck scope, Eddystone 680X. Tel for prices. G3TFM, QTHR. Tel Stratford-on-Avon (0789) 294055, after 6pm.

Heavy duty 1hp 240V dc motor, ball bearings, would make good generator, approx weight 2cwt, £30 ono. Trailer, 4 by 3ft, 7cwt suspension, Mini-size wheels, £55. G8YAC. Tel Rugeley (08894) 6354.

3200 radio, television, tape-recorder service-sheets in spring-back binders, manuals, text books, etc, *The Second Great War,* a fully-documented history by Sir John Hammerton, eight vols, 4,000 pages, mint, offers. Watts, 62 Belmore Road, Norwich. Tel 0603 33103.

Cambridge AM10D, six channel, mods for a.m./fm, auto-toneburst, dash-mounted tx switch, 11 sets xtals for most common channels, £60 ono. Prefer buyer collects. G8DHE, QTHR. Tel Worthing (0903) 32161.

IC211E tx/rx, £350. 7200G, six rptr, four simplex chs, £90. Both as new. Heathkit monitorscope, £40. All ono. Prefer buyer examines/collects, or agrees carriage. G2YS, QTHR. Tel Rickmansworth 76864.

QTH—modern three bed detached bungalow, Penzance, Cornwall, central heating, double-glazed, gardens, utility room, garage, loft ladder, roof space, 2m quad, Ringo, HFTD3, 150asl, half-mile Newlyn Harbour, overlooks Mounts Bay, east/w sea paths, £34,750. G4IMG, QTHR. Tel 0736 4402.

FRSDX400 rx, all filters, 2m, 4m converters etc, absolutely mint, £150. KW Viceroy ssb tx, £60 ono. Both plus carriage. Only selling and going tx/rx as shack needed for expanding family. GM4ENF, QTHR. Tel Cupar (0334) 54842.

Yamaha A55 electronic organ, list £699, £525. Swan 100MX mobile/fixed tx/rx, £360. Heath HR1680, 80-10m ssb/cw rx, £100. All p/exch for: TS120V, G-whip, hf minibeam, hd rotator, Palm 2, IC2E, Z5800, Palm 4 or PF2UB. G4JQP, QTHR. Tel 0761 34216.

KW2000A, recently overhauled by KW, £150. G4DVR, QTHR. Tel 01-337 2025.

Tektronix oscilloscope, 85MHz, vgc, sensible offers. industrial electronics simple oscilloscope, £12. General radio oscillator, 65-500MHz, £15. Hewlett Packard vtvm, all probes type 410B, £20. Klystron psu, various crt, offers. Cooper, 11 Radical Ride, Wokingham, Berks. Tel 0734 734312.

Marine radar Raytheon 1900, 250V ac, manual, spare valves, £100. FT101E, YC601, spare Toshiba valves, £375. Eddystone EC10 Mk2, mains psu, £110. Pye W15FM Westminster, comp, dash mount, R7, S0, S20-22, £120. Pye PF1s on RB2 and 433·2, new batts, circuits, £35 pr. PF1 tx, batts, new, £4 ea. Jaybeam C8/70m, nearly new, £35. FDK TM56B scanning rx, amateur and marine xtals, £45. G4EZM, QTHR. Tel 0253 853933, evenings.

TS520S with cw filter, as new, £370. Yaesu tx FL200B, 240W dc input, all hf bands, exc cond, £90. G4IBG. Tel 0273 731391.

Mast section, brand new unused aluminium tube, 1·375in dia, 11ft long, suitable for small masts or booms, £4 per length. Carriage extra at cost. John Balls, G4ALC, 31 Beechwood Avenue, Greenford, Middlesex UB6 9UB. Tel 01-578 9621, evenings.

FDK Multi 700E, 25W rig, boxed, one year old, £160. G8RZH, QTHR. Tel 0234 64552, after 5.30pm.

Sale: KW2000B, many spare valves, £220. MM144/28 converter, £12. *Wanted:* Nascom 1, single paddle key, QQV07-50. G. Orford, G4FRO. Tel Bristol 426851, day, Pilning 3422, evenings.

FRSDX400, fully optioned, FLSDX400, SP400 spkr, lot, £300. KW107 Supermatch atu, £65. Datong rf speech clipper, £30. Pye Pocketfone, fitted S20, S22, GB3MP, 2W, £55. Turner 5A thermocouple meter, cased, £7. Catronics teletext decoder pcbs, nearly complete, £30. SWR10 meter, £5. Elektor cw decoder board, tested, assembled, £25. *Radio Communication* 1975-79, £10. AEI CT52 miniature scope, £16. W2AU balun, £6. G4CVZ, QTHR. Tel 051-220 5470, after 6pm.

Bearcat 220FB, £199. 2m handheld Bosch, 3ch fitted, S20, SU5AN, £20. G3KLM, (Surrey). Tel 04867 6010.

Nicads, Varta 4AH SP2 size, set of nine for 12V, used little, £9. Sealed 6V 6AH compact rechargeable batteries, used little, £10 pair. Valves: QQVO320A (good cond), 2C39A, DET23, offers? G4BLT, NOT QTHR. Tel Wakefield 255515.

Icom IC255E, mint cond, scanning mic, improved front end, mobile bracket, orig packing etc, £210. G8NFL, QTHR. Tel 0889 590018, evenings.

Morsepak-B microprocessor-controlled morse decoder/keyboard sender as advertised *Ham Radio,* £130. Magnum 2m linear EDL144, preamp, 100W output, £80. MMT 432/28 transverter, used little, £80. G4GGV, QTHR. Tel Maidenhead (0628) 20651.

FTDX500, 560W, manual, £185. 5in Dumont lf scope, £25. Olympus Pen-F 1/2 frame slr, Zuiko f1·8, £65. All perfect. G3ZUE, QTHR. Tel Byfleet 46744.

IC202S, nicads, charger, exc cond, £140. GM8MRK. Tel 0292 69030.

Heathkit HW101, 10-80m, cw HP23B psu, both well made, wkd lots dx, £190. G3TMU, QTHR. Tel Yateley 877485.

KW2000, ac psu, mic, low power output for tvtr etc, good cond, £110 ono. Buyer inspects, collects. G3WGV, QTHR. Tel Reading (0734) 733745, 6-7pm.

