RADio COMmunication

April 1981

IARU REGION 1 CONFERENCE BRIGHTON 1981

Journal of the Radio Society of Great Britain

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:	144–146MHz
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**

NEW TR8400
70cm FM SYNTHESISED MOBILE

TR8400 Brief Specification

Frequency Range:	430–439·975MHz
Channel Spacing:	25kHz
RF Output Power:	10W (HI) or 1W (LO)
RX Sensitivity:	0·4μV for 12dB SINAD
Memories:	5 (scanning)
Repeater shift:	±1·6kHz
Price:	**£279**

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. Securicor delivery arranged. All prices include VAT.

BARCLAYCARD VISA

Access

CATRONICS LTD, DEPT 104, COMMUNICATIONS HOUSE,
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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.

APRIL 1981

VOLUME 57 No 4

RADio COMmunication

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

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

Tel 0245 84938

Office hours: 0900 to 1700

ADVERTISING

Advertising, other than Members' ads, should be sent to:

Mr C. C. Lindsay,
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Croydon,
Surrey CR0 5NL

Tel 01-686 5839 *(Not RSGB)*

Hours: 0915 to 1715

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RSGB Headquarters,
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London WC1N 2AE

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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.

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

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

26,007 copies per issue average circulation in 1980

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

TRIO *pacesetter in amateur radio*

With more features than ever before available in an amateur band receiver. This triple-conversion (8·83MHz, 455kHz, and 50kHz IFs) receiver, covering all Amateur bands from 160 through 10 metres, as well as several shortwave broadcast bands, features digital as well as analog frequency readouts, notch filter, IF shift, variable bandwidth tuning, sharp IF filters, noise blanker, stepped RF attenuator, 25kHz calibrator, and many other features, providing more operating conveniences than any other receiver.

FREQUENCY COVERAGE

160 metres (1·8–2·0MHz)
80 metres (3·5–4·0MHz)
40 metres (7·0–7·5MHz)
20 metres (14·0–14·5MHz)
15 metres (21·0–21·5MHz)
10 metres (28·0–28·5MHz)
10 metres (28·5–29·0MHz)
10 metres (29·0–29·5MHz)
10 metres (29·5–30·0MHz)
19 metres (15·0 (WWV)–15·5MHz)
49 metres (5·9–6·4MHz)
31 metres (9·4–9·9MHz)
25 metres (11·5–12·0MHz)
16 metres (17·7–18·2MHz)
Auxiliary band

- VBT/SELECTIVITY CONTROLS Separate controls on the same shaft provide variable bandwidth tuning as well as selection of four IF filters: 250Hz*
- IF SHIFT Varies (shifts) IF passband away from interfering signal
- RIT/NOTCH CONTROLS RIT allows receiver to be tuned off frequency, while not affecting transmit frequency, when in transceive mode. Notch control tunes notch within IF passband for eliminating interference. Notch frequency remains the same, even when IF shift is utilized.
- DRS DIAL Satin-smooth VFO tuning dial system provides accurate analog frequency readout. LSB, USB, and CW frequencies are accurately read from the same pointer
- BAND SWITCHES Selects frequency bands from 15MHz (WWV), 160 through 10 metres, the 49, 31, 25, and 16-meter shortwave broadcast bands, and an auxiliary band.
- PRESELECTOR Peaks tuned circuits in RF amplifier stage for increased selectivity and sensitivity, RF amplifier coil is dual-tuned.
- AGC SWITCH Automatic-gain-control circuit switchable to slow or fast response, or completely off.
- RECORD JACK Makes recording off the air simple.
- MODE SWITCH Selection of AM, CW, upper or lower sideband or RTTY.
- RF-ATTENUATOR SWITCH 10dB steps of attenuation from 0 to 40dB to prevent overloading from nearby stations, and for precise signal comparison.
- DIGITAL HOLD Locks counter and display while VFO is tuned to another frequency. Helps return to "hold" frequency.

R-820 receiver £690 inc VAT

R-820 *"the amateur band receiver plus"*

TS-130S/V *processor, N/W switch, IF shift, DFC option*

The compact, all solid-state HF SSB/CW mobile or fixed station TS-130 Series transceiver covers 3·5 to 30MHz, including the three new bands.

TS-130 SERIES FEATURES:

- 80–10 metres, including the new 10, 18, and 24MHz bands. Receives WWV.
- TS-130S runs 200W PEP/160W dc input on 10–15 metres and 160W PEP/140W dc on 12 and 10 metres. TS-130V runs 25W PEP/20W dc input on all bands.
- Built-in speech processsor.
- Narrow/wide filter selection on both CW (500Hz or 270Hz) and SSB (1·8kHz) with optional filters.
- Automatic selection of side-band mode (LSB on 40 metres and below, and USB on 30 metres and above). SSB REVERSE switch provided.
- Built-in digital display.
- Built-in RF attenuator.
- IF shift (passband tuning).
- Effective noise blanker.

OPTIONAL ACCESSORIES:

- PS-30 base-station power supply.
- YK-88C (500Hz) and YK-88CN (270Hz) CW filters.
- YK-88SN (1·8kHz) narrow SSB filter.
- AT-130 compact antenna tuner (80–10 metres, including three new bands).
- SP-120 external speaker.
- VFO-120 remote VFO.
- MB-100 mobile mounting bracket.
- PS-20 base-station power supply for TS-130V.

Optional DFC-230 Digital Frequency Controller
Frequency control in 20Hz steps with UP/DOWN microphone supplied with DFC-230). Four memories and digital display. (Also operates with TS-120 and TS-830S.)
TS–130S £491.05 inc VAT.
TS-130S £404.34 inc VAT.
Carriage £4.50.

PS-30 SP-120 TS-130S VFO-120

LOWE ELECTRONICS Ltd
CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2817

TRIO *pacesetter in amateur radio*

TR-8400 *the new synthesized 430MHz FM mobile transceiver*

. . . . . JUST HOLD AN 8400

- **SYNTHESIZED DESIGN**
  Covers 430–440MHz in 25kHz steps. channel band-width is 10MHz.
- **FIVE MEMORIES**
  Four of the five memories may be operated in simplex mode or the transmit frequency may be offset ±1·6MHz with the offset switch to access most repeaters. The fifth memory stores both receive and transmit frequencies independently, for operation on repeaters with non-standard splits (as well as standard repeater and simplex operation). A memory back-up terminal is provided on the rear panel.
- **TWO VFO'S**
  Convenient for switching quickly from repeater to simplex portions of the band, or to any particular frequency selected by either VFO.
- **OFFSET SWITCH**
  Allows four of the five memory frequencies and both VFO frequencies to be offset ±1·6MHz for operated simplex) during transmit mode, for repeater access.
- **MEMORY SCAN**
  Automatically locks on busy memory channel and resumes when signal disappears or when SCAN switch is pushed. Scan HOLD or microphone push-to-talk switch cancels the scan function.
- **AUTOMATIC BAND SCAN**
  Scans 430–440MHz in 25kHz steps and locks on busy channel. Scan resumes when signal disappears or when SCAN switch is pushed. Scan HOLD or microphone push-to-talk switch cancels the scan function.
- **UP/DOWN MICROPHONE PROVIDED**
  Included with the TR-8400 is an UP/DOWN microphone for manually scanning 430–440MHz in 25kHz steps, allowing easy frequency changes while driving.
- **VERY COMPACT AND LIGHTWEIGHT**
  Truly a "miniature" mobile transceiver, the TR-8400 measures only 147·5 (5·9)W, 51·5 (2·1)H and 193 (7·7)D and weighs only 1·5kg (3·3lbs). Such a small package is easy to mount in any car.
- **FOUR-DIGIT FREQUENCY DISPLAY**
  A four-digit LED display indicates receive and transmit frequencies.
- **S/RF LED BAT METER**
  Received signal level and relative RF output are indicated on a multicoloured, eight-segments, LED bar meter.
- **LED MODE INDICATORS**
  Three-front-panel LEDs indicate BUSY channel, ON AIR, and REPEATER offset.
- **TONE BURST SWITCH**
  The TONE BURST switch activates the accurate 1750MHz repeater access tone oscillator.
- **HI/LOW POWER SWITCH**
  RF output power can be switched from 10W to1W.

TR-8400 £279.00 inc VAT
CARRIAGE BY SECURICOR £4.50

All Trio equipment is available from the following authorised Trio dealers
LOWE ELECTRONICS LTD. Chesterfield Road, Matlock, Derbys. Tel: 0629 2430 or 2817

LANCASHIRE
Stephens-James Ltd
47 Warrington Rd
Leigh
0942 676790

BIRMINGHAM
Ward Electronics
Soho House, 362–364 Soho Rd
Birmingham B21 9QL
021 554 0708

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

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Hockley Essex. 0702 206835

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W. Sussex. 0444 400786

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Photo Acoustics Ltd
58 High St
Newport Pagnell
Bucks. 0908 610625

WALES
MRS Communications Ltd
76 Park Rd
Whitchurch, Cardiff
0222 616936

NORTH LONDON
Radio Shack Ltd
188 Broadhurst Gardens
London NW6 3AY
01-624 7174

YORKSHIRE
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.

FROM THE JAPAN RADIO CO LTD

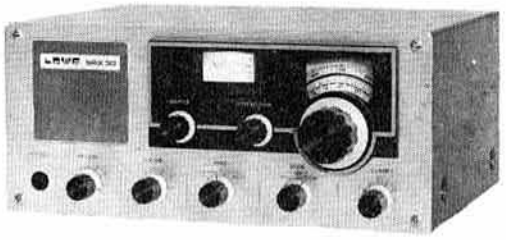
NRD-515 Receiving for the discerning few

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 HF RECEIVER £948.75 inc VAT

MIZUHO RACK SYSTEM FOR THE ADVANCED LISTENER

KX2 500kHz–30MHz aerial tuner	£29.90	APM1 audio peak & notch filter	£33.00
AX1 aerial switching system	£27.03	SR1 mini rack for system	£14.09



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

MARCONIPHONE

- FULLY SOLID STATE ● CRYSTAL CONTROLLED
- SPOT FREQUENCY CHECK ON 2LO ● MATCHED FOR LONG WIRE ANT
- POWER REQUIREMENTS; 1 FINGER POWER + PATIENCE
- MODE AM ● SEMI AVC BY MOVING PHONES AWAY FROM EAR
- FREQUENCY STABILITY: GOOD WITH STEADY HAND

MARCONIPHONE BABY

THE PRICE TO BE ANNOUNCED APRIL 1st 1981

TRIO

TR-9000 The exciting TR-9000 2-metre all-mode transceiver combining the convenience of FM with long distance SSB and CW in a very compact, very affordable package. Because of its compactness the TR-9000 is ideal for mobile installation, add on its fixed station acessories and it becomes the obvious choice for your shack.

TR-9000 2 METRE MULTIMODE

£345.00 inc VAT. Carriage by Securicor £4.50

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2817

TRIO
R-1000

"Hear there and everywhere"
easy tuning, digital display

The R-1000 is an amazingly easy-to-operate, high-performance, communications receiver, covering 200kHz to 30MHz in 30 bands. This PLL synthesized receiver features a digital frequency display and analog dial, plus a quartz digital clock and timer.

R-1000 FEATURES:

- Covers 200kHz to 30MHz continuously.
- 30 bands, each 1MHz wide.
- Five-digit frequency display with 1kHz resolution and analog dial with precise gear dial mechanism.
- Built-in 12-hour quartz digital clock with timer to turn on radio for scheduled listening or control a recorder through remote terminal.
- Step attenuator to prevent overload.
- Three IF filters for optimum AM, SSB, CW. 12kHz and 6kHz (adaptable to 6kHz and 2.7kHz) for AM wide and narrow, and 2.7kHz filter for high-quality SSB (USB and LSB) and CW reception.
- Effective noise blanker.
- Terminal for external tape recorder.
- Tone control.
- Built-in 4-inch speaker.
- Dimmer switch to control intensity of S-meter and other panel lights and digital display.
- Wire antenna terminals for 200kHz to 2MHz and 2MHz to 30MHz. Coax terminal for 2MHz to 30MHz.
- Voltage selector for 100, 120, 220, and 240 VAC.

RECEIVER WITH DC KIT FITTED £285 inc VAT
SP-100 MATCHING EXT. SPEAKER £26.45 inc VAT
CARRIAGE BY SECURICOR £4.50

FOR THE HF RECEIVERS USE THE TRIO HEADPHONES HS5 OR HS4
HS5 £21.85 inc VAT. HS4 £10.35 inc VAT

SR9 DAIWA

2mtr FM TUNABLE/XTAL RECEIVER

£46.00 inc VAT carriage £1.50

SL-1600A

XTLS £2.50/CH

16 CHANNEL 2mtr SCANNING RECEIVER

£39.50 inc VAT carriage £1.50

AR22 FLEXIBLE ANTENNA £3.00

AOR AR2

2mtr FM SYNTHESISED RCVR

£83.00 inc VAT carriage £1.50

TRIO

TR-7800 Trio's remarkable TR-7800 2-metre FM mobile transceiver provides all the features you could desire for maximum operating enjoyment. Frequency selection is easier than ever, and the rig incorporates new memory developments for repeater shift, priority, and scan. The TR-7800 by Trio, the only FM mobile.

TR-7800 THE ULTIMATE 2 METRE MOBILE

£268 inc VAT. Carriage by Securicor £4.50

TRIO

SP40
FOR MOBILE USE
NEW SPEAKER
AUDIO TAILORED TO COMBAT CAR NOISE
£26.89 inc VAT carr £1.50

TR-2300 The remarkable TR-2300 is a compact 80 channel FM transceiver designed for use in the 2-metre band. The TR-2300 is engineered with the latest techniques in all solid state construction. The small and lightweight design of the TR-2300 offers you versatile use.

TR-2300 THE VERSATILE 2 METRE PORTABLE

£166.75 inc VAT. Carriage by Securicor £4.50

LOWE ELECTRONICS Ltd

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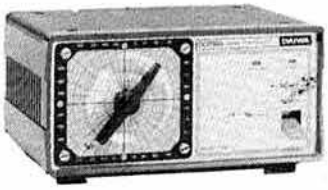
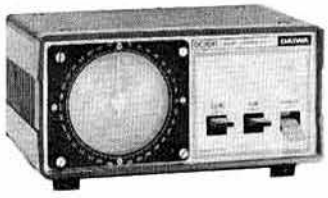
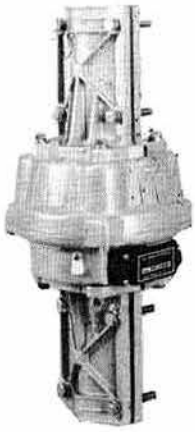
DAIWA
INDUSTRY CO., LTD. DISTRIBUTED IN THE UK BY LOWE ELECTRONICS LIMITED







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.

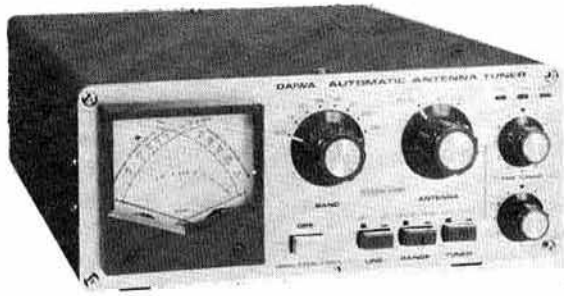
DAIWA ROTATOR SYSTEMS

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.

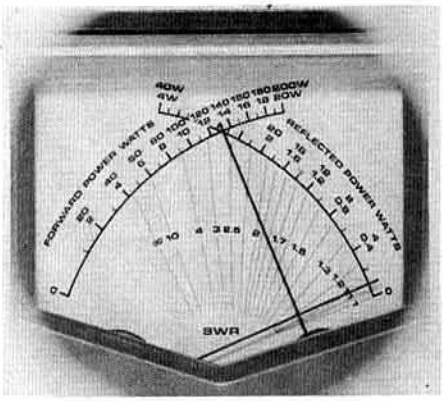
The CNA1001A incorporates a sensitive reflected power detector which monitors SWR all the time. At the first push of the operate button, a motor driven gearbox drives the load and match variable capacitors through their entire range in overlapping small increments seeking a correct match. When matching 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 DO 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 the 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

CORDLESS MICROPHONE

CONTROLLER & CHARGER

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

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE 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.

		NETT	inc. VAT	CARR.
SS015S	80–10m solid state SSB/CW/FM transceiver. Semi kit form	225.00	258.75	4.50
SE-NB	Noise blanker kit	6.75	7.76	.50
SE-FMrx	RX FM discriminator kit	15.00	17.25	1.00
SE-FMtx	TX FM generator kit	11.00	12.65	1.00
SE-MK	RX marker kit	9.60	11.04	.50
0.5 CWF	500 Hz CW filter	19.50	22.43	.50
Optional band crystals		3.00	3.45	.25

AR 245 *2 metre hand held synthesized 144–146 5/1 watt.*

AR 240A *2 metre hand held synthesized 144–146 1½ watt.*

AR 245 £178 inc. VAT. AR 240A £158 inc. VAT. Carriage £1.50.

SX 200 SCANNING MONITOR

The SX-200 scanning monitor receiver will enable you to enjoy a new dimension of scanning ease, convenience and efficiency. Many thousands of frequencies at your fingertips. These frequencies can be easily selected by keyboard operation, and can be monitored, searched, scanned and memorised at will, without the need to purchase expensive crystals. An additional feature is the accurate digital clock which assists accurate log keeping.
The receiver covers amateur VHF and UHF frequencies, both repeater and simplex contacts between amateurs can be monitored. Also available are aircraft and marine frequencies but please note, a licence may be required to legally listen to certain frequencies within the performance range of the SX-200 in some countries. So there we are, the SX-200, a precision instrument designed by J.I.L. to give not only ease and efficiency in use but hours of enjoyment either at home or in your car.

SX 200 £237 inc VAT carr £4.50

FREQUENCY COUNTER *Model HFC 55*

The HFC55 is a sensibly priced, easy to use digital frequency meter covering 10kHz–55MHz in a single range. The bright 5 digit display gives a direct reading of frequency when the built in telescopic aerial is placed near a source of RF. The HFC operates from internal dry batteries and is housed in a strong metal case to withstand regular and continuous use.

HFC 55 Frequency Counter £36.50 inc. VAT. Carriage £1.50

POWER SUPPLY UNITS

the PP1305 4 amp 13·8 volts d.c. £18.40 inc. VAT.
the PP137 7 amp 13·8 volts d.c. £32.00 inc. VAT.
the PP1310 10 amp 13·8 volts d.c. £49.50 inc. VAT.
Carriage £2

NOTE THE PRICES WITHIN OUR ADVERTISEMENT ARE CORRECT AS OF THE 12TH MARCH 1981

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Carriage charge in brackets

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)
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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)
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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 9 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	121.00 (n.c.)
FT107M	160-10m band transceiver	625.00 (n.c.)
FV107	Remote VFO for FT107	92.00 (n.c.)
FC107	160-10m atu, aerial switch, p/meter	102.00 (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	57.50 (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	11.90 (.75)
YM37	500ohm manual mic FT707/107	6.15 (.75)
FT707S	160-10m 8 band transceiver	454.00 (n.c.)
FT707	160-10m 8 band transceiver	499.00 (n.c.)
FP707	230v AC to 12v DC for FT707	109.25 (2.50)
FC707	160-10m atu	80.50 (1.50)
FV707DM	External digital vfo for FT707	186.30 (n.c.)
MR7	Metal rack for FT707	14.95 (1.50)
MMB2	Mobile mounting bracket FT707	16.00 (1.50)
FRB707		21.85 (1.00)
FL2100Z	160-10m 1200 watt linear	362.25 (n.c.)
YP150	150 watt dummy load	83.95 (1.75)
YH55	8ohm headphones	9.95 (1.25)
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FP4	230v AC 4 amp DC p/supply	41.40 (2.50)
FSP1		9.95 (1.00)
FRG7	0.5-30MHz communications Rx	189.00 (n.c.)
BHRG7	Battery holder for FRG7	5.00 (1.00)
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YC500S	Frequency counter	270.25 (n.c.)
YC500E	Frequency counter	345.00 (n.c.)
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FRG7700	MEM As above with freq mem	380.00 (n.c.)
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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 Base station	520.00 (n.c.)
FT225RD	144-146MHz with digital readout	565.00 (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	120.00 (n.c.)
S72	Switching box	56.00 (n.c.)
E72S	2m of connecting cable	23.00 (1.00)
E72L	4m of connecting cable	28.00 (1.00)
720RV	10W 2m module	133.00 (n.c.)
720RVH	25W 2m module	143.00 (n.c.)
720RU	10W 70cm module	156.00 (n.c.)
MMB3	Mobile mounting bracket	6.00 (1.50)
NEW	FT101Z (WARC) 9 band HF transceiver with FM	TBA (n.c.)
NEW	FT101ZD (WARC) 9 band HF transceiver with FM	TBA (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.)
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		
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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)
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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)
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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)
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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 (1¼" masts)	2.65 (1.00)
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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)
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A5	5' × 1" straight	2.30 (1.50)
A9	9' × 1¼" 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 1¼" 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"-1¼" 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 1¼" 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.)
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Tribander Helical for 10/15/20 metres		24.75(2.00)
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LF80m Coil for above		6.55(.50)
LF160m Coil for above		6.55(.50)
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Jaybeam KR400 (6 core)	105.00(2.00)
CDE alignment bearing	7.75(1.00)
Channelmaster alignment	11.75(1.00)
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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 100W 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.)
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 1⅛" 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 £639.00

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 £491.00

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 TR2300 £166.75

KING OF THE PORTABLES!

TRIO R1000 £285.00

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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EXCITING PRODUCTS FROM THE HAM RADIO CENTRE OF THE SOUTH

(See pages 296 and 297 for complete price list)

WELZ SWR/POWER METER £29.95 inc VAT
400W 5-BAND ATU £49.95 inc VAT

Here's a couple of new units from Welz that are of particular interest to HF operators with solid state transceivers. The units are available either separately or can be linked together to form a single unit. The AC35M comprises a 5-band ATU with a power capability of 400W pep and will match your transceiver to coax feeder. The matching SP-15M is a combined SWR meter and power meter covering 1·8 to 150MHz. Three switched power leads are available, 2·5, 20 and 200W.

ARE YOU LEGAL?

Here's a nice little gadget that will make your station legal. The FX-1 wavemeter covers the range 0·7 to 250MHz with a series of plug-in coils and fulfils licence requirements. The clearly calibrated dial provides accurate frequency readout and the internal battery powered amplifier makes it very sensitive as either an absorption wave meter or field strength meter.

FX1 WAVEMETER
£28 inc VAT + £1 p&p

EXCITING PRODUCTS—IMPORTED SPECIALLY BY US FOR YOU!—EXCITING PRICES!

"WELZ" TELLS THE TRUTH

MODELS
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.)

Welz VSWR/POWER meters are high quality instruments approaching laboratory accuracy. They are capable of providing extremely accurate measurements of both power and voltage standing wave ratio. Features include high sensitivity (2·5W full scale 1·8-500MHz), & completely flat response.

VSWR/POWER FIELD STRENGTH METER
3·5-150MHz £11.95 inc VAT + 65p p&p

There really is no excuse for not owning one of these little units. It's a combined SWR meter, power meter and field strength meter covering HF and VHF bands 3-150MHz. It tells you all you need to know about your aerial system either mobile or fixed and gives an indication of power output and field strength. Each one is fully guaranteed for 12 months.

NO MORE SNAP, CRACKLE & POP
SEIF PS134—THE RUGGED ONE
240V AC—12V DC 4AMPS

The message is beware of super cheap power supplies—they could destroy your transceiver! The SEIF unit is different. It's a really rugged unit with a heavy duty transformer ideal for running 10-15W mobile rigs. Completely stabilised and protected, this unit will give you good, reliable performances.

£22.95 inc VAT
£2.00 carriage

NEW **THE 'LONG JOHN' SUPER GAIN VERTICAL**
£19.95

A highly compact vertical aerial that will more than double your effective radiated power. Only 4ft tall yet really outclassing all its similar sized competitors. Construction features high quality plated aluminium and stainless steel fittings. The base matching section is fully protected against the weather and the SO239 socket is fully shrouded. The aerial comes complete with mast mounting clamps. The "Long John" really packs a knock-out punch.

NEW **HANDHELD CO-LINEAR**
£21.95

Surely the answer to the portable operator who seeks gain without increased battery drain. This highly compact co-linear completely folds down into its own carrying case. Yet in seconds it can be snapped together to give you up to 5dB of gain—that's nearly four times your power! Ideal for 2m handhelds and possibly a pretty good idea for RAYNET. Not only have you the advantage of the antenna gain, you also have the added gain obtained by the higher elevation of the handheld aerial. They really do work, we've tried them!

STILL THE MOST SENSITIVE MONITOR ON THE MARKET TM56B £89 inc VAT

Two models are available, one for the marine band and one for the amateur band. Each model comes fitted with 10 popular channels with a total capability of 16 channels of which four can be continually scanned. The TM56B can be operated from an external 12V DC source or from its own internal 240V AC supply. The loudspeaker is built into the base of this most sensitive monitor.

NEW **AT1000 SWL ATU**
IMPROVED SELECTIVITY
0·2-30MHz

£31.95
+£1 p&p.

Cross-modulation, intermodulation, poor sensitivity etc—all problems today's short wave listener is likely to suffer. That's why we have had the AT1000 specially designed for us in Japan in order to overcome these very problems. Insert the AT1000 between your aerial and receiver for an immediate improvement. Then sit back and really hear the DX roll in. A receiver without an AT1000 will soon be a thing of the past!

TVI CORNER

TV
If you are suffering TVI then you should try our HP3A high pass filter. Simply plug into the TV aerial socket to filter out the interference. As supplied to Home Office departments. **£3.50** inc VAT

AUDIO
Even more of a problem today is Hi-Fi interference. Our special ferrite rings are ideal for fitting to speaker leads, signal leads and mains cables—they really are magic! **£0.35** each, p&p 30p min.

MOBILE SAFETY MICS
WHICH MODEL SUITS YOU?

AM202S
The boom mic with clip comes with control box which clips onto gear lever. This model suits all mobile transceivers except Icom IC255. **£20.95** inc VAT

AM202H
The boom mic with clips comes with control box with up/down frequency control buttons. This model suits most modern synthesised transceivers that have remote frequency control. **£29.00** inc VAT

If in doubt about suitability, please telephone.

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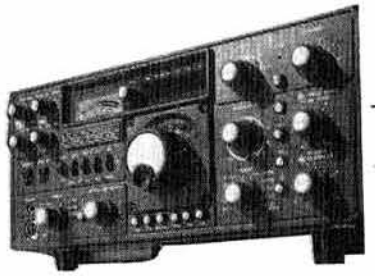
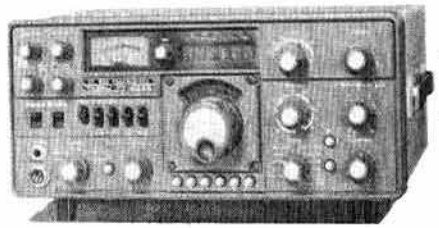


Buy this FT902 DM at £799.00

AND TAKE
1 Skymaster 4000 Rotor *Worth £85.00*
or
1 Astatic Silver Eagle Mic
Worth £50.00

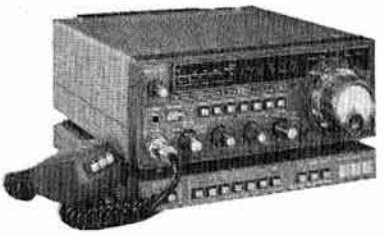
Free



Buy this FT101ZD at £569.00

AND TAKE
1 Shure 526T Mic
Worth £40.00
or
1 Oskerbloc or 200B SWR/PWR Meter *Worth £40.00*

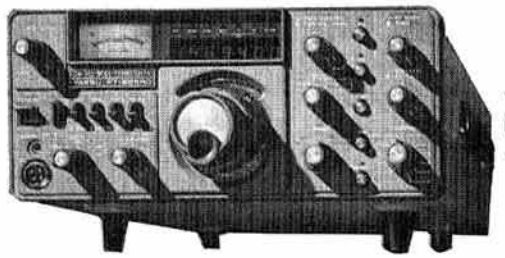
Free



Buy this FT707 at £529.00

AND TAKE
1 Shure 526T Mic
Worth £40.00
or
1 Killowatt Dummy Load
Worth £35.00

Free



Buy this FT225 RD at £565.00

AND TAKE
1 AR40 Rotor
Worth 59.00
or
1 Shure 526T
Worth £40

Free

Buy this FT480 at £359.00.

AND TAKE
1 Jaybeam 4 Element Quad
Worth £23.69
or
1 Jaybeam 8 x y/2m Antenna
Worth £28.40

Free

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Thanet Electronics for ICOM
the amateur's professional friends

IC-451 UHF Base Station

ICOM are proud to announce 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

£579 inc. V.A.T.

It's Small- but very Sensitive
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. 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.

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

SEND FOR TECHNICAL DETAILS

Also available from our shop in Herne Bay are:

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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.

Thanet for ICOM

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

All over the World they haven't been able to get enough!

(But things are getting better)

ICOM's new 9-band HF Transceiver – the IC-720A beats the lot!

IC-720A
£795 incl

Some features.

- 9 Bands Top to Ten including new ones!
- General Coverage Receiver – 100KHz to 30MHz.
- Tuning down to 10Hz steps – YES! 10Hz – yet stable as a rock!
- Built-in Speech Compressor which really gets excellent reports.
- The famous ICOM Band Pass Tuning.
- Memory – it even does all the band changing for you.
- Self cancelling RIT.
- 3 rates of Tuning.
- Two Independent VFOs (in band duplex possible).
- 100 W Output.
- Modes AM, SSB, CW and RTTY.

A lot in a small packet for £795 inc. VAT (13.6V operation – matching mains PSU £100)

- Solid State 500W linear available shortly.

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

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

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.

'NEW' IC24G

The famous IC240 has finally been replaced. Many thousands are in use and its popularity was due in part to simplicity of operation, sensitivity and superb audio on TX and RX. The new IC24G has these and other features:-

Full 80 channels selected by easy-to-operate press button thumbwheel switches. Readout is by channel numbers, ie: S21=521, S16=516 and for the lower part of the band 144.5=420. This readout can be clearly seen in the brightest of sunlight. Duplex and reverse duplex is provided along with a crystal controlled tone call. Hi-10w and lo-1w RF output is available, along with a 12½KHZ upshift, should the new channel spacing be necessary. The old IC240 proved to be the most reliable rig we have ever sold - the IC24G, because it is so similar, looks like following the same pattern.

Remember, for mobile use a rig MUST be easy to operate to be safe.

SEND FOR TECHNICAL DETAILS

Thanet for ICOM

TELEX: 965179

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.

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

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. Now supplied with up-down scanning mic.

£339 INCL.

It will seduce you in it's own way the ICOM IC 251E only £479 INCL.

SEND FOR TECHNICAL DETAILS

AGENTS (PHONE FIRST — All evenings and weekends only, except 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)		

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Your number one source for YAESU MUSEN

FT-107M Deluxe solid-state HF transceiver

A real thoroughbred from the YAESU stable – a superb receiver section in combination with a rugged, powerful, solid-state PA. 240 watt PEP input, 12 memory option, latest bands.

FT-480R High technology all-mode 2metre mobile

The most advanced 2 metre mobile available today– USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

FT-707 All solid-state HF mobile transceiver

The definitive HF mobile rig, digital,variable IF bandwidth, 100watts PEP SSB. AM, CW (pictured here with 12 channel memory VFO).

As factory appointed distributors we offer you– widest choice, largest stocks,quickest deal and fast sure service right through–

Access

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

FT-707 In base station format

Here we show the 707 together with the matching FP-707 PSU, FC-707 ATU and FV-707DM VFO memory.

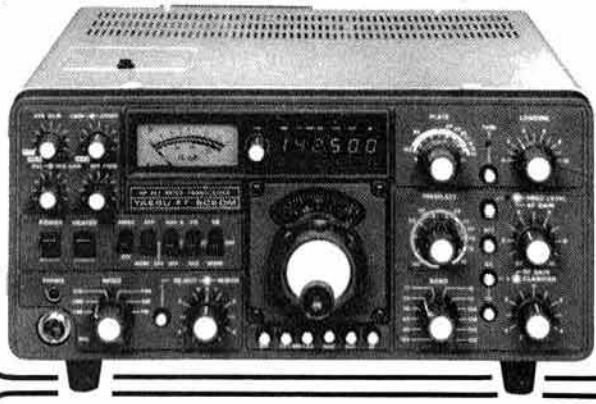
For full details of these new and exciting models, send today for the latest YAESU CATALOGUE and LEAFLETS. All you need to do to obtain the latest information about these exciting developments from the world's No. 1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3.60p – a 10 to 1 winning offer.

FL-2100Z High power all band HF linear

Conservatively rated at 1200W PEP input, the new WARC model incorporates all the new bands.

FRG-7700 Synthesized general coverage receiver

The very latest in receiver technology from YAESU. Receives USB, LSB, CW *and* FM–memory option with 12 channels and automatic band selection.



FT-902DM Competition grade HF transceiver

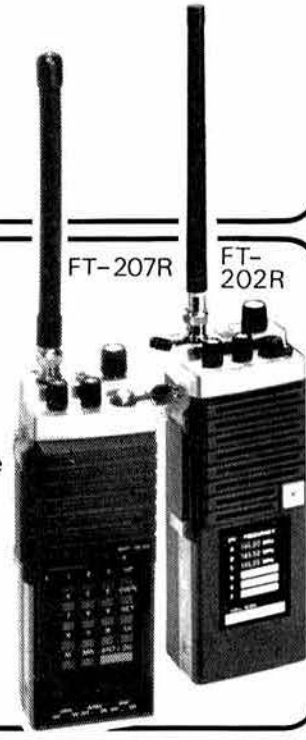
The YAESU world famous pace–setter with the acknowledged unbeatable reputation. Now with the new WARC bands.

FT-101ZD High performance HF transceiver (NOT ILLUSTRATED)

Next to the 902 comes the superb FT–101Z/ZD. This fine HF transceiver out–performs many a more expensive rig.

FT-225RD Deluxe 2 metre base station

The tried and proven all–mode 225RD has a very comprenensive specification including memory option, variable power output and DC operation for portable working.



FT-202R 2 metre hand-held

Ultra compact lightweight (400g) FM hand–held 1 watt 6 channel, rugged and reliable – many thousands in use.

FT-207R Synthesized 2 metre hand-held

400 channels on 144–146 MHz. Memory back–up, 2·5 watt output.

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NORTH EAST – NORTH EAST AMATEUR RADIO, DARLINGTON 0325 55969
SOUTH EAST – AMATEUR ELECTRONICS, UK – KENT KEN McINNES, G3FTE, THANET (0843) 291297

As from May 1st. our new opening hours are 9.30–5.30 Tues. to Sat. continuous and CLOSED all day Monday.

WHERE TO FIND US

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 comples. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100yds 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 leave on A47(East). We are located three miles from this point.