KW1000 linear, £175. AR88LF incl manual, £30. BC221, no psu, £20. KW Victor tx, £50. Fullerphone test set, ex-second world war, £35. G3PSY. Tel Tenterden (Kent) (05806) 4531, evenings and weekends.

QRO mains transformer, 3kV at 1A rms, continuous rating, 130lb weight, £30. G3ONP, QTHR. Tel Wolverhampton 788459.

TR2200G portable tx/rx, fitted S20, S22, R6-7, all accessories, orig packing, absolutely mint cond, bargain at £80 ono. G8CLJ, QTHR. Tel 0438 723934.

IC202, nicads, charger, vgc, £120. Starphone 460MHz fm, unmodified, £50. G8AKB, QTHR. Tel Gordon, Whissendine (Leics) (0664 79) 547.

Sullivan & Griffiths universal inductance meter, 1μH-1H, £350. Sullivan & Griffiths precision wheatstone bridge, £250. Both exc cond. G3PSY. Tenterden (Kent) (05806) 4531, evenings and weekends.

Trio TR7500 fm tx/rx, 80 channel, good cond, mobile mount, manual, maker's carton, comp, £175. G8SNC, QTHR. Tel 0793 70 3526.

Heathkit HW100, very clean, fb cw xtal filter and psu, £95. Wood & Douglas modules, 144SY25 synth with digital control board, 144FT2TR, tx and rx units, all manufacturer tested ok, £60. G4EIJ, QTHR. Tel Chipping Sodbury 314243.

FT200B, 80-10m tx/rx, FP200B psu, vgc, manual, spare valves, £220. Six section lp filter, £5. Datong asp processor, unused, £70. BM3 xtal mic, £5. G3HBW gdo, see *Radio Communication HB,* 1-60MHz, wkg fb. G3TTC, 5 Hurst Close, Chessington, Surrey.

FT221R, D suffix, £280. Trio TR9000, £320. Pair 14-el Hygain Yagis, £30. G8OFQ, QTHR. Tel Lincoln (0522) 26399.

FT200/FP200, mic, vgc, £200. Prefer buyer inspects, operates, collects, but could deliver reasonable distance. G3EWP, Park Lodge, Butterton, Newcastle, Staffs. Tel 0782 619575, day or evening.

Trio R1000, as new, less than 10hr use (reason for sale acquired Trio TS180S), £230, save £55. G8ZHH. Tel 051-480 0240.

Shack clearout: sae for list. Cassette deck, Dolby nr,

£40 ono. Hartley 13A double beam 'scope, one Y amp valve missing, ok, £8. Many other items. 807s; 30p each. G4FTK, QTHR. Tel Farnborough (0252) 514381.

TR2200, six channel tx/rx, xtals for 10 channels, (ie 20 xtals), £75. 150W transistor for hf pa, £4. *Wireless World* 1954-78, any offers? 8K of dynamic r.a.m., 4096, 330ns, £30 for the 16 ics. G8CGK, QTHR. Tel 0989 2715.

All Heathkit: RF1U sig gen, £25; GD1U grid dip met, £15; C3U res cap bridge, £25; AO1U sin sq wave gen, £25; V7A/uk vv-meter, £25. All perfect cond, with manuals, p&p paid. G3RUN, QTHR.

Pye fm Bantam, three channel fitted, R6, S13, S8, S22 xtals incl, comp with auto toneburst, helical whip, leather carrying case, nicad, charger, £80 ono. G8MMN. Tel 051-653 8330, evenings and weekends.

FT101/2, mint, fan, mic, spare valves, used little, £300. H/B ssb tx/rx, 90W p.e.p., 160-10m, prof. built, £110. SAE for photos. FT220, exc cond, incl xtals for 16 channels, £210. G3GMN, QTHR. Tel Gloucester (0452) 31365.

FR101S, FL101, manuals, leads hardly used, £600 ono. Bristol area. *Wanted:* 18AVT/WB. Trio AT200. Tel 0256 2059.

Trio 2200GX portable/mobile tx/rx, xtals fitted S18-23, R2, R4-7, R2, rx, S0, S0 reverse, £90. G4HNO. Tel 061-431 3725.

FC107 antenna tuner, 10-160m, inc power and swr meters, four way antenna switch, new, beautiful, £79. Pair 160m traps, new, unused, £5. G2KF, QTHR. Tel 072-681 2337.

New QTH forces clearout. FT207RB still under guarantee, fluke 8000A-01 batt/mains dvm, 2200GX 12 channel mobile mount, two pairs Pocketphone PF1, IC202 nicads, 2m 20W pa, Garex 70cm-10m converter, PET2001, 8K. G8ILB NOT QTHR. Tel East Grinstead 25952, after 6pm.

TS120V with Kenwood MC30S mic, DAC 13-8V regulated power supply, £320. SEM Z-Match, 160-10m, built-in Eezitune, £60. Going QRT on hf. Collect or carriage extra. G3AHO, 65 Warlingham Road, Thornton Heath, Surrey CR4 7DF.

Heath HM102 swr/power meter, 0-200W, 0-2000W, mint, handbook, £21. 40 valves (25 per cent new, boxed) incl E88CC, ECC91, 6BE6, 5763, 6BW6, EF183, etc, £9. Pocketsize 100kHz xtal marker, accurate, cased, £5. Bath area. Tel 0373 4694.

Test gear: Marconi rf signal generator, 0·15-30MHz, £20 ono. Dawe Inst's rf signal generator, 0·1 30MHz, £20 ono. Airmec valve voltmeter, 100Hz-900MHz, £25 ono. All quality gear with manuals. Tel 01-578 4484, after 6pm.

Liner 2, fitted preamp, rf gain, £95. Trio 2200GX, S0, S20, S22, R7, nicads, charger, carrying case, homebrew vfo, repeater shift, £130 ono. G4GXA, QTHR. Tel Stroud (04536) 77207.

Heathkit SB301, SB401, £200 ono. Datong rf speech clipper, £25. SSTV monitor, MK type, £30. Cossor double beam oscilloscope, £10. Cowl gill motor and power supply, £15. Jim Blackburn, G4ACI, QTHR. Tel Upholland (0695) 622754.

Yaesu FT207R, NC2 charger, YM24 mic, two nicads, under gtee, cost £290, accept £200 ono. Heathkit HW101, matching power supply, both in kit form, untouched, cost £470, accept £275. 1 Meadowbank, Hitchin, Herts. Tel Hitchin 58937.

Icom 251E multimode base station, three months old, as new, handbook, orig packing, £425. G8VTQ, QTHR. Tel 050 841 284.

IC202E, as new, under guarantee, new set nicads, £150. G8LMY, QTHR. Tel 02775 2797, evenings, weekends.

FR101 digital hf, 2m a.m., filter, broadcast xtals, offers over £400. Tel J. Wright, Basingstoke 68649.

Heath SB303, 401, mic, SB600 spkr, vgc, some spare valves, £275. Heath HM102 swr/power meter, £25. Datong rf clipper, £25. Kenwood TR9000, USA model, 144-148, SP120 spkr, PS20, psu, 240V, offers? G3XTN, QTHR. Tel 0926 56862.

Icom IC251E 2m multimode, as new, four months old, £385. G3DAC, 55 Wordsworth Drive, Crewe. Tel Crewe 582910.

Interton computer tv game, 12 months old, colour, sound effects, joystick hand controls will include four cartridges giving over 100 games incl space war, £150 of equipment, ideal Xmas present, only £110 ono. G8JYT. Tel Luton 591447.

Mint NEC CQ110E digital tx/rx, 160-10m and 11m, 300W p.e.p., all modes, cw filter, mains and 12V psus built-in, used little, boxed, cost £750, accept £425 ono. G3UJE, QTHR. Tel 0565 53669, after 6pm.

FT224 2m tx/rx, all repeater channels, rev R0, S20-23, £70 ono. Europa C 2m transverter with repeater shift, £70. G3VDN, QTHR. Tel 053-755 636.

Vidicons type F262A, £8. Valves, 8012, TZ40, 35T, TT12, RK34, 807. G3CSW NOT QTHR. Tel Haverhill (0440) 3793.

FT2400 2m tx/rx, still under warranty, £175 ono. Azden PCS2000 2m tx/rx, 25W, six memories, scan, synthesized, digital readout, £210 ono. G4HTX. Tel Bedford (0234) 43348.

FT250, FP200, part 10m mod for cw power, £180. GM3MHG, QTHR. Tel 0292 311934, after 6pm.

Trio JR599 Custom Special rx, 2m converter built-in, vgc, £165 ono. Tel Weymouth 786930.

TR2400, three months old, genuine reason for sale, £170 ono. Tel Slough 74463, weekends only.

HRO rx, good cond, but needs slight attention, 11 coils, psu, spkr, leads, manual, other info, spare valves, £60. Mr J. C. Harris, 16 Rosebery Avenue, Cosham, Portsmouth, Hants. Tel 380147.

TS700G, exc cond, orig packing, vox unit, MC50 desk mic, £300. G3KEQ, QTHR. Tel 01-684 1234, day, 01-657 1847, evening.

Trio TS120S tx/rx, immac cond, £350. Yaesu FT227R, with scanner, £185. AM Pye Bantam, xtalled for 2m, £50. Hygain TH6DXX, £175. 2m 9dB colinear, £40. Racal 30MHz timer/counter, £60. HP handheld dvm, £75. Tel 01-390 4817, after 7pm.

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Icom IC240 fm 2m mobile, £120 ono. G4IEZ, QTHR. Tel 0532 672784.

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FT7B, £300. FL110, £90. FT225R, £350. All items new March 1979, orig cond, no mods, seller will pay carriage to UK mainland. GI4IBD, QTHR. Tel Belfast 621148.

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Circuit and instructions for Murphy radio rx, using the following valves: 51·6, HL41DD, VP41, TH41, UU6, all with coating, serial number 506795, short w, medium, long, will refund cost involved. Mr N. A. G. Mortimore, 62 Ashbourne Road, Mitcham, Surrey CR4 2BA.

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Copies of *Radio Communication* prior to 1970. G4HUE, QTHR. Tel 01-554 0399.

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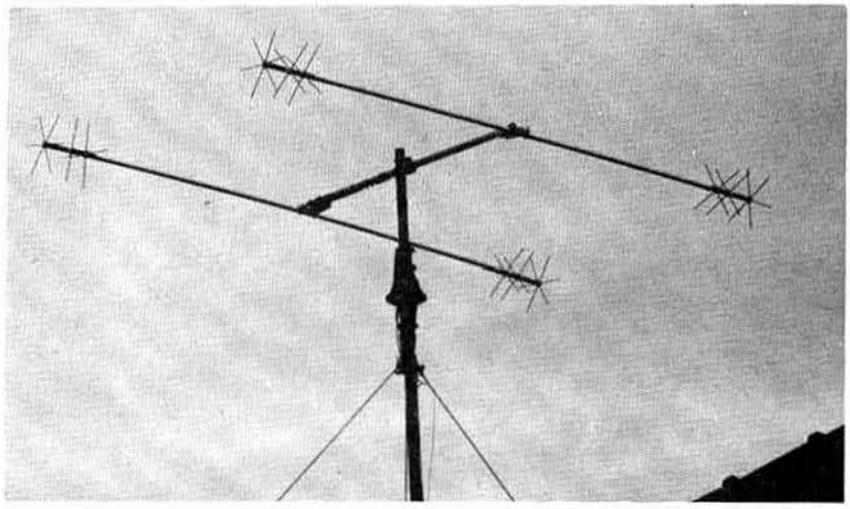

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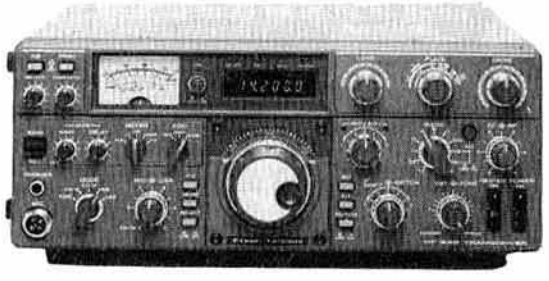

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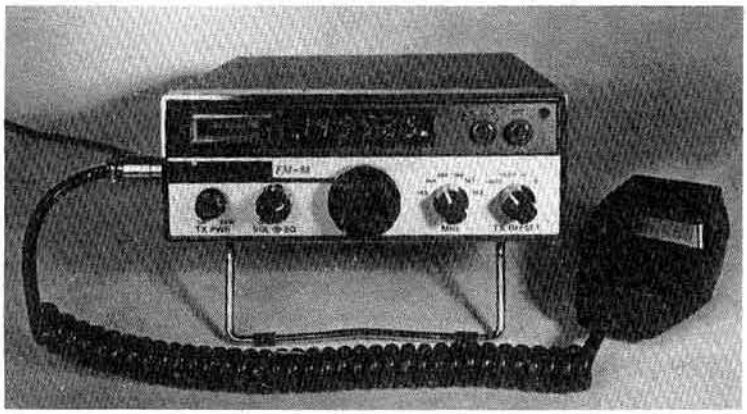


A new rig from UNIDEN

Offering simplicity, high reliability, sensitivity and power.