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Excellent Parking Facilities

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A Western SPRING SELECTION OF HF TRANSCEIVERS

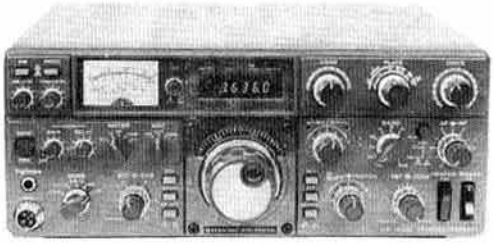
YAESU FT-101ZD

The FT-101 series needs little introduction. Suffice it to say that the latest FT-101Z (analogue) and FT-101ZD (digital) transceivers represent a first-class continuation of a fine line of HF equipment. The latest technology brings you top performance at a price you can afford. Full details of this exciting transceiver available on request. WARC bands fitted, of course!

YAESU FT-707

The FT-707 is in the forefront of the new generation of compact HF solid-state transceivers. Little larger than a book, the FT-707 is a full-feature transceiver with performance you might expect only in a "top-line" piece of equipment. Ideally suited for a home base station or as a mobile travelling companion. Features digital display, IF width control, LED meter system—and of course all new WARC bands!

TRIO TS-830S



The TS-830S is a high-performance, very affordable, HF SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 metres (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning. IF shift, and an IF notch filter, as well as very sharp filters in the 455kHz second IF.

TRIO TS-130S

The TS-130S 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 29·7MHz (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.

. . . AND A GREAT PAIR OF GENERAL COVERAGE RECEIVERS

YAESU FRG-7700

The short-wave listener's dream is now a reality in the FRG-7700—an advanced all-mode communications receiver featuring significant advances in circuit design and operating convenience.

TRIO R-1000

One of the best on the general coverage scene. Full coverage 200kHz to 30MHz with digital frequency readout and clock/timer. Switched selectivity for optimum performance and other features making it a joy to use and first-class value for money.

PRICES

WE'RE THE KEENEST IN THE BUSINESS! GIVE US A TRY!
. . . AND OUR YAESU AND TRIO HAS A 2 YEAR WARRANTY. . .

ACCESS—VISA CARDS ACCEPTED—HP ARRANGED (WRITTEN QUOTATIONS ON REQUEST)
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Bredhurst electronics

BREDHURST NEWS

April 1981

TRIO

		£	carriage
TS 830S	160 10m transceiver 9 bands	639.00	–
VFO 230	Digital VFO with memories	194.00	(2.00)
AT 230	All band ATU power meter	106.00	(1.50)
SP 230	External speaker unit	33.00	(1.50)
DFC 230	Dig. frequency remote controller	163.00	(0.50)
YK 88C	500 Hz CW filter	26.45	(0.50)
YK 88CN	270 Hz CW filter	28.75	
TS 130S	8 band 200 W pep	491.00	–
TS 130V	8 band 20 W pep	404.00	–
VFO 120	External VFO	89.70	(1.50)
TL 120	200 W pep linear for TS 130V	128.80	(1.50)
MB 100	Mobile mount for TS 120/130	17.25	(1.00)
SP 120	Base station external speaker	25.30	(1.00)
AT 130	100 W antenna tuner	72.89	(1.00)
PS 20	A.C. power supply TS 120V/130V	44.85	(2.00)
PS 30	A.C. power supply TS 120S/130S	85.00	(3.00)
MA5	5 band mobile aerial system	74.75	(3.00)
MC 50	dual impedance desk microphone	24.15	(1.50)
MC 35S	Fist microphone 50K impedance	13.80	(0.75)
MC 30S	Fist microphone 500 ohm impedance	13.80	(0.75)
LF 30A	H. F. low pass filter 1 kW	18.40	(0.75)
TS 770E	2m/70cm all mode transceiver	730.00	–
SP 70	External speaker unit	18.40	(1.00)
TR 9000	2m synthesised multimode	345.00	–
BO 9	Base plinth for TR 9000	32.20	(1.50)
TR 7800	2m F.M. synthesised mobile 2 5W	265.00	–
TR 2300	2m F.M. synthesised portable	166.00	–
VB 2300	1 OW amplifier for TR 2300	49.45	(1.00)
MB 2	Mobile mount for TS 2300/VB 2300	17.25	(1.00)
RA 1	Rubber flexible antenna	6.90	(0.50)
TR 2400	2m F.M. synthesised handheld	198.00	–
ST 1	Base stand and quick charger	43.70	(1.50)
BC 5	12v quick charger	17.25	(1.00)
SC 3	Soft carrying case	11.50	(0.50)
PB 24	Spare battery pack/charger lead	14.26	(1.00)
R 1000	Gen coverage receiver	285.00	–
SP 100	External speaker unit	26.45	(1.50)
HS 4	Economy headphones	10.35	(0.75)
HS 5	Deluxe headphones	21.85	(0.75)
HC 10	Digital station world time clock	55.00	

FDK VHF UHF EQUIPMENT

M 700EX	2m F.M. synthesised mobile 2 5W	199.00	–
M 750E	2m synthesised multimode - mobile	299.00	–
Expander	70 cm transverter for M 750E	p.o.a.	–
PS 750	A.C. power supply for M 750E	p.o.a.	–
Palm II	2m F.M. 6 channel portable	89.00	–
Palm IV	70cm F.M. 6 channel portable	149.00	(0.30)
TB 1	1750 Hz toneburst for Palm II/IV	10.00	(0.50)
CC 2	Leather case for Palm II/IV	5.75	(0.50)
BC 2	A.C. battery charger for Palm II/IV	4.50	

MORSE EQUIPMENT

HK 707	Up/Down Key	10.50	(0.50)
MK 704	Squeeze paddle	10.50	(0.50)
EK 121	Elbug	29.95	(0.50)
EKM 12	Matching side tone monitor	10.95	(0.50)
EK 150	Electronic keyer	74.00	–

POWER SUPPLIES – Overvolts current limit protection

4 Amp	Continuous 4 amp 12v P.S.U.	27.95	(1.50)
6 Amp	Continuous 6 amp 12v P.S.U.	44.95	(2.00)
12 Amp	Continuous 12 amp 12v P.S.U.	69.00	(2.00)
24 Amp	Continuous 24 amp 12v P.S.U.	92.00	(3.00)

SWR – POWER METERS

YW 3	Twin Meter	11.50	(0.50)
T 435	Toyo twin meter (144-435 MHz)	34.45	(0.75)
SW 110A	Daiwa (1.8 – 150 MHz)	35.00	(0.75)
SP 200	Welz (1.8 – 150 MHz)	49.95	(0.75)
SP 400	Welz (130 – 500 MHz) cross-pointers	49.95	(0.75)
CN 620A	Daiwa (1.8 – 150 MHz)	52.80	–
SP 300	Welz (1.8 – 500 MHz)	69.95	–
CN 630	Daiwa (140 – 500 MHz) cross-pointers	71.00	–

MICROPHONES

MM 202S	Adonis clip on safety mic	20.95	(0.50)
MM 202HD	Adonis head band safety mic + Up/Down	29.00	(0.50)
MM 202FU	Adonis swan kneck safety mic + Up/Down	30.00	(0.50)
AM 502	Adonis compressor mic – 1 O/P	39.00	(0.75)
RM 940	Daiwa infra red link safety mic	45.00	(0.50)

YAESU

		£	carriage
FT 101Z	160 – 10m 9 band transceiver	488.00	–
FT 101ZD	160 – 10m 9 band transceiver	569.00	–
DCT 101Z	12 v d.c. adaptor	34.50	(1.00)
FV 101Z	remote VFO for FT 101Z/ZD	121.90	(1.00)
FT 107M	160 – 10m 9 band transceiver	690.00	–
FV 107	remote VFO for FT 107M	92.00	(1.00)
FC 107	160 – 10m atu aerial switch p/meter	102.00	(1.00)
FP 107E	230v a.c. power supply for FT 107	106.00	(2.00)
FP 107	power supply for internal fitting	97.75	(2.00)
FTV 107(2)	transverter main frame with 2 metres	207.00	–
430 V107V901	70cm transverter card	175.00	–
SP 107P	external speaker in cabinet	57.50	(1.50)
SP 107	external speaker in cabinet	27.60	(1.50)
DMST 107	12 channel memory for FT 107	£88.00	(1.00)
CW	CW filter for FT 107	23.00	(0.50)
AM	AM filter for FT 107	23.00	(0.50)
YM 34	desk mic for FT 707/107 dual imp.	18.80	(1.50)
YM 35	500 ohm up/down mic FT 707/107	12.65	(0.75)
YM 36	500 ohm noise cancelling FT 707/107	11.90	(0.75)
YM 37	500 ohm manual mic FT 707/107	6.15	(0.75)
FT 707S	500 ohm manual mic – low pwr	454.00	–
FT 707	80-10m 8 band transceiver – high pwr	529.00	–
FP 707	80 – 10m 8 band transceiver – low pwr	109.00	(2.00)
FC 707	230v a.c to 12v d.c. psu for FT 707	80.00	(1.00)
FV 707DM	80 – 10m a.t.u. for FT 707	186.00	(1.00)
MR 7	Ext. digital V.F.O. for FT 707	14.95	(1.00)
MMB 2	Metal rack for FT 707	16.10	(1.00)
	Mobile mounting bracket for FT 707	385.00	(5.00)
FL 2100Z	160 – 10m 1200 watt linear	9.95	(0.50)
YH 55	8 ohm headphones	22.25	(0.75)
FF 501	Low pass filter 1 kW	25.70	(0.75)
QTR 24D	World clock (quartz)	78.00	(2.00)
FP 12	230v a.c. 12 amp D.C. power supply	41.00	(1.50)
FP 4	230v a.c. 4 amp D.C. power supply	9.60	(0.75)
FSP 1	Mobile speaker 8 ohm 6 watt	189.00	–
FRG 7	0.5 – 30 MHz communication receiver	309.00	–
FRG 7700	Latest gen cov receiver from Yaesu	389.00	–
FRG 7700M	as above but with memories	195.00	–
FT 207R	2m F.M. synthesised handheld	39.60	(1.00)
NC 2	Nicad fast charger/hod for FT 207	7.50	(0.50)
NC 9	Nicad 230v charger for FT 207	16.85	(0.50)
NBP 9	Spare micad battery pack	13.39	(0.75)
PA 2	12v P.S.U. for FT 207	2.70	(0.50)
FBA 1	Nicad pack charging adaptor	359.00	–
FT 480R	2M synthesised multimode	59.00	(1.50)
FP 80	Matching 230v a.c. power supply		

ICOM

IC 2E	2M F.M. synthesised handheld	159.00	–
IC L3	Soft case	3.00	(0.50)
ICHM 9	Speaker – microphone	9.00	(0.50)
ICBC 30	230v a.c. base charger and hod	34.00	(1.00)
ICBC 25	230v a.c. charger	3.70	(0.50)
ICPC 1	Car charging head	2.75	(0.50)
ICBP 2	6v Nicad pack for IC 2E	22.00	(0.75)
ICBP 3	9v Nicad pack for IC 2E	15.50	(0.75)
ICBP 4	Empty battery case for IC 2E	5.00	(0.75)
ICBP 5	11.5v Nicad pack for IC 2E	30.50	(0.75)
IC 240	2M F.M. synthesised mobile (10w)	169.00	–
IC 255E	2M F.M. sythesised mobile (25w)	255.00	–
IC 260E	2M synthesised multimode (10w)	339.00	–
IC 251E	2M multimode base station	479.00	–
IC 202S	2M SSB portable	169.00	–
IC 720	H.F. Transceiver, gen. cov. receiver	699.00	–
IC PS 15	20 amp power supply for IC 720	99.00	(2.00)
IC HM 10	Scanning Mic for IC 255/260	20.00	(0.75)

STATION ACCESSORIES

BL 40X	1:1 balum – 1 kW	11.25	(0.50)
DM 81	Trio gnd dip meter	51.00	(0.75)
FX 2	Wave meter	28.00	(0.75)
HP 3A	High pass filter – TV down lead	3.50	(0.25)
DL 20	30 w Dummy Load	6.00	(0.30)
T 100	100 w Dummy Load (500MHz)	24.00	(0.30)
T 200	200 w Dummy Load (500MHz)	35.00	(0.30)
APM 1	Audio peak and notch filter	33.00	(1.00)
KX 2	SWL aerial tuner 0.5 – 30 MHz	29.90	(1.50)
L-3	SWL inverted 'L' 3-30 MHz antenna	9.95	(1.00)
	10 core rotator cable (price per metre)	0.28	(0.05)
	Ferrite rings 1⅛" dia. per pair	0.80	(0.20)
	75 ohm light duty twin feeder (per mtr)	0.20	(0.02)
	300 ohm ribbon (per mtr)	0.14	(0.02)
	T piece polyprop.	1.00	(0.10)

To order any of the above items simply write, enclosing a cheque, or phone your credit card number to: Bredhurst Electronics, High St, Handcross, W. Sussex. Tel. 0444 400786

Visit our Ground Floor Showroom!

Bredhurst electronics

BREDHURST NEWS

April 1981

Page 2

IC-2E £159 inc. VAT & CARRIAGE

- Fully synthesized – covering 144-145.995 in 5kHz steps.
- 1.5W power output with 9V battery as supplied.
- Optional 6V or 12V packs for lower or higher power.
- BNC antenna output socket for helical or external antenna.
- Weight – only 450 grams with supplied battery pack and helical.
- Send/battery indicator – indicates transmit until time for battery recharge.
- Duplex/Simplex switch – Hi/Low power switch.
- Optional external speaker microphone available now.
- Full 12 months guarantee for all rigs bought from Bredhurst Electronics.

YAESU FT480R

2 Metre Multimode

£359 inc VAT and carriage

TR-7800

FEATURES INCLUDE

- 15 Multifunction channels, selectable with rotary control
- Priority Alert. Audible warning plus immediate operate switch
- Internal battery backup for all memories
- Full coverage 144.00 to 145.995MHz in either 5kHz or 25kHz steps
- Front panel keyboard of frequency selection, scan control and memory programming
- Frequency readout and channel in LED display
- 25W power output with Hi/Low power switch

£265 inc VAT & carriage

NEW DRAE PRODUCTS

POWER SUPPLIES

- Overvoltage Crowbar protection.
- Short circuit proof
- Foldback current limit
- Regulation better than 1%
- Fused output protection
- Thermal overload protection

Continuous Rating	Price	(Carriage)
4 AMP	£27.95	(1.50)
6 AMP	£44.95	(2.00)
12 AMP	£69.00	(2.00)
24 AMP	£92.00	(3.00)

V.H.F. WAVE METER

A new wave meter designed to meet the requirements of 2 metre operators. Frequency range 130MHz to 450MHz.

£24.95 inc VAT (carriage 75p)

NEW TRIO TS-830S

The TS-830S is a high-performance, very affordable, HF SSB/CW transceiver with every conceivable operating feature built in for 160 through 10 meters (including the three new bands). The TS-830S combines a high dynamic range with variable bandwidth tuning, IF shift, and an IF notch filter, as well as very sharp filters in the 455kHz second IF. Its optional VFO-230 digital VFO provides five memories.

TS-830S £639 inc VAT & carriage

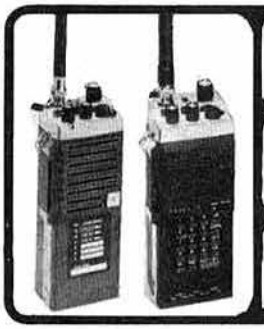
Bredhurst Electronics, High Street, Handcross, W. Sussex Tel. 0444 400786

REMEMBER: When you deal with SMC you get:

The SMC 2-year guarantee on Yaesu. The speedy free Securicor service.
The security of dealing direct with the largest authorised importer.
The spacious, very well equipped, ably staffed test and service facility.
The knowledge that we carry tens of thousands of pounds of spare parts.
Our discreet "instant" H.P. Our personal export documentation scheme.
Our in-person, or over the 'phone, time saving credit card acceptance.
Our honest advice and evaluation of part exchange equipments' worth.
Our deep interest and knowledge in most facets of our common hobby.

AND DO NOT FORGET THE FREE FINANCE SCHEME

Give us a ring for full details (subject to clearance and a minimum of £100 invoice) we will help you to enjoy new regular priced Yaesu, KDK, Gem Quad, Ascot, SMCHS, CDE, Hy Gain, Stolle, Channel Master, SMC, Hansen, MFJ, KLM, Mirage, and Hi-Mound—Tomorrow!



FT207R £195 144MHz 3W 12½kHz Synth

FT202R £109 144MHz 1W 6 Chan (3 inc)

FT404R £179 432MHz 3 W 6 Channel

*9 Band Models—6 Banders in stock

FT101ZD £569*

10–160m, SSB, CW, AM, Digital, Variable IF bandwidth. (Analogue version £488.57!!)

*9 Band Models—6 Banders in stock

FT107M £690*

160–10m + 2 Aux, SSB, CW, FSK, AM Memory option. Deluxe all solid state

*9 Band Models—6 Banders in stock

FT902DM £799*

10–160m, SSB, CW, AM, FM, Deluxe Digital, (DE version £713.00. D version £724.50)

FT7B £399

80–10m, SSB, CW, AM. Audio filter for CW. 100W PEP 5 bands

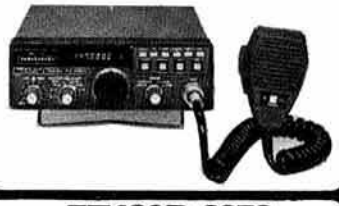
* SALE *

FT/FP200 £335

10–80m. SSB, CW, 180W PIP, C/W, FP200 AC PSU/speaker. 5 Bander

FT707 £529

10–80m. 100W PEP, SSB, AM, CW. Variable IF Bandwidth. Digital. 8 Bander



FT480R £359

2m, Synthesized. 100, 25, 1kHz steps FM 1kHz, 100, 10Hz, steps SSB, 10W PEP.

* NEW *

GaAs FET RF

FT780R £409

70cm, Synthesised. 100, 25, 1kHz steps FM. 1kHz, 100, 10Hz steps SSB. 10W PEP

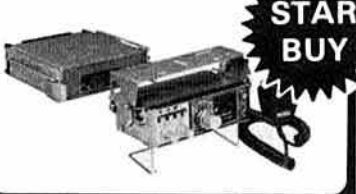
FT225RD £565

2m. SSB, CW, FM, AM, Digital readout. 25+ watts. (Analogue version £449.00)

FRG7 £199

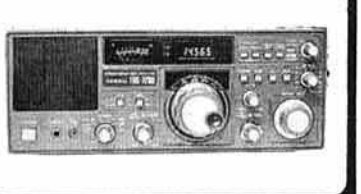
0·5–30MHz General Coverage Receiver. 230V ac. 12V dc, + Battery pack. AM/SSB

STAR BUY



FT720RV £253

FT720R £120, S72 £56, E72S £23, E724 £28, 720RV £133, 720RVH £143, 720RV £156, MMB3



FRG7700 £309

0·15–30MHz General Coverage Receiver. AM/SSB/CW/FM (Memory Version £389)

PRICES INCLUDE VAT @ 15% **FREE SECURICOR DELIVERY** **2 YEAR DISTRIBUTOR WARRANTY**

SMC Ltd, Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegrams: "Aerial" Southampton

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

Twelve years of continuous development has produced a range of over 50 models, all of which, being made in England, conform to the current B.S.S., requiring minimum designed wind speeds of 85mph and up to 117mph.

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.*

STANDARD TYPES

Post mounting			**Post Mounting**		
13M20P25	25'	£252	16M20P40	40'	£514
13M20P40	40'	£345	16M20P60	60'	£584
13M20P60	60'	£422	16M20P80	80'	£880
13M20P80	80'	£805	16M20P100	100'	£1,061
Fixed Base			**Fixed Base**		
13M20FB25	25'	£188	16M20FB40	40'	£404
13M20FB40	40'	£280	16M20FB60	60'	£478
13M20FB60	60'	£357	16M20FB80	80'	£752
13M20FB80	80'	£739	16M20FB100	100'	£920
Socket Types			**Socket Types**		
13M20SP25	25'	£293	16M20SP40	40'	£558
13M20SP40	40'	£386	16M20SP60	60'	£640
13M20SP60	60'	£464	16M20SP80	80'	£937
13M20SP80	80'	£847	16M20SP100	100'	£1,118
Base plate			**Base plate**		
13M20BP25	25'	£295	16M20BP40	40'	£524
13M20BP40	40'	£389	16M20BP60	60'	£606
13M20BP60	60'	£464	16M20BP80	80'	£902
13M20BP80	80'	£847	16M20BP100	100'	£1,083
Wall Mounting			**Wall Mounting**		
13M20W25	25'	£203	16M20W40	40'	£412
13M20W40	40'	£296	16M20W60	60'	£483
13M20W60	60'	£373	**Mobile Type**		
Mobile Type			16M20M40	40'	£1,723
13M20M25	25'	£1,356	16M20M60	60'	£1,823
13M20M40	40'	£1,484	16M20M80	80'	£2,241
13M20M60	60'	£1,576	16M20M100	100'	£2,316
13M20M80	80'	£1,998			

'T' Series Towers (20' sections)

13M20T85	85'	£1,135	13M20T120	120'	£1,550

The range encompasses towers between 25 and 120ft in 10, 20 or 40ft sections mounted on ground post, base plate, wall, fixed base or high speed trailer.

Towers are supplied complete to brochure specifications. Check details of luffing gear, head unit, winches and bolts against your requirements. (Standard items will be credited in full at order time).

***New reinforced head unit with provision for KS065 rotary bearing (£15.35 extra) is now available.**

'30ft': 10ft SECTION "MINITOWER"

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.

10M10P30 Post mount	£307
10M10W30 Wall mount (LG1013W extra)	£295
10M10BP30 Base Plate (HD Bolts extra)	£325
10M10FB30 Fixed base (HD Bolts extra)	£285

NB. PRICES EXCLUDE VAT AT 15%
DELIVERY EXTRA (distance dependent)

HANSEN

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

The Hansen range covers 20 quality models with top-of-the-line the FS710. These are flat frequency response, peak envelope power and R.M.S. in-line wattmeters with many novel features. Most notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.

FT710; PEP AUTO-SWR RMS LEVEL
FS710 £68

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

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: 6½×2½×4½"

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: 6½×2½×4½". 'N' type sockets

FS711 £28

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10%. SWR 1:1-3:1 ±3%
Indicator 5×2½×1½"
coupler 3½×2½×1½"

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: 6½×2½×4½"

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: 6×2½×2½". 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: 6×2½×2½". 'On the Air' LED

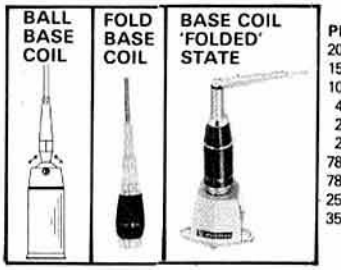
NB: PRICES EXCLUDE VAT (15%)
BUT INCLUDE POST AND PACKING

SMC-HS

INTERCHANGEABLE ELEMENT MOBILE ANTENNAS

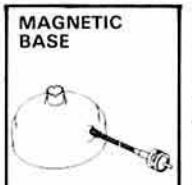
SMC HS Mobile antennas, tabulated below, feature an in-built PL259M connector which mates with the SO239M of the cable assembly (fits a ⅜" hole in car body or the cast chromed gutter mount) or the magnetic base (recommended for smaller antennas only). This arrangement is ideal for easy removal (element 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
2VF	144MHz	3dB	½λ	50W	1·06m
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



PRICES

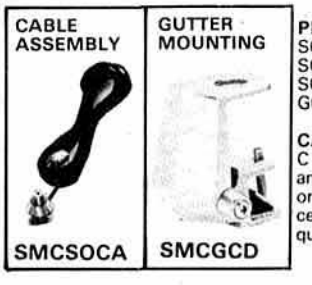
20SE	£12.00
15SE	£10.00
10SE	£10.00
4E	£6.50
2VF	£9.00
2NE	£5.50
78F	£10.00
78B	£11.00
258	£10.00
358	£12.50



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 magnetic base SMCS0MM is also supplied complete with 4m of RG58/U cable.

The ¼'s are particularly recommended as the actual system gain, if the antenna is poorly sited, is usually very substantial.



SOMM	T.B.A.
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%)
CARRIAGE EXTRA AS INDICATED

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

SMC FOR ALL YOUR STATION ACCESSORIES

2m AMPLIFIER
160W out for 15W max drive. 12V DC (circa 18A) RF/manual switch. SSB FM. Excellent heat sink over temp trip out/reset.
PA 15-160BL (p&p free) **£171.30**

COAXIAL RELAYS (12V DC)
50 ohms. 1kW PEP @ 30MHz. 50dB isolation at 1GHz. 0·2dB loss at 0·5GHz (All are post free.)

CX540D	3 BNC sockets	**£18.00**
CX530D	2 BNC + 1N	**£18.00**
CX520D	3 N sockets	**£18.00**

2m LINEAR AMPLIFIERS
12V. Switch SSB/FM, Low noise pre-amp, Switchable.

B108	80W out 10W	**£105.00**
B3106	160W out 30W	**£142.50**
B1016	160W out 10W	**£165.00**
RC1	Remote 18' cable	**£15.00**

DUMMY LOAD
52 ohms. 1kW for 3min. 300W continuous. Oil filled, 1·2:1 VSWR @ 1500MHz
SMCDL1000 (p&p £1.95) **£34.65**

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

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**

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**

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**

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

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

FM BOOSTER
88 108MHz pre-amp. Type 4·5dB N.F. 20dB gain.
T203 (p&p free) **O/S**
SALE WAS **£9.81**

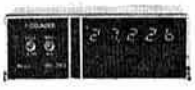
COAX SLIDE SWITCH
50 ohms. SO239 sockets. 2 in 2 out. Ganged.
TWS220 (p&p £0.40) **£9.35**

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**

432MHz AMPLIFIER
R.F. sensing 12V DC. 10W drive 45W out. 433MHz 2½" × 5½" × 7½".
APB57A (p&p free) **£79.00**
SALE WAS **£102.25**

COAXIAL SWITCHES
High quality, shorting types.

KSW3	1 in 2 out	(p&p foc) **£10.30**
KS23	1 in 3 out	(p&p foc) **£19.35**
KS24	1 in 4 out (ills)	(p&p foc) **O/S**



30MHz COUNTER
100kHz to 30MHz 12V DC 5 × 7 segment display (10Hz).
RT750 (p&p foc) **O/S**

ANTENNA COUPLER
3·5-30MHz. Metered coax and single wire to 50Ω. To 500W PIP
LAC895
WAS **£92.00** (p&p foc) **£69.00**

DIGITAL MULTIMETER
1-1000 scale. 10MΩ AC (V/mA) DC (V/mA). Auto zero and polarity.
ME521 (p&p foc) **£39.00**

POWER SUPPLY, 12A
12V DC regulated supply 240V, 50/60Hz input, 12A @ 13·6V DC. Speaker built in.
FP12 (p&p free) **£68.00**

FREQUENCY COUNTER
500MHz Hi Sens., Hi/low Z, 12/230V.

YC500J	10 ppm	**£165.00**
YC500S	1 ppm	**£235.00**
YC500E	0·02 ppm	**£300.00**

MOBILE SPEAKER
Heavy duty external speaker, 8 ohms, 6 watts, 3·5" dia., Large magnet, 4" × 4" × 2½".
FSP1 (p&p free) **£8.35**

POWER SUPPLY 4A
12V DC, 4A regulated supply 240V, 50/60Hz input.
FP4 (p&p free) **£36.00**

QUARTZ CLOCK
World time clock. Wall or desk Mounting. Year battery life. 12 hour local, 24 hour DX times.
QTR24D (p&p free) **£22.35**

NOISE CANCEL MIC
500 ohm fist mic with switchable noise cancelling element. 6dB signal/noise ratio improvement possible.
YM21 (p&p free) **£12.50**

LOW PASS FILTER
52 ohm, 38MHz cut off. -80dB above 75MHz. loss <0·5dB., 1·2KW P.I.P. c/w 2 PL259 plugs etc.
FF501 DX (p&p free) **£19.35**

HEADPHONES
Light weight, soft padded cushion headphones. 8 ohms curly lead fitted ¼" jack.
YH55 (p&p free) **£8.65**

DESK MICROPHONE
Dual impedance 500 ohm/50k. PPT switch with lock. Adjustable swan neck.
YD148 (p&p free) **£16.25**

PRICES DO *NOT* INCLUDE VAT (15%)—CARRIAGE (PLUS VAT) AS INDICATED

(5/6 band and discontinued items) YAESU "599" SALE (normal prices in brackets)

FT101ZD	Digital Transceiver	(£569.25)	**O/S**	**FR101DD**	RX Dig/deluxe	(£707.25)	**£549**	**FT301D**	Transceiver	(£676.20)	**£459**
FT101Z	Analog Transceiver	(£488.75)	**£445**	**FR101SD**	Receiver Stan/Dig	(£592.25)	**£449**	**FP301D**	AC. PSU. digital	(£186.88)	**£149**
FT901DM	Super Deluxe Tx/Rx	(£799.25)	**£699**	**FR101D**	Receiver Deluxe	(£603.75)	**£469**	**YO301**	Monitor Scope	(£192.05)	**£139**
FT901D	Transceiver 160-10m	(£724.50)	**£625**	**FL101**	Transmitter	(£500.25)	**£379**	**FT620B**	6M Transceiver	(£316.25)	**£249**
FT901DE	Transceiver 160-10m	(£713.00)	**£635**	**YO101**	Monitor Scope	(£194.93)	**£129**	**YC221**	Digital Readout	(£83.37)	**£ 49**
FT107M	Transceiver 160-10m	(£690.00)	**£625**	**FTV250**	2M Transvertor	(£212.75)	**£119**	**DC200**	DC Power Supply	(£97.75)	**£ 59**
FT200	Tx/Rx c/w FP200 AC PSU	(£483.00)	**£335**	**FTV650B**	6M Transvertor	(£178.25)	**£139**				

(3·18MHz for FT/FR 101's. 9 & 10·7MHz for H.B) CRYSTAL FILTERS (normal prices in brackets)

TF30F350	350Hz 6 pole 3·18MHz	(£19.26)	**£19**	**TF90H600**	600Hz 8 pole 9MHz	(£22.83)	**£20**	**YF107H600**	600Hz 8 pole 10·7MHz	(£22.83)	**£21**
YF30F600	600Hz 6 pole 3·18MHz	(£19.26)	**£17**	**YF90F2·4**	2·4MHz 6 pole 9MHz	(£18.28)	**£16**	**YF107F2·4**	2·4kHz 6 pole 10·7MHz	(£18.29)	**£17**
TF30F12	12kHz 6 pole 3·18MHz	(£21.68)	**£18**	**YF90H12**	12kHz 8 pole 9MHz	(£21.05)	**£20**	**YF107H12**	12kHz 8 pole 10·7MHz	(£21.05)	**£18**
TF30H12	12kHz 8 pole 3·18MHz	(£25.24)	**£21**	**YF90KIT**	One each of above	(£62.16)	**£50**	**YF107KIT**	One each of above	(£62.17)	**£50**

SALE PRICES INCLUDE VAT (15%) AND CARRIAGE

COMMUNICATIONS LTD

SMC

SMC THE ONLY CHOICE FOR ROTATORS AND ACCESSORIES

KENPRO KR500

Elevation Rotator (180°).
Up to 50kg of Load.
1½"-2½" mast
1¼"-1⅝" boom.

RC6W 6-core control cable per metre **00p**
KR500 (post and packing free) **£75.00**

KENPRO K050

Rotary bearing.
Dual mounting.
Takes 1¼" mast.

Post and packing **£1.00**
K050 **£10.65**

KENPRO K065

Rotary bearing.
Dual mounting.
Takes 2" mast.

Post and packing **£1.30**
K065 **£15.35**

CHANNEL MASTER

Upper mast support bearing.
Takes 2" mast and 1¼" stub.

Post and packing **£1.20**
9523 **£10.20**

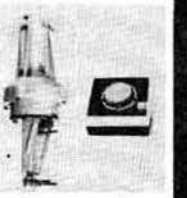
CHANNEL MASTER

Rotary bearing 3-way guying.
Takes 1⅝" mast.

Post and packing **85p**
9525 **£11.30**

SMC RLD3

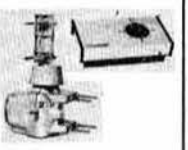
Automatic control box. 24V AC motor. Light-weight head.
To 2½sq feet.
Takes 1¼-1½" tube



RC50W core control cable per metre **26p**
RLD3 (Rail £1.65) **£29.35**

CDE AR30

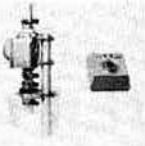
Accurate, silent self-calibrating control box. Dial up desired beam heading, push knob; motor rotates to that position and then switches off.
For UHF and small VHF use



RC5W 5-core control cable per metre **26p**
AR30 (post and packing free) **£41.00**

STOLLE 2050

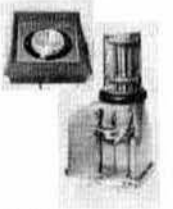
Automatic control box. Dial desired direction and the rotator turns to the position and stops. Turning shaft (up to 1⅝") passes through rotator.
For UHF and small VHF use.



RC5W 5-core control cable per metre **26p**
2010 (post and packing free) **£45.00**

CHANNEL MASTER

Automatic control box. Dial direction secondary pointer gives position during travel.
Takes 1-2" mast and 1-1⅛" stub.



RC3W 3-core control cable per metre **26p**
9502A (post and packing free) **£46.00**

CHANNEL MASTER

Automatic control box. Dial direction secondary pointer gives position during travel. Stainless steel hardware. Heaviest duty "offset type". To 5sq.ft.
Takes 1-2" masts and 1-2" stub.

RC3W 3-core control cable per metre **20p**
9508 (post and packing fee) **£57.00**

KENPRO KR250

Twist and switch controller.
Rotator 200kg/m
Bruke 600kg.
1"-1½" masts.

RC6W 6 wag rotor cable per metre **00p**
KR250 (post and packing free) **£39.00**

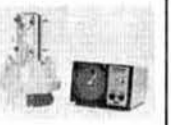
CDE AR40

Accurate, silent self-calibrating control box. Dial up desired beam heading, push knob; motor rotates to that position and then switches off.
For VHF use and light HF use c/w low casting.

RC5W 5-core control cable per metre **26p**
AR40 (post and packing free) **£52.00**

KENPRO KR400RC

360° round type meter. Max: load 200kg.
Rot. 400kg/m, brake 1500 kg/m.
1½"-2½" masts.
Lower casting option.



RC5W 5 way rotor cable per metre **26p**
KR400RC (post and packing free) **£79.00**

CDE BT1

Four position preset plus normal manual controls. Handles aerials up to 5sq.ft of wind area. Supplied with lower mast fit casting.

RC5W 5-core control cable per metre **26p**
BT1 (post and packing free) **£79.50**

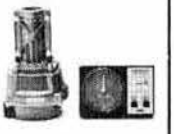
CDE CD45

Large illuminated meter gives read out of antenna heading at all times. Armature brake. Low voltage meter. Handles antennas to 8½sq.ft.

RC8W 8-core rotor cable per metre **39p**
CD45 (Securicor Delivery free) **£99.00**

KENPRO KR600RC

360 round type meter.
Max: load 200kg.
Rot. 600kg/m, brake 400kg/m.
1½-2½" masts.
Lower casting option.



RC6W 6 way rotor cable per metre **00p**
KR600RC (post and packing free) **£115.00**

CDE HAM IV

Large illuminated meter gives read out of antenna heading at all times. Wedge solenoid brake mechanism. Handles antennas to 15sq.ft.