We are convinced that the FM88 is one of the most reliable 2 metre rigs being offered today. The construction has to be seen to be believed, and all the frills which normally lower reliability have been omitted.

If you are considering buying a new 2 metre transceiver, you owe it to yourself to consider a unit which has proven itself with thousands of hours of reliable "on the Air" operation in the USA.

Brief Specification:—

143-149 MHz in 5 KHz steps.
.25 uv sensitivity.
25 Watts output — infinitely variable, not switched.
Provision for standard and non standard splits.
Mobile mount and microphone included.

INTRODUCTORY PRICE £178.00 inc. VAT.

Zycomm Electronics Ltd.

Full range of amateur and commercial antennas and Home Office approved two way radio equipment available. SAE for details.

G3ZYC G8CNB G3NJX G3ZYD G8ZYC

47/51 Pentrich Rd., Ripley, Derby DE5 3DS Tel Ripley (0773) 44281 Telex 377466

SOUND ADVICE—SOUND VALUE

A GOOD START is essential to short wave listening and expert advice is important in achieving this—So here's some—If you've made up your mind to buy a receiver you should be aware it will perform only as well as the antenna it sees. The old adage regarding wire antennas "As long and as high as you can" is still good, but at best is only good for PEAK PERFORMANCE on one or two frequencies, at worst none.
Whichever frequency you tune your receiver to, for PEAK PERFORMANCE on all frequencies you need good matching between your Receiver and Antenna to hear the best from it. If you plan to listen on the high frequency bands up to 30MHz then you know you can't have an antenna for every frequency! Or can you?—Well not quite! BUT we can offer you MUCH IMPROVED PERFORMANCE from your receiver by using an antenna tuning unit, that will electrically change the length of your antenna to match the frequency you select—in other words—A MATCH AT ALL FREQUENCIES.
You'll see many antennas being advertised under gimmicky names, but when it comes down to it they're only random wires or odd configurations. At the end of the day, if you're expecting the performance the manufacturers specified, then you'll have to buy an antenna tuning unit. Tell you what we'll do—we'll prove to you—we'll give you one ABSOLUTELY FREE when you buy your FRG 7 or FRG 7700 and we'll give you complete advice on an antenna to suit your available space, which should only cost you a couple of pounds!
So let's put the offer in big print for you!

1 YAESU FRG 7 + AMTECH 200 ATU	**£199.00**
1 YAESU FRG 7700 + AMTECH 300 ATU	**£309.00**
VAT included	

What's the difference between the Amtech 200 and Amtech 300? Well both will tune any random length of wire but the Amtech 300 will do a little extra—it will also tune co-axial fed antennas—Their normal selling price? The Amtech 300 **£39.95**—The Amtech 200 **£25.95**—What can you lose? So get cracking MAKE A GOOD START! HAVE PEAK PERFORMANCE FROM THE OFF.

JAYBEAM—HYGAIN—BANTEX—AMTECH—CUSHCRAFT—SWAN—ATLAS
and 50 other major lines—all ex stock

AMCOMM

AMCOMM SERVICES

194A NORTHOLT ROAD, SOUTH HARROW, MIDDX. LONDON. Tels: 01-864 1166
& 01-422 9585
Opening hours: Tues–Sat 9.00–5.30, Sundays by appointment. Closed Monday.

YAESU

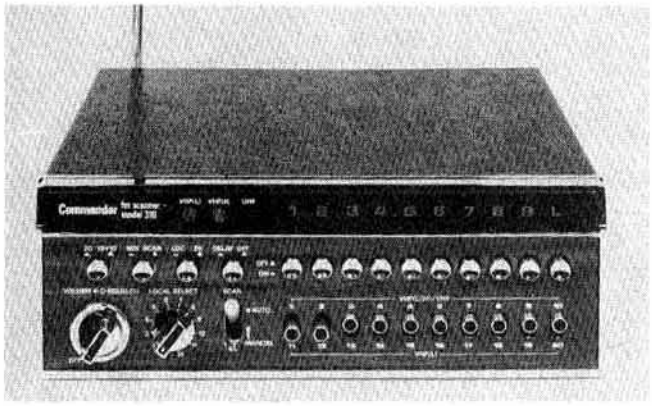
SUGIYAMA F850

An all band (160 to 2m including 4m) all mode transceiver, with a specification to suit the most discerning operator.

VOX and speech processor as standard. 10 watts output SSB/CW/FM — 5 watts AM Mains or Battery, large LED frequency display.

LIST PRICE:
Fitted 2.4 KHz filter £799.00 inc VAT
Fitted ALL filters £899.00 inc VAT
432 MHz Transverter (ordered with F850) £100.00 inc VAT

318-FM SCANNING MONITOR



A compact unit suitable for fixed or mobile service, giving the option of scanning in user programmed order up to 20 channels in the 430-470 MHz, 140-175 MHz or 68-88 MHz frequency ranges.

Manual/automatic and fast/slow scan with channel lockout and delay. Mains or battery operation. Vehicle Mount Supplied.

PRICE: £95.00 inc VAT

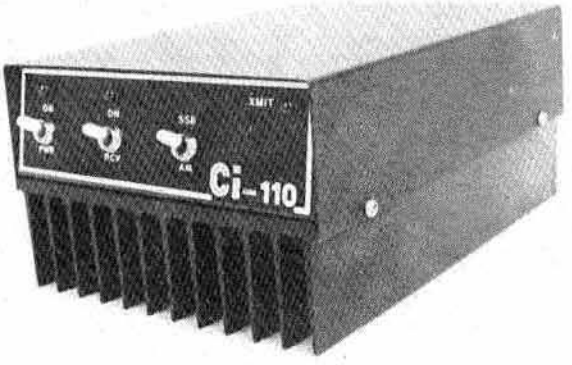
STOCK CRYSTALS: S20, 21, 22, 23 — RO to 7 — SU 8 and 20 — RBO, 2, 4, 6, 10, 14 — MO, 6, 10, 16 — 70.26 MHz. PRICE: £3.00 each inc VAT.

Zycomm Z5800 Hand Portable

A no nonsense sythesised rig, free of gimmicks yet offering high power and good sensitivity. Covers 144-148 HMz with channels in 5 KHz spacing selected by decade switches. Slide switches control simplex or repeater and high or low power operation. Low power level is adjustable by internal preset. Maximum power (5 watts nominal) may exceed 7.5 watts from internal NiCd battery pack. Antenna has BNC connector.

PRICES: Z5800 £175.00 inc VAT
Desk Charger £19.00 inc VAT
Remote Mic/Speaker £18.00 inc VAT
INCLUSIVE PRICE: £199.00 inc VAT

Ci-110 Mk2 POWER AMP



A Solid State, all modes unit covering 1.7 to 38 MHz. Typical power output 130 watts for 215 watts DC input and 4-7 watts drive (15 watts SSB). RF sensing VOX circuit. Switchable receive pre-amp. Supply requirements: 13.8V at 20A, Negative Earth. Size: 5" w x 7" l x 3" h. Weight: 2.5 lbs.

PRICE: £95.00 inc VAT

Zycomm Electronics Ltd.

Full range of amateur and commercial antennas and Home Office approved two way radio equipment available. SAE for details.

G3ZYC G8CNB G3NJX G3ZYD G8ZYC

47/51 Pentrich Rd., Ripley, Derby DE5 3DS Tel Ripley (0773) 44281 Telex 377466

muTek limited

rf technology from G4DGU

January is traditionally a time for taking stock and making resolutions for the New Year. 1980, despite all its problems was a good year for muTek. We've learnt a great deal about our strengths and weaknesses, and will hopefully be able to apply these lessons to our activities in 1981.

We try very hard to make sure that no request for date goes unanswered, sometimes though, the sheer complexity of the questions that we've been asked means that a particular query gets put to one side until we've time to answer it properly! The best way of getting any data other than that on our standard data sheets is to 'phone! Give us a jingle!

The "Moonbeam"
Some of you will have seen this at Leicester. Although this 432MHz long-yagi costs substantially less than anything else on the market, its performance isn't compromised. By passing the savings that we make by supplying the elements uncut along to you, we allow you to use the cash for something more useful like better feeder or even another antenna.

1—£16.50 2—£32.00 4—£63.00 8—£116.00
Carriage—£1.50 per antenna

FT221/225GT front-end board
This board will transform the receive performance of most standard '221's and 225's. The 2dB noise figure and excellent dynamic range performance provide a receiver which will be very significantly more 'crunchproof' than most with receive sensitivity essentially limited by external noise. **£53.87**

1·3GHz low-noise amplifier
This preamplifier uses an NE64535 in a very carefully optimised teflon-glass microstripline design giving a *genuine* noise figure of less than 1·8dB (typically 1·65dB) quite reproducibly without tweaks! By adopting this approach, which requires a fairly sophisticated understanding of low noise amplifier design, we are able to keep our manufacturing costs, which directly influence our selling price, very low.

Our noise figure spec. is very much in line with the device-manufacturer's claims, when the inevitable losses in the input matching network are taken into account. Of course other people claim lower noise figures, although these don't stand-up to rudimentary analysis (unless they've developed some completely new technique—superconducting microstrip perhaps?!) We sleep more soundly by avoiding hi-fi style specmanship and sticking to good engineering practice.

Unboxed (with BNC or SMA connectors) **£22.72** Boxed **£30.81**

144MHz preamplifier
Many of our comments regarding specmanship apply to this amplifier. We obtain nf's of less than 1·5dB (this equates with perhaps 1·1dB in black-box land . . . .) with an associated gain of about 15dB. The pass band is flat to better than ±0·5dB over the 144-146MHz band with greater than 50dB rejection at ±12·5MHz.

Boxed **£17.72** Unboxed **£10.79**

Microwave system components
We haven't really the space this month to list these goodies. We've held back in the production of new data, as several new items have been due for introduction and our move slowed this up rather. It should be available in the very near future.

Kungsimport Antenna Combiners
Prices and other details are listed in previous ads. We now have Ben's dish feeds available at £30 for both the 1·3 and 2·3GHz versions: they really are very well made in brass and are fitted with an integral 'N' connector.

TVI filter
This is a bandpass filter covering the 470—860MHz band, synthesised using microstripline techniques. Many people have found it very useful in dealing with TVI from both hf and vhf transmitters. **£1.80**

NEC rf and microwave semiconductors
A large selection available ex-stock. Prices are as before, with the exception of the 3SK88 which has now been reduced to **£1.53**

Data on request: SAE appreciated. CWO. Please add 50p p&p unless otherwise stated, and then VAT. Tnx!

muTek limited, Bradworthy, Holsworthy, N. Devon EX22 7TU
Telephone: Bradworthy (0409 24) 543

UPPINGTON Tele-Radio (Bristol) Ltd

12-14 Pennywell Road, Bristol, BS5 0TJ Telephone 0272 557732

G2BAR HAM BAND AERIALS

2 metre Folded Dipole YAGI	**Price inc VAT**	**2 element YAGI Beams**	**Price inc VAT**
5/FD. 5 ele Sq section Boom	£7.48	Driven and Director elements. Boom to element clamps Tubular Gamma Match tuning unit supplied.	
8/FD. 8 ele Reinforced Boom	10.35	**10 metre**—2 element array	31.68*
2 metre 'J' Pole		**15 metre**—2 element array	39.80*
1/JP. ¼ wave matching sections enclosed connectors with ¼ wave radiator 1bmm sq eles	6.90	**20 metre**—2 element array	49.45*
70cms. Folded Dipole YAGIs		**Boom to Mast. bracket plate. 4U Bolts**	4.60
6/FD. 6 ele Sq section Boom	6.90	**Trapped Vert ¼ wave 300W**	
11/FD. 11 ele reinforced Boom	10.93	10-15 and 20 m. Tuned, Slim Line Traps—Telescoping Ali Eles for easy adjustments	28.18*
HF. ¼ wave Mono Band Verticals with insulator and Ground post sections		**Portomasts** 12/4 telescoping ali tubes extended to 12' 6" mast incl 3 guys and ground pegs	9.20
10/HFV. 10 m vert 3 sec telescoping tub dia 1" to ⅜"	9.78	18/6 18ft. Portomast with 6 guys and ground pegs	13.60
15/HFV. m vert 4 sec telescoping ali dia 1" to ⅜"	11.20		
20/HVF m vert 6 sec telescoping ali tube dia 1¼" to ½"	13.23		