RC8W 8-core rotor cable per metre **39p**
HAM IV (Securicor Delivery free) **£145.00**

CDE T2X

Large illuminated meter gives read out of antenna heading at all times. Wedge solenoid brake mechanism. Handles antennas to 30sq.ft.

RC8W 8-way rotor cable per metre **39p**
T2X (Securicor Delivery free) **£199.00**

ALL PRICES EXCLUDE VAT (15%) CARRIAGE AS INDICATED

SMC

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

AGENTS

G3ZUL	Brian	Stourbridge	(03843) 5917
GI3KDR	John	Bangor	(0247) 55162
GM8GEC	Jack	Edinburgh	(031665) 2420
GI3WWY	Mervyn	Tandragee	(0762) 840656
GW3TMP	Howarth	Pontybodkin	(035287) 846/324
GW8EBB	Peter	Swansea	(0792) 872525
GJ4ICD	Geoff	Jersey	(0534) 26788

★ NEW ★

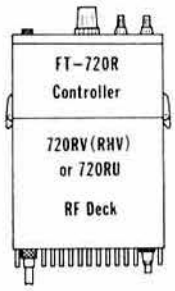
LEEDS
S.M.C. (Leeds)
Colin Thomas, G3PSM
257 Otley Road,
Leeds 16, Yorkshire.
Leeds (0532) 782326
9-5.30 Monday-Saturday

CHESTERFIELD
S.M.C. (Jack Tweedy) LTD
Roger Baines, G3YBO
102 High Street,
New Whittington, Chesterfield.
Chesterfield (0246) 453340
9-5; Tuesday-Saturday

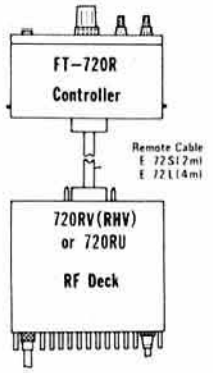
WOODHALL SPA
S.M.C. (Jack Tweedy) LTD
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire.
Woodhall Spa (0526) 52793
9-5; Tues-Sat (+ appointments)

YAESU MUSEN

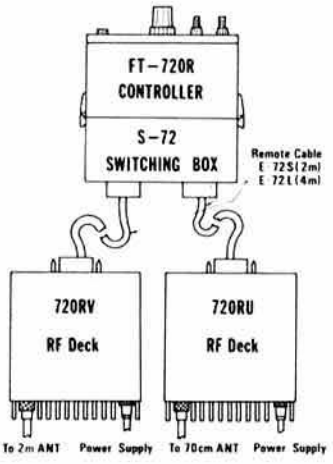
LOCAL

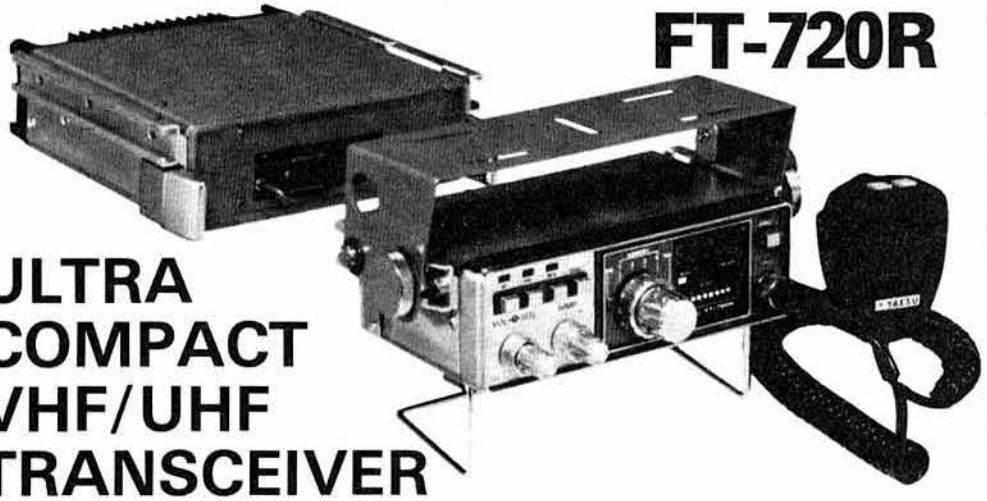


REMOTE



DUAL BAND





FT-720R

ULTRA COMPACT VHF/UHF TRANSCEIVER

Maximum Performance
Consider the top ten 'S' parameters on which you would judge a conventional FM transceiver; sensitivity, selectivity, suppression of images, strong signal handling, size, scanner, stability, synthesizer steps, spurious suppression, stability of output and the '720 emerges as a pretty potent package, plus:

Choose your favourite Band
The control head may be used with the 2 meter RF (10 or 25W output) or the 70cms 10W RF decks.

Local or Remote operation
Short of space? The control head and deck can be separated by up to 4 meters with extension cable.

Dual Band Capability
The switching box allows operation of two decks from one control head. Single switch changeover.

Scanning
Fingertip controls on the microphone provide up/down scanner control. The scanner may be programmed to stop on a busy or clear channel.

Five Memory Channels with Priority
Five memory channels may be programmed for instant return to a favourite repeater or simplex channel. One of the memory channels may be used as a priority channel, where the microprocessor will search between the priority channel and your main dial frequency.

Simplex or Repeater
Plus and minus repeater shifts (600kHz for 144MHz and 1·6MHz for 70cms) are built in as is manual and automatic 1,750Hz tone burst.

Easy-to-Read S/PO Meter
A string of bright yellow and red LEDs gives you an easy-to-understand indication of the relative power output or received signal strength level.

Compact Size for Today's Amateur
LSI, single chip PLL and micros combine for you, so see your Yaesu dealer today *and think small* —ask for the exciting new FT720R series!

FT720 Control Head
- ★ Four easy write-in memory channels
- ★ Rx priority channel (auto check)
- ★ Scanning of band or memory channel
- ★ Up/down tuning/scanning from mic.
- ★ Scanning for empty or occupied channels.
- ★ Optically coupled tuning control
- ★ Easy selection of up/simplex/down
- ★ Manual and automatic tone burst
- ★ String LED's for 'S' and PO
- ★ Seven status report LED's
- ★ Convenient concentric AF and squelch
- ★ 1½W of audio to internal/external speaker
- ★ 3·3(4·3)in D × 6in W × 2(2·2)in H
- ★ Optional bracket for FR deck MMB3
- ★ Optional 200cm cable S
- ★ Optional 400cm cable L

720RV 10W, 2m deck
720RVH 25W, 2m deck
- ★ 144–146MHz (144–148MHz possible)
- ★ 12½kHz synthesizer steps
- ★ ±600kHz repeater offset
- ★ 0·3μV for 20dB quieting
- ★ Rx 0·5A. Tx; RV 3·5A, RVH 6·5A
- ★ 10·7MHz + 455kHz double conversion
- ★ 5·8(6·5)in D × 6in W × 2(2·2)in D

720RU 10W, 70cm deck
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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	G8OZ	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	G4LAA		1030
SE from Lincoln	G8OFQ	(Vacancy)	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV/GM8MBP		1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz. (S21) Mode: fm (vertical polarization)			
Cornwall	G2ABC	G3NPB/G3VGO	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930H
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	G4GWJ/G4KYY	1000
Londonderry	GI2DHB	GI4AHD	1000H
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G8OGQ	(Vacancy)	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM/GM3VTB	1000
Elgin	GM4ILS	(Vacancy)	1000
Carlisle	G4LAA	G8OAU	1100
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Brighton and coast	G3ZYE	(Vacancy)	1100
Jersey	GJ8KNV	GJ4ICD	1100H
Gwynedd	GW4KEV	GW8TTM	1100

H = horizontal polarization

IARU Region 1 Conference

The twelfth triennial conference of the IARU Region 1 Division will take place at the Brighton Metropole commencing on Monday 27 April 1981. The 34 national societies which have indicated their intention to send a delegation represent the following countries: Algeria, Andorra, Austria, Bahrain, Belgium, Bulgaria, Czechoslovakia, Denmark, Eire, Federal Republic of Germany, German Democratic Republic, Ghana, Gibraltar, Finland, France, Hungary, Iceland, Italy, Jordan, Liberia, Luxembourg, Monaco, Netherlands, Nigeria, Norway, Poland, Romania, Sierra Leone, South Africa, Spain, Sweden, Switzerland, United Kingdom, USSR and Yugoslavia.

The Region 1 Division of the IARU was formed in 1950 with a membership of 15 societies. The present total of 50 member societies reflects the active state of the division, and this figure comprises a high proportion of the total number of IARU societies worldwide (113).

Opening

The conference will be opened on Monday 27 April by the Rt Hon Timothy Raison, MP, Minister of State for Home Affairs. He will be supported by a number of distinguished guests from the Home Office and other organizations. Lord Wallace of Coslany will welcome visitors, and a response will be made by Noel Eaton, VE3CJ, the president of the IARU.

Guests who will be present from the world of amateur radio include Harry Dannals, W2HD, president of the ARRL, Richard L. Baldwin, W1RU, secretary of the IARU, Pedro Seidemann, YV5BPG, secretary of IARU Region 2, and David Rankin, 9V1RH, secretary of IARU Region 3.

RSGB representation

The Society's delegation will be led by Tim Hughes, G3GVV, who will be supported by John Allaway, G3FKM; Dennis Andrews, G3MXJ; John Bazley, G3HCT; Dain Evans, G3RPE; and Keith Fisher, G3WSN. Attending in their IARU capacities will be Colin Thomas, G3PSM (Intruder Watch), and Alan Taylor, G3DME (International Beacon Project).

Also present during the conference will be the RSGB President, Basil O'Brien, G2AMV; and David Evans, G3OUF; Ray Eckersley, G4FTJ; and other members of RSGB headquarters staff. RSGB affiliated organizations which will be represented by observers will include AMSAT-UK, (G2UK and G3AAJ), BARTG and Raynet (G3BPT).

Conference proceedings

There are three basic committees of the conference. These are Admin & Operational (below 30MHz), VHF/UHF/Microwave, and Finance & Credentials. At the time of writing, the agenda of these committees will include at least 140 papers submitted by member societies. In addition to the meetings of the three main committees, there will be small working groups mainly meeting outside normal conference hours to deal with specialized subjects, such as contests, direction finding, rtty and satellites. The final day of the conference is devoted to a plenary meeting at which all committee decisions are discussed and ratified.

Discussion and production of paperwork, although essential in their rightful places, do not represent the executive output of the conference. It is the duty of the delegates to carry to their national societies the recommendations of the conference and to secure their implementation. This is a vital activity without which the organization and cost of the meeting will be worthless.

Region 1 organization

To support the activities already mentioned, Region 1 has a small secretariat and an executive committee. The present executive committee comprises: L.v.d. Nadort, PA0LOU, chairman; W. Nietyksza, SP5FM, vice-chairman; R. F. Stevens, G2BVN, secretary; K. W. Strom, SM6CPI, treasurer; J. Rottger, DJ3KR; H. Walcott Benjamin, EL2BA; and J. Znidarsic, YU3AA. The group meets at least annually, and there is considerable informal contact between these meetings. In addition to maintaining contact with 50 member societies, the Region 1 organization publishes *Region 1 News* at four-monthly intervals, and numerous other booklets and documents. This effort has been supplemented by the preparation and despatch of the 140 conference papers. The finance to run the division is obtained by a contribution from member societies based on an annual figure per licensed member. In 1963 the contribution was 50 Swiss centimes per member, in 1981 the figure is 80 Swiss centimes.

The future

At the last Region 1 conference the main talking point was the forthcoming WARC. This time there will be considerable discussion around the acquisition and use of the new hf and microwave bands. Although the major obstacle of WARC 79 has been cleared, there are still a number of ITU conferences in which the IARU must participate if the amateur service is to survive effectively. The strategy and planning for these conferences will also be a subject for discussion. At WARC 79 the global plans of the IARU were well supported and mainly successful. This conference must lay the ground work for future similar activity both by the IARU and its regional organisations and the societies who are members. □

QTC
Amateur radio news

Citizens band radio approved—on 27MHz fm and 930MHz fm

27MHz a.m. equipment remains illegal

The following is the text of a press release issued by the Home Office on 26 February:

Britain is to have a legal citizens band radio service. Mr William Whitelaw, the Home Secretary, announced this today in a Parliamentary answer to Mr Patrick Wall, MP. It is hoped that the new service will be introduced in the autumn.

The new personal two-way service will be authorized on 27MHz fm, and a further frequency will be made available around 930MHz. Equipment will be required to meet a technical specification, and users will have to buy a licence.

The 27MHz a.m. equipment currently being used in this country is illegal and will remain so.

Commenting on the introduction of the new service, Mr Timothy Raison, MP, Minister of State at the Home Office, said today:

> "We are offering a new service which we hope will provide enjoyment for many people. It will give as good a service as the illegal a.m. equipment—indeed some of this is already obsolete. It should soon cost about the same and should cause fewer problems for others. The interference which illegal cb equipment is causing to tv reception and emergency services is giving rise to concern, and now that the Government has gone so far towards meeting the wishes of supporters of cb, I hope that we can rely on those with illegal equipment to act responsibly and stop using it."

Choosing the frequency

The Home Secretary said in a written Parliamentary reply on 18 December 1980 that he favoured the introduction of a cb facility on a frequency around 930MHz, but because of public demand for an alternative he undertook to consider the possibility of legalizing additionally on a lower frequency. The final decision had to take into account the need to introduce a legalized service with the minimum of delay; the risk of interference to radio, tv and other authorized services both in the United Kingdom and in neighbouring countries; the availability of frequencies; and the desirability of adopting an international standard. The frequency selected—27MHz fm—should give cb enthusiasts the performance they want at about the same cost as illicit equipment but with far less interference to other users. France, The Netherlands and Germany are among those European countries who have legalized on 27MHz fm equipment, and the Irish Republic has recently announced its intention to do the same. The other frequency proposed—around 930MHz—is going to be adopted in North America and some European countries, and is seen as being capable of giving a good quality service, especially in towns and

cities, with the minimum of interference. It offers the prospect of an international market for British manufacturers.

Other alternative frequencies, such as 41MHz and 450MHz, were reviewed but none was free of interference difficulties or met the other requirements.

Existing authorized users of the 27MHz band—for example, hospital paging systems—may be affected by the Government's decision, and the implications for them will be taken into account during the planning period.

Existing equipment

Existing illegal 27MHz a.m. equipment will not be legalized. The volume of interference from cb sets using 27MHz a.m. equipment is increasing—in the last five months alone there were nearly 5,000 complaints of interference to radio, tv and hi-fi which were directly traced to the use of illegal 27MHz a.m. sets; this represents an increase of about one-third of all recorded complaints of interference from all sources. Emergency services have also been affected. Although recent a.m. equipment of USA origin causes less interference to some services than earlier models, its potential for interference to tv remains high.

Equipment specification

Specifications for the new fm equipment will be drafted to ensure that it causes the minimum of interference to other radio users; standards will be set to which manufacturers, importers and assemblers will conform. The equipment will have to be permanently marked so that a purchaser knows that the set he is buying meets these standards. Such specifications are vital to ensure that other radio services (police, fire, aviation) are not adversely affected.

Licensing

Users of the new service will have to buy a licence, renewable annually, which will entitle them to use equipment on either frequency. Talks are taking place with the Post Office to see if they can issue licences on behalf of the Home Office. It is too early to say what the cost of a licence will be.

Commencement date

It is hoped to complete the arrangements for technical specification, equipment marking and licensing, and bring the new service into operation, by the autumn. □

RSGB reaction

The Society's frequently expressed views on open channel/citizens band remain unaltered in the light of the above Government announcement. It is appreciated that there is a demand for a personal radio service. The Society is, however, still deeply concerned about the interference problems which arise from the allocation of the 27MHz band. On the other hand it is considered that the choice of fm is the right one.

No announcement has been made regarding the power to be permitted. Assuming this to be in the 2 to 4W range and that the operators observe the need to work in the fm mode the Society feels that interference levels could well be reduced. However, in practice it is likely that a.m. equipment and high power amplifiers will continue to be used and that these will give rise to significant levels of interference to domestic entertainment equipment. The Society welcomes the concept of licensing cb, as this will be some aid to the control of interference problems.

The RSGB will continue to bring to the attention of the Government the problems associated with the licensing of 27MHz for citizens band. □

Introduction to amateur radio and short wave listening

Following the success of a similar short course last year, it has been decided to repeat it at two centres in Nottingham immediately after the conclusion of the current RAE course. Commencing on 18 May 1981 at Hucknall CFE, and on 20 May at Arnold & Carlton CFE, the course runs for five weeks, excluding the spring bank holiday week.

The syllabus includes an outline of the RAE, some basic theory, receiver operation of the amateur and commercial bands, and practical points concerning construction techniques and antennas—a useful preliminary to the Radio Amateur's Examination course.

Further information from the course tutor, Alan Lake, G4DVW (Nottingham 382509), from Hucknall CFE (Nottingham 637316), or from Arnold & Carlton CFE (Nottingham 876503).

To mark his contributions over many years in the field of international frequency management, the RSGB presented to Mr D. E. Baptiste, on behalf of the International Telecommunication Union, a scroll signed by the secretary-general and senior officials of the ITU. Basil O'Brien, G2AMV, RSGB President, is shown here presenting the scroll to Mr Baptiste at a dinner recently given in his honour. On the right is Mrs Baptiste

Tape-slide lecture

The RSGB Interference Committee is preparing a tape-slide lecture on problems of breakthrough and suggested methods of dealing with them. Any member who has photographic material (slides or negatives) which might be incorporated is invited to contact the committee via RSGB HQ.

J8A-J8Z

In accordance with the Radio Regulations, the callsign series J8A-J8Z has been allocated provisionally to Saint Vincent and the Grenadines by the ITU.

Universities 3·5MHz net

G5YC and G3UCL, the club stations of Imperial College and University College, London, respectively, will monitor 3,725kHz from 1300 to 1500gmt every Wednesday in the hope of forming a regular universities net on 3·5MHz.

Stolen equipment

From a car parked in Sheffield: stereo cassette radio and Trio TR7500 serial No 661879. Information to G8PUK, QTHR, or Sheffield CID.

On 6 February, from a car in Bournemouth: Trio TR2300 serial No 921187 with reverse repeater modification; homebuilt 25W amplifier with auto t/r rf sensing and integral nicad battery charger, dark grey, 3 by 3 by 12in. Information to G4GTH, QTHR or tel 0202 763899; £10 reward offered for recovery.

On 11 February from a car in Glasgow: Robyn SB505D ssb 28MHz mobile transceiver, 28·5–28·9MHz, serial No 83001605; equipment has HO import licence No 981. Information to GM4DHJ, tel 041 889 9010.

On 12 February, from a car in Portland, Dorset: KDK2025 serial No E1326. Information to G3EAT, QTHR, or tel 0305 785459.

On 15 February, from a car in Cheltenham: Trio TR7500, mint condition. Information to C. G. Baker, G4KFJ, tel Rotherham 526320, or Cheltenham police.

Radio Fraternity Lodge No 8040

Mr Sydney Law, G3PAZ, who for many years contributed the "Raynet" column in *Rad Com*, was recently installed as master of this Freemason's lodge for 1981–2. The secretary of the lodge is Mr G. Wakefield, G5WG.

Looking ahead

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

11 April—RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.
27 April–1 May—IARU Region 1 Triennial Conference, Brighton.
28–30 May—RSGB National Amateur Radio Exhibition, Alexandra Palace, London.
12 September—Scottish Amateur Radio Convention, Glenrothes.
27 September—Welsh Amateur Radio Convention, Blackwood.
10 October—Midlands VHF Convention, Wolverhampton Polytechnic.
11 October—EI/GI Convention, Ballymascanlon.

Hellschreiber

What it is and how it works

by S. A. G. COOK, G5XB*

Introduction

Considerable interest has been aroused in recent years, particularly among amateurs in Europe, in the direct printing telegraph system known as Hellschreiber, or, to give it its correct name, Siemens-Hell-Schreiber. This upsurge of interest in what might be described as an out-moded means of transmission began in the mid-'seventies when a number of amateurs acquired or unearthed pieces of ex-second-world-war German military equipment. Subsequently other amateurs began to study the principles of the Hellschreiber, and soon found ways of adapting it to the ubiquitous microprocessor. No one seems to know why the Hellschreiber system failed to attract the attention of amateurs much earlier—it was used extensively for over 30 years in various types of radio communication, referred to in text books [1], and given a full description in at least one journal as early as 1948 [2].

However, the present growth of interest in the subject has prompted amateur radio magazines to publish information on the Hellschreiber and on the way in which it is being used by amateurs in The Netherlands, West Germany and France [3]. One might therefore ask: "What is there in the Hellschreiber system that has attracted the amateur at this late stage?" and "How does the system compare with other printing telegraphs?" The object of this article is to explain the Hellschreiber system of transmission, to describe its advantages and limitations and thereby to enable the reader to answer these questions.

History

Siemens-Hell, the name by which the Hellschreiber system generally became known and further contracted into "Hell", was devised by Dr Rudolf Hell and developed by a company of that name in Germany in the early 'thirties. The patents of the system were later made available to Siemens-Halske of Berlin, and the equipment was subsequently manufactured by them and marketed world-wide under the name Siemens-Hell. As well as taking the first syllable of the name from that of its inventor, the full name "Hellschreiber" is the German word for "clear writer".

When first launched upon the communications world it was particularly attractive for its simplicity; the receiving mechanism had only two major moving parts and, furthermore, could be plugged into the most elementary type of radio receiver. For this reason it was ideally suited to the transmission of news despatches and multi-destination radio news broadcasts, and by the outbreak of the second world war a number of world news agencies had adopted the system for world-wide distribution of their material. From 1939 to 1945 Germany's Hellschreiber transmission dominated Axis news from the war areas; the official news agency operated an almost day-long service in German for domestic newspapers, while other subsidiary news agencies broadcast Hellschreiber transmissions in several languages to many parts of the world.

As might be expected, Siemens-Halske were quick to appreciate the possibilities of Hellschreiber in other branches of telecommunications, and by 1935 the company had developed a portable Hellschreiber transceiver, the *feldfernschreiber* or "field telegraph writer". Information published at the time described this equipment as "suited to use by the military or police for transmitting written messages over temporary telephone or power lines and radio circuits." The *feldfernschreiber* eventually became a standard unit of the German armed forces, and they were manufactured in large numbers in Germany and in other parts of occupied Europe almost until the end of hostilities.

After 1945 most of the world news agencies adopted the Siemens-Hell system for both overseas and domestic news distribution. It was adapted by Siemens to other alphabets such as the Cyrillic script, in which Russian and some Slav languages are printed, and by the Chinese for transmitting the ideograms of Chinese and other Asiatic languages (see Fig 1(f)). In the 'fifties Siemens produced a page-printing *hellblatteschreiber* which was used extensively in western Europe during the post-war years, and the Siemens-Hell-Schreiber GL, a start-stop system evidently intended as a competitor to the rising popularity of the Baudot-coded radio teleprinter. The GL system survives to this day and is used commercially on wire circuits in Germany, and by amateurs. It was perhaps a foregone conclusion that one day the Hellschreiber would be out-moded. Essentially a strip printing system, it was eventually out-performed by the Baudot-coded radio teleprinter, which by the early 'sixties had become firmly established as a page printing system with the added benefits of frequency-shift keying and protective devices.

General

Before describing the Hellschreiber system and making comparisons with other systems, the main features of its closest rival, the teleprinter, should be briefly considered. As many will know, the teleprinter is a digitally-encoded system. Each transmitted letter consists of an even-length group of five impulses or elements, usually of 20ms duration, and designated "marks" or "spaces". Some are grouped together in blocks, but each is preceded by a "start" pulse of one "space" element and finished by a "stop" pulse usually of 1·5 "mark" elements. The receiving mechanism is at rest until the start pulse is received; it is then put into motion. As the signal train arrives, each element is examined in turn and, finally, the receiving machinery is set up to print the received character. If an element is not "seen" by the receiving interrogator, the wrong letter is printed; or if the missing group is a "shift" signal the machine will stay on "letters" when "figures" is intended. It is therefore essential that each coded letter group is received undistorted, and to this end much effort is directed both in the signal path and in the terminal circuitry and printer mechanism.

By contrast, Hellschreiber is not a digitally-encoded system. Each letter is transmitted as a picture consisting of a train of "mark" and "space"

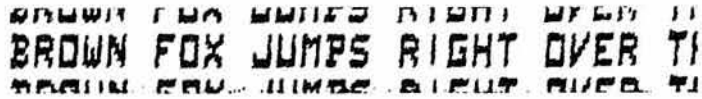


Fig 1(a). Transmitter and receiver running at approximately the same speed

Fig 1(b). Receiver running slow

Fig 1(c). Receiver running fast

Fig 1(d). QRM on DL1OY in QSO with PA0OB on 7,033kHz

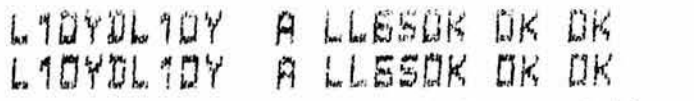


Fig 1(e). Computer-produced signal from DL1OY using an Apple 2

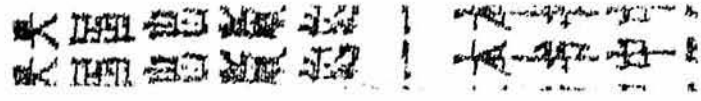


Fig 1(f). Hellfax from Peking received by ZL1BAD and processed before printing at G5XB. Frequency 14,140kHz

*Little Orchard, Gallows Tree Common, Reading RG4 9BP.

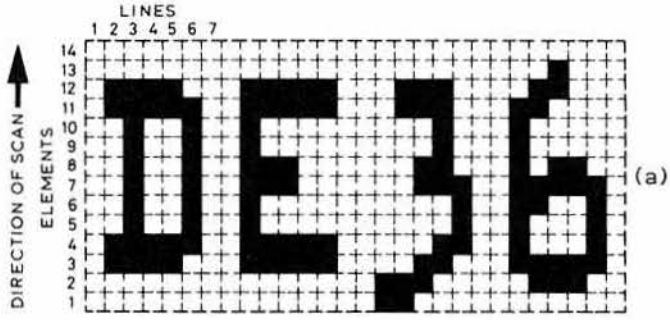
impulses which are synthesized in the receiver into a mosaic of black and white elements on a grid of closely-spaced parallel lines. There are no "start" or "stop" elements, and many signal elements may be lost or blurred without serious consequences.

This gives rise to one of the most attractive features of the Hellschreiber system, its relative immunity to the effects of circuit noise and interference. Such intrusions in a Hellschreiber radio circuit merely produce a fuzzy background, never the wrong letter, or figures instead of letters, or vice versa. In a sense this makes use of the human eye's ability to select intended information in the same way that the ear is able to pick out a weak morse signal from heavy interference. Another useful feature of the Hellschreiber system is its speed tolerance. The transmitting or receiving speeds can vary as much as plus or minus 5 per cent (this will be explained later). Some machines had belt drive!

Character generation

Mention has already been made of the Hellschreiber letter synthesis, and Fig 2(a) illustrates how this synthesis is produced. Each letter or character received is formed as a mosaic on a matrix or frame of seven vertical lines each having 14 picture elements. The first and seventh lines are left blank to give letter spacing, and the first, second, thirteenth and fourteenth elements in each line are normally left blank to give spacing at the top and bottom of each character. Exceptions to this element-blanking rule occur with numerals such as 3 and 5. An example of this is shown in Fig 2(a). The object of this irregularity is to avoid ambiguity, since a reader of the printed text would not easily mis-read a 3 with its tail below the line for a 5 with its top or hat above the line. It should also be noted that although there are 14 picture elements to each line they are never transmitted singly. This is an important feature which will be explained later.

It will also be seen from Fig 2 that although the mosaic is of seven-line construction—it is called a seven-line Hellschreiber—the active elements of each character or letter are formed within a five by five domain. The shaded areas in the drawing correspond to a "mark" signalling condition and the unshaded areas to "space". Note also that in the drawing the lines are numbered from left to right, the normal progression of printing or writing, while the picture elements are numbered from bottom to top



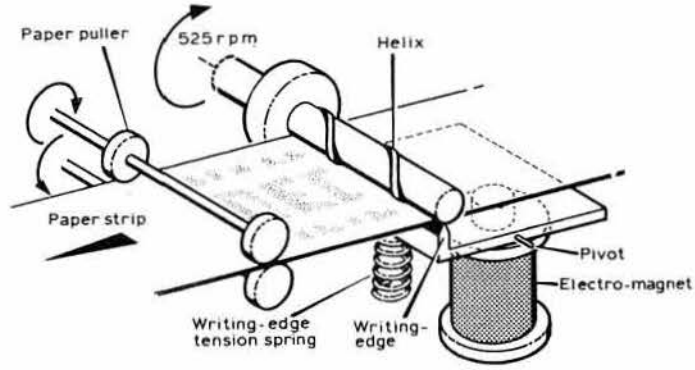


Fig 3. Working parts of the Hellschreiber printing head

since, as will be described later, this is the way in which the letters are formed in the receiving process. For example, the letter D is sent by the mechanism originating a serial train of impulses or elements corresponding to the shaded areas of the diagram at Fig 2(b). At the receiver the impulses are formed into the letter D by a scanning action. The full range of characters is shown in Fig 2(c).

Writing

The Hellschreiber receiving mechanism shown in Fig 3 is about the simplest device, apart from the human hand with pen and ink, for printing capital letters, numerals and the necessary punctuation signs. The working parts are a revolving helix inked by an idling felt roller, a signal-operated writing edge and a pair of knurled wheels driven through gearing arranged to pull a paper strip or tape between the helix and writing edge.

When a succession of current impulses corresponding to the pattern of a letter train is fed to the printing magnet, the writing edge is moved rapidly up and down, lifting the paper into contact with the helix. The letter is then written by the resulting action of the helix. The pitch of the helix is designed to print a double row of characters as shown in Fig 1(a). It is this feature of the Hellschreiber system which obviates the need for precise speed control. Fig 1(b) and (c) show the effect of small speed discrepancies; the line of printing merely runs up or down, always leaving one clear letter on the tape. In practice the speed of the transmitting machines may differ by as much as 5 per cent without seriously affecting the legibility of the copy.

Sending

Two methods were used to generate Hellschreiber signal trains. The mechanics of the first system involved a tape head having sensing "peckers" similar to those of the present-day teleprinter senders, the tape interface being the standard Baudot-coded five-hole type. The peckers sensed a character and then released the clutch of a rotating cam assembly which opened and closed contacts in conformity with indentations on its

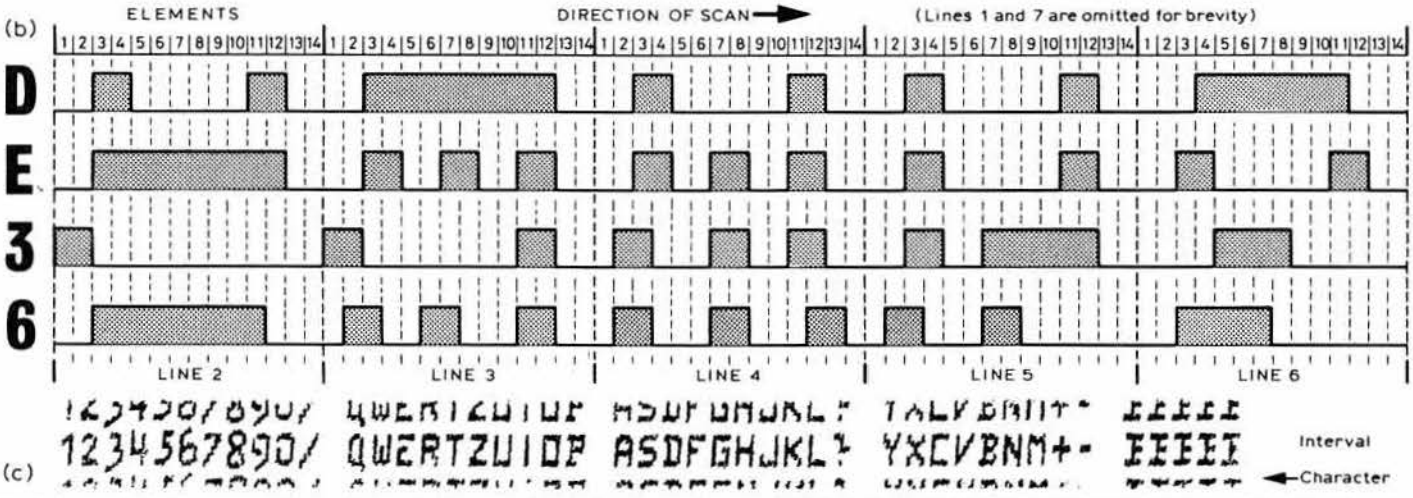


Fig 2. Method of character synthesis: (a) matrix diagram of typical letters and numerals; (b) element trains necessary for their formation; (c) Hellschreiber character font

Siemens *Feldfernschreiber*. *Photo:* **Science Museum**

circumference. This method, with variations, was used for all commercial equipment throughout the Hellschreiber's working life. It was particularly suitable for the transmission of multi-destination messages and press agency broadcasts, because it made possible tape editing and the repetition of material for secondary destinations, as well as the additional facility of sending traffic in either or both the Hellschreiber or teleprinter modes. The speed was five characters per second or approximately 50wpm.

The second system, which survives today in the German army *feldfernschreiber* machines used by amateurs, produces character trains directly from a keyboard. In these machines the signals are derived from a rotating drum or commutator having on its surface a track of insulated metal segments corresponding to the matrix coding for each character. Depressing a key causes a contact to drop onto the drum for one revolution, thus making an electrical circuit and so producing the appropriate pulse train. Each key has an interlock to prevent the signalling of another character before the preceding one has been completed. Operation of these machines is essentially at cadence speed of 2·5 characters per second or 25wpm.

Throughout the Hellschreiber's working life, transmissions were mostly operated on the "keyed tone" or "keyed carrier" principle, sometimes simultaneously. This keying mode (A1, A2 and A3) allowed the use of the simplest of terminal units, such as the connection of the printing electromagnet, via a metal rectifier, directly into the loudspeaker sockets of a broadcast receiver. At the other end of the scale the more elegant terminal devices boasted an audio bandpass input filter, a two-stage amplifier, clipping and agc, bridge-type metal rectification and further dc amplification.

The Siemens *feldfernschreiber,* mechanical details

So far as is known, the only mechanically-operated Hellschreiber equipment of the standard seven-line type in use today is the ex-German army *feldfernschreiber,* the general construction of which can be seen in the photograph. It is perhaps a tribute to the design and manufacturing skills of the Siemens factories that so many of these machines have withstood the ravages of time and, with renovation, are still in use.

As the photograph shows, the equipment is in two parts, a keyboard and receiving module and a terminal unit. The rotating mechanism is powered by a 12V dc motor generator which generates a 165–180V dc supply for the terminal unit from a second winding and commutator, as well as mechanical power for the commutator drum and helix assembly. These rotating parts are driven through a gearbox which has precision-hobbed silent-running-helical and worm gears, all running on ball-races.

A valve is used to regulate the speed of the motor-generator; this is effected by passing the anode current of the regulator valve through a second field winding to act as a brake. Centrifugally-operated contacts on the armature shaft open and close the valve's grid circuit, thus varying the anode current and thereby the speed. Although, as stated earlier, accurate speed control is not essential to the system, the regulation obtained by this means is better than 0·5 per cent. Motor-generator brushes and governor contacts are fully rfi suppressed.

Terminal unit

The terminal unit comprises a 900Hz sine wave oscillator, a single-stage input amplifier, a full-wave copper oxide signal rectifier and a dc amplifier driving the electromagnetic printing head. It has three inputs, one for 800Ω unbalanced lines, another at 4,000Ω for input from a radio receiver, and a high level "listen" jack at the amplifier output. A fourth jack is provided in some models for direct connection to a balanced 800Ω telephone line. Two contacts of a 12-pin socket on the front panel break into the commutator circuit for low-level dc or tone keying. Local copy of the outgoing signals is obtained through an auxiliary winding on the input/output transformer. A simplified circuit diagram of the unit is show in Fig 4. The four valves are Telefunken RV12 P4000, the multi-purpose type commonly found in second world war German military equipment. It will immediately be obvious that the simple receiving mechanism can easily be copied by interested model-makers. For those who might be interested, the two-start helix rotates anticlockwise viewed from the driven end at 525rpm. A close-up of the printing head is shown in the photograph.

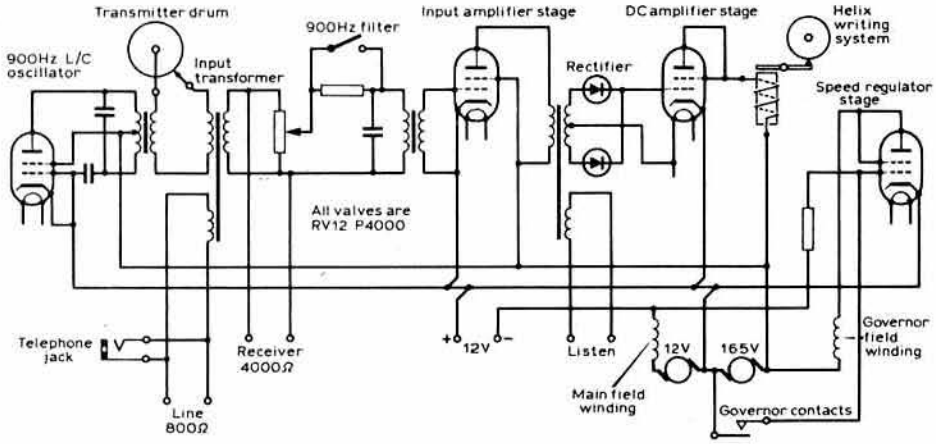
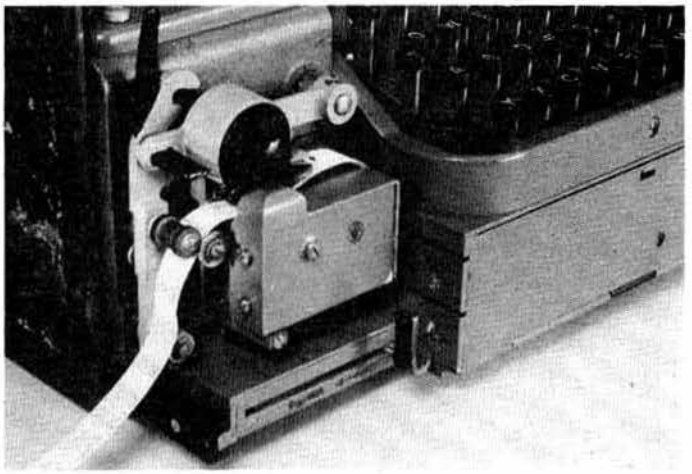


Fig 4. *Feldfernschreiber* terminal unit



Close-up of printing head. *Photo:* **Science Museum**

Bandwidth (how much?)

At this point it might be opportune to pose the question which many users and observers of the Hellschreiber system raised in its early years—"What is the bandwidth of a Hellschreiber signal?" and "How much of the spectrum does it occupy when transmitted over a radio circuit?"

As many amateurs of the 'thirties will remember, early Hellschreiber transmissions were often extravagant of bandwidth. In retrospect it is easy to see why this was so. Transmitters of that period were not so well frequency-controlled as they are today, and this led to the widespread use of A2 type emissions (interrupted continuous wave) and, in some cases, A3 (full carrier plus two sidebands). Then, as today, there were over-driven and over-modulated transmissions; and everyone knows how easy it is to produce a small family of spurious signals on either side of a parent signal. (The splatter produced by over-driven (non) linear amplifiers is a modern manifestation of the same condition.) The situation today is different. First, there are no commercial Hellschreiber transmissions except possibly in China; and second, amateur Hellschreiber communication is on-off keyed and most operators restrict their bandwidth to reasonable limits by one means or another.

So just how much bandwidth does a Hellschreiber signal need, and how much does it occupy in practice? The answer to this question is to be found in the International Radio Regulations, where the bandwidth necessary for any form of telegraphy is specified as the keying speed in bauds multiplied by a factor of three if signals are steady, or by five when the signal merit is poor. To see how this specification affects Hellschreiber it is necessary to review fundamental keying definitions. The baud, the basic unit of telegraph speed, is the duration of the shortest pulse or one code element per second. But a single code element must always be followed by a space, otherwise no intelligence would be transmitted. It is obvious therefore that one cycle of keying is equal to two code elements. Telegraph keying is ideally a square wave, but it has long been recognized that a wave shape somewhat short of the ideal and containing only the third harmonic plus the fundamental is perfectly satisfactory for good communication. This is the reason for the factor of three in the International Regulations.

The shortest signalling pulse of the present-day amateur Hellschreiber transmissions is 1/49 of a complete letter frame—remember, Hellschreiber picture elements are always sent in pairs. The baud speed is therefore computed by multiplying the figure of 2·5 characters a second by 49, which is 122·5 bauds. Since one cycle of keying must always consist of two elements, a mark and a space, the keying bandwidth is one half of this value, ie or 61·25Hz or, after applying the factor of three to preserve a reasonably shaped square wave, 183·75Hz. However, when this waveform is made to modulate a carrier wave, a further factor of two is introduced because, like any other form of modulation, two sidebands are created. Thus the radio frequency bandwidth is twice the keying bandwidth, or 365·3Hz. This is approximately 0·125 of the bandwidth taken up by a well-engineered A3j ssb voice transmission although about 25 per cent wider than the 246Hz of an expertly tailored 45·5 baud, 170Hz shift amateur teleprinter signal (see "Appendix").

How well the computed figure for Hellschreiber bandwidth is realized in practice depends on the type of keying used and the steps taken by the system designer to shape the applied keying waveform. Amateur Hellschreiber transmissions are invariably on-off keyed and, when investigated spectrally, few have exceeded the computed bandwidth; in fact some signals have exhibited a narrower bandwidth of some 200–300Hz with no loss of intelligibility resulting from the element distortion produced by the unduly soft keying.

Construction

As mentioned earlier, the European amateurs' interest in Hellschreiber began in 1976 and 1977 when a number of the German army *feldfernschreiber* machines were rescued from scrap heaps and elsewhere in Holland and West Germany and restored to their original condition. The source of these machines having dried up—they are much-sought-after collectors items—many amateurs have turned to constructing them. The simplicity of the receiving mechanism has been particularly attractive to the do-it-yourself types, and many receive-only devices have been constructed from the junk box. In 1942 the author built a receiver from the remains of a morse inker and a helix fabricated from a brass cylinder to which short pieces of steel piano wire were sweated. A collection of Meccano gears completed the picture. Some 10 years later a similar machine was seen at a hobbies exhibition.

More recently the West German and Dutch amateur fraternity have turned their attention to the microprocessor, and several have written programs for the Apple 2 computer. No doubt many others will soon be working on the TRS80 and the PET! As with the mpu-driven "driven" Baudot-coded rtty systems, the operation is paperless. The signal trains are derived from a type of ASCII-to-Hellschreiber converter and received on an ASCII-driven vdu display. What could be simpler?

An appraisal

Some may feel that the relatively slow speed of amateur Hellschreiber signals (25wpm) may limit it as a viable system of communication. But if instead of speed the criterion of comparison is made one of accuracy, the Hellschreiber system compares very favourably with the 5U teleprinter. For example, a single incorrectly-received element in the case of a 5U coded signal will alter a transmitted character completely or transpose a shift signal to the opposite case. On the other hand an incorrectly received Hellschreiber letter element will only result in a blurred outline—never the wrong letter.

Although no authentic records of the Hellschreiber's interference avoiding properties are known to exist, a listener to the signals of the European net on 3·5, 7 and 14MHz will be left in no doubt as to the validity of the claim. Many signals monitored during the past three years have at times been so weak or overlaid with various types of interference that they are rendered inaudible and yet capable of being selected by the eye. A good example of this is seen on the tape of DL1OY in QSO with PA0AOB in Fig 1(d).

This article may have left some important questions unanswered, and the future of Hellschreiber—if it has a future—in doubt. But at least it may have stirred someone's grey matter, as indeed the author's was stirred when he first bumped into the Hellschreiber system in 1941, and again in 1977 when the familiar sounds from a machine at PA0AOB unexpectedly came popping out of a receiver at G5XB.

Bibliography

[1] *Telegraphy,* Freebody.
[2] *Funk-Praxis* Vol 1, Nr 14, December 1948.
[3] *Ham Radio* December 1979, Evers, PA0CX.
[4] "Technical Topics", J. P. Hawker, *Rad Com* February 1980, pp 154–5.

Appendix

The necessary bandwidth for F1 type emissions is determined according to International Radio Regulations as follows:

(1) Bandwidth $= 2{\cdot}6D + 0{\cdot}55B$ for $1{\cdot}5 < \frac{2D}{B} > 5{\cdot}5$

or

(2) Bandwidth $= 2{\cdot}1D + 1{\cdot}9B$ for $5{\cdot}5 \leqslant \frac{2D}{B} \geqslant 20$

where B = Telegraph speed in bauds
D = 0·5 times the frequency shift

For 45·5 baud 170Hz shift $\frac{2D}{B} = \frac{170}{45{\cdot}5}$ or 3·7

Clearly formula (1) applies.

$\therefore 2{\cdot}6D = 221$

$0{\cdot}55B = 25$

246Hz. □

Phase-shift monitor—an aid to tuning rtty

by A. J. OAKLEY, G4HYD*

Front view. Actual size 3·5 by 5in with 2in crt. The switch marked "in-alt" allows for switching an "alternative" input from a second receiver. This is not shown on the circuit diagram, and may be omitted

Introduction

A phase-shift monitor is a simple device that displays an rtty signal on the screen of a cathode ray tube in such a way that the "mark" and "space" signals may be looked at separately but simultaneously, and their relative amplitudes and frequencies compared. Apart from being an easy way to tune in an rtty signal, it will also indicate whether the "mark" is hf or lf of "space" (ie the right or wrong way round), whether the frequency difference between the signals is correct, show audio distortion of either the received or transmitted signal, and also show the strength of signals. It works just as well for fsk or afsk signals, and it can also monitor one's own outgoing signal. Finally, no modifications to one's transceiver are required, as its inputs are in parallel with the station loudspeaker and microphone.

The heart of the device is the series-tuned circuit formed by L2 and C10+C11, which is tuned to the mid-frequency between "mark" and "space". The rtty audio is applied across this circuit, and the voltage across the whole circuit applied to the X plates, while the voltage across the inductance alone is applied to the Y plates. At resonance, the voltages across the capacitance and inductance are equal, but 180° out of phase, so they cancel out and no voltage is applied to the X plates, while half voltage is still applied to the Y plates. This produces a vertical line on the tube display. Either side of resonance a voltage is also applied to the X plates, whose amplitude is proportional to the frequency shift (from resonance) and which is either in phase or 180° out of phase with the voltage on the Y plates. This causes the vertical line to rotate clockwise or anticlockwise on the screen. The direction of rotation depends upon whether the frequency shift is high or low from the resonant frequency.

A proper rtty signal consists of two tones, equally spaced above and below the resonant frequency. Due to persistence of the tube (as well as vision) the two signals combine to form an "X" display. The frequency shift of the rtty signals is indicated by the angle between the legs of the "X", incorrect tuning by the rotational position, amplitude by the length of each leg, and distortion by a widening of either or both legs. Fig 1 shows the displays most commonly encountered.

Description

No real originality can be claimed for either the idea or the basic circuit of this device; however, the author believes it incorporates a few useful improvements on earlier circuits. First of all, with the exception of the three controls for brilliance, focus and gain, as well as the 'scope tube and transformer, all the components are mounted on a single printed circuit board. Although the prototype used a 2AP1 tube, almost any tube may be used, and the 800V available is sufficient for most 3in and even some 4in tubes. The use of adjustable inductors makes the tuning of the resonant circuits extremely simple. (It is worthwhile to note that while the 485mH inductor may be replaced with a standard 88mH type, with suitable tuning capacitors, this is most definitely NOT recommended, as this part of the circuit requires a high LC ratio for best results.) Last and by no means least, the use of push-pull deflection amplifiers and electronic spot centering ensure a symmetrical display around a true centre.

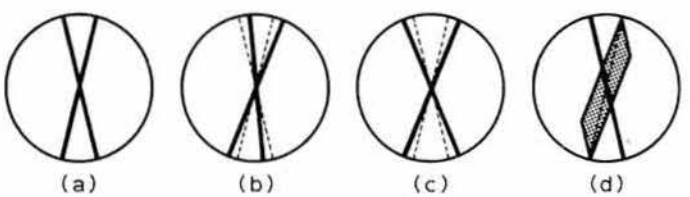


Fig 1. CRT displays. (a) Correct tuning and shift. (b) Incorrect tuning, but correct shift. (c) Correct tuning, but too-wide shift. (d) Correct tuning and shift, but heterodyne beat note on "space" signal

Why valves in 1981? First of all, both ht and heater voltages have to be supplied for the tube anyway, so no additional complication is involved. Second, some 400V peak-to-peak needs to be developed to scan the tube and while transistors to do this are readily available, a high voltage ht is still required. Finally, the author's age group puts him firmly in the "bottle-fed" era. So come on, you solid-state merchants, wallow in a spot of nostalgia—believe it or not, the valves are easily obtained and are no more expensive than transistors.

Construction

Construction is straightforward, as most of the work consists of assembling the components on the pcb. Remember that high voltages are developed around this circuit, and that all capacitors should be suitably rated. Do not forget the two wire jumpers on the component side of the board for the heater supply to V2 and V3. The transformer should be mounted directly behind the tube base to minimize spot elongation due to its magnetic field. No dimensions are given, as the case size will depend upon the crt used, but remember to allow plenty of room. The completed pcb should be mounted on 0·25in-high spacers soldered to the pads around the securing bolt holes to ensure proper grounding.

Check all wiring before applying power. Insert all valves and the crt, then switch on. With a voltmeter, check heater volts first, then the ht both positive and negative with respect to ground. If all is well a spot should appear on the tube face. Focus this as small as possible using RV7, then reduce brilliance to a low level using RV6. Next shift the spot to the centre position by adjusting RV3 and RV5 with an insulated tool. So far, so good. Now apply an audio signal at about 1,200Hz to the input. The spot should elongate. Adjust the gain control (RV1) and the audio signal level so that the elongated spot is about three-quarters across the tube. With a 'scope or audio voltmeter measure the ac voltage between X1 and ground, and note the value. Now measure between X2 and ground, and adjust RV2 to bring this voltage to the same value as that noted on X1. Repeat the process with Y1 and Y2 using RV4. (If no suitable equipment is available, set the presets to mid-range—it is not too critical).

Alignment and use

The figures in brackets refer to the "old" tones. First adjust the audio input frequency to 1,360Hz (2,210). Adjust the core of L2 so that the line displayed on the tube face is vertical. Alter the frequency to 1,275Hz (2,295) and mark the tube face with a felt-tip pen at the ends of the line, which should have rotated. Now alter the frequency to 1,445Hz (2,125) and mark the tube face again. Compare the marks, which should indicate that both lines were of the same length. If not, adjust L1 and repeat the process until they are the same length.

The tube face may now be permanently marked with a wax crayon or,

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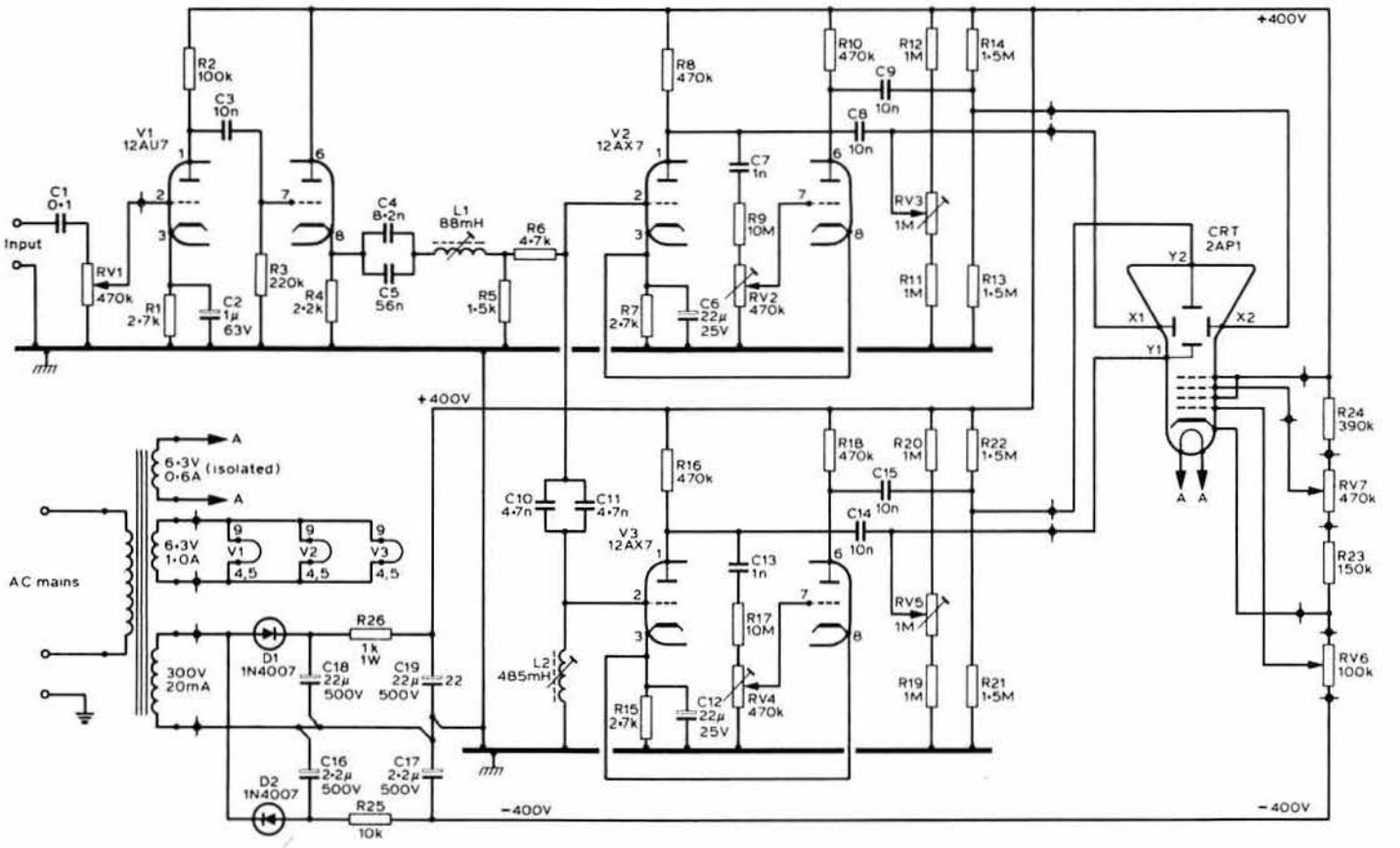


Fig 2. Circuit diagram

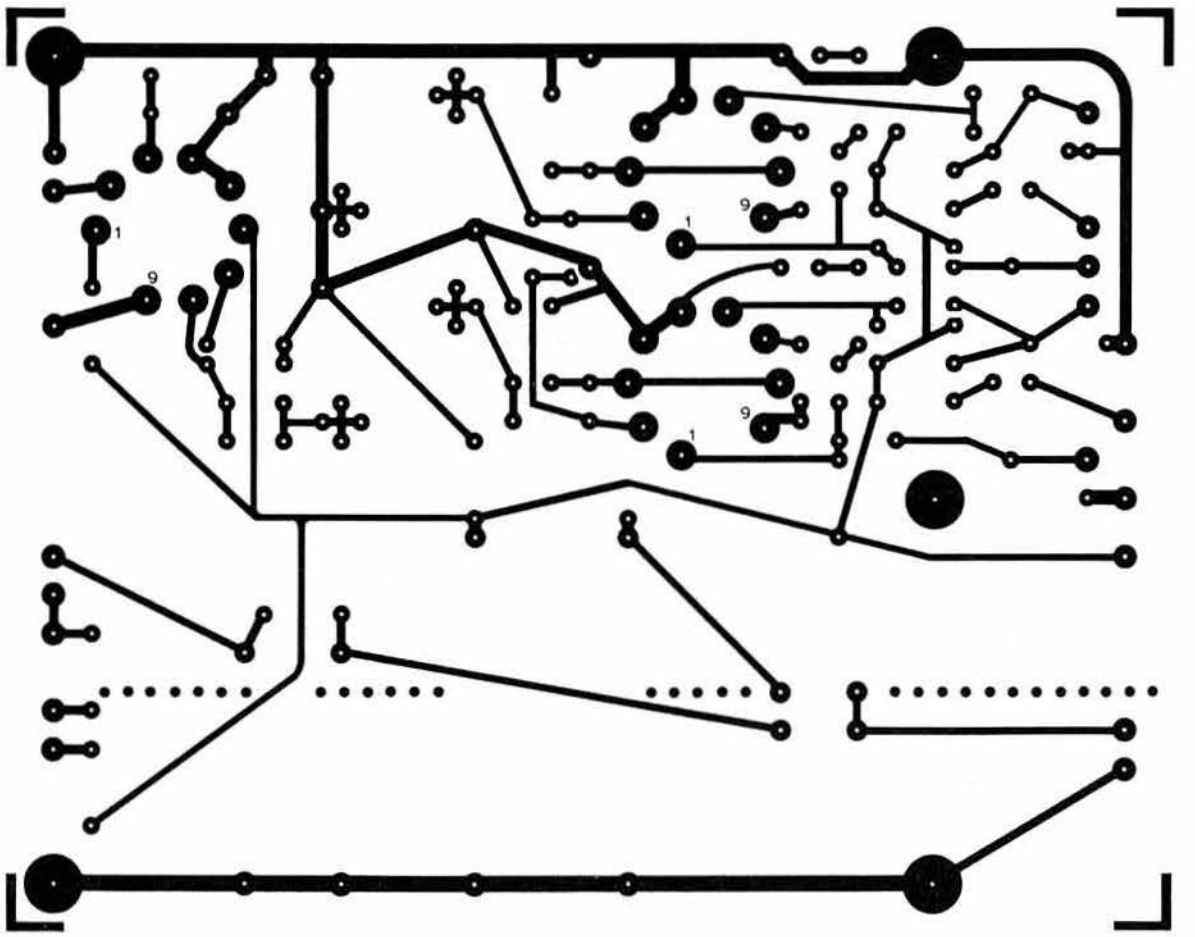
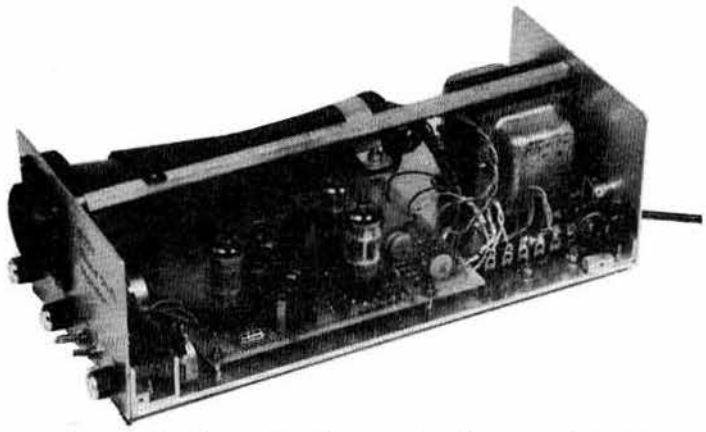


Fig 3. PCB layout

Components list

R1, 7, 15	2·7kΩ	**C1**	0·1μF	(P)
R2	100kΩ	**C2**	1μF 63V	(E)
R3	220kΩ	**C3, 8, 9, 14, 15**	10nF 500V	(C)
R4	2·2kΩ	**C4**	8·2nF	(Pc)
R5	1·5kΩ	**C5**	56nF	(Pc)
R6	4.7kΩ	**C6, 12**	22μF 25V	(E)
R8, 10, 16, 18	470kΩ	**C7, 13**	1nF 500V	(C)
R9, 17	10MΩ		4·7nF	(Pc)
R11, 12, 19, 20	1MΩ	**C10, 11**	2·2μF 500V	(E)
R13, 14, 21, 22	1·5MΩ	**C16, 17**	22μF 500V	(E)
R23	150kΩ	**C18, 19**	E = Electrolytic	
R24	390kΩ	P = Polyester	Pc = Polycarbonate	
R25	10kΩ	C = Ceramic		
R26	1kΩ 1W			
All 0·25W except R26				
RV1	470kΩ log	**D1**	1N4007	
RV2, 4	470kΩ hor preset	**D2**	1N4007	
RV3, 5	1MΩ hor preset	**L1**	88mH adjustable	
RV6	100kΩ lin	**L2**	485mH adjustable	
RV7	470kΩ lin	**V1**	12AU7	
		V2	12AX7	
		V3	12AX7	
		CRT	2AP1	



Internal view, showing single pcb mounted under crt, and transformer mounted behind tube base to minimize effects of magnetic field

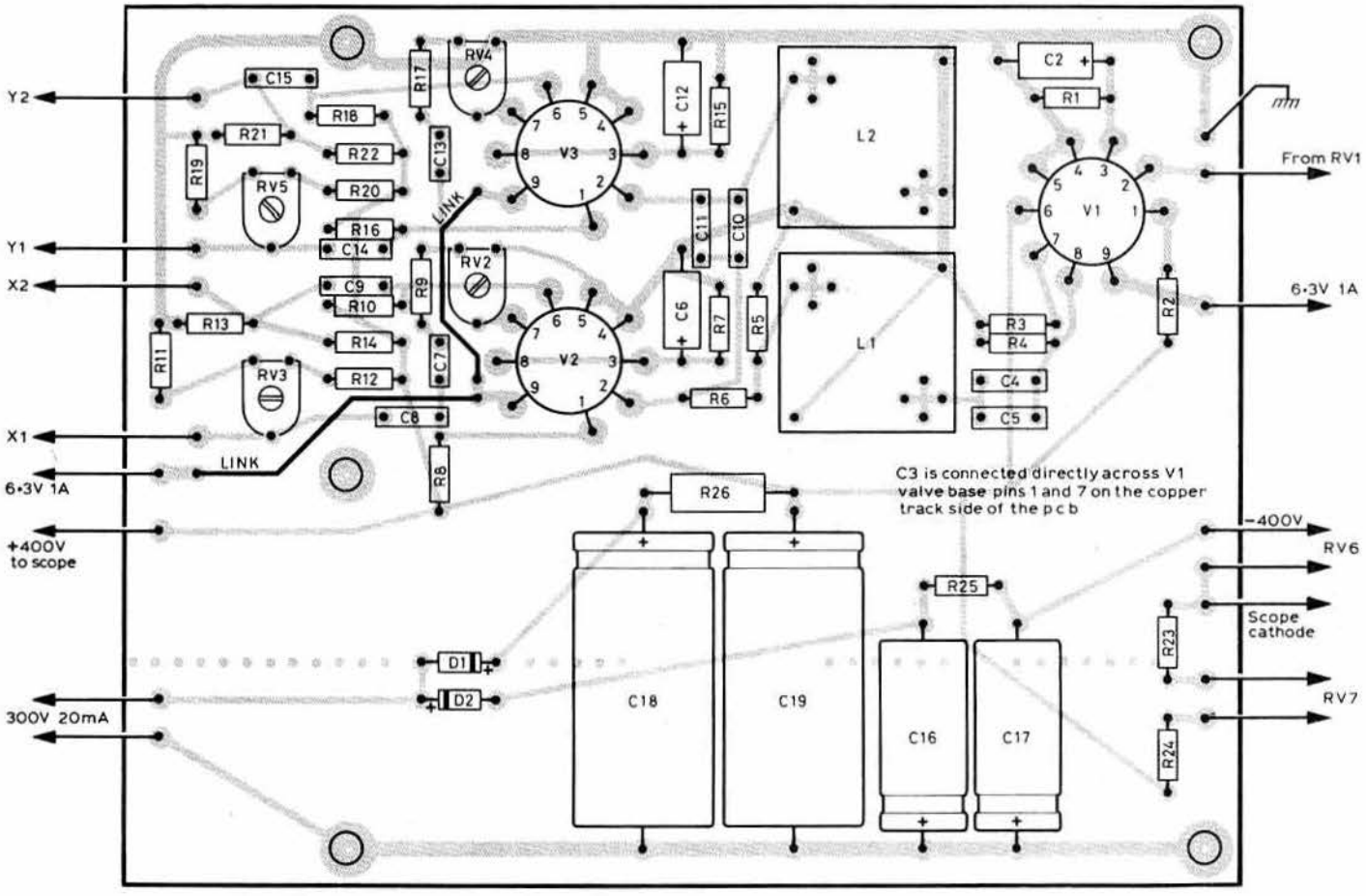


Fig 4. Component layout

better still, a proper Perspex screen may be made with an engraved "X" to coincide with the two lines.

In use the receiver loudspeaker is connected in parallel with the input of the monitor, and the rtty signal tuned in by aligning the "X" on the display with the marks on the screen. Too narrow a shift is indicated by the top of the "X" being closer than the marks, and vice versa. If the direction of rotation of the display is of the wrong sense with respect to the receiver tuning knob, reverse the leads from the crt to X1 and X2.

A few minutes use on the air is more meaningful than a page of writing, so go to it. After a short while you will wonder how you ever tuned in rtty without one.

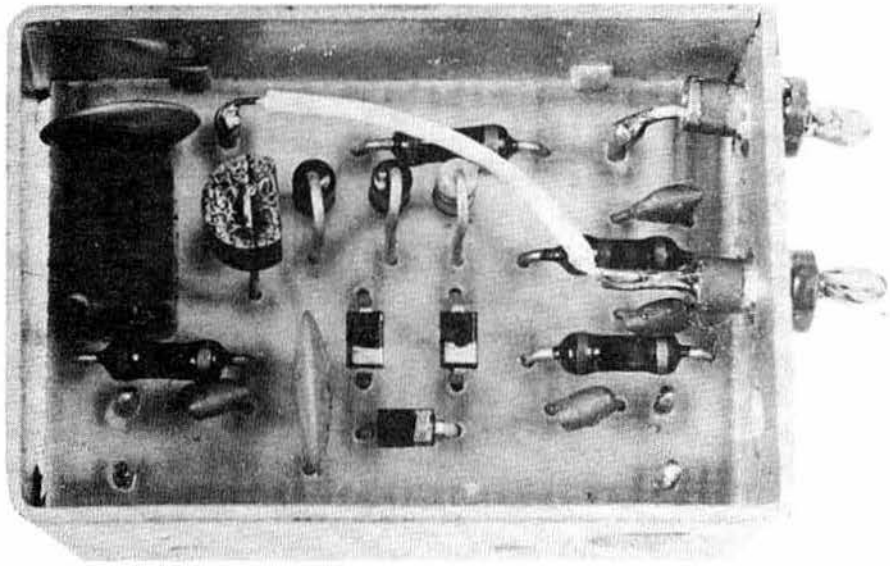
For those without the facilities themselves, the author can supply the pcb, the tunable inductors and the mains transformer. All the other components are readily available from many sources, including mail-order, the high street or at rallies. □

The RX80 Mk2

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

(Part 4)

A. L. BAILEY, G3WPO*



The AT80 rf attenuator

THE AT80 RF ATTENUATOR

While the existing rf gain control of the RX80 tunable i.f. module provides adequate control of gain for most purposes, it involves varying the operating point of the mosfet and, as such, is not ideal. Also there is no means of reducing signals entering the hf converters themselves which, if at high levels—such as in the 7MHz band—may lead to cross-modulation problems etc.

An external rf attenuator is required to overcome these problems, and is placed immediately after the antenna input. There are several ways of constructing such a unit, the most obvious of which is the use of fixed or variable resistor networks. These have the disadvantage of needing another switching unit if stepped attenuation is required, or elaborate combinations of potentiometers if the impedence matching at input and output is to be maintained. An alternative approach is the use of a PIN diode attenuator with dc control of the attenuation level, which is the basis of the AT80 unit.

The circuit (Fig 30) uses a constant impedance network of three PIN diodes type BA479, whose biasing is controlled by a bipolar pnp transistor TR1 (BC307). Capacitors C3 and C6 dc isolate the circuit from the antenna and receiver input. The attenuation control, RV1, sets the level of signal attenuation by varying the base voltage of TR1. With TR1 on (0V control) D1 and D2 are reverse biased, and D3 forward biased, giving minimum signal attenuation. As the control voltage is increased TR1 begins to turn off, the biasing conditions of the diodes are reversed, and signal attenuation increases to a maximum of around 45dB. There is a small residual attenuation of 1·5dB at zero control volts, which is not too much of a problem as adequate sensitivity exists in the receiver to overcome this.

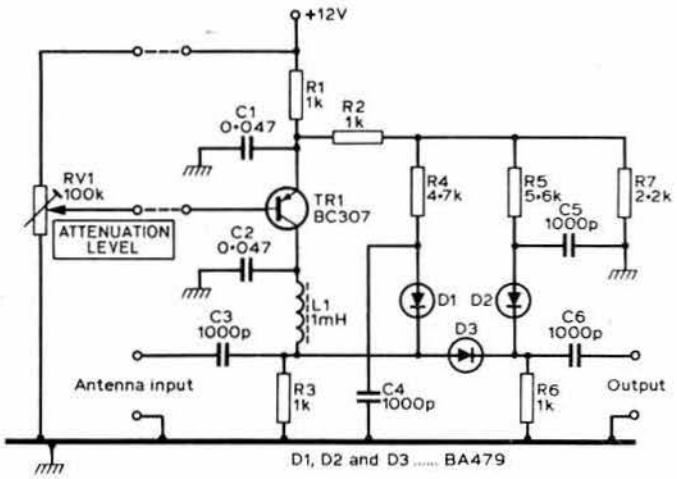


Fig 30. The AT80 rf attenuator circuit diagram

If required, TR1 can be replaced by an npn version, such as a BC107, for reversal of the control voltage characteristics if this is more convenient with a receiver other than the RX80. It is possible to have the attenuator controlled by the agc line of a receiver, but not with the RX80, as the characteristics of the agc system used cause violent pumping of the signal.

Fig 30 shows the wiring as for the prototype receiver, where the AT80 is used as a fixed attenuator; the level set by RV1 mounted on switch S17 (see Part 3 for details of wiring) is selected as required. An indicator LED was added to remind the user that the attenuator is in use. Alternatively the front panel rf gain control can be replaced by a 4·7kΩ log taper potentiometer (Fig 31) to provide a continuously variable option, which is the preferred method. In this case, the connection pin to R4/C5 on the main RX80 module, which normally goes to the wiper of the rf gain control, should be earthed permanently to the antenna earth connection pin.