FOR DESCRIPTIVE LEAFLETS—PLEASE SEND 30p STAMPS P&P * = £4, rest = £1.15

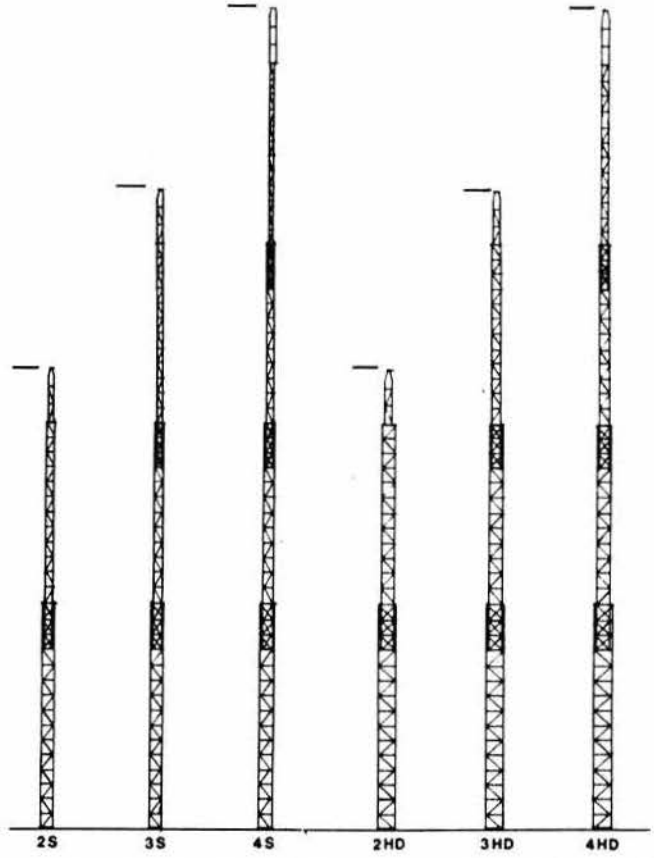
Western

Lift Yourself Above the QRM with

WESTOWER

FEATURES

- ★ Heights from 25 to 120ft.
- ★ Self supporting (no guys) up to 58ft.
- ★ Full headloads up to 75mph (Standard Series) or 100mph (Heavy-Duty Series)—reduced loading above these speeds.
- ★ Unique Framed Base Plate for mounting. Post or wall mounts also available on Standard Series.
- ★ All have reinforced head units.
- ★ Heavy duty towers have auto-braked winches.



A range of steel lattice telescopic, tilt-over towers offering high strength at moderate prices. Used extensively by commercial and professional bodies, the WESTOWER is designed to the latest British Standards by our own Chartered Engineers and manufactured in our own factory using modern electrically controlled welding techniques.

DON'T FORGET!

With WESTOWER you deal DIRECT with the DESIGNERS/MANUFACTURERS and NOT WITH THE AGENTS.
FIRST-HAND INFORMATION AND ADVICE is YOURS for the asking.

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FAIRFIELD ESTATE, LOUTH, LINCS LN11 0JH
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Electronics (UK) ltd

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FOR BOTH YAESU and TRIO

YAESU

TRY A Western PACKAGE TO START 1981

THE '707 PACKAGE

FT-707
+
FP-707
+
FC-707
+
YM-36 mic
ONLY
£555

LIST PRICE SEPARATELY £573.95

THE '101Z PACKAGE

FT-101Z
+
FC-902
+
YE-7A HAND MIC
ONLY
£579

LIST PRICE SEPARATELY £593.50

ADD £80 FOR 'ZD — ADD £14 for DESK MIC

THE '9000 PACKAGE for VHF

TRIO TR-9000
+ BO-9 BASE
+ PS-20 POWER SUPPLY
ONLY **£389**

LIST PRICE SEPARATELY £402.45

THE '720 PACKAGE for V/UHF

YAESU FT-720RV (2M)
+ E-72L EXTENSION CABLE
+ FP-4 POWER UNIT
ONLY **£305**

ADD £30 FOR FT-720RU (70cm)

THE '120 PACKAGE (while stocks last)

TRIO TS-120S
+ PS-30 POWER SUPPLY
+ MC-35S MICROPHONE
ONLY **£499**

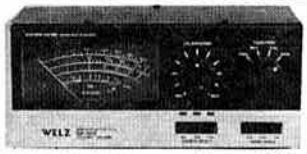
THE '7625 PACKAGE (while stocks last)

TRIO TR-7625 (25W 2M)
+ RM-76 REMOTE UNIT
ONLY **£279**

SEND FOR LISTS of OTHER EQUIPMENT AVAILABLE (large SAE please)
ACCESS — VISA — HP (ask for WRITTEN QUOTATIONS)
CREDIT CHARGE — CONTINUOUS CREDIT — SEND FOR DETAILS

JUST TWO FROM OUR SELECTION OF STATION ACCESSORIES

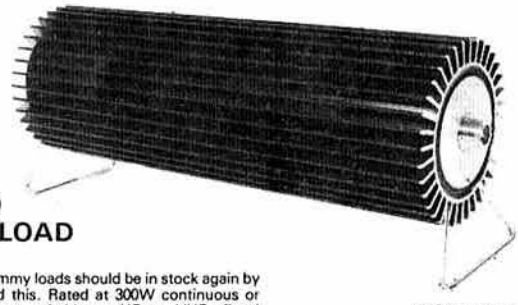
NEW! **POWER SWR METER**
1·8 to 500MHz



YES!—A power meter that covers all bands 1·8 to 500MHz.

- ★ sensors (a) 1·8 160MHz, 1kW, SO-239 connectors
  (b) 1·8 200MHz, 200W, SO-239 connectors
  (c) 130 500MHz, 150W, N-type connectors
- ★ Measures SWR, FWD, REFL power
- ★ Push button selection of sensor to meter
- ★ Size 220(W) × 91(H) × 113(D); weighs 1·8kg

£69.95



MDL-1000
DUMMY LOAD

These popular dummy loads should be in stock again by the time you read this. Rated at 300W continuous or 1000W intermittent; suitable at HF or VHF; fitted SO-239 socket and chrome stand; oil-filled and sealed

£29.95

ALL ABOVE LISTED PRICES INCLUDE VAT AT 15% AND CARRIAGE

Western Electronics (UK) ltd FAIRFIELD ESTATE, LOUTH, LINCS LN11 0JH
Tel: Louth (0507) 604955 Telex: 56121 WEST G

OPEN HOURS: 09.00–12.00; 13.00–17.00 Mon/Fri; SATS only BY APPOINTMENT 09.00–12.00

SCOTLAND
Jim Henderson, GM4HKW
Falkirk (0324) 25559

NORTHERN IRELAND
Les Lyske, G13CDF
Newtownards (0247) 812449

SOUTHAMPTON
Alan Paxton, G4BIZ
Southampton (0703) 582182

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Mays Hi-Fi, Churchgate
Leicester (0533) 58662

DATONG ELECTRONICS LIMITED

...and the beauty isn't just skin deep!

Multi-mode Audio Filter — Model FL2

Adds variable selectivity to existing communications receivers without internal modifications. Gives extremely sharp pass-band edges for truly exceptional filtering performance on all modes but especially for SSB. Its 10 poles of fully variable low and high pass filtering **give sharper filter edges even than normal crystal filters**. A separate manually tuned notch filter is also fitted. In "cw" mode all 12 poles of filtering are combined to give exceptional skirt selectivity.
Connects in series with loudspeaker.

General Coverage Converter — Model PC1

Model PC1 converts any good two metre SSB receiver or transceiver into a **superb general coverage communications receiver.** Coverage is 0 to 30 MHz in thirty synthesised bands of 1 MHz and no receiver modifications are required.
Advanced **parametric mixer** and **LS1 frequency synthesiser** ensure that the overall performance is limited only by that of the main receiver.
Also usable with 28-29 MHz receivers via a conventional 2-metre converter.

Automatic r.f. Speech Processor — Model ASP

Makes your transmitted speech louder and clearer for a given transmitter power. The 'Rolls-Royce' of r.f. speech processors Model ASP **adjusts itself to suit your voice level** and your microphone. Simply select the degree of r.f. clipping in steps of 6 dbs. Connects in series with microphone.

The Answer to the Morse Test. Model D70

The Datong Morse Tutor (Model D70) is your passport to a full licence. Compact, with internal battery and speaker plus personal earphone it provides unlimited random morse for practice.
With Model D70 you can practice morse anywhere anytime, and at your own pace. With the Morse Tutor practice becomes a pleasure because you get results quickly.

Active Receiving Antennas — Models AD270, AD370

Ultra-compact receiving antenna systems giving wideband coverage from 200kHz to over 30MHz at high sensitivity.
Models **AD270** and AD370 give **similar receive performance to large conventional antenna systems yet are only 3 metres in overall length.** The balanced dipole configuration also gives good rejection of local interference.

Model **AD270** (an upgraded version of Model AD170) is for indoor mounting.
Model AD370 is waterproofed for outdoor use. Model AD370 & AD270 head units only are also available separately for upgrading earlier AD170 systems.

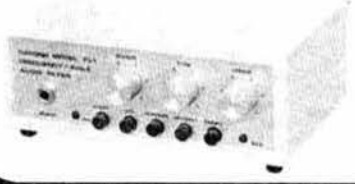
Model D75 RF Speech Processor

Model D75 uses the same method of r.f. clipping as in Model ASP but features manual adjustment of input level rather than the automatic system used in Model ASP.

Like all our r.f. clippers the unit helps your speech signals stand out from the next under DX conditions. Many users consider the use of our r.f. clippers more effective than a linear.

MODEL FL1 Frequency-agile Audio Filter

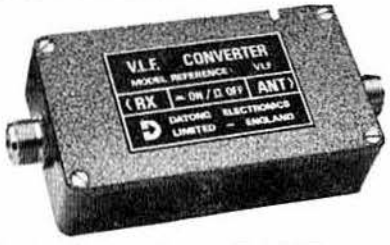
As unique now as when we first invented it, model FL1 is still the only audio filter which is able to automatically notch out an interfering heterodyne from SSB speech signals. This ability provides the perfect answer to those who "tune up" on occupied channels. As a cw filter it is surpassed only by our new Model FL2. Independent control of bandwidth and centre frequency gives beautifully smooth adaptability to varying conditions.



INGENIEURBÜRO ULRICH HANSEN

VHF & UHF PREAMPLIFIERS: A new range from Ulrich Hansen of West Germany

Everyone agrees that VHF receivers should have a low noise figure, and converter and receiver makers compete to announce the lowest possible figure. But really the most important thing is not the noise figure of the receiver but that of the receiving system as a whole.
If your coaxial feeder has a loss of 3 dbs, for example, your overall noise figure is automatically increased by the same factor. This makes the search for the last fraction of a db at the receiver look a bit academic.
Ingenieurburo Ulrich Hansen in Germany has introduced a range of in-line preamplifiers which allow you to put a very low noise preamplifier right at the antenna. This way feeder loss does not degrade the system noise figure. The improvement on weak signals can be dramatic.
All the products in the Hansen range are built to very high standards and no compromises are made which would degrade the achievable noise figure.
The top-of-the-line units use gallium arsenide FET's to give remarkably low over-all noise figures.
In addition most units incorporate relay switching to bypass the preamplifier while transmitting.
Our new short form data sheet on these products is available free on request.



Very Low Frequency Converter Model VLF

If your communications receiver gives poor results below 500kHz Model VLF is the answer. It also adds MW and LW coverage to amateur bands-only receivers for news time checks etc.