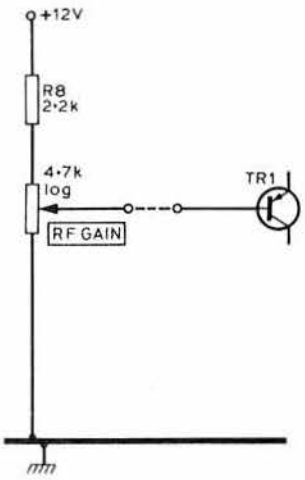


Fig 31. Alternative front panel attenuator control circuit

AT80 rf attenuator components

R1,2,3,6	1kΩ	TR1	BC307 or similar pnp
R4	4·7kΩ		
R5	5·6kΩ	L1	1mH choke Toko type 7BA
R7 (+ R8 if required)	2·2kΩ		
RV1	100kΩ Alps carbon preset	D1,2,3	BA479
Resistors are 0·25W carbon film 5%		2-off 1,000pF solder-in feedthrough capacitors	
C3,4,5,6	1,000pF disc ceramic	Screening enclosure type SCB1	
		6-off 0·1in pcb connection pins	
C1,2	0·047μF disc ceramic	UR95 miniature coaxial cable	

Toko and Alps components are available from Ambit International together with the screening enclosure. A printed circuit board and a complete set of components are also available from Ambit International.

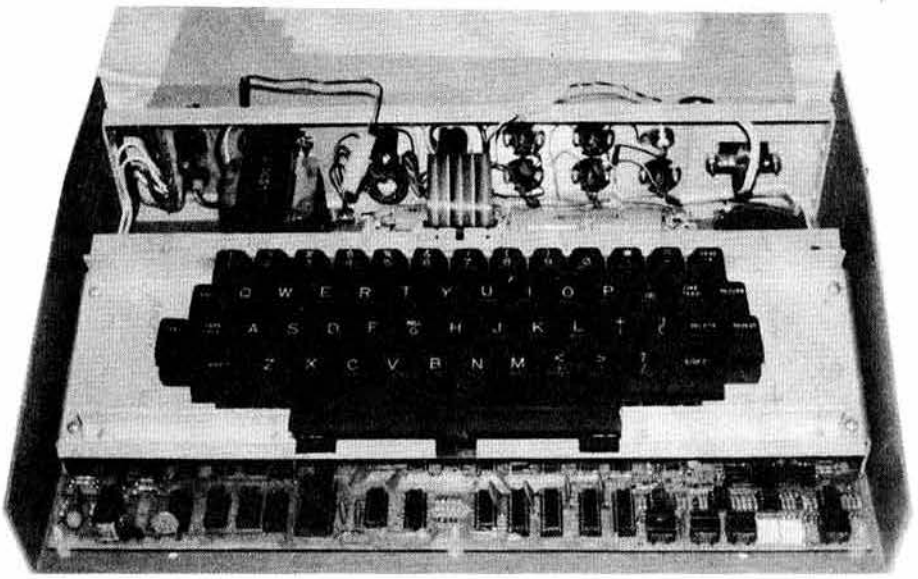
*9 Alberta Walk, Worthing, West Sussex BN13 2SG.

(Continued on page 330)

EQUIPMENT REVIEW

The Robot 800 speciality mode terminal

by PETER BURNETT, G4BLL*



The Robot 800 with cover removed

"Finally to return to scan-converters, with future development undoubtedly towards their role as a central processing unit, cw, rtty and sstv enthusiasts will find themselves 'travelling the same road'. This will represent just one more step towards acceptance of video display capability for the 'complete' amateur radio station."

This was the final paragraph to *SSTV scene* June 1978, and two years later this prediction was realized with the introduction of the Robot 800.

Though not a scan-converter—a Robot 400 or similar is required to display sstv at fast-scan rate—the Robot 800 does include all circuitry necessary to transmit and receive cw and rtty and transmit (only) sstv alphanumeric information. The only other piece of equipment necessary is a video monitor (vdu) plus, of course, a transceiver.

Perhaps one word of advice with regard to the practical use of this unit: it should be realized that this is an advanced piece of electronic equipment which, in the case of cw, has been designed to interpret a code originally intended for direct interpretation by the human brain. The ingenious way it achieves this will be dealt with later, but its limitation should be borne in mind—do not expect the unit to copy poor morse without some gaps and errors—the comparator updating system used needs time to recognize the characters, especially where excessive speed variation occurs or where gaps are left by the sending station. Also, as the filters used are only 80Hz in width, a stable receiver is a prerequisite for successful vdu display of the received cw. A good idea is to allow the receiver to stabilize before using the unit and, to gain experience, tune the receiver to one of the good commercial cw frequencies received at good signal strength with no interference—listen for the morse coming back out of the side tone as well as tuning for maximum length of the tuning bar on the vdu. Another way to gain experience in the use of the unit to receive cw is to obtain the help of a fellow amateur with a "good fist" and get him to send a known message, ie an extract from a newspaper, so that you are aware of what should be coming up on the screen —this will illustrate the full capabilities of the unit. Once you have gained confidence you can try to receive and display the weak dx cw.

The Robot 800 is a complete communications terminal for sending and receiving Baudot, ASCII and morse code. In addition, it generates alphanumeric character displays and transmits them in amateur sstv format. The Robot 800 is a microprocessor-based system using the 8085, with 5,120 bytes of rom and 2,560 bytes of ram. There is provision for expansion of this memory capacity to double its present amount. An Intel USART 8251 is used for serial 1/0 and 8155s are used for parallel 1/0 and keyboard interface. As with the Robot 400, no modification to existing station equipment is required; the 800 is interfaced directly to the audio input and output sockets of the transceiver. A built-in terminal unit is provided for demodulation of incoming morse and rtty, as well as an audio frequency shift keyer for transmission. The unit also includes its own inbuilt power supply. A standard closed circuit tv monitor is used for the character display.

A comprehensive manual supplied with the unit describes in detail the various functions, and section three of the manual, entitled "Get on the air", is a most useful basic function guide compiled for those operators who must operate first and read afterwards.

RTTY operation

Proper receiver tuning is imperative for reliable rtty reception. The rtty demodulator uses two active discriminator filters for separating the mark and space tones. Optimum tuning is attained when the filter outputs are equal, as indicated by the "plus-plus" tuning bar on the status indicator line. It displays alternately the outputs of the mark and space discriminators, and the length of the bar will change if the outputs are uneven due to receiver mistuning, ie the bar will be seen to "flicker". Correct tuning is for minimum "flicker". There is also a scope output at the back of the 800 for those operators who prefer to tune by an oscilloscope display.

The status line gives a direct indication to the operator if the unit is in transmit or receive mode, code used (Baudot or ASCII), polarity (normal or reverse) shift 170 and 850Hz and special modes indicator, autostart, selcom and normal. The autostart mode prevents unwanted characters being written up on the screen in the absence of a legitimate rtty signal, but 3 to 4s of rtty carrier will be required for the unit to "lock-on" and print characters. The selcom (selective communications) mode is composed of two basic parts, automatic answer back "who are you" and automatic message recording (selective calling or "selcal"). These features, based on an eight-character code, provide totally automatic station operation.

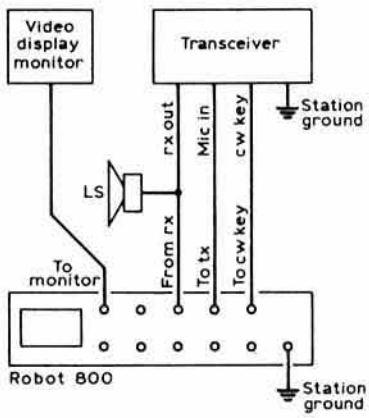


Fig 1. Station interconnection for rtty and cw

*21 South Cross Road, Cowcliffe, Huddersfield HD2 2PH.

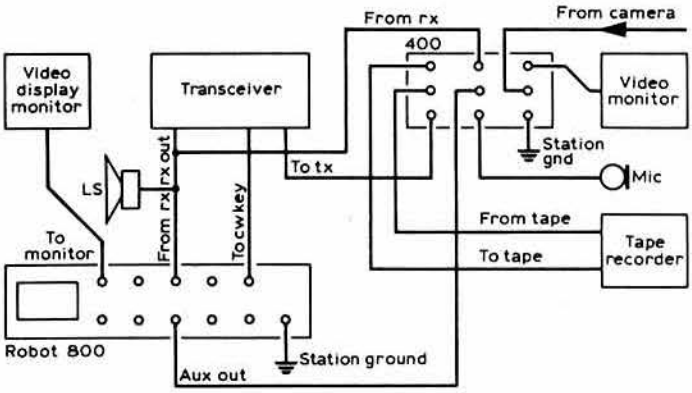


Fig 2. Station interconnection for all modes with Robot 400

In transmit there are three modes which may be selected by the user: (a) continuous—each letter is transmitted as it is typed; (b) word mode—the entire word only transmitted when it is completed (when the space bar is hit)—this allows the operator to edit mistakes prior to transmission by use of the DELETE key: (c) line mode—where the entire line (72 characters) is transmitted as it is completed, allowing editing of the entire line—line completion is detected by a RETURN entry or by the automatic carriage return feature.

Two commonly-used test messages in rtty are included: "RY" and "Quick brown fox". The Robot 800 also has two programmable 64-character "here is" message memories and an automatic id memory—typing CTRL-ID will enable the terminal to transmit a preprogrammed eight-character message in cw. It is possible to erase the status line so that all 24 lines of the display can be used for text. On receive a "word wrap-around" feature automatically erases the part completed word at the end of a line and shifts it to the beginning of the following line.

Morse code operation

In order to understand how the Robot 800, a machine, achieves interpretation of a variable speed, variable length code originally conceived for human interpretation, one must realize the special timing relationships between dots, dashes and spaces. Fig 3 illustrates this relationship; the basic timing element of morse code is the dot. Fig 4 is a flow chart diagram of the computer program used in the 800 for interpretation of morse code, and a single transmitted bit of information (dot or dash) is referred to as a mark. A mark discriminator filter (1,275Hz) is used.

The length of the inputed mark is first determined by measuring against a clock. This is then compared with the unit's average mark, which is the computed average time required for *two dot lengths*. Because a dot is a single-dot length, and a dash is a three-dot length, by comparing the inputed mark with the average mark, it can be determined if it is intended to be a dot or a dash. This is then averaged with the last character element length. That element is then added to any previous elements received. A new computed average mark (two dot lengths) is taken from the average of the average dot and dash lengths. This double-running average technique allows for some margin of error in the timing of the incoming code; tracking adjustments are made with every transmitted character element, allowing for speed variations. The incoming speed measurement (in wpm) is calculated from the average mark length and is displayed on the status line.

The timing continues by checking the spacing between transmitted elements to determine if the character has been completed. If the spacing is greater than six dot lengths it assumes that a word has been completed and prints a space. As will be realized, this is a very sophisticated process of interpretation with, of necessity, a limitation to the tolerance of poor code.

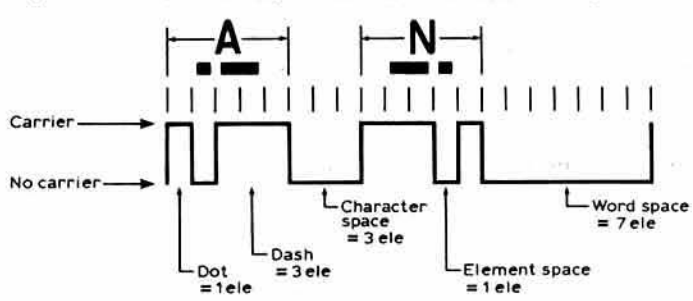


Fig 3. Morse code timing

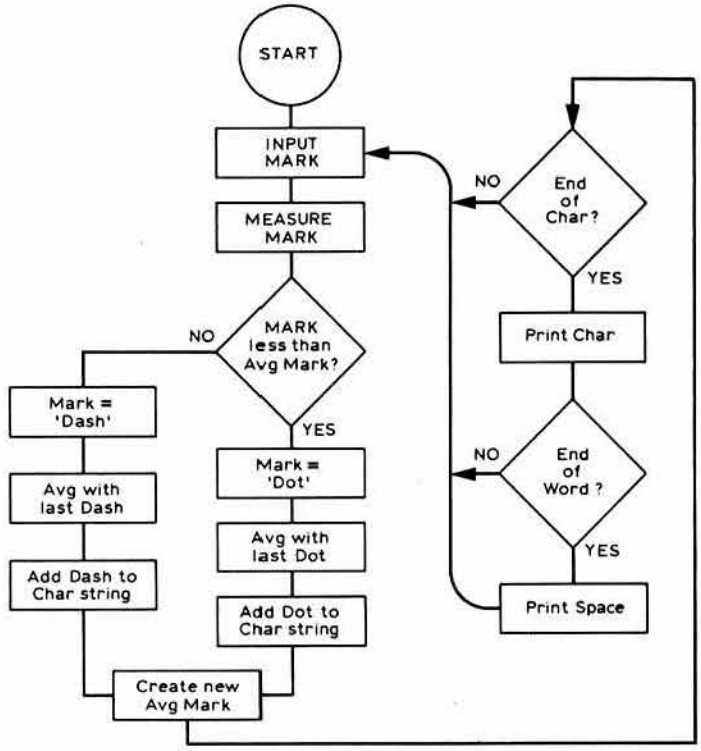


Fig 4. Flow chart for morse code interpreter

One of the advantages that the human brain has over any 800-type machine is the ability to recognize words, thus compensating for mistakes made by the sending operator.

When tuning-in cw, set the receiver after adequate warm-up period (to minimize drift) so that the tuning indicator bar (as displayed on the status line) is at maximum length. In addition, the side-tone oscillator can be enabled and the processed code used as a tuning aid.

In transmit mode, any speed between 3 and 99wpm may be selected by typing CTRL-SPEED followed by the desired numerals. On receive the unit automatically tracks and displays the incoming code at any speed within the above range. The internal side-tone oscillator is enabled by typing CTRL-T. It is interesting to listen to the "corrected code" as the computer interprets it compared with the code from the receiver audio output. The test messages "RY" and "Quick brown fox" may also be used in the morse code mode.

SSTV operation

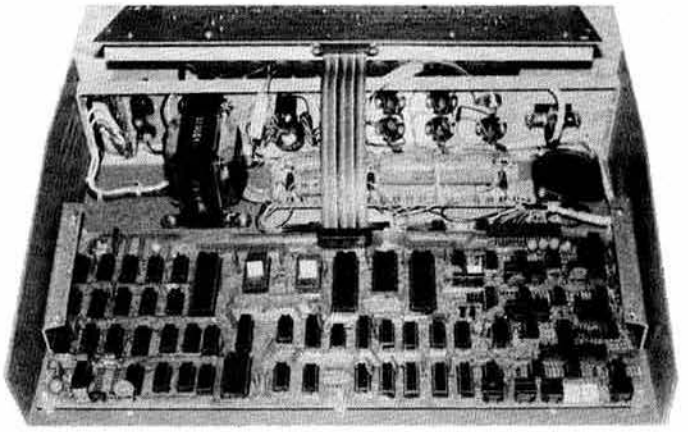
On sstv the model 800 has a supportive role as a message generator for transmission, and utilizes six lines of six characters. For reception of sstv a scan converter which also contains the necessary switching between transmit and receive is required, such as the Robot 400.

To select sstv for transmission type CTRL-SSTV the status line is now at the bottom of the frame. A black line travels down the picture and indicates exactly what portion of the sstv frame is being transmitted. The "winking" cursor line tells the operator which character position is to be filled next.

Typing GRY-SCL enables a six-bar grey scale as indicated by the status line. The grey scale is not displayed locally and thus allows the composition of a message while the scale is being transmitted. This also applies to a checkerboard test pattern which is transmitted when CTRL-CHECKER is typed.

Partial frames may be transmitted (eg one to six message lines) by selection, thus reducing transmission time for short messages, eg callsign only. This feature also allows a message to be inserted over a picture held in the Robot 400 memory. The partial frame scan does not erase the bottom part of the picture. A second format of three lines of six "tall" characters is also available. Typing CTRL-CHARS will toggle the terminal into the 3×6 "tall" mode, typing CTRL-CHARS again will return the unit to the normal 6×6 character mode.

A cursor control allows the operator to move the cursor around the screen for editing purposes. Typing CTRL-HOME moves the cursor to the top left corner without erasing the screen. Typing CTRL followed by one of the three directional arrow keys moves the cursor one space in the direction of the arrow. The LINE FEED is used to move the cursor down the screen.



Interior view of the Robot 800 with keyboard removed

Operation of the Robot 800 is achieved totally by the use of the keyboard; no other additional switching is used. A given key can have as many as three different functions: the basic function is when the key itself is depressed; a shift function occurs when the shift key is depressed and held and then the object key depressed; and a third function called a control function is enabled by holding down the CTRL key. Almost all the control functions are associated with the top row of keys, which are identified by legends printed above the keys. The top row indicates the function in sstv mode, the bottom row is rtty and cw mode. A 55-key professional-quality keyboard is used. All parts are easily accessible for servicing, and the unit reflects Robot's typically high-standard of construction.

Conclusion

Although the Robot 800 represents one of the most sophisticated "all mode" terminal units made for the amateur radio operator, its simplicity of operation brings the transmission and reception of rtty well within the understanding and capability of the average or non-technical amateur. In addition, the hardwork and "heartache" is taken out of cw—gone are the days of committing strings of dots and dashes to the human memory bank. The small size, quality of construction and design for operating convenience of the Robot 800 should ensure its success and acceptance by the most discerning of operators.

Addenda

The unit was supplied by Aero & General Supplies Ltd, Building 33 East Midlands Airport, Castle Donnington, Derby, who, since this review was written, have advised us that an improved Robot 800 with additional features will become available in April 1981. The main new features are:

1. Split-screen facility; ie received text on top half and typed reply on bottom half into transmitter buffer. Text will be transmitted when the 800 is turned to transmit and a key hit.
2. The present 255-character transmit buffer will be increased to 511 characters.
3. A transmit cursor will surround the character actually being transmitted, even though the typed message may be well ahead of this.
4. Several other minor improvements will be incorporated.

The UK price of the new model will be £675 including VAT and Securicor delivery. □

The RX80 Mk 2

(Continued from page 327)

Construction

The circuit is accommodated on a small single-sided pcb (Figs 32, 33) and installed in a tin-plate screening enclosure, with the control voltage and +12V lines connected via 1,000pF feedthrough capacitors. The screening enclosure is vital if maximum attenuation is to be achieved. A suitable enclosure is supplied with the kit, or may be constructed in the same manner as previously described for the other modules.

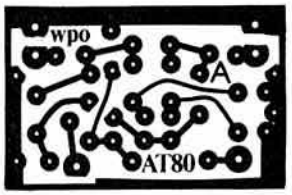
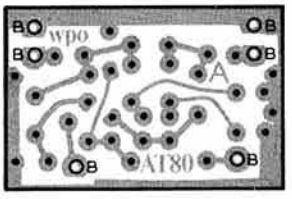


Fig 32. The AT80 pcb



27 x 24mm
Viewed from underside (copper track side)
Material ..... 1/16" thick glass-fibre printed circuit board
Holes shown • are 0·85mm dia
6 holes 'B' ..... 1mm dia

Fig 33. AT80 pcb drilling details

As the circuit uses few components, detailed constructional data are not given, but Fig 34 should give sufficient information. Keep all leads as short as possible and ensure that the three PIN diodes are inserted correctly. R2, 4 and 5 mount vertically with the other resistors horizontal against the pcb. If using the ready-made enclosure the pcb is mounted with its top surface against the underside of the four retaining lugs, and the foil side of the pcb soldered directly to the case at the edges. No alignment is required and the circuit should function immediately. If problems are experienced check the diodes with a multimeter for forward and reverse resistance, and that TR1 is conducting as required. Voltage checks on the circuit with power applied, to verify that the biasing conditions are being met, should also help to isolate the problem.

Table 4 Receiver performance

TUNABLE I.F.	
Sensitivity	Better than 0·8μV 10dB signal + noise/noise
Image rejection	45dB
I.F. rejection (455kHz)	70dB
AGC range	55dB
Selectivity	Dependant on filter (see Part 1)
Stability	200Hz 5min, ±100Hz 30min thereafter (without stabilizer)
CONVERTERS	
Sensitivity	Varies with band 0·8-better than 0·5μV 10dB signal + noise/noise
I.F. rejection (3·5MHz)	Better than 50dB
Image rejection	Varies with band 45-70dB

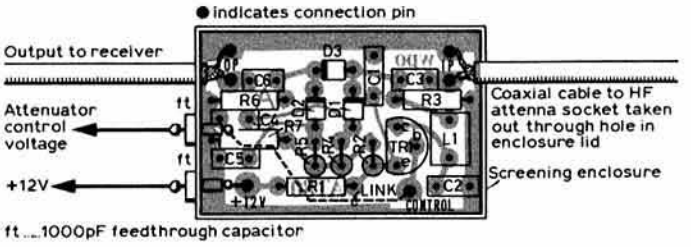


Fig 34. AT80 component layout

Overall receiver performance

Table 4 gives the receiver performance parameters which may be expected for a complete hf receiver. Note that these parameters are dependent on the alignment of the various modules and the filter used at the i.f., and to the overall screening of the unit. However, significant departures from these figures would indicate a problem with one or more of the modules.

TO BE CONTINUED

TECHNICAL TOPICS

Pat Hawker, G3VA

HAS the progress of semiconductor technology brought about an era of "fit and forget" equipment? Should we rush to jump on the bandwagon of the all-channel, all-mode, runs-itself transceiver regardless of its ever-greater complexity? Is there still a role for simple designs, even those based on "old-fashioned" (not in the RAE) thermionic devices, that can be put together in an evening and still leave time for a whirl around the bands? Do broadband (no tuning) stages always result in better performance? Is a short rod (<1m) in an active antenna what you need to receive dx from 10kHz to 30MHz?

You may not find a definitive answer to all, or any, of these questions this month—but at least we give them an airing and they are not all modelled on the Latin "num" construction (the form designed to produce a "no" answer to any suggestion of change)!

Reliability, complexity and "kiss"

Recent notes (*TT* October 1980, March 1981) on the factors affecting the long-term reliability of modern all-solid-state equipment have stressed that the calculation of reliability factors such as "mean time between failures" and "mean time to repair" reflects techniques developed for military and professional equipment where users are prepared to pay a good deal extra in order (they hope) to minimize the risk of failures at critical times. Semiconductors, for example, are expected to work satisfactorily in environments that would soon spell death to the sort of devices used in consumer and amateur equipment (particularly in terms of low-temperature operation). Accelerated life tests, stringent environmental tests with equipment operated for periods under the most unfavourable conditions of cold, humidity, heat etc are combined with the development of elaborate automatic test equipment. Advantage is taken of clean-air production techniques which originally were associated with the need to shoot complex electronic equipment into the hostile space environment or to put long-life amplifiers into the repeaters in under-ocean telephone cables.

So one might logically expect that by now, in 1981, military equipment should be near infallible and "down time" almost a thing of the past.

Unfortunately, in truth, no! Military and professional systems, including communications, data processing, office electronic equipment and the like are still *very* far away from the "fit and forget" ideal, and some observers believe the situation is in fact deteriorating: the main cause is the ever greater complexity that has been made possible by large-scale-integration and the like, even though the lsi devices are themselves very reliable.

A recent report of the US General Accounting Office (PSAD-81-17 *Effectiveness of US Forces can be increased through improved weapons system design*) calls for more emphasis on quality control and field logistics support, and blames over-complexity, low reliability of many key electronic components, too much reliance on automated test equipment (which itself may prove unreliable), too little training and too little skill and knowledge on the part of the users for the current unsatisfactory situation.

According to *Electronics* (10 February 1981) nine out of 21 weapons systems described as "undependable and difficult to operate" involve complex electronics. For example, the automatic test equipment developed for use with the F-15 fighter aircraft is quoted as "down half the time and unable to identify faults 40 per cent of the time when working". A US Navy MK86 gun fire control is stated to have "a significantly large number of random failures" among its 40,000-plus component parts. Anti-tank missiles regularly miss targets: in one case due to the shock it delivers to the user; in another case because unreliable batteries make firings unreliable or cause loss of guidance in flight.

If this should induce any feeling of smugness among British readers, then I could add that a very real problem in our own services would appear to be that complex electronic and communications systems seldom seem to be understood by the senior officers in command of their use. A journalist friend noted recently, during a press tour of NATO and British units, that every time he sought some explanation of the equipment being demonstrated an nco had to be wheeled on to provide the answer.

What has all this to do with amateur radio equipment? The answer, I would humbly suggest, will be obvious if you look through all those black-box advertisements. Virtually all the hard-sell "copy" is now based on the selling of complex features rather than basic performance specification. Many of the features are aimed solely at making it easier to use equipment without understanding how the circuitry works; the hobby, it seems, is being progressively converted to a "black-box mentality", and that is something much more damaging than the black boxes themselves! Keep it simple, stupid (kiss)!

As the late E. F. Schumacher ("Small is beautiful") wrote: "Any third-rate engineer can make a complicated apparatus more complicated, but it takes a touch of genius to find one's way back to the basic principles, which are normally fairly simple . . . Complexity is a kind of disease. Even if it's not a question of cost, you can avoid it being immensely costly only by handing production over to mindless machines and mass-production machines. The more complex a thing is, the more it tends to break down and then where are you headed? You can't possibly repair it yourself, it's too complex . . . Is that a price worth paying so you don't have to turn a handle?"

Preselection filtering for receivers

For many years cost-conscious receiver designers have been striving to reduce the number of signal-frequency, variable-tuned circuits in the front-ends of receivers, seeking to replace them either by broadband techniques or by economical low-pass, high-pass, or octave and sub-octave bandpass filters that do not call for ganged tuning capacitors etc. Yet it needs to be said that, even today, really effective selectivity before the mixer stage can improve performance in a number of ways, much as it did in the days of the AR88, HRO, CR100 etc. One result has been the development of preselection filtering (without providing gain) intended as add-on units for high-cost professional receivers, even though these feature the sort of wide dynamic range that is often held to be entirely suitable for a broadband approach.

Gian Moda, 10SWX, has brought to my attention an article by Robert Sternowski of Rockwell-Collins ("Using preselectors to improve hf performance" *Communications International* May 1980, pp34, 38, 44 and 51). This emphasizes that add-on preselectors applied to receivers and transceivers "is simply a method of attenuating all signals present at the antenna port of the receiver except the desired signal". Reducing the level of out-of-band interfering signals before they pass through the mixer results in a number of advantages.

Reducing out-of-band intermodulation: pre-receiver selectivity will reduce the unwanted spurious products caused by non-linearities in the front-end of the receiver caused by the mixing of two or more strong unwanted signals and their harmonics. The intermodulation intercept performance of a receiver is improved decibel for decibel by the amount of attenuation provided by the preselector at the frequencies of the unwanted signals.

Cross-modulation: in this form of im distortion, the wanted signal represents one of the two intermodulating signals. The preselector helps by attenuating the very strong interfering signal which may typically come from an hf broadcast station.

Image-rejection: A preselector improves image rejection of a receiver by the amount of attenuation of strong signals at the image frequency.

I.F. rejection: Similarly a preselector reduces signals reaching the receiver input at the intermediate frequency (or frequencies) and so improves the overall amount of i.f. rejection.

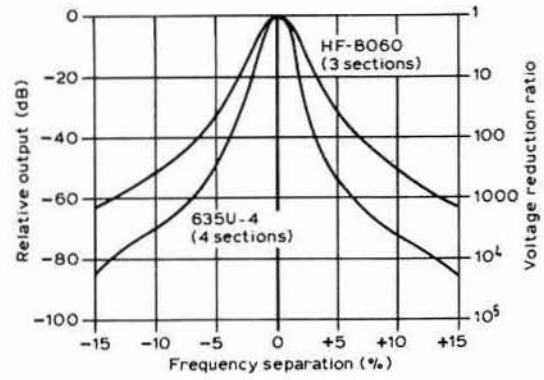


Fig 1. Typical selectivity curves for professional three- and four-section preselectors used in front of communication receivers in the presence of strong local signals

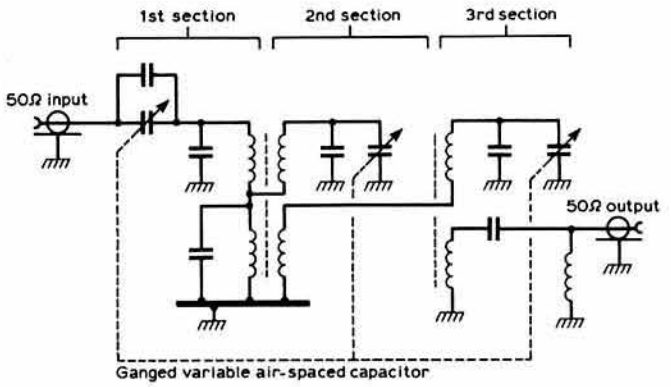


Fig 2. Simplified basic diagram of the Collins HF8060 three-section filter

Noise modulation and desensitization: By this is meant the reciprocal mixing effect of an interfering signal with the noise sideband shelf of the local oscillator. This can reduce the signal-to-noise ratio of the wanted signal and may also, if of sufficiently high level, cause the receiver agc to reduce gain and so desensitize the receiver. A preselector will help if it can attenuate the interfering signal (though in practice this may be too close in frequency to the wanted signal for normal LC filter circuits to have much effect—*G3VA*).

High-voltage protection: A preselector can reduce the level of local very strong signals and so help to protect the receiver input circuit (here again, in amateur practice, where the most troublesome local signal is likely to be your own transmitter on the same channel as the wanted signal, a preselector may not have much effect unless it incorporates voltage-limiting devices such as diodes or neon bulbs etc—*G3VA*).

If the filter is suitable for use with a transceiver, it will help clean-up unwanted out-of-band spurii, including harmonics, broadband noise radiation etc, although clearly even a sharply-tuned filter will not cope with unwanted incoming or out-going signals that fall within its passband.

Fig 1, reproduced from the *Communications International* article, shows the sort of selectivity achieved with professional three-section and four-section tuned filters, and a simplified outline of the Collins HF8060 three-section filter is shown in Fig 2. In practice, professional units such as these may feature servo-tuning of the ganged variable capacitors, using a discriminator tuning technique similar to that used in automatically-tuned transmitters and antenna matching units: for amateur units, manual tuning of a ganged capacitor is more likely to be chosen.

Robert Sternowski emphasizes that "electronic tuning (of such filters) is 'not here yet' simply because semiconductor devices necessary to achieve such a design are not yet available. The primary problem is (the requirement of) a semiconductor device that will not shift its tuning characteristics in the presence of an extremely high signal level. Experimental architectures and devices do not exist". A timely reminder of the still real problems of electronic tuning of receivers and transmitters.

It should perhaps be emphasized that preselectors of the type outlined here are currently offered for use with the highest-grade professional receivers, especially in situations (such as shipboard) where several different transmitters and receivers may be operating simultaneously in close proximity. These notes are intended to emphasize that broadband and sub-octave fixed bandpass input circuits, as used in many modern receivers, are not the total answer to receiver design. Nor, yet, is electronic tuning—there is still something to be said for the classic design approach of 40 years ago!

Power mosfet transmitters

Over the past few years, the most promising new development in solid-state technology for standard amateur radio applications has been the rise of mosfet rf power transistors, including the vmos and dmos types. While we are still becoming used to the idea of bipolar rf devices providing outputs of 100-200W per "module", and up to about 1kW total in communications and a.m. broadcast transmitters, these are now being overtaken by transmitters based on power mosfets, with the final power amplifier providing power gains up to about 20dB and a total output of several kilowatts.

A recent paper in *IEEE Trans on Broadcasting* (Vol BC-26, No 4, December 1980) by Hiroaki Ikeda of NHK (the Japanese national broadcasting organization) describes the use of power mosfets in a.m. broadcast transmitters rated at up to 10kW output on mf and over 600W output on hf. His paper suggests that while "maintenance-free" solid-state broadcast transmitters are available based on npn bipolar transistors "these do not seem to be as economical and reliable as conventional thermionic valve units because of the inherent characteristics of npn transistors: ie carrier storage, current hogging, secondary breakdown and other unstable characteristics. Under the cost-performance trade-off, these characteristics limit the output power of such solid-state radio transmitters to 1kW". It is suggested that mosfets have many advantages and can be used for the power amplifiers of radio transmitters because of excellent thermal stability as well as excellent switching characteristics; and that the technique will spread from mf use to hf applications. The basic mosfet devices used in a number of configurations described by Ikeda are manufactured by NEC in Japan (2SK278 etc), and operate from supply voltages of around 160V.

In the UK and USA, Siliconix are now marketing a full range of "12V" vmos devices from 2·5W output (DV1202) to 40W output (DV1240) with some 10dB typical gain up to 175MHz (max supply voltage rating 24V). They also have an extensive "28V dc, 300MHz" series with up to 120W output.

But it has to be said that, particularly with 12V supplies, it can prove easier to obtain good linearity for an ssb transmitter with bipolar devices than with power fets, and one should not write-off the bipolar approach too soon, particularly for vhf/uhf transmitters.

5W vmos oscillator

Crystal oscillators capable of providing watts of rf output without further amplification may seem like a 50-year throwback to the days when very many early amateur hf transmitters comprised an oscillator, fullstop. In a "Design Idea D180-1" note published by Siliconix, Larry Leighton and Ed Oxner, KB6QJ, describe a "5W parallel-mode crystal oscillator" based on a DV2805 (28V) vmos power fet. This can provide a stable 5W output on 10MHz without exceeding a crystal dissipation of 1mW, and with an effective shunt capacitance across the crystal of approximately 21pF. The dc input with a 28V supply is 14W. It is noted that with an F_t of about 1GHz, this device offers considerable latitude in oscillator design, and the example shown in Fig 3 was set by the components available at the time. The upper frequency and the stability of such an oscillator is limited by decreasing power gain and increasing crystal current. As a precaution, during initial design and tune-up, a zener diode gate voltage clamp can be used to limit the drain current to a safe value. Fig 4 shows a 50MHz vmos crystal oscillator.

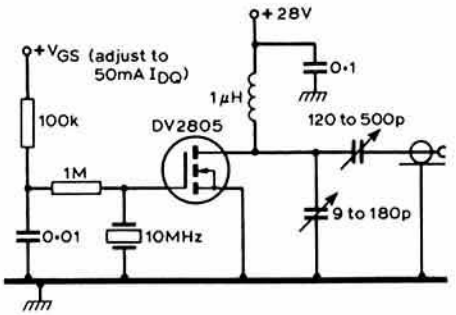


Fig 3. 10MHz vmos crystal oscillator capable of providing 5W output from 28V supply without exceeding 1mW crystal dissipation. The dc input is 14W

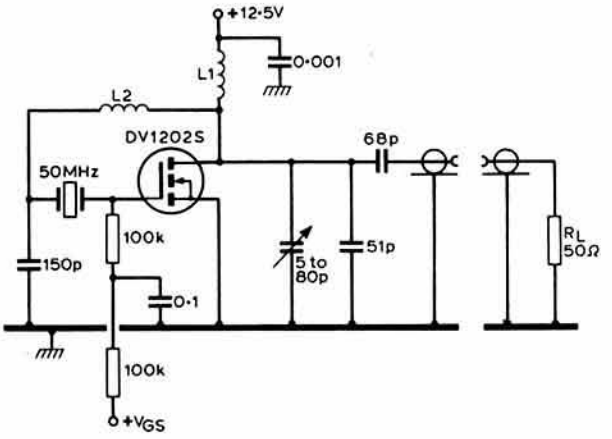


Fig 4. 50MHz vmos crystal oscillator with good spectral response providing about 1W output from 12·5V supply. L1 6t No 18 wire on 0·125in diameter former, L2 5t No 22 on 0·187in former

The "one-hour" home-built transmitter

After reviewing progress in solid-state transmitter technology it seems appropriate to quote from a letter by Al Rechner, VK5EK, in *Amateur Radio* February 1981, p38, commenting on a 5W solid-state hf/cw design that appeared recently in that magazine. He wrote:

"If we are trying to overcome the 'black box' syndrome by inducing people to build their own equipment, then we will maximize our chances of success by presenting simple, cheap projects. Good applied engineering is concerned primarily with securing a stipulated design objective in the simplest and cheapest manner.

"Your 5W (solid-state) cw transmitter fails dismally in this regard and is a stunning example of solid-state technology gone berserk. I present an alternative circuit (Fig 5) which will do substantially the same job. The solid-state rig has about 100 components, mine less than 20. Most of your components would be purchased new; most of mine can be salvaged from an old black-and-white tv set (apart from the crystal and tuning capacitor). I could build mine from scratch and have it working in one hour if I set my mind to it; or I would take two or three hours if I wanted a pretty appearance. Yours could hardly be built in less than four or five nights. You price yours at A$50 (including crystal). I price mine at nil cost (excluding crystal and assuming a modest junk box).

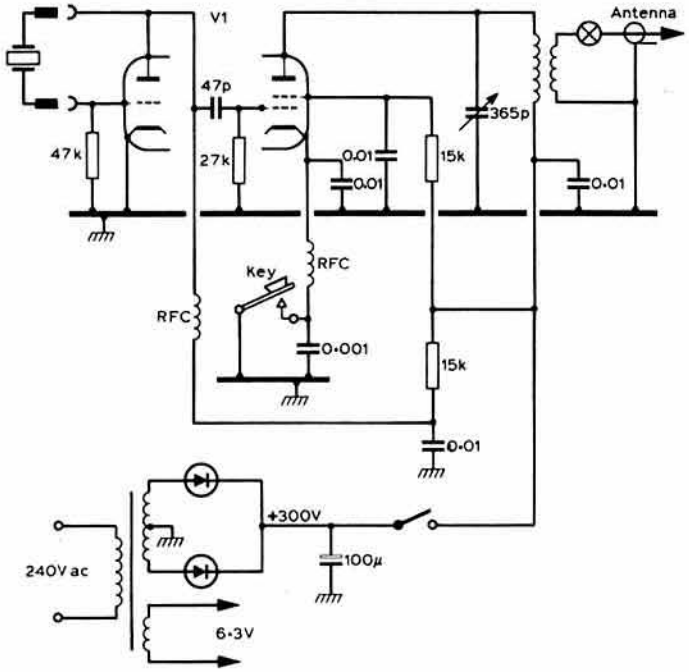


Fig 5. VK5EK's "one-hour" 5W 3·5 or 7MHz transmitter using "plasma technology" salvaged from old tv set. V1 could be ECL82 (6BM8), ECL84 (6DX8), ECL85 (6GV8) or ECL86 (6GW8) etc

"Your rig has a vxo and the capability for battery operation which mine does not—but mine will readily work into any standing wave ratio.

"Solid-state technology affords commercial manufacturers cheap, large-scale production and it is ideally suited to logic and non-linear applications. But for transmitters, transverters, receivers and converters of practical simplicity, valves remain incomparably superior for one-off, home-built projects."

VK5EK makes it clear that he is not criticizing the original solid-state unit, and that such a rig can be a worthwhile project. But his letter and design (which could readily be expanded to include additional features) represents a powerful argument for not regarding thermionic devices as obsolete or old-fashioned. For serious use, it would be advisable to build in some harmonic supression, even for 5W, unless used with a harmonic-reducing atu; and old British tv sets will not disgorge a suitable mains transformer, though many old domestic radios will.

Rain gain on microwaves

The diagram showing the various over-the-horizon microwave propagation modes in the December *TT* (Fig 5, p1293) reproduced from the British Telecom Research paper by M. T. Hewitt and A. R. Adams included rain-scatter, although at the time I did not elaborate on this in the text. Clive Elliott, G8ADP, considers that too few explanations or references to rain-scatter have appeared in the journals normally read by amateurs. He has found by experience that, in certain circumstances, it is possible to make effective use of this mode on 10GHz, and it would seem applicable over a considerable part of the shf spectrum.

In the British Telecom paper it is noted that work by J. A. Lane of the Appleton Laboratory indicates that signals resulting from the scattering effect of precipitation, including rain, are usually weaker than those of clear-air scatter or from super-refraction and other forms of tropospheric ducting, but *this is not always the case*. This directed me towards the detailed account by J. A. Lane in *Electronics Letters* (Vol 14, No 14, 6 July, 1978, pp425-7) "Relative importance of tropospheric and precipitation scatter in interference and co-ordination". This presents an analysis of the magnitudes of signals caused by tropospheric forward scatter in clear air, and scatter from rain, and shows that, in practice, the former mode (ie forward tropospheric scatter) need not be considered when estimating co-channel interference to microwave telecommunications circuits; he recommends the "co-ordination area" (ie the area in which it is necessary to co-ordinate and plan the use of a frequency band in order to avoid excessive co-channel interference) should be determined either by super-refraction *or by scatter from rain*. In other words, there are circumstances where the signals arriving as the result of rain scatter can be *a few decibels stronger* than those propagated even by super-refraction or ducting. Translated into amateur radio terms, this indicates that "rain" can sometimes be even more effective than super-refraction for making over-the-horizon microwave contacts. J. A. Lane defines the particular circumstances as paths over very rough terrain or where the station(s) are screened by hills.

But is this view supported by practical experience? Let me quote directly from the letter by Clive Elliott, G8ADP, who seeks to encourage others to try this interesting mode. He writes:

"My interest is fixed station microwave operation, although living in a location (Upper Wield, Alresford, Hampshire) severely obstructed in all directions, I am dependent on troposcatter and rain scatter. On 10GHz I have worked paths up to 150km using troposcatter enhanced, I suspect, to some extent by rain. To hear G3JVL (at sea level) over a very grim path of 40km, I am largely dependent on rain scatter. Under normal conditions his signals are at best −6dBn (in 2·5kHz bandwidth) but in the presence of heavy rain overhead (drizzle is not good enough) signals rise as much as 30dBn. Even beaming in the *opposite* direction I am able to get rain reflections giving 15dBn. Beaming in all other directions, including straight up into the sky, signals 5 to 10dBn are achieved! In fact one of the more exacting requirements of normal microwave operation, namely correct antenna heading, is (temporarily) eliminated.

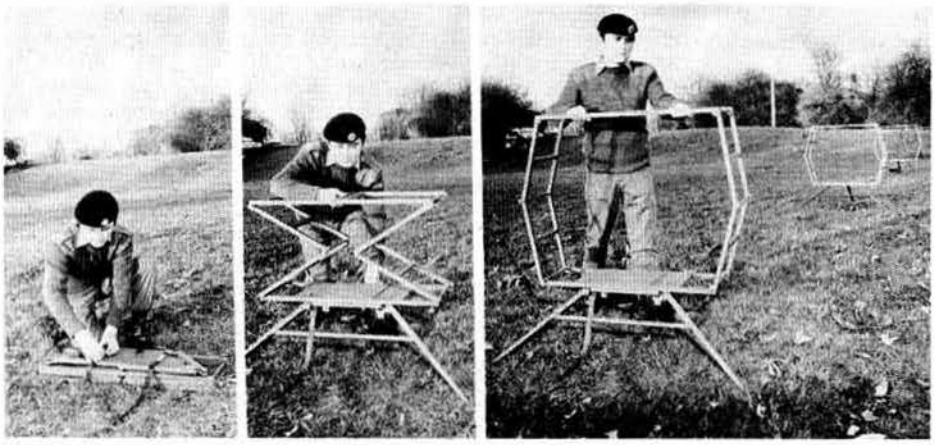
"For obvious reasons this mode of propagation is not too convenient for portable operators (who, in any case, would usually have more sense than to be in a heavily-screened location) but it seems to me that amateurs should be encouraged to change sometimes from the traditional "sunny day, hill-top to hill-top only" type of microwave operation towards trying to work from home, even when in abysmal locations, under what might seem traditionally-hopeless microwave weather."

Improved active antennas

Over a decade ago, I was fortunate enough to attend lectures at which Professor H. H. Meinke and Dr H. Lindenmeier of the Munich Technical High School described some of their pioneering work on miniature active antennas, with the result that *TT* was probably the first column in any amateur radio journal to mention this important development, since increasingly used in professional communications etc.

Although the principle is now well known, that of using just a very short antenna element over a very wide range of frequencies by incorporating into the antenna system a wideband low-noise amplifier designed to provide a suitable match at all frequencies, its use by transmitting amateurs (who normally wish to use a single antenna for both transmission and reception) is clearly limited. Nevertheless the active antenna deserves to be considered by those who are interested in receiving only, or those who wish to use separate antennas for receiving and transmitting. Several designs have been published for amateur use, although mostly these tend to be of limited dynamic range and subject to such problems as static damage unless intended for indoor use (which cannot be recommended).

In *IEEE Transaction on Ant & Prop* (Vol AP-28, No 6, November 1980, pp904-910) Ernst H. Nordholt and Durk Van Willigen, of the Delft University of Technology in The Netherlands, present "a new approach to active antenna design". This provides full design details for a novel family of amplifiers suitable for use with broadband active antennas covering 10kHz to 30MHz and using antenna rod elements having physical lengths less than 0·5m (diameter 30mm). The authors claim that "the resulting configurations have significantly better properties than those reported



The folding active loops of the novel C & S Antennas directional receiving array permit easy transportation. Intended for military and professional applications

until now". The high performance amplifiers break with the "current prejudice that implies the input impedance of the active-antenna amplifier should be high for optimum performance". The Dutch system involves a large amount of negative feedback around several cascaded stages, and results in a virtual grounding of the gate of the E212 first-stage fet; the amplifier can be used with single elements or as part of an array; full details of one of the Dutch designs are given in Fig 6. The amplifiers will function in the presence of very strong local signals (up to about 10V/m) and are claimed to outperform most professional-class communication receivers in respect of dynamic range and noise. An active antenna of this class provides a signal-to-noise ratio fully equivalent to that of a good conventional antenna because of the inherent limitations of atmospheric, galactic and man-made (quiet location) noise. It should be mentioned that for optimum results the short antenna should preferably be out-of-doors and well clear of mains-borne interference; one sometimes sees the inference that because an active antenna can deliver as much signal to the receiver as a full-size antenna it can be placed on top of the receiver etc. Well it can, but the signals in your operating room are certain to be contaminated by local electrical noise.

The use of active loop antennas to form directional receiving arrays was pioneered by EMI-Cossor in the late sixties, using lines of about eight fixed double loops (*TT* July 1968). The British firm of C & S Antennas subsequently developed a unidirectional terminated loop (*TT* August 1976) intended for this type of application. They have recently redesigned this to form what they claim to be "the world's first portable hf antenna" (surely a remarkable claim!). However, what they have done (in more realistic terms) is to devise a novel form of folding loop, so that each array element packs down rather like a flat deck-chair so that up to four loops can be readily carried in a military vehicle. Despite their rather fulsome press release, which gives remarkably little information on actual performance and directivity etc, this is clearly a mechanically-cunning idea (see photograph).

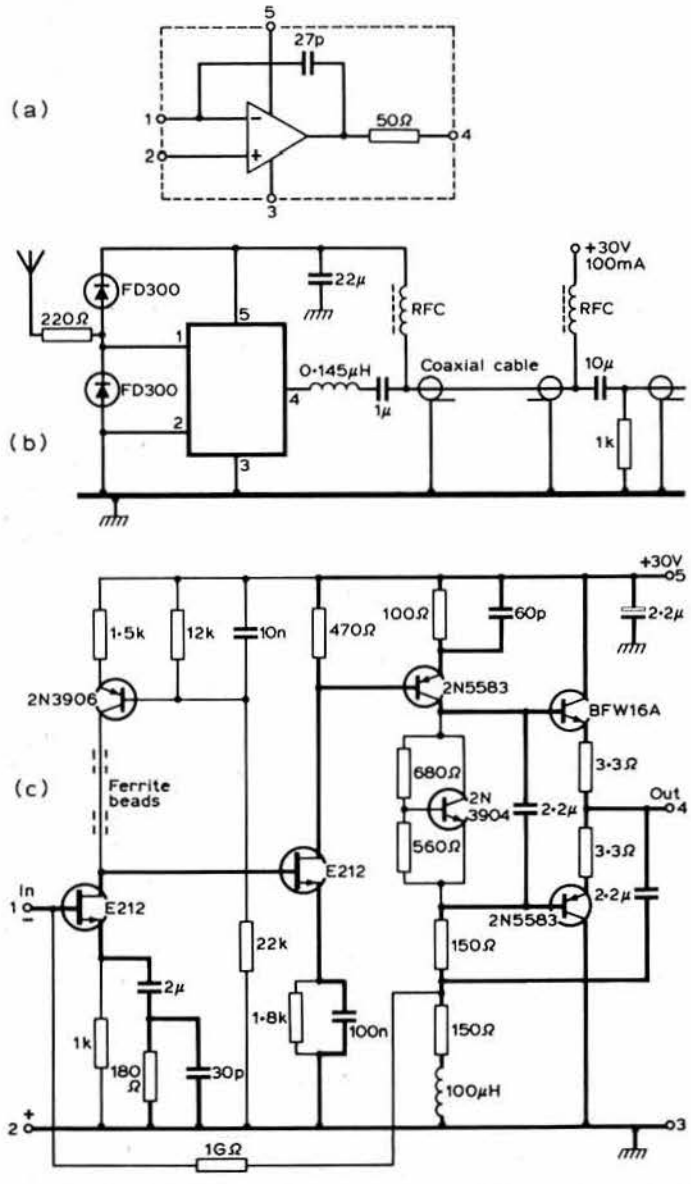


Fig 6. Details of the Dutch active antenna system. (a) One of the two basic configurations used to provide heavy negative feedback. (b) Overall scheme showing protective diodes, method of powering over the feeder cable etc. (c) Internal amplifier as used in the two different configurations, including that shown in (a). Numbers 1 to 5 correspond to those shown in (b)

Using electret microphones

Low-cost miniature electret inserts can provide a useful microphone for communication applications. However, since they require a small polarizing potential they cannot be directly substituted for other types. In *cq-DL*, 9/80, DJ1XK provides a tip showing how a 1·5V potential can conveniently be derived from a conventional ptt line by means of a couple of 1N4148 diodes and a tantalum-type 10μF electrolytic capacitor: Fig 7.

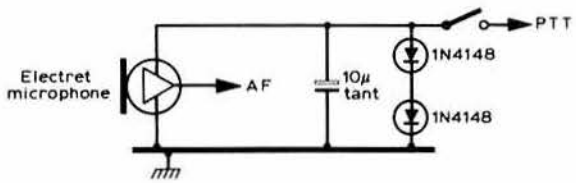


Fig 7. DJ1XK's method of obtaining low polarizing voltage for an electret microphone insert

IC regulation of high-current power supplies

Attention has been drawn on several occasions to the availability of three-terminal ic regulators capable of handling currents up to 5A (eg LM138, 78H12 etc). Although fairly costly, such high-current regulators eliminate the need for quite a few of the discrete components used in conventional series regulators and do simplify the design. National Semiconductor have now introduced a new single-chip adjustable voltage regulator, type LM196 in a TO-3 can, capable of outputs in excess of 10A at power levels up to 70W. On-chip trimming of the reference voltage is to within ±0·8 per cent, and output voltage is continuously adjustable from 1·25 to 15V with the full load current of 10A (subject to the maximum power limit of 70W and a maximum junction temperature). Four-pin versions are to be marketed later this year. In large quantities (100-up) the USA price is quoted as $12.35.

In *Electronic Design* (20 December 1980) Carl Nelson of National Semiconductor has described how three-terminal ic regulators can be made to work in parallel while retaining good load regulation. His technique for sharing current among parallel regulators is claimed to correct

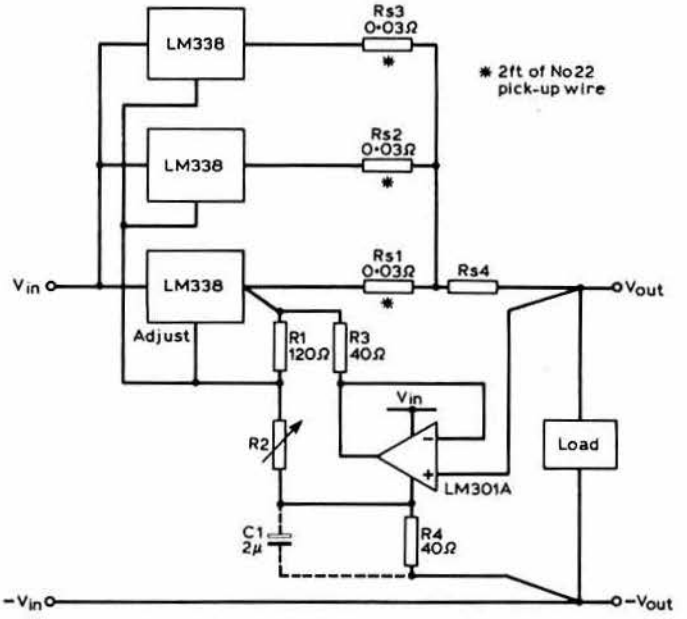


Fig 8. Use of load-sharing resistors with Kelvin remote voltage sensing to permit the paralleling of 5A ic regulators, protected by current-sharing resistors (*Electronic Design*)

automatically for the poor load regulation associated with simple series current-sharing resistors, and, as a bonus, provides remote sensing that is not available in standard ic regulator circuits. The circuit is shown in Fig 8, in which the three load-sharing resistors are formed from lengths of hook-up wire, and an additional output resistance common to all three regulators normally comprises that of the output lead wire plus connector loss and should not exceed a voltage drop of more than 0·25V. Remote "Kelvin" sensing compensates for the associated voltage drop while the regulators are forced to share the load current in approximately equal proportions. Any attempt to parallel ic regulators without employing current sharing resistors will cause the device with the highest voltage output to carry most of the load current, resulting in overheating and poor reliability.

Now for 30A

Michael J. Tubby, G8TIC, has sent details of a unit capable of providing up to 30A, depending on the heatsink and transformer. He writes:

"The psu is based on the μA723 voltage-regulator ic which provides 2-37V at up to 150mA; but at full current it becomes quite hot, so it is advisable to solder the device straight into circuit. All the bits cost me under £15 by shopping around at a local rally.

"The 723 includes a pair of op-amps, one of which takes care of voltage stabilization in the conventional way, while the other monitors the voltage drop across a current limiting resistor; when the current limit is reached the output voltage is reduced to maintain the current at a constant level.

"A transformer providing about 16-18V is suitable to drive the regulator. It is worth acquiring some large diodes for the rectifier bridge, eg 80A car alternator diodes are suitable. It is also important to use a good-quality smoothing capacitor with the capability of handling 30A ripple. Wire the output of the rectifier stack straight to the capacitor terminals, and then from capacitor to the regulator. The four 2N3055 series-pass transistors do not need to be matched, as their gain is very low when the collector current is 10A, current equalization is achieved by the 0·1Ω emitter resistors.

"For the sake of convenience it is easier to bolt the four 2N3055 devices to the heatsink, to common the collectors, and then insulate the heatsink (remembering that this will be 22V above chassis. This approach does away with some of the heavy wiring; for the remainder use 2·5mm house wiring cable for short lengths, but for anything over about 2ft it is worth considering 4mm cable. The 0·1Ω resistors may be made from two 0·2Ω 10W resistors in parallel; alternatively a suitable length of constantin resistance wire can be used.

"Heavy-duty transformers are used in the electroplating industry, with secondaries having an output of about 30V at 20-30A, and these may be tapped or rewound to reduce the output voltage. Do not forget the need for a 13A fuse in the mains plug, or the switch-on power surge will keep blowing the fuse."

It may be found useful when building such a unit to glance through some of the earlier *TT* items for additional hints on heavy-current power supplies. Note that no overvoltage protection is provided against the possibility of a short-circuited pass transistor.

VHF/UHF in the Arctic

Detailed measurements of path losses at 150 and 450MHz over paths up to 100km and over land, water (fresh and salt) or ice, or mixtures of the three, using both vertically and horizontally polarized antennas, were carried out in the areas of Inuvik and Resolute Bay, North-West Territories, a few years ago and are reported by Frank H. Palmer, of the Canadian Communications Research Centre, in *IEEE Trans Ant. & Prop.*, Vol AP-28, No 6, November 1980. While the results are directly applicable only to a terrain very different from that normally found in the UK, a number of the findings could be of considerable interest in view of the closeness of the frequencies to the 144 and 432MHz amateur bands.

For example, it was found on both frequencies that a receiving site behind an area covered with trees experiences an increase of path loss when using vertical polarization of about 5dB; whereas, with horizontal polarization, the additional path loss is only about 1 to 1·5dB. In general the use of vertical polarization over non-line-of-sight paths resulted in path losses up to 6dB higher than with horizontal polarization.

In the rugged countryside around Resolute Bay, various receiving sites (separated by from 1 to 10km) showed deviations of the differences between measured and calculated path losses at both frequencies of about 15dB, whereas in the less-rugged Inuvik area the corresponding figure was 10·3dB, applicable to both 150 and 450MHz.

On the other hand, considerable depolarization of received signals was sometimes observed at Inuvik, but relatively little at Resolute Bay where cross-polarization losses (of 20-25dB on both frequencies) were normally near the limit set by the receiving antennas; at Inuvik the polarization discrimination losses ranged from 25 right down to only about 3·5dB. It is believed that the marked depolarization of signals at Inuvik resulted from the presence of "trees and perhaps other types of ground cover".

These experiments thus add further confirmation to the belief expressed a number of times in *TT* that trees can have considerable effect on vhf/uhf signals, particularly when these are vertically polarized. □

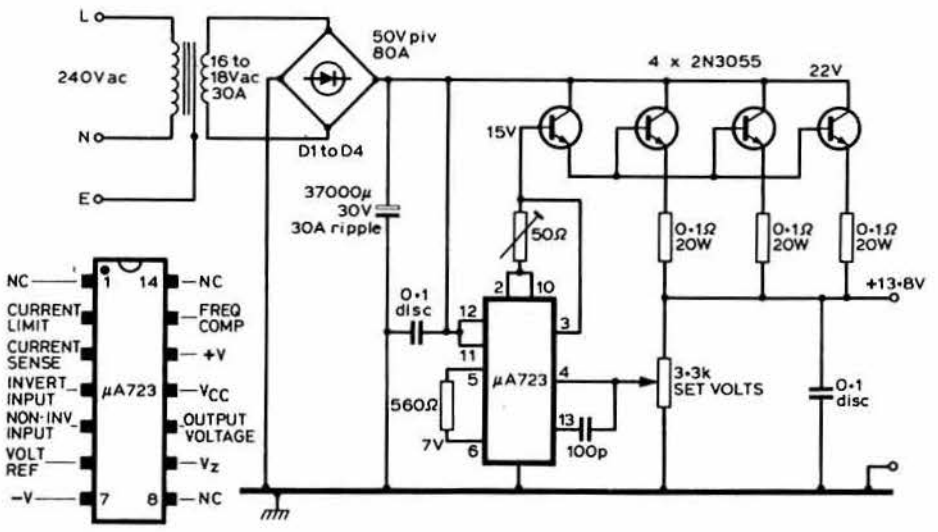


Fig 9. G8TIC's power supply unit capable of providing up to 30A output

OSCAR NEWS

AMSAT Phase 3B

AMSAT has tentatively fixed the following frequencies for the next Phase 3 satellite.

U-transponder

Uplink	435·300–435·150MHz
Downlink	145·820–145·970MHz
Engineering beacon	145·990MHz
General beacon	145·8125MHz

L-transponder

Uplink	1,269·950–1,269·150MHz
Downlink	436·150–436·950MHz
Engineering beacon	436·020MHz
General beacon	436·040MHz

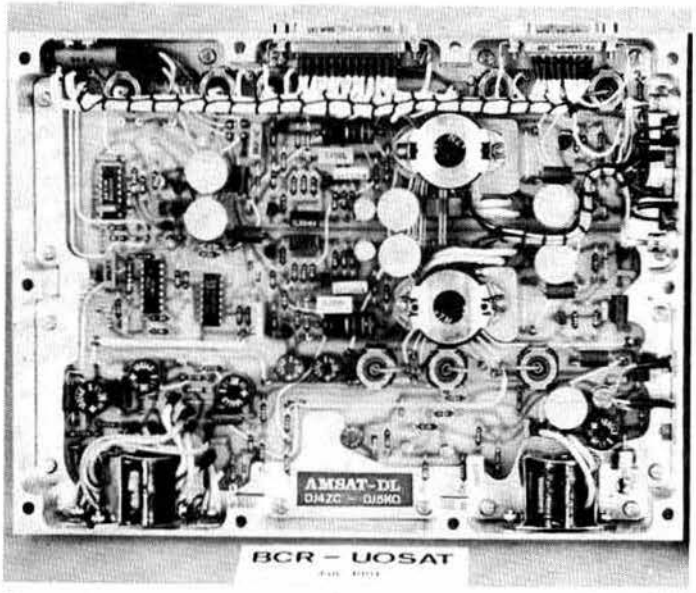
Comments on this frequency selection are invited and should be sent to the secretary of AMSAT-UK, G3AAJ, QTHR.

UOSAT

The launch of UOSAT (see *Rad Com* March 1979, p230; March 1980, p247; and February 1981, p134) together with the solar mesasphere explorer satellite, is planned to take place in September 1981 on a US Delta 2310 flight. If it achieves the planned orbit the satellite should have a life of about 4·5 years. AMSAT-USA has negotiated the launch of UOSAT with NASA, with Jan King, W3GEY, acting as liaison officer.

AMSAT-DL has participated in this project, because it furnished a fine opportunity to test some concepts for the AMSAT Phase 3 satellites in space. Werner Haas, DJ5KQ, has built the battery charge regulator for UOSAT. This is an evolution of the appliance which AMSAT-DL developed for AMSAT Oscars 7 and 8. It is well known that this concept has proved to be excellent. It is still functioning perfectly after more than six years. In order to improve the charge behaviour and to increase the life-span of the battery the temperature sensors are now installed directly in the battery box, which means that a better adaptation of the charge voltage to the temperature is accomplished. This concept was already employed in the first (unfortunately lost) Phase 3 satellite.

As a second contribution for UOSAT, the programming system IPS developed by Dr Karl Meinzer, DJ4ZC, was made available by AMSAT-DL. This computer language was also primarily developed for the Phase 3 program. Since the on-board computer of UOSAT is very similar to that of the Phase 3 satellites, it is possible to employ the German programming language IPS almost unaltered.



Battery charge regulator for the UOSAT satellite built by AMSAT-DL. *Photo:* W. Gladisch

Ariane launches

The firm launch date for the next Ariane space launcher remains undetermined, as work continues on solving the first-stage engine combustion problem that led to the failure of Ariane's second test flight last year shortly after lift-off from French Guiana.

Two types of modifications for the Ariane's liquid-fuel Viking main engines are being evaluated to resolve the high frequency combustion instability that developed during the unsuccessful launch on 23 May 1980. Both modifications involve changes to the engine's injector—the component to which the combustion problem was traced.

If the third Ariane launch takes place in June 1981, as presently scheduled, the fourth and final mission in the pre-operational test programme is anticipated to follow in October 1981. The June Ariane launcher will carry the European Meteosat geostationary weather satellite and India's Apple communications test satellite. The October 1981 Ariane payload will be the ESA Marecs A satellite.

Based on these launch plans, the remaining missions include the following: December 1981, launch of the Exosat satellite; February 1982, a dual payload consisting of the Marecs B and Siro 2 satellites; April 1982, launch of the Intelsat 5 F6 or the ECS 1 satellite.

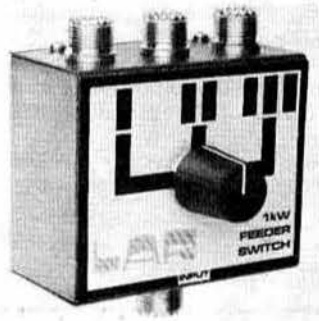
The AMSAT Phase 3B satellite is at present scheduled to be carried on Ariane L07 in February 1982. □

NEW PRODUCT

LAR 1kW feeder switch

The LAR 1kW feeder switch provides a convenient means of routing a coaxial feeder to any one of three outputs. The design may be used equally well for either transmission or reception. The switch is housed in a robust steel case. Mirror type fixing holes are provided in the back of the case to facilitate mounting on a support. Selection of output is by means of a three-position rotary switch. Connections to input and outputs are by uhf plug connectors type PL259. Through power – 1kW p.e.p. (with termination better than 1·2:1 vswr); impedance – 50Ω; connectors – uhf sockets type SO239 ptfe insulated; switch – single-pole three-position, make-before-break contacts, ceramic insulated; weight – 305g; vswr – better than 1·1:1 at 30MHz; overall size – 85mm wide, 70mm deep, 96mm high.

Price £16.95 incl VAT, p&p £1.50. Further information from LAR Modules Ltd, 60 Green Road, Leeds LS6 4JP. Tel 0532 782224.



The LAR feeder switch

LITERATURE RECEIVED

Ambit International catalogue

The new Part 4 of the Ambit catalogue (which contains the revised remnants of the original Part 1) is now available. This section comprises 96 pages in A4 format and contains a wealth of information about many specialized radio components, presented in a very accessible and readable form. The cost of Part 4 is 75p (including postage), or £1.75 for Parts 2, 3 and 4. Obtainable from Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG; tel 0227 230909.

MICROWAVES

Charles Suckling, G3WDG*

Beacon news

A new 10GHz beacon, GB3XGH, has recently come on the air at Norley, 18km ENE of Chester (QTH locator YN67b, ngr SJ567 721). It is running 16mW output into a horizontally-polarized 15dB slotted waveguide antenna mounted 25ft agl (325ft asl) on a frequency of 10,400MHz. The Gunn oscillator is an ex-doppler module unit with excellent stability and is mounted with the antenna inside a 5m diameter heavy-duty pvc drainpipe used as a radome. The power supply and keyer are at ground level, and the modulated supply is fed via 30ft of coaxial cable to the outdoor Gunn oscillator/antenna unit. A standby battery supply is provided in case of mains failure. The keying sequence is "de GB3XGH-17s tone-1s break-3s tone" repeated continuously. The beacon was built almost single-handed by G3PFR, QTHR, who would be most interested in any reception reports.

Members of the SK6AB Radio Club at the Chalmers University of Technology, Sweden, have recently put into operation a new beacon, SK6UHG, on 1·3GHz. It is located 10km west of Gothenburg at FR29g, and runs 10W output into a stack of four "big wheel" antennas (horizontally polarized) on 1,296·925MHz. The callsign is sent once per minute on A1 for identification purposes.

Any reports of this beacon would be greatly appreciated by the group, and should be sent to SK6AB Radio Club, PO Box 25049, S-400 31 Gothenburg, Sweden.

SK2GJ 1·3GHz eme activity

More news has come in about the SK2GJ 1·3GHz eme tests held last November (see *Microwaves* February 1981). Apparently all problems with the computer tracking system for the 32m dish had been solved, and more rf output (150W) was available. These two factors combined to make the tests very successful indeed. In just two evenings members of the group worked the following stations via eme: VK5MC, OK1KIR/P, SM6CKU, DJ8QL, K2UYH, LX1DB, K4QIF, SM0DFP, SM0FFS, VE7BBG, G3WDG, G4KGC, G4CNV, G3YGF, G3LTF, SM6FHZ and PA0SSB. They were disappointed, however, not to have worked ZL2ARW. Reports were exchanged (539/339) but unfortunately no Rs were received. In fact, ZL2ARW's signals were so good that they were broadcast live via a telephone link by a local radio station! They also heard ZL1BQ.

A number of UK stations were listening with loop-Yagi antennas, but heard nothing of SK2GJ. However, one interesting report has been received from N6CA who did receive them, using four loop-Yagis, 0·7dB of feeder loss and an NE218 gasfet preamplifier. SM2BYA reports that there is a good chance that the group will be able to borrow the 32m dish again this summer for 1·3GHz eme tests, so there may be another opportunity to listen for them again then.

1981 microwave cumulative contests

During 1981 a slightly different format has been adopted for the microwave cumulative contests. In addition to the 10GHz contests, which will be run on identical lines to last year, each activity day will also have one extra band assigned to it, in order to stimulate activity on these bands. Each of the other bands will be scored as a separate event, so that each band leader will receive a certificate.

In response to many requests, there will be six activity days this year, see "Contest news" in this issue for details.

1·3GHz activity night

The popularity of the regular activity on 1·3GHz induced by the cumulative contests has led to a number of requests for an activity night to be organized on 1·3GHz. Thus, starting now, please call on 1296·200MHz every Tuesday from 8pm onwards.

*46 Windsor Close, Towcester, Northants.

Spectacular opening on 10GHz

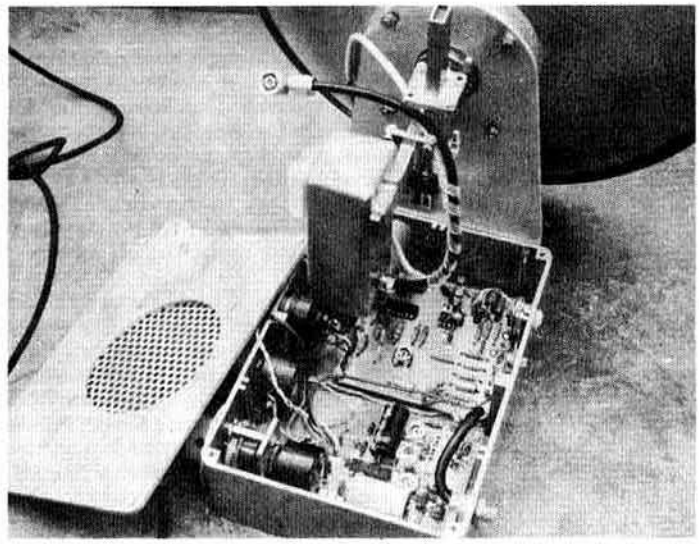
The spell of good conditions which prevailed on the vhf and uhf bands at the end of January produced a most remarkable opening on 10GHz. G3JHM (Four Marks) was the first to discover this on 29 January when he received the Alderney beacon GB3ALD at good strength from his home, over a 175km badly-obstructed path. This is the first time that signals had been heard over this path, despite many previous attempts during lift conditions. G3JHM immediately alerted G8DEK (Winchester) who quickly put together his equipment and also heard the beacon. The lift continued for the next three days, and during this period both stations heard the beacon many times.