- Connects between antenna and receiver input
- Converts signals from 0 to 500kHz to the range 28 to 28.5MHz with low noise and high sensitivity. Useable to 1MHz with reduced sensitivity
- Crystal controlled for high stability
- Quality construction in diecast aluminium box (size 112x62x31mm). SO239 connectors. LED indicator in/out switch
- Operates from internal 9 volt battery or external supply (5-15 volts DC)

Products not shown in this advertisement
Model Datest 1 Transistor Tester
Model Datest 2 Transistor Tester
Model RFC/M R.F. Speech Processor PCB Module
Model MPU Mains Power Unit
Accessory Leads

PRICES: All prices include delivery in U.K. basic prices in £ are shown with VAT-inclusive prices in brackets.

FL1	59.00 (67.85)	AD270	33.00 (37.95)
FL2	78.00 (89.70)	AD370	45.00 (51.75)
PC1	105.00 (120.75)	AD270 + MPU	
ASP	69.00 (79.35)		37.00 (56.3)
VLF	22.00 (25.30)	AD270 + MPU	
D70	43.00 (49.45)		49.00 (56.35)
D75	49.00 (56.35)	MPU	6.00 (6.90)
RFC/M	23.00 (26.45)		

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone: (0532) 552461

From the World-Record JOYSTICK people!

A REVOLUTIONARY ANTENNA THEY CALLED "IMPOSSIBLE"

THE JOYFRAME

(Patent Applied for)

Amateur Bands 3·5–30MHz.

The ultimate in small package, poor QTH, versatile antennas. Comes in easily assembled package which makes up to a 21 × 21 × 21 (inches) triangle. The unit JUST STANDS ON TOP OF TX/RX! Two knob control—and is rotated by hand for directivity on 80m. Is omni-directional on higher freq.'s and for many SW BC stations. Incredible low angle radiation. Tested at 2 watts (only) CW at our works—world wide contacts! "Soak test" with G2VF using only 30 watts has satisfyingly filled his log with world wide QSO's. Loop TRANSMISSION performance with such a small unit has, we believe, never been seriously contemplated before, but rather written off as "impossible". Years of research from the firm that produced the JOYSTICK VFA and related systems now offers the JOYFRAME to the amateur fraternity and is the answer to the "maidens prayer" to everyone with a space problem. All the benefits of JOYSTICK products: substantially harmonic-free, low angle, efficiency, compact.

COMPLETE JOYFRAME (incl. ATU) £60.00

(or write—14p—or phone for literature)

TRANSCEIVERS ETC.
We reckon we're offering the

LOWEST YAESU PRICES!!!

Try phoning us for your PERSONALISED quote with or without Partridge antennas. For example: ● FT101ZD—only £559 ● FT901DM—only £795 ● FT7B—only £395.

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BARCLAYCARD VISA

JUST TELEPHONE YOUR CARD NUMBER

0843 62535 (Ext. 6) After office hours 0843 62839 or send 14p stamp for FREE literature. Prices correct as at press NOTE our prices are always INCLUSIVE of VAT, carriage. Prompt service too, goods usually despatched WITHIN 48 HOURS!

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PARTRIDGE ELECTRONICS BROADSTAIRS KENT ENGLAND

G3CED G3VFA

ROBOT '800' SUPER TERMINAL

THE FIRST INTEGRATED RTTY, ASCII, MORSE, SSTV, TERMINAL

Please see September *Rad. Com.* or send a large stamped addressed envelope or 12p in stamps for full details. **£645** incl. VAT. HP available if required

AERO & GENERAL SUPPLIES

Building 33, East Midlands Airport, Castle Donington, Derby. Tel: (0332) 812446

COAX UR67/RG213 50 ohms 10·mm, **51p/m** (5p/m—**£1** min.) 60m max, by post UR76/RG58 50 ohms 4·95mm, **21p/m** (3p/m—**50p** min.)

VALVES

6AV6	—£1.15;	6AV11	—£1.75;	6AW8A	—£1.95;	6BA6	—£1.55;	6BA7	—£3.55
6BN8	—£2.25;	6BV8	—£2.40;	6BZ6	—£1.36;	6C10	—£2.15;	6CB6	—£1.65
6CL6	—£2.20;	6DQ5	—£3.55;	6EA8	—£1.80;	6EJ7	—£1.55;	6EV7	—£1.75
6EW6	—£1.55;	6GK6	—£1.95;	6GW8	—£2.30;	6GX6	—£1.50;	6HF8	—£2.30
6HS6	—£2.80;	6JB6	—£3.10;	6JS6C	—£3.50;	6KD6	—£3.75;	6LQ6	—£3.85
12AV6	—£1.40;	12AX7	—£1.40;	12BY7	—£1.65;	12GN7	—£2.45;	OA2	—£1.40
6146A	—£5.10;	6146B	—£5.10;	7360	—£7.80;	8950	—£5.90;	572B	—£22.50

Ask for quote for other types (**20p** each, free over £15)

CONNS PL259 special, UR67 fit —**£1.07**; UR76/UR43/RG58 fit —**£0.92**
BNC 50 ohms, free plug (5mm) —**£0.50**; 4-hole socket —**£0.50**
N 50 ohms, free plug (UR67) —**£0.97**; free socket for UR67 —**£0.79**
SO239 4-hole socket —**£0.40**. (**30p/order** free over **£15**)

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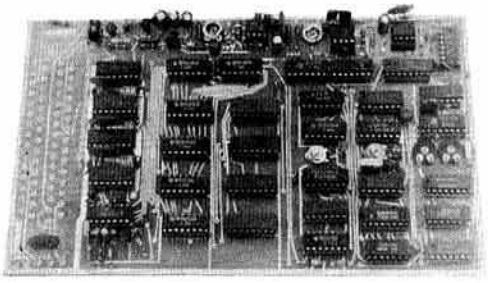

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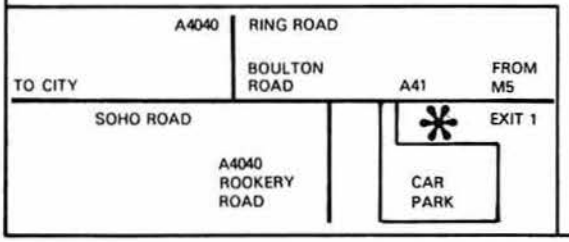

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