Unlike some previous events, this opening was experienced over quite a large area. GW3PPF/P (South Wales) copied GB3ALD on 30-31 January at good strength, and later went on to work F1BQ (AJ31h) over a 330km path, making the first GW-F 10GHz QSO. Equipment at both stations used low-power wideband fm. Towards the end of the lift on 1 February, G3JHM attempted a QSO with F8WN, but by then conditions were deteriorating and only a one-way contact could be made.

This opening certainly proves that tropo lifts as experienced on lower bands do extend occasionally to 10GHz. It is noteworthy that all the signals were heard on wideband fm, showing that the paths were exhibiting near free-space loss values. This suggests that well-sited fixed stations could, in such openings, also work remarkable distances.

Photo feature

The photograph this month shows the 24GHz equipment built by G8SHF (Nailsea, near Bristol). The rf source is a Plessey GD033 Gunn oscillator fed from the G4CNV power supply/modulator described in *Microwaves* September 1980. On receive a cross-coupler is used to feed local oscillator power to a 1N26 diode mixer. The 10·7MHz i.f. signal is amplified by two BF180 transistors and thence to a CA3089E ic. The antenna used is a 11in dish obtained from a scrap paraffin heater.



A view of G8SHF's 24GHz equipment

1980 microwave awards

Quite a large number of microwave awards were issued during 1980 by vhf awards manager G5UM. These included a 1·3GHz Senior Award, which went to G3TDG (Biggin Hill) in December. The requirement for this award is six countries and 40 counties and is certainly not easily obtained! In fact only three such awards have ever been made (G4BEL in 1976, G3DAH in 1979 and G8GP in 1980).

The full list of award winners in 1980 is as follows:

1·3GHz Distance Award (for first contact beyond 600km): 11 G8IFT, 12 G8LEF, 13 G8BFX, 14 G4ASR, 15 G3XDY, 16 G3XDY/P, 17 G8MWR, 18 G8LHT, 19 G8GNE, 20 G8LZM, 21 G3HCW, 22 G8ART, 23 G8FIS, 24 G8SFI, 25 G3TDG, 26 G3TQF.

10GHz Distance Award (for first contact beyond 150km): 45 G3FNQ/P, 46 G8CIU/P, 47 G3YJH/P, 48 G2DSP/P, 49 G4ETU/P, 50 GW8NBK/P, 51 EI2VDH/P (G8AXE).

QTH-Squares Awards: 1·3/5-1 G8MWR, 2 G4FRE, 3 G3SPJ, 4 G4FAW, 5 G8FMG, 6 KA1GT, 7 G8GXE, 8 G8FMK, 9 G8KAX, 10 G8ABP, 11 G3TQF; **1·3/10**—1 G8LEF, 2 G3XDY, 3 G3SPJ, 4 G8IFT; **1·3/15**—1 G3XDY/P, 2 G3XDY, 3 G8LEF, 4 G8ART, 5 G3TDG; **1·3/20**—1 G8BFX, 2 G3XDY; **1·3/30**—1 G4BEL; **2·3/5**—1 G4BYV; **2·3/10**—1 G4BYV; **10/5**—11 F0AKD/P (G3JHM), 12 G3YJH/P, 13 G2DSP/P, 14 G4ETU/P. □

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John Morris, G4ANB*

1981 IARU Region 1 Conference

As this is being written the first batch of conference papers has just been distributed, and 54 of the 120 or so papers submitted so far deal with subjects relating to vhf, uhf and shf. Many of these papers fall within the scope of *4-2-70*, and some of the more interesting proposals and suggestions are discussed this month.

One curious omission is of any proposal to change to 12·5kHz channel spacing for 144MHz fm. This is somewhat surprising, because at the last IARU Region 1 Conference, held in Hungary in 1978, several societies expressed support for this change, and the band has certainly not become any less crowded since then. The present RSGB position on this subject was described last month. Perhaps other societies have made similar investigations and come up with the same conclusions.

During the course of the conference a special station using the unique callsign GB1IARU will be operational on a number of amateur bands, and this should be worth looking out for, if only to get this exceedingly rare prefix in the log!

Meteor scatter frequencies and procedures

Meteor scatter is a useful and interesting propagation mode for the amateur, as it can provide long-distance contacts on vhf at times when conditions are otherwise completely flat. The main problem in making ms QSOs is that the path between the two stations is open for only a small fraction of the total time, and in short and unpredictable bursts. For this reason special operating techniques are used, as described in the *Amateur Radio Operating Manual*, with timed transmissions, known frequencies, and high speeds on cw. This is quite satisfactory for skeds, where the two stations involved can decide between themselves the frequency and timing sequence to be used. However, a problem arises with so called "random" ms, where a station attempts to establish a contact by calling "CQ" without any prior arrangement.

Given the sporadic nature of the propagation it would obviously not be practical to tune up and down the band looking for stations. The present solution to this is a set of calling frequencies and simple conventions which specify the timing sequence as a function of frequency and geographical location. These simple arrangements have now become unsatisfactory due to the rapidly-growing popularity of ms operation. During a major shower it is fairly common for a single burst to make several dx stations audible simultaneously, all transmitting on approximately the same frequency, and very difficult to distinguish one from another. This overcrowding has reached the state where it causes contacts to be lost.

Several papers have been submitted to the IARU Region 1 Conference suggesting ways in which random ms activity could be spread out over the band without introducing complete uncertainty about exactly which frequency should be used for calling and listening. There are two basic approaches. The first is to have a calling frequency and to include a simple code in the "CQ" call which indicates where the actual QSO is to take place. For example, ON4ZN has proposed that instead of calling "CQ", two other letters should be used, the first being either U or D, indicating up or down in frequency respectively, and the second giving the number of kilohertz to move, according to its position in the alphabet. For example, a call of "UE ON5FF" would mean that ON5FF is listening for a call, and hoping for an eventual contact, 5kHz higher in frequency. The Swedish society has suggested a similar system for use on cw, but with just a single letter indicating how far above 144·1MHz a reply is expected.

The second approach is for the person calling "CQ" to use a frequency which depends on the geographical location of the station, and various methods of dividing Region 1 into "frequency zones" have been proposed. SM5AGM has suggested that the frequency used to call "CQ" on cw for random ms should depend on the longitude of the calling station. Between 2°W and 2°E, 144·100MHz would be used; 2°E to 6°E, 144·101MHz; and so on, the calling frequency rising by 1kHz for each 4° strip to the east, and falling by 1kHz for each strip to the west.

A slightly more complex system has been proposed by SP5JC, based on radial rings. In this system the calling frequency would be a function of the distance of the station from some central point. The proposal suggests that the rings should be 137km wide (the width of a large QRA square at a latitude of 52°), with the exception of the central circle, which should have a radius three times this, a distance comparable with the tropo range of a well-equipped station. The number of rings a station is away from the centre of the system would give the calling frequency, in kilohertz above 144·1MHz for cw, and kilohertz above 144·2MHz for ssb. To listen for CQ calls from a specific area one would point the beam in the appropriate direction and set the receiver to the calling frequency of that area, obtained by calculation or from a special map. The suggested centre for the system is at 52°N, 16°E; a point which by a strange coincidence lies within Poland.

Band plans

One of the most important functions of the IARU Region 1 Conference is to reach agreement on the 144 and 432MHz band plans, and several papers have been submitted proposing changes to or clarification of these. The beacon sub-band in the present IARU 144MHz band plan is only vaguely delimited, as it is specified as being centred on 144·9MHz, but with the limits undefined. Three papers contain proposals aimed at rectifying this omission. They all seek to set the upper limit at or just below 145MHz, but the frequencies suggested for the lower sub-band edge range from 144·8 to 144·9MHz. One proposal also suggests dividing beacons into two classes; high power Class 1(dx) beacons used for propagation indication and research; and low power Class 2 (local) for educational and test purposes.

The problem of fitting a comprehensive 144MHz repeater network into eight channels has been discussed several times in *4-2-70*. In many ways the UK is lucky in this respect, as we are at the edge of the Continent, and so do not suffer unduly from international co-channel interference. Some of the countries in the middle of Europe are not so fortunate, especially those who came late to the repeater scene and found most of the channels already occupied by units in neighbouring countries. The Austrian national society, OVSV, has submitted a paper pointing out that a good vhf repeater network is greatly needed in their mountainous country, and proposing the introduction of four new repeater channels, R16 to R19. These would have outputs on the same frequencies as the present simplex channels, S16 to S19, with the inputs 600kHz lower, between 144·8 and 144·9MHz.

Moonbounce is an activity which continually grows in popularity, and some stations are now experimenting with using ssb for eme contacts. SRAL (Finland) has proposed that the upper limit of the exclusive moonbounce portion of 144MHz should be raised from 144·010 to 144·015MHz, and that ssb should be allowed between 144·000 and 144·015MHz for moonbounce work only.

Another experimental technique which is attracting increasing attention is data communication, and NRRL (Norway) has proposed frequencies within the all-mode parts of 144 and 432MHz for this. Their paper recommends calling frequencies of 144·675 and 432·675MHz, with working frequencies stretching down to 144·65 and 432·65MHz.

At the 1978 IARU Region 1 Conference it was decided that vhf repeater channels R8 and R9 would be retained, but that their use should be discouraged, and 145·8 to 146MHz allocated to satellite communications for the three years following the conference. A paper has been submitted by ARI (Italy) proposing that the allocation of this sub-band to the satellite service should continue, and that it should be cleared of all activity not connected with space communications.

VHF manager

Tom Douglas, G3BA, was sadly forced by health reasons to resign the post of vhf manager at the end of 1980. During his 18-month tenure of this office Tom skilfully applied all of his enormous enthusiasm, experience and dedication to the job. The vhf manager rarely receives much publicity, but his position is an important and arduous one, as it requires the ability to deal with matters and correspondence which are too pressing to await a committee meeting, or require discussions with other groups and societies. Despite his venerable callsign, G3BA retains a youthful mind, with the capacity to accept and evaluate new ideas on their merits, and this has been a great asset to the RSGB. The good news is that these talents will not be lost to the Society, as Tom is continuing as a member of the VHF Committee. Readers will no doubt wish to join in thanking Tom for his efforts,

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which were ably assisted by wife Phyllis, and in wishing him success in his future enterprises.

The baton has been taken up by Keith Fisher, G3WSN, who was recently elected to Council, and who has a keen interest in all aspects of amateur radio at vhf and uhf. The work of the vhf manager is particularly important in the run up to, and during, the IARU Region 1 Conference, and G3WSN and G3BA will be closely collaborating throughout this period.

Aurora

A series of magnetic storms in early February resulted in a good period of auroral propagation on 6 February, with a weaker event also having been noted by some operators on the previous day. For GM3WOJ (YP72c) the aurora lasted continuously from 1820 to 2250gmt, and on 70MHz 25 stations and 11 locator squares were worked, the best dx being G3ZRF (ZL70d) at 2024gmt. During the evening the best beam heading moved round from 20° to 50°, with a striking swing to the W of N in the dying minutes. GM3WOJ was also heard by George Grzebieniak, RS41733, in London.

G3TCT, in Fleet, Hants, also stayed with 70MHz after being alerted by the reception of Tone A television sound from the Meldrum Ch4 transmitter. Between 1810 and 2230gmt a dozen stations were heard or worked, the best contact being GM3YOR (YQ65f). The beam heading for all of the contacts was NNE. G4BPY also preferred 70MHz, and made several auroral contacts between 1712 and 2043gmt, including a 50-70MHz crossband with EI6AS GM4IGS (XP37c) managed a contact with G4CG (XL square).

Several correspondents have commented on the high level of 70MHz activity during this opening, and GM3WOJ actually worked more stations on 6 February than during the spectacular opening on 19 December. G3TCT described signals as generally not very strong but consistent.

On 144MHz GM4IHJ, in Fife, spent most of his time plotting the course of the aurora, rather than making contacts, but altogether 12 countries were heard, including Norway, Sweden and Denmark. The auroral propagation lasted from 1640 to 2145gmt in Fife. GM4IHJ was interested to note a number of stations using narrow beamwidth long Yagis to effectively select the region to be worked, rather than scattering signals at random, and at reduced effective power, all over Europe. GM4IHJ also used this event to test his 1980 observations of "natural auroral radio noise". He has found the best frequencies to be 600 to 800kHz, and there were strong signals on 6 February.

In London G8LFB (ZL30f) swung the beam NNE at 1830gmt, and during the next 45min worked GM4JEJ (YG38g), GM8VFT (YR38d) and GM8LWR (YP05j). There was a second phase in the small hours of the morning, as G8FLB discovered when a "sudden attack of insomnia" prompted him to check the band at 0155gmt. GM8MBP was heard calling, but no contact was made.

This opening came as no surprise to those who keep auroral calendars, as it was in line with the auroras of 10 and 11 January, on the previous solar rotation. When using an auroral calendar to help predict openings it is well worth listening to the GB2RS news bulletin each Sunday, as this often carries details of auroral events which may have been missed locally.

Sporadic-E

Es propagation reached 70MHz on several occasions during the winter season, but only two short openings on 144MHz have been reported. GM4IHJ, in Fife, recorded propagation above 70MHz on 31 December and 5, 9, 15, 20 and 21 January. G4BPY, in Walsall, found sporadic-E openings towards Scandinavia on 20 and 21 January, and on the second day made a 70-28MHz crossband contact with SM6PU between 1735 and 1747gmt. On 23 January G3TCT in Hampshire received in Meldrum Ch4 television transmission by *Es* for about 30min from 1730gmt, but despite many calls on 70MHz was unable to raise anybody in northern Scotland.

G8MZI was operating mobile on 144MHz around Weymouth on 25 January, using an IC240 and a 5/8 whip on the roof of the car. On tuning over the band at 1756gmt he came across a French repeater on ChR4. A short call brought a reply from F1FLX, who revealed that the repeater was high up in the Pyrenees, in locator ZC07h; 5min later, conditions were back to normal. There was also a small sporadic-E event recorded at 2000gmt on 26 January.

50MHz

January's *4-2-70* included a list of the 28-50MHz crossband contacts made by GW3MHW which were thought to be "firsts" from Wales. Tom Higginson, GW3AHN, in Cardiff, has now put in another claim. On 2 December 1979 he worked W4VWH/KV4, one day before GW3MHW worked the same station. GW3AHN also worked VP8WB on 8 December 1979, and wonders if this was the first 28-50MHz crossband contact between Wales and Bermuda. Among the best crossband contacts made by GW3AHN during the 1979 season were W6BJI on 18 November, W7CI in Arizona on 8 December, and VO1DI, also on 8 December. All of these contacts were made using homebrew equipment, the transmitter running only 5W on 28MHz. The same 28MHz ground-plane antenna in the roof space of the house was used for both transmission and 50MHz reception.

The new USA callsign system has confused many people, including your scribe. KC4CI was erroneously reported in February's *4-2-70* as being on Nevassa Island. With a rapping of knuckles G3COJ has pointed out that KC4CI is actually in Orlando, Florida, and used to hold the callsign WB4GHA.

February seems to have been a bad month for callsigns, as Peter Taylor, H44PT/G8BCG, has revealed that his 50·005MHz beacon on the Solomon Islands actually uses the callsign H44HIR. The beacon runs 10W to a vertical dipole and sends "H44HIR QSX 28885" on fsk. H44PT is active on both ssb and cw on 50MHz, usually around 50·110 or 52·050MHz, running 450W to a wide-spaced five-element Yagi, with a masthead-mounted preamp on receive. Over the last two years he has worked 37 countries on the band, including such rarities as 9N1, FY7, HK, TI and YV. H44PT has been monitoring the 17,000km transpacific path from the Solomon Is to French Guiana. The FY7THF beacon can be heard almost every day for at least a short period, perhaps only a few seconds, around local midday. On a good day the beacon may be audible from 1100 to 1600 local (0000 to 0500gmt).

Repeater proposals

Deadlines have been set for the 1981 batch of 145MHz repeater proposals. For a proposal to stand any chance of being included in the submission of vhf Phase 5 to the Home Office, the RSGB general manager must have been informed in writing *before* 31 May of the intention to propose a repeater. For those groups who meet this deadline, all paperwork must be completed and sent in by 30 June.

After considerable discussion the Repeater Working Group has accepted proposals for two more 145MHz repeaters in Birmingham, subject to the usual vetting procedure. They are for GB3AM on ChR6 at Longbridge, to the south of the city, and GB3BX on ChR2 at Wolverhampton, to the north. This decision is of course subject to acceptance by the Home Office of deliberately overlapping repeater coverage in cities other than London.

Licences have been issued by the Home Office for three more of the 433MHz repeaters in uhf Phase 5: GB3OS (RB2, Stourbridge, Worcs); GB3SM (RB13, Leek, Staffs); and GB3YL (RB14, Lowestoft, Suffolk). The latest information about the dates on which these and other repeaters become operational will be given in the GB2RS news broadcasts.

The RWG has agreed to introduce a new uhf repeater channel, RB15 (434·975MHz input, 433·375MHz output), when the uhf Phase 6 proposals are submitted to the Home Office. The first unit to use ChRB15 will be GB3FN, which is proposed for Farnham in Surrey.

When corresponding with a repeater group the RSGB sends all communications to a single person, who acts as the "contact man" between the Society and the group. This usually works very well, but a couple of recent incidents have highlighted cases where the contact man has been failing to pass on any information to his committee. When this occurs the result is that the RSGB is accused of keeping people in the dark. This is understandably frustrating for the hard-working members of the RWG, who devote much spare time to individual correspondence and a regular newsletter, especially as the very nature of the communication problem makes it difficult to discover. *Repeater Report* is sent to all repeater groups at approximately two-monthly intervals to keep them fully up to date on the latest repeater matters, and the information contained in this should be passed on to the groups by their contact men.

Repeater news

On 24 January the Dover 145MHz repeater GB3KR was closed down on ChR4. The hardware was then retuned to ChR1 and brought back on the air with the callsign GB3KS. These changes were made by the Kent Repeater Group in preparation for the introduction of its second vhf repeater, GB3KN, which operates on ChR4 from Maidstone.

For the first six weeks of this year GB3CF (R0, Leicester) was running on reduced power and with separate transmit and receive antennas, until engineering work in the middle of February brought the primary equipment back into operation and full-power operation with a single colinear antenna was restored.

A new vhf repeater, GB3HI, is now operational on ChR4 from the

island of Mull, and is reported to be giving good coverage from Fort William down to the Ayrshire coast. The repeater began operations on a temporary receive antenna, and the transmitter power was correspondingly reduced. The installation of the permanent receive antenna was suspended until the weather improved.

Three uhf repeaters have become operational again after periods off the air. These are GB3CI (RB2, Corby, Northants), GB3MS (RB0, Malvern Hills, Worcs), and GB3BS (RB10, Bristol) which has been overhauled and given a modified power supply and a new pa. GB3NR (RB0, Norwich) is also back on the air after a site change.

Esmond Eguilar, F6GOV/G4KBJ, has provided details of a new uhf repeater which was due to come on the air on 15 March. FZ2UHF replaces the F6KKU/B beacon which was installed on Lille town hall for a coverage survey, as described in December's *4-2-70*. The repeater will run about 50W on the Continental repeater channel RU2, and reports on its reception will be gratefully received by F6GOV at 39 Avenue de Verdun, 59700 Marcq-en-Baroeul, France.

The Stevenage UHF Working Group has recently been formed to promote 432MHz activity in the area, where there is already considerable use of fm on 433·2 and 433·45MHz, as well as some ssb activity. As there is no repeater either operational or planned which covers Stevenage, the group is considering submitting a proposal for a 433MHz unit. The group holds a net every Monday evening at 1900gmt on 433·450MHz, and anyone within calling range is welcome to join in. Further information may be obtained from the secretary, Trevor Tugwell, G8KMV, QTHR.

Predicting propagation by Oscar

DX propagation at vhf and uhf relies upon signals launched into the infinite being returned to earth by one means or another, and knowledge of what is going on in the regions where these reflections take place would clearly be a useful asset in predicting propagation. One obvious way of probing these regions is by the use of satellites, as transmissions to and from these must pass through the interesting portions of the upper atmosphere and ionosphere, and so analysis of the characteristics of received signals should give an inkling of what is going on between the observer and the satellite. The Oscar satellites would appear to be particularly useful, as by monitoring one's own returned signal it should be possible to glean information about both the uplink and downlink frequencies.

Pat Gowen, G3IOR, has been making observations along these lines, and has found that the Oscar satellites can indeed serve as excellent propagation forecasters, especially when they are near the local horizon. Although this large and complex field is far from being fully explored, G3IOR has provided a few simplified pointers to the use of Oscars as propagation barometers. All of these notes refer to the Mode A transponders, with 145MHz uplink and 29MHz downlink.

Good tropospheric conditions are indicated by severe attenuation of one's own returned signal, with deep and rapid QSB, when the satellite is just above the horizon. Brief and rapid "pop-ups" of the signal before and after the predicted times of access are caused by scintillation of the 144MHz uplink as it passes through the variable density refractive ducts.

The effects of sporadic-E are similar, but much more intense, and can take place when the satellite is at quite high elevations. The QSB is caused by the presence of multiple diffraction paths in the upper atmospheric levels.

Aurora causes a marked degradation in tone on the returned signals from some of the more northerly stations. This can be quite specific to small areas, and G3IOR has checked his smoothing capacitors more than once after hearing himself at Tone A on the downlink. An early warning of an aurora is often given by marked flutter and roughness on all downlink signals as the satellite approaches the auroral zone.

G3IOR described some of these effects in greater detail in *73 magazine*, November 1977, and interested readers are referred to this article. There is scope for much more investigation in this area, and G3IOR has expressed the hope that somebody with sufficient time will take it up as an interesting and valuable project. With UOSAT due to take to the skies in September there should certainly be an abundance of data available. Copies of the "Project Oscar" precision predictions for Oscar 7 and Oscar 8 are available from G8PRI, QTHR, on receipt of a sae and 20p in stamps.

RTTY

Phil Hodson, G8RBY, in Melton Mowbray, is active on rtty on most evenings and weekends, but has been disappointed at the level of activity during weekday evenings. In the shack is a Creed 7ERP, an APR100 vdu, a TS700G, and a pair of 4CX250Bs, while outside G8RBY is upgrading the antenna system to a pair of 16-element F9FT Yagis at 46ft, and a masthead mounted gasfet preamp. G8RBY finds himself in the odd situation of having worked seven different countries on rtty, the best dx being DK3VW (FM31h), but only 11 big QRA squares. He is continually on the lookout for other rtty stations, and has noted that although contacts are easy to come by at weekends, there is scope for much more activity in the week.

Whatever the state of rtty of 144MHz, it is certainly not dead on 70MHz, according to G3OIC at Hollywood near Birmingham, who has regular contacts with G4ARI near Leicester. Both of these operators are shift workers, appearing on the band at various times of the day and evening, and they would be pleased to hear from anyone else interested in making 70MHz rtty QSOs.

Scatter

G4KAB is one of the small, hard-working band of volunteers who help sort cards for the QSL bureau, a task considerably slowed when cards for the UK are mixed with those for other countries. G4KAB has reported that some holders of new G8/G6 callsigns have been failing to presort their cards according to the instructions sent out to all new members. Please follow these instructions, and those vital verifications will be sent speeding on their way all the faster . . . The first-ever USSR to USA 144MHz contact was logged at 0430gmt on 19 January 1979 when K1WHS worked UT5DL by moonbounce . . . G4ILO has been having his callsign pirated—many people will remember him as G8ILO, and he does not operate through GB3SL . . . EA1QJ (J. Suarez, Apartado 1299, Coruna, Spain) is available for cw or ssb skeds from VD square, running 300W into a 16-element Yagi on 144MHz . . . G8WEE has written to reassure those awaiting QSL cards from him that they will appear in due course . . . An extended tropo opening at the end of January brought contacts from as far afield as East Germany and southern Spain—the log from EA1QD (VD59h) for the period shows nearly 100 QSOs on 144 and 432MHz with UK and Republic of Ireland stations, including GI4GVS (XO21b) on uhf . . . GM3WOJ is building a 70MHz "contest station for the 'eighties", based on an Icom IC551 . . . G3UUT has donated a 25W transmitter and crystal for the proposed 70·690MHz GB3ANG beacon, and an identical transmitter for GB3SX (another is available for GB3CTC if required)—a heavy-duty four-element Yagi for GB3ANG has been provided by GM4IGS.

Awards

An unusual triple claim was submitted in mid-February by Bob Lane, G8VLQ, for the 144MHz and 432MHz FMD Standards plus the 144MHz 4-2-70 40+10 Award. He now has certificates Nos 568, 158 and 44 respectively, and is also the first holder of a G8V-- callsign to take a 432MHz award. A few weeks earlier a double claim came in from G8LZM of Middlesborough for the 432MHz Standard and 432MHz Senior, Nos 157 and 71, and this was followed closely by 432MHz Senior No 72 to G8KAX.

Members who have changed from Class B to Class A status often ask the vhf awards manager if cards received for the previous callsign remain valid. The answer is that they do. A case in point is provided by Steve Cottis, of Harrogate, part of whose submission was for G8FTR and part for G8KMH. Now 144MHz FMD Standard No 562 is on the shack wall as the first one of 1981. Others to date are Nos 563 to 569 to GW3UCQ (the first "U" callsign in this series), G4FRE, G8MXP, GM8MBP, G4CRN, G8VLQ and G4JZF. The last was the second claim for this award by Graham Taylor, in Cannock, who had earned No 550 as G8SZF six months previously, and went on to do the whole job again with an entirely fresh set of cards. He repeated this performance in the 144MHz 40+10 Squares category, taking No 21 as G8SZF and No 43 as G4JZF, again with a complete set of new cards.

Other 4-2-70 144MHz Squares awards recently issued were No 41 to G8MXP and No 42 to G8PNN; with 60+15 stickers Nos 11 and 12 going to G8RYK and G8TFI; 80+18 No 6 to GW4EAI; and 100+20 No 4 to G4IJE. Like several other operators, G4IJE has suggested that there should be a higher category, such as 22 countries and 120 squares.

In the 144MHz FMD Senior, hard-earned certificates Nos 159 to 162 have gone to G6LX, G8RYK, G3OZN and G8PNN. Bob Percival, BRS43977, has taken 144MHz FMD Receiving certificate No 38, just a month after receiving No 7 in the 432MHz series.

G5UM has reported that many claimants express regret at the length of time it takes to get the needful QSLs. One of the award winners listed this month told how he had to send out over 80 letters to get the last 20 cards in each letter with an sae and a slip showing details of the QSO. All the recipient had to do was sign the slip, and send it back in the sae! □

SWL NEWS

Bob Treacher, BRS32525*

G4KAB has recently started to help sort outgoing QSL cards at the RSGB QSL Bureau. He has noticed that a number of listeners tend not to "follow all the rules". In particular, two points to help make the job a little easier: (a) all cards should be sorted in prefix order, with cards intended for UK stations either together at the beginning, or at the end; (b) if using a one-sided QSL card, please write the callsign of the station on the back as well, in either the top left- or top right-hand corner, in largish letters. Just a few minutes extra thoughtfulness saves a great deal of inconvenience for those who help to make sure our cards actually reach their destination.

Newcomers

First, welcome to Jim Stoodley, ORS45655, who is currently in A4 and who joined the Society in November. He uses an FRG7 into a dipole and a long wire (end-fed on G-land) for the higher frequency bands. 7MHz is a difficult band to listen to in Oman because of very heavy QRM. 3·5MHz is also poor, but Jim hopes to erect an antenna for that band soon. He is able to log a good number of maritime mobile stations from his Middle East location and mentions in particular A4XSV/MM, who is sailing from Muscat to China on the original *Sinbad the Sailor* route. He can be heard daily at 1745 on 14,225kHz. Jim finds the hobby an absorbing one, but all very different from 30 years ago when he used 19A and B wireless sets. Yes, times change!

Leonard Salaman, RS46145, was given a crystal set for his birthday in 1921, made by Mitchells of Peckham. Now 67, he gets much pleasure from the hobby and is associated with the Intruder Watch and Raynet. He has over 700 cards on the shack wall. If they date back to 1921, there must be some really exotic and unusual material to interest both newcomers to the hobby and old hands.

S. Whetstone, BRS40338, is another older member who gets great pleasure from an FR101 receiver. He is trying hard for the DXLCA Award (for having 100 countries confirmed) but is finding it difficult to get cards returned to reach the magic three figures. Getting cards returned via the bureau may not be the quickest method of obtaining QSLs, but it is very reliable. Some cards may take as long as five years to come through the system—so please do not give up too quickly! He also mentions the 1981 table, which appears for the first time this month. The rules appeared in December's *SWL news,* p1311. Dudley Gordon, BRS43752, submits a table score for the first time.

Frank Hitchcock, BRS39054, was spurred into writing by G3SEM's "Secret listeners" article in the December 1980 issue. He was a keen swl in 1936, using a Hallicrafters receiver, and while on service around the east coast of England used to visit some of the "listeners", who spent many a lonely hour at their sets. He now uses a Yaesu 7000 into a trap dipole.

Basil Woodcock, BRS44266, has logged 1,440 QSOs since joining the Society in April last year. His latest dx included HK0COP, KH6APS, ZD8TC and D68AM. His score was not quite up to the 200 needed to enter the 1981 table, but there is ample time left to reach that figure. Basil asked for details of nets which can be heard on the higher frequency bands. All the following produce useful dx: 28,750kHz, 1130 daily, run by DK2OC; 21,155kHz, 1100 daily, run by DK9KE; 21,185kHz, 1200, run by VK3BOE; 21,275kHz, 1700, Mondays and Fridays, run by WB8ZJW; 21,355kHz, 2000 daily, run by W2PPG; 14,180kHz, 1900 daily, the Roundtable Net; 14,220kHz, 0630 daily, run either by VK2BKD, VK2DEJ, VK5MQ or VK9NS; and 14,265kHz, 0600 daily, run by VK2CX or VK3PA. Hopefully, everyone will find something of interest on at least one of these net channels.

Paul Crankshaw, BRS48909, uses a Sanyo RP 8880 receiver into a vertical antenna for 28–14MHz and a long wire for 7–1·8MHz. He enters a score for the countries table, and admits that this has forced him on to the lower frequency bands for the first time. He has been pleasantly surprised at what they have to offer, although he says that more than one rare station has been lost in the QRM. Many others would echo that sentiment. Paul's best dx of late was PY0ZZ on 14MHz, PY0CW on 7MHz, WH3AAB on 14MHz and A51PN on 28MHz.

It is hoped that this latest clutch of newcomers will continue to add their callsigns and interesting views to this piece, as their comments have certainly added some variety this time.

1981 hf countries table

(Starting score 200)

Station	28	21	14	7	3·5	1·8	Total	Mode
RS42604	110	123	105	104	100	14	556	ssb
BRS14585	125	115	111	76	90	4	521	ssb/cw
A8808	108	85	94	79	82	30	478	ssb/cw
BRS8841	71	74	111	69	68	2	395	ssb/cw
BRS1066	74	77	97	65	52	21	386	ssb/cw
BRS48909	77	88	108	51	45	6	375	ssb
ARS42503	57	50	91	7	18	0	223	ssb

Help

Michel Delvaux, ARS42503, has just purchased the 1981 DX Callbook. If any swl requires addresses for direct QSL purposes, Michel would be pleased to provide the details on receipt of an sae. His address is 14 Western Road, Lancing, Sussex BN15 8RX. Brad Bradbury, BRS1066, passes on the news that LX2BQ does not QSL via the bureau.

7 and 3·5MHz challenge

Not many listeners have passed on details of their final scores for January. Those who have are as follows: RS42604, 66 on 7MHz, 73 on 3·5MHz; A8808, 75 and 81; BRS8841, 61 on 3·5MHz; BRS43135, 48 on 3·5MHz. Your scribe managed 84 and 88, and it would be interesting to hear if this was bettered.

The rest of the mail

By the time this is in print, VK0HI will hopefully have materialized, assuming the final details regarding the availability of the boat to take the group to the island were resolved. VK9NS, who was to have led the trip, had been heard to say that the trip would be cancelled if the boat availability had not been settled by 15 March.

E. Williams, BRS43606, is now G6ADR. Roger Jones, BRS43135 has enrolled for the May exam. Mark Mullins, RS42604, was unable to travel to A7 at Christmas, but was hoping to make the trip over the Easter period. L. Collinson, BRS41320, now has 165 countries heard.

John Goodrick, BRS44395, mentions his recent contest exploits, having entered both the PACC and YU-DX contests. He was hoping the Society's 7MHz CW Contest would be well-supported this year. He reported a number of Europeans on 1·8MHz including OE5KE, OK1DFF, OL5AWJ, UB5NAR and UC2OKF.

Paul Crankshaw, mentioned earlier, reports IA0KM. The station is located in Rome and is apparently a fully independent administrative and political entity, which could receive DXCC status on the lines of 4U1ITU and 4U1UN. QSLs for the station go via I0MGM.

Paul Tittensor, A8808, entered the White Rose SWL Contest with pleasing results. He listened for the entire 18h and managed 124 multipliers, including TR8DX, VE7IG and ZD7BW on 7MHz, and EL7A, OA4AWB, YI1BGD and HT1KD (YN) on 3·5MHz. At other times during the month A51PN, CE9AH and VK4NIC/3X were heard on 21MHz, while 3·5MHz produced DU1JB and TA8BE/TA1. 1·8MHz listening captured LA4O, W1–4, VE1 and 2, KV4 and KP4. Mark Mullins, RS42604, reports, among other things, on 28MHz propagation. He lists much dx heard on the band—some of the better dx being WN4FVU/A2, HK0COP, VE7AAZ/4U (counts as YK for DXCC—QSL via VE1BWV) and 9V1VV.

Robert Small, BRS8841, reports the logging of VK4NIC/3X as his last country in mainland Africa. He now requires the QSL card to have the whole of mainland Africa confirmed. He reports HK0FBF and KL7Y as new countries on 3·5MHz, CR9CT and 6O0DX on 7MHz and ZD8TC on 28MHz. He was also delighted to hear VP8AEO/CE9 and TI9TI on 14MHz.

QSL returns

Most reporters commented on their QSL successes since Christmas. Some of the more choice dx stations which have confirmed G-listener reports are as follows: CE0AC, CN2AQ, CR9CT, D68XX, FB8ZO, KC6YC (Western Carolines), KA6HIQ/KH3, TU4AW, UK1PAA and 9L1CA.

Copy date for the **June** issue is **Tuesday 21 April.** □

*79 Granby Road, Eltham, London SE9 1EH

THE MONTH ON THE AIR

John Allaway, G3FKM*

THIS month delegates from over 30 IARU Region 1 member societies will gather in Brighton for their 1981 Conference. Your scribe is certain that all members would like to join him in welcoming our guests and hoping that their stay in our country will be a very happy one.

A comment from G4KAB concerning outgoing QSL cards being sent to G3DRN—it would be of great help if those destined for UK stations could be separated from all the others.

G4DPS reports that his callsign is being pirated regularly—mainly on 14MHz. The pirate has been using the name Oliver, and appears to be well outside ground-wave range of Bridgwater. Most contacts are on Tuesday, Thursday or Friday, and never on Sunday, and the majority of QSOs are between 1100 and 1400. Any help in tracing the culprit would be appreciated.

A letter from John Troster, W6ISQ, one of the best-known Californian dx stations, expresses pleasure at seeing his QSL card on the wall at the home of A4XVK in November *MOTA*. This is the first time in 46 years on the air that he has seen it in a picture! You may be in a position to make someone else happy too—MOTA needs more pictures . . . please.

DX news

QRZ DX has received a letter from ON5NT concerning recent activity from Burundi, and also a copy of a letter from ex-9U5DS addressed to the DXCC desk. 9U5AV was genuine of course, as was K5VT—to whom QSLs should be sent. 9U5DL restricts his activity to keeping some schedules with a Belgian amateur on 14MHz and has no QSLs. 9U5AC is also F8SA and was on the air a great deal during 1978 and 1979—his QSLs have been accepted by DXCC. 9U5JM (F6DLW) is Jean Masson and sometimes joins the French DX Information Net on 21,170kHz at 1730. FY7AN has been assisting him to work stations by forming "lists". Documentation has been forwarded to ARRL, and QSLs should be sent via F6DLW or F3LQ. 9U5DS and 9U5BB, as well as any others who are asking for QSLs via ON5TO, are pirates. To confuse the issue still further, there are some "9U5DS" QSLs in circulation which appear to be confirmations of contacts made by "cw operator Guy".

The position of G3JKI/5A remains obscure at the time of writing. No QSL cards had been reported as received. *Long Skip* tried to speak to Arthur by telephone but did not meet with any success. Your scribe would welcome some first-hand information on the position, as a number of letters concerning the operation have been received.

Ian, VK4NIC/3X, should be in Guinea for a few more months and has acquired an Atlas 210 transceiver from his QSL manager W4FRU. The International DX Foundation has sent Ian a replacement vfo for his Yaesu transceiver and also a cw filter. An amplifier, beam antenna, and rotator are also to be supplied.

A22ZM is 16 years old and often works into Europe after 1400 on 21,235kHz. 5H3AA is also to be found on 21MHz—in this case usually near 21,280kHz from 1930. 5H5KS should have left Tanzania by now and be on the air as 5N0KWS from Nigeria.

G4DSE advises that operators Neil and John from CE9AF are probably due to leave South Shetland Is at the end of April. Recently they have been signing as VP8AEO/CE9. Peter also says that he has been receiving QSLs for QSOs made on 14MHz between 2300 and 2400. The only time they are able to be on the air is during their lunchtime or after work in the evening, and schedules are not made because access to their equipment cannot be guaranteed.

It seems that stations in St Vincent are now to be issued with J8 calls in place of the former VP2S series. Activity from the Cocos Is appears to be on the increase following the installation of a beam on the islands for the use of visitors.

Tom, VR6TC, keeps a schedule with DL8FL at 1700 on 28,950kHz each Tuesday, and has also been working into the UK on 7,060kHz around 0700. From the Cocos Keeling Is VK9NYG is very active and found on most days around 28,430kHz after 1100. He has also been worked on 21,210kHz around 1400, and has dipole antennas and 30W input. ZL3AFH/A, on Campbell Is, should be on the air until the end of 1981, and he is able to use all modes, including rtty, but does not operate on 28MHz. Frequencies to watch include 14,020, 14,220, 14,258, and 14,320kHz between 0530 and 0900.

VK9ZD has already made several thousand contacts but does not like pile-ups. He is known to answer "CQ" calls, and has been worked in the UK on 28,750kHz at 1100 and on 21MHz ssb after 1000. It seems that Willis Is will continue to be populated for a while, but it may be closed later and its function taken over by Groote Eylandt in the Gulf of Carpentaria. Macquarie Is has no amateur at the present time but another station should be there next winter.

The New Zealand Post Office has authorized the issue of ZL0 callsigns to visiting amateurs. In the case of those with Commonwealth licences a proper ZL0 call will be issued, and for others with reciprocal licensing arrangements with New Zealand this will also have a suffix denoting the country of origin of the operator—eg ZL/0AA/W6.

1A0KM (incorrectly described as IA0KM in an earlier *MOTA*) was active from the fully independent administrative entity of the Sovereign Order of the Knights of Malta which has been located in Rome since 1834. The order maintains diplomatic relations with 45 countries and has delegations at the Council of Europe and UNESCO. It issues its own passports and stamps and it would appear that there could be a possibility of DXCC status being granted.

The prefixes of Kiribati stations have been changed by the ITU. The islands in the Gilberts group now use the T30 prefix, those in the Phoenix group T31, and in the Line Is T32.

ZK1CG (KA7HRK) has an Icom 701 and TH6DXX beam, together with dipoles for 3·5 and 7MHz. He may visit the North Cook Is in the near future. QSLs should include three ircs and be sent to V. Rivera, PO Box 38, Rarotonga, Cook Is.

The *DX Bulletin* lists the callsigns of five stations in the Central African Republic which are licensed: TL8CN (QSL to W5RU), TL8RP (QSL to F3EA), TL8JM and TL8WH (QSL both to W5RU), and TL8CR. TL8WH tries to be on 3,511kHz or 7,082kHz at 2300 on Saturdays.

News from overseas

Publicity Sheet No 80-6 from IARU Region 3 Association concerns activities in the Solomon Is. Peter Taylor, H44PT, is now president of the Solomon Islands RS, and he has advised that the 50,005kHz beacon H44HIR now operates continuously and runs 10W to a vertically-polarized dipole. Reports will be welcomed and should be sent to SIRS, PO Box 418, Honiara, Solomon Is. H44PT also reports that it is hoped to set up a 28MHz beacon on the islands in the near future, as part of the International Beacon Project.

Eddie Talberg, G5DED/ZS6ZH, is now ZS6ZH/4X and living on a moshav (a small village of some 40 families) in southern Israel. He is now on the air with an FT107, Dentron GLA1000 and ATV4 antenna, and hopes to have a Hy-Quad in use by August. Eddie believes that he is the only 4X station operating from Sinai.

John Sceal, A9XZ, has written to the RSGB to point out that the A7XZ reported in October 1980 *MOTA* appears to have been an unauthorized operator. However, A9XZ is legal and occasionally heard on 3·5, 7, 14, 21 and 28MHz.

Mike Townley, ZC4MT, reports that activity on the ZC4 front is not very great and that several of the stalwarts have left recently. At the moment there are only about five active ZC4s—a fact which makes them very popular! Mike visited South Africa and was disappointed to find that the new visitor's licence was not as easily obtained as he had hoped. It was suggested to him that three-months notice would be needed and he was asked to produce an operating certificate. A Kenyan licence could have been obtained prior to his arrival and would have cost him £10.

The Nigerian ARS elected 5N0AAJ as its president at the national general meeting in December 1980. Brigadier A. O. Aduloju was elected national chairman, Lt Col I. O. Willems first vice-chairman, 5N0DOG first vice-president, 5N4BPC second vice-president, 5N0OBA secretary-general, 5N4GM asst sec-gen, 5N0APA vhf manager, 5N0BMB treasurer, 5N0PEE, assistant treasurer, and 5N6ATT, 5N0UDB and 5N0ATW executive members. New international awards have been approved and will be detailed under "Awards" next month.

5N3PJR has passed some important information via G2AMV concerning difficulties experienced by amateurs visiting Nigeria who have not made adequate and correct arrangements. The Nigerian ARS is empowered to issue visitors' licences for a period of up to one year. At least two months in advance of a visit application should be made by sending NG6 (for the licence) plus NG10 (for membership of NARS) to NARS,

*10 Knightlow Road, Birmingham B17 8QB.

QTH CORNER

C5ADT	via G3VMK, D. Chadwick, 59 Sandy Lane, Hucknall, Nottingham, NG15 7GN.
VP8AEO/CE9	via G4DSE, P. Zollman, 52 Church Rd, Astwood Bank, Redditch, Worcs, B96 6DD.
W4GSM/CE0A **W4PRO/CE0A**	via W4PRO, Marion Wise, 15 Willow Rd, Hampton, Va, 23664, USA.
ex-EP2SL	G4JVG, 15 Malvern Court, Addington Rd, Reading, Berks, RG1 5PL.
FM0FOL	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
FG0FOO/FS	via N6RA, T. Gallagher, Box 31365, San Francisco, Cal, 94131, USA.
GB1IARU	Stan Williams, G3LQI, 58 Grinstead Lane, Lancing, W. Sussex, BN15 9NZ.
J6LOU	via KA4BOT, R. Givens, RFD 2-Box 103-A, Pleasant Shade, Tenn, 37145, USA.
HK0FBF	PO Box 842, San Andres Is, Colombia.
KC6GZ **KC6VY**	via W6TPC, H. Ward, 6696 Cabaret St San Diego, Cal, 92120, USA.
T30AC	via WB6FBN, 5521 Sagitarius Way, Citrus Heights, Cal, 95610, USA.
VP2MIX	via G6HC, A. R. Bartle, 105 Mayfield Rd, Thornton Heath, Surrey.
3D2YU	via DL2RM, R. Wolf, Alta Waldmuenchener Str 32, Regensburg, D 8400, West Germany.
VK4NIC/3X	(*Op. Karl only*) via W2TK, R. Renz, 366 Rutherford Av, Lyndhurst, NJ, 07071, USA.
8P6OL	"Jolly Roger", Barbados.
9U5WR	via SP6FER, Z. Pietrzak, Skrytka Pocztowa 2156, 50-983 Wroclaw 47, Poland.

Box 2873, Lagos. A list of all the gear to be carried into Nigeria must be included—otherwise problems may be encountered at Customs. It is possible that the visitor's plane may be met if these instructions are followed.

G3SBP, formerly VP2VD, G3SBP/KV4 and 5N2RDG, has been in Abu Dhabi for three years and left last month. He says that during his stay he has known senior members of the Ministry of Communications who categorically state that no amateur licences have been issued and are not likely to be issued in the United Arab Emirates for some time. Callsigns would be A6X followed by a single letter.

Top band

VK6HD has once again been working into Europe and, in fact, was still doing so early in March—easily the latest date he has been able to do so since commencing his activity on the band 10 years ago. He points out that the band never stays open more than 30min, and often for much less, and as a result of this he asks everyone to confine QSO exchanges to report only—on more than one occasion this season a station has faded out while giving other data. On average an opening lasts about 5min only. One-way skip seems prevalent and favours Europe in December and Australia from late January and February. Mick uses inverted-V and $\lambda/4$ "sloper" antennas, and has worked G3RPB, G4BYG, GD4BEG, G3RTY, GI3OQR, G3XWZ/A, GM3IGW, G3ZYY/A, G3SZA, G3YDX, G3HCT and G4CNY this year. In all, he has worked 16 countries—G, OZ, F, GD, GI, VS5, DU, EL, 5N0, VE1, VS6, YU, SP, DL and PA0—all at sunrise time in VK6. His best QSO was with VE1BVL and VE1ZZ via the long path across Europe.

Danish amateurs are now allowed to use 10W of cw in the bands 1,720–1,740kHz and 1,830–1,850kHz.

G3XTT has made the very useful suggestion that now is the time to make a list of 1·8MHz "firsts". He has been researching past copies of *Rad Com* and has discovered that various claims have been made from time to time but that sometimes claims have not tallied. A list compiled from this information is as follows: CX3BH–G3SSO (11/68), HK4EB–GI6TK (7/3/64), HR2HH–G2PL (2/1/70), 5Z4LE/HZ–G3RFS (12/69), MP4BJI–GW4AEC (8/71), MP4TAF–G3XAQ (26/7/69), PJ0CC–G3VUM (11/68), PZ1AH–G3SED (8/12/67), VQ8CCR/CPR–G3XAQ (5/69), VS6DO–G3WRF (18/11/71), VS9OC–G3SVK (21/12/69), ZS4PB–G3MYI (26/2/78) and 9X5SP–G3IGW (12/69). Your scribe would be very pleased to receive comments or corrections to this list, as well as claims for other first contacts with countries outside Europe on top band—for instance, who made the first QSOs with VK and ZL?

GD4BEG feels that the band has been a long way below normal during the period under review; however, there have been some freak openings—as on the occasion when after calling "CQ" fruitlessly for half an hour he was answered by W7FS whose signals were RST 579. The dawn peak seems to be appearing again after an absence of about two years, and some of the USA signals are stronger than some of the Gs.

Dxpeditions

Rumours are around that CE5CJA and two others will go to Juan Fernandez Is (CE0Z) between 13 and 18 April, but that their going depends on sufficient funds becoming available—US$1,000 are needed, and donations should be sent to FRAC, PO Box 3016, Valparaiso, Chile.

George, AD0S, together with Bill, W6TPH, and possibly one other, were due to leave Hawaii on 31 March on the ketch *Banyandah* (owned by VS5JB/KB7NW). They will head for Palmyra Is where they hope to operate for six days commencing 6 April. Following this they will move on to Kingman Reef for another six-day operation, probably starting on 15 April. After this they will go to West Samoa and may use 5W1AU's callsign for a while before returning to the USA. After a refit in Apia the *Banyandah* will proceed to Tokelau Is (ZM7) with a new crew consisting of VK2BJL, ZL1AMO and VK2BKD. It is possible that VK2BJL may go to Mellish Reef in the ketch later this year.

GB1IARU

This very unusual callsign will be heard on all bands operating continuously on phone and cw from 23 April to 1 May. It is the official station of the IARU Region 1 Conference which will be taking place in Brighton at that time, and operators will be drawn from clubs within the counties of East and West Sussex. Please QSL direct or via the bureau to the address in "QTH Corner".

Contests

SP DX Contest—1500 4 April to 2400 5 April (cw); 1500 18 April to 2400 19 April (phone). Rules from MRO at RSGB HQ.

HM The King of Spain Contest—2000 25 April to 2000 26 April. Rules as last year.

Italian QRP Club Field Day—0500 25 April to 1700 26 April. Rules from G3FKM (sae please).

Band reports

Once again the postal system appears to have defeated G8KG with his monthly report—it is hoped to include it in next month's column. Other correspondents seem to have noted quite good openings on all bands, and as G3KSH points out "when activity is stimulated by some event (eg contests) the bands are found to be open!".

An interesting phenomenon reported by G3IMW was a contact with VK7AE and G3XRJ on 3·5MHz at the time of an eclipse of the sun in Tasmania on 4 February. On this occasion the dawn peak propagation time was extended by some 50min.

The following are thanked for supplying information from which this section has been compiled: G5JL, G2s AMV, HKU, G3s GHY, GIQ, GVV, HCT, IMW, KSH, NWG, GM3PPE, G4AXD, GD4BEG, G4s BDQ, DSE, EHQ, GW4KGR, and RSs 1066 and 42876.

Stations listed in italics were using cw.

1·8MHz. **0000** *EA9EU* (QSL to I8UDB), *UM8MAZ.* **0100** *OY7ML, UD6DMR, 5N0RHK.* **0400** NP4A, KV4FZ, VP2ED. **0500** *EA8QO, W2,W4,W8, VP2EV.* **0600** *K5GO, W1,W2,W3,W4, K5VWW, W7FS* (Wash), *W8,W9.* **0700** *VE2, W2,W3,W4, W5, W9.* **2000** *EA8QO.* **2100** *JAs, UL7CAD, VK6HD.* **2200** *EL2FY, VK6HD, UT5AB, G3PQA/5N0, VS5RP, VS6DO.* **2300** *LA9SC,* RP2BFC, YU3AAR, *UA9AEK, UL7PBY, VE1BVL, W1BB.*

3·5MHz. **0000** *UI8ADM.* **0200** *A4XIH, PY7ZZ.* **0500** HK0EHM (QSL to WD9DZU). **0600** 6Y5DA (QSL to VE4JK). **0700** C5ACG, C6ADV, N0NO/CE0, CP, *FG7AS,* J3AH, KL7Y, KP2A, LU, M1C, VP2KAO (QSL to K2AOQ), ZP. **0800** VP1CBT (QSL to JI1CVC), *ZL2, ZL4.* **2000** VK2AVA, VK7AE, *VK3s KS,MR,VJ,XB, VK5QG.* **2100** UF6FER, UA9XPM, ZD7HH. **2200** AP2KS, KP4KK/DU2, 5B4CV. **2300** *OD5LX, ZB2EO, 4K1OC.*

7MHz. **0000** *EA9GK, FM0FOL, 9Y4VU.* **0300** *N7DF* (Utah), *W6, 9M2LK.* **0600** J3AH, *KL7GK, VP1CW, VP2MS, W6-W7, XE1AAG.* **0700** CE3CGB, *W4PRO/CE0,* FO8FO, VK, VK9NS, *VP2KAO,* ZL, ZS1LD, VK4NIC/3X. **0800** C6ADV, *KH6AK,* VK. **0900** J88AH, *UA0,* 7X5AB. **1700** UK0AMM, 6O0DX. **2000** *ZD8TC.* **2100** *JA, PY.* **2200** JA, ZD7HH. **2300** *A7XE, W2BIH/PJ2, VU.*

14MHz. **0000** HH2L, *VP2MIX* (QSL to G6HC). **0200** *FO8HD.* **0700** *KX6MY,* **0800** C21BS, TI0HE, VK, VP2EV, VK4NIC/3X, 9G1JV/9M6. **0900** K4ESQ/CE0, *KH6IB/HL, KL7,* VK9NS, *VY1AC,* W6, 5W1DB, 9M8PW. **1000** *N6YK/VP2A,* ZL3AFH/A. **1200** *KL7MF, VS6JR.* **1300** EP2TY. **1500** BV2B, TU2IN. **1700** CR9EL, VP1WP, ZL1IB, 4S7WP, 9V1UQ. **1800** CR9C, HS5AID. **1900** CR9CT, *FW0VU, KH6IJ.* **2000** KC4AAA, VKs, VP5TCI, W7, *9X5AB.* **2100** J6LDB (QSL to VE3GMT), J6LOU, *TL8CN,* VKs, VP8PP. **2200** VP8AEO/CE9, JAs. **2300** W0RIF/CE0.

21MHz. **0000** *W7.* **0800** JA, VK, ZL. **0900** JA, *JT0JTO, KL7HNU,* P29SH, VS5CT, *ZB2G,* ZL. **1000** C5ACA, JA, *KP4KK/DU2,* P29GG. **1100** KL7IB. **1200** JAs, VUs, YB2CR. **1400** EP2TY. **1500** PJ7ARI, *VP2KAO* (QSL to K2AOQ), VU2LQA, ZD8TC. **1600** CR9EL (QSL to OE2DYL), *FG0FOK,* 9L1AP. **1700** FR0FLO, *J87BN* (QSL to W1JPI), VE4-VE7, W6,W7. **1800** FM0FOL, J73PP, J88AM, *K4FN/VP2K,* W6,W7, 9G1PA. **1900** VP8AEO/CE9, D68AM, ZD7BW, VK4NIC/3X. **2000** W0RIF/CE9, FG0FOK, J28CJ, *ZD8RH.* **2200** 5N1KBM.

28MHz. **0800** HM1QO. **0900** A9ZEX, AP2P, *HL1FHD,* JA, JTs 1AN, 1KAI, 5H3PA, *5N0WRA.* **1000** AP2IZ, H44PT, EI4CY/OD5, *VU2BK.* **1100** VP2MEA, 9M2GZ. **1200** JT0YFU, DJ9GD/ST2, TL8CN. **1300** FM0FOL, FR0FLO, *VP5FP, 5Z4YV,* 9N1BMK. **1400** A22ZM. **1500** *KA7GXO* (Nev.), YC0BRT. **1600** W0RIF/CE0, HZ1HZ, HB9EU/S8, VP8PP, W6-W7. **1700** A4XIH, A7XD, VE6, VE7, VK4NIC/3X. **1800** VP8AEO/CE9, KH6IBA, PJ7VL (QSL to W2BBK), VE5, VE7, W6, W7. **1900** W9DCN/C6A, VE7, W6, 8R1J. **2000** *N0NO/CE0,* VE7, VE8YD. **2100** *K7CA/HC1,* J6LDB, *ZF2AD,* 8P6OL.

Thanks to all who contributed to this month's column, and to the following for items extracted: 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/VE3BMV)**, *QRZ DX* **(K5FUV)**, *DX'press* **(PA0TO)**, *CQ Magazine* **(W1WY)**, and *DX-NL* **(DL3RK)**.

All items for **June** issue to **reach G3FKM by 24 April**—this is a **very early** deadline—please note! □

RAYNET

G. Cluer, G4AVV*

It has been some time since the last appearance of the Raynet column, so the writer intends to spend some time addressing RSGB members who do not belong to Raynet.

Raynet was formed in 1953 when much of the east coast of Britain was devastated by the worst flooding in living memory. Gales which brought disaster on the sea, and water rushing inland destroying everything in its path, caused a major emergency all down the coast. The Humber Radio coast station went under water and ceased to function, and radio amateurs along the east coast heard distress calls being made in vain by ships at sea. Disregarding the risk of loss of their licences, many of these amateurs answered the distress calls and passed them on to lifeboats, tugs, police and government authorities until the GPO's own emergency station came into operation. Later a number of amateurs manned shifts at naval reserve stations, operating side by side with naval reservists. Had not the amateurs stepped into the breach many more men might have been drowned and much more shipping lost.

Within months of this disaster the RSGB set up a committee to reconsider the question of an amateur radio emergency service in this country, and as a result the Radio Amateurs' Emergency Network, which is now known as Raynet, was set up. Since the inauguration of Raynet, the organization has grown to the second largest of its kind in the world, surpassed only by the USA with its enormous amateur radio population. There are now some 3,600 members in 160 groups, with most of the country covered by some group.

Why join Raynet? It is true that the amateur radio licence has now been amended to allow any licensed amateur to operate on behalf of the four user services (Red Cross, St John Ambulance, police and emergency planning officers) but there are some relaxations concerning non-disaster operation or oil pollution operation or talkthrough that are only available to Raynet members. More important, however, is the fact that only by joining with others to form a group will a user service know whom to contact—or how. Raynet members also gain a certain amount of insurance cover while taking part in emergency events or training.

Raynet groups have been set up all over the country to make contact with the user services and to train Raynet members. (Frankly, the thought of an untrained amateur population, however well meaning, talking directly to shipping in distress under today's conditions sounds like a recipe for disaster to most Raynet members.) The amateur needs to learn how to fit in with the more formal procedure used by most user services, and it has been found that training vastly improves the amateur's ability to function accurately under stress. These Raynet groups are run as virtually autonomous units co-ordinated by a committee of the RSGB. Membership of Raynet first involves joining nationally (see details below) and then becoming a member of a local group. There is no charge on a national level but most groups charge a small fee to cover administration costs. More important, however, is the cost in terms of time and commitment.

Groups are usually happy to accept unlicensed members, young or old, but there is little use in joining if you are unable to take a full part in the group's activities. Raynet is essentially a force of mobile trained and equipped people with the ability to improvise if things go wrong. Raynet can use you if you are not licensed or if you are not equipped but, frankly, not if you are unable to attend training and exercises. Because of this level of commitment, and also the increased awareness of county councils of their responsibilities towards emergency planning, most groups are desperate for new members.

Raynet is a service to the community, and an excellent public relations exercise for our hobby. It is also great fun. If you would like to find out more, get in touch with the controller of your local group. All groups are different, the controller will tell you what is expected of you and what the group can offer you. If there is no group in your area and you are a glutton for punishment, then set up your own group. Write to the address below, enclosing a large sae (or stamped addressed adhesive label), and an application form to join nationally and the address of your local group controller will be sent to you.

Finally

A few words to the groups around the country. What have you been up to? Please let the writer know of *all* live incidents during 1980 or 1981 as he would like to publish details. If you have not heard from the Raynet Committee recently it could be that something has gone wrong at this end—drop a line to one of the following committee members: **Supplies** (badges, stickers etc)—Mrs J. Balestrini at G3BPT QTHR; **Registration** (send completed membership cards etc)—Mrs T. Crane at G3PED QTHR; **Permission to work at county shows etc or to use talkthrough**—emergency communication manager G3BPT QTHR; **Group information** (annual survey form, details of area covered by groups, change of controller etc)—G8CAC QTHR; **Publicity material, requests for application forms or new member information**—G4AVV at address below (not QTHR), tel 01-656 3949; **all other correspondence** to the chairman of the RSGB Raynet Committee, Eric Yeomanson, G3IIR, QTHR, or via RSGB. □

*12 Bingham Road, Addiscombe, Croydon CR0 7EB.

HF propagation study

Predicted hpf + luf in megahertz for April 1981

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	1912	1812	1810	2107	2409	2711	2811	2811	2909	2707	2409	2112
Wellington (s)	1911	1811	1909	2407	2710	3011	3111	3111	2709	2606	2408	2010
Osaka	1911	1812	2112	2711	3010	3211	3211	2811	2509	2206	2304	2108
Hong Kong	1909	1912	2312	3112	3411	3611	3811	3711	3609	3206	2503	2105
Sydney (s)	2011	1911	2411	3209	3510	3711	3811	3611	3109	2706	2505	2108
Moscow	1602	1503	1704	2306	2707	3007	3107	3107	3106	2904	2202	1801
Bangkok	2007	2011	2512	3412	3712	3911	4011	4011	3809	3406	2703	2203
Singapore	2108	2011	2512	3512	3812	4011	4111	4011	3909	3406	2703	2303
New Delhi	2104	2008	2611	3512	3812	4011	4111	4011	3609	2906	2703	2302
Perth	2308	2111	2612	3711	4010	4211	4311	3411	2909	2506	2303	1904
Teheran	2302	2105	2609	3711	4012	4212	4311	4211	4009	3506	2903	2502
Colombo	2304	2209	2712	3712	4012	4211	4311	4211	4009	3606	2903	2502
Bahrain	2502	2305	2709	3811	4112	4412	4512	4311	4209	3706	3103	2702
Cyprus	2301	2102	2305	3308	3709	3909	4109	3909	3907	3605	2902	2502
Aden	2802	2604	2808	3911	4312	4612	4712	4511	4409	4006	3403	3102
Seychelles	2902	2605	2809	3912	4012	4112	4212	4211	3909	3606	3403	3202
Mauritius	3002	2704	2809	3912	4412	4612	4811	4611	4509	4206	3503	3302
Nairobi	3302	2902	2806	3811	4412	4312	4612	4711	4609	4306	3703	3602
Malta	1901	1701	1702	2405	2906	3107	3207	3206	3105	3104	2502	2101
Salisbury	3502	3102	2805	3710	4412	4712	4912	4911	4709	4506	3903	3802
Cape Town	3202	2402	1703	3507	4411	4712	5012	5111	4910	4706	4103	3902
Lagos	3702	3302	2803	3306	4411	4612	5112	5112	4910	4806	4203	3902
Suva (I)	3712	3411	2809	3206	3409	2911	2711	2511	2310	2806	4209	3812
Gibraltar	1601	1501	1402	1803	2405	2706	2806	2806	2806	2804	2302	1801
Ascension	3502	3302	2803	2906	4209	4612	4212	4312	4411	4208	3703	3502
Wellington (I)	3510	3310	2808	3006	3309	2711	2511	2311	2110	2307	3808	3610
Dakar	3402	3202	2803	2906	4009	4511	4812	5012	4812	4709	4104	3602
Adelaide Is	2803	2202	2003	1806	2109	3011	4811	5011	4810	4708	4106	3604
Las Palmas	2501	2401	2202	2404	3307	3808	4009	4009	3908	3906	3403	2802
Falklands	3202	3102	2803	2806	2409	3411	4711	4911	4710	4609	4107	3504
Rio de Janeiro	3202	3102	2803	2806	2809	4411	4711	4212	4112	4411	4007	3402
Buenos Aires	3102	3002	2703	2706	2609	3911	4611	4711	4612	4611	4008	3404
Sydney (I)	2811	2811	2511	2508	3309	2811	2412	2311	2110	2007	3105	3309
Lima	2703	2602	2403	2406	3009	2911	4111	4211	4112	4212	3911	3207
Barbados	2702	2602	2403	2406	2909	3811	4011	4112	4112	4212	3910	3206
Bogota	2603	2502	2303	2306	2709	3111	3911	4012	4012	4112	3811	3108
Jamaica	2604	2302	2203	2106	2409	2811	3611	3712	3812	3912	3712	3108
Bermuda	2503	2302	2103	2106	2409	3211	3611	3712	3712	3812	3610	3007
New York	2404	2202	2003	1906	2009	2611	3111	3311	3412	3512	3410	2908
Mexico	2407	2203	2003	1906	2209	2211	2911	3311	3412	3512	3412	2911
Montreal	2404	2102	1903	1906	2009	2511	3011	3211	3212	3411	3410	2908
Denver	2308	2004	1803	1806	1809	1711	2111	2511	2711	2812	3012	2711
Los Angeles	2209	2006	1803	1706	1909	1711	1911	2411	2810	3112	3012	2611
Vancouver	2110	1907	1704	1706	1809	1611	1811	2011	2210	2311	2512	2511
Iceland	1402	1201	1102	1304	1705	2106	2206	2206	2305	2304	2103	1602
Honolulu	2012	1811	1707	1806	2109	2611	2411	2411	2809	2809	2612	2312
Fairbanks	2010	1809	1707	1906	2209	2211	2311	2311	2209	2210	2211	2111

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

Propagation predictions

During April the change from winter to summer conditions will become very marked, and will be noticed on all bands as the season advances. The daytime frequencies will drop continually to reach their minimum during July–August. During the coming months traffic conditions on **28MHz**, especially to North America, will worsen. Solar activity has only decreased marginally since April 1980, so conditions will be similar to those of a year ago.

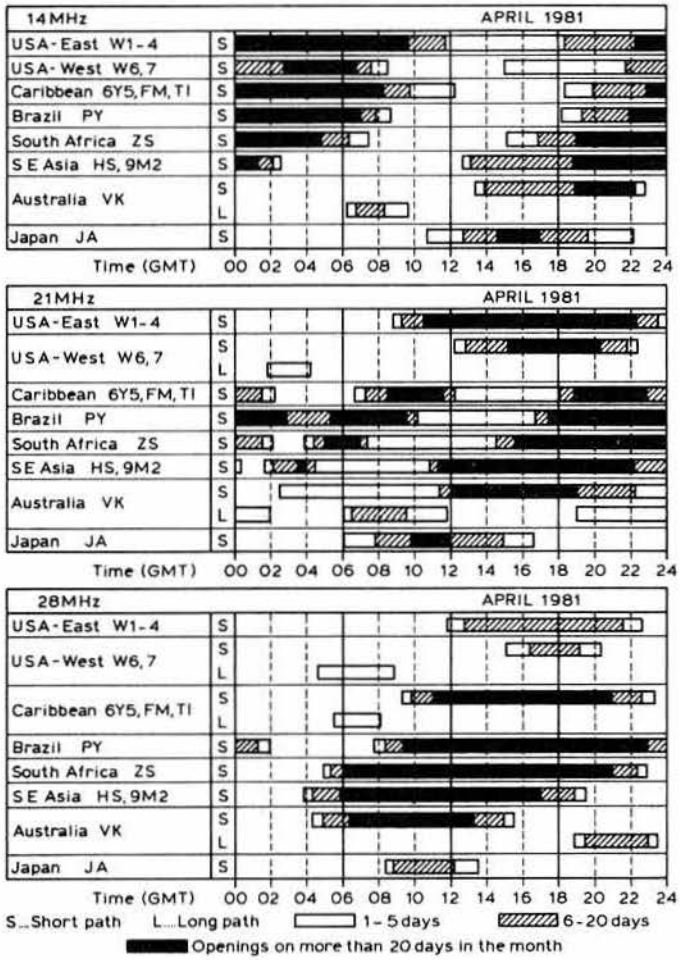
The **21MHz** band will remain open longer in the evenings for traffic with North and Central America because of the longer days. During the early hours of the morning there may be a chance of traffic with Hawaii on favourable days. Towards the end of the month it may be possible to reach western North America via the indirect path now and again during the early hours.

The main night-time dx band will be **14MHz**, even more so than during the winter. Only in the early morning will daytime traffic with North and South America be poss-

ible. Traffic with East Asia and Australia, which should be possible according to propagation predictions, will be interrupted by QRM.

There is a chance of dx via the long path on **7MHz** if the longest part of the path lies in darkness. During daytime this band, as well as **3·5MHz**, will be ideal for local traffic without interruption by the dead zone. The maximum distances covered will be greater on **7** than on **3·5MHz** and will generally decrease during the summer on both bands. During the latter half of the night local traffic will seldom be interrupted by the dead zone on **3·5MHz**.

The provisional sunspot number for January 1981 from the Sunspot Index Data Centre is 114·4. The predicted smoothed numbers for May, June and July are 131, 129 and 127 respectively.



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—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.

3 May—Maidstone Mobile Rally, Y Sports Centre, Melrose Close, Cripple Street, Maidstone, Kent. 10am-5pm, trade stands open at 11am. A special event station, GB2YSC, will be in operation. A beer tent will be open during the rally. Details from G4GKW, c/o Y Sports Centre.

3 May—Spalding & DARS Tulip Time Mobile Rally, The Grammar School, Haverfield Road, Spalding. Start 10.30am. Talk-in on 144 and 432MHz. Details from sec G. Parker, G4EMK, 29 Saxon Way, Bourne, Lincs.

10 May—Barry College of Further Education RS Mobile Rally, Barry Memorial Hall. Bar and food available. Talk-in on S22. Details from K. B. Hodge, GW8BIP, Grafton, Claude Road West, Barry CF6 3JG.

17 May—Northern Mobile Rally, Victoria Hall, Victoria Park, Keighley. Organized by the Otley R&ES. Doors open 11am, 10.45 for wheelchair and blind visitors. Talk-in on 144MHz and on GB3WF, RB14. Many attractions including film shows and safe play area for junior ops. Details from P. A. Horne, G8KRU, QTHR, tel 0943 74986, after 5.30pm.

24 May—East Suffolk Wireless Revival, Ipswich. Talk-in on 144MHz by GB4SWR. There will be a transceiver clinic and antenna testing range plus all the usual attractions: sideshows, stalls, light refreshments and bring and buy etc. Further details from Jack Toothill, G4IFF, QTHR. Tel 0473 44047.

24 May—Plymouth Radio Club Rally, Tamar Secondary School, Paradise Road, Stoke, Plymouth. Open 10.30am-4.30pm. Talk-in on S22, SU8 and RB2 by GB2PRC. All primary routes to rally signposted. Ample car parking. Equipment, components, RSGB bookstall, bring and buy, raffles, Raynet, GB3NC and GB3CH repeater groups, etc. Licensed bar, refreshments and food available. Details from John Benoy, G8PSC, QTHR.

7 June—Hull & DARS Mobile Rally, Hull University. Further details later. Contact I. B. Carress, G8EAH, 124 Dayton Road, Priory Road, Hull, Yorks.

14 June—RNARS 21st Birthday Mobile Rally. HMS Mercury, 10am-5.30pm. There will be talk-in on 432, 144 and 3·5MHz. Plenty of parking, with on-site space for invalid visitors. The usual trade stands and arena events will be present. Details from G4DIU, QTHR.

14 June—Elvaston Mobile Rally, Elvaston Country Park, 5 miles south-east of Derby on B5010. Organized by the Nunsfield House ARG. Open 10am. Trade stands, displays, Post Office etc. On-site catering facilities. Grand bring and buy sale. Talk-in on 144 and 432MHz. Further details from I. Cage, G4CTZ, QTHR, tel Derby (0332) 71875.

21 June—Denby Dale & DARS Rally, Shelley High School, Nr Denby Dale on the B6116, access from M1 junction 38 or 39 and M62 junction 23 or 29. Open 11am. Talk-in on GB4CDD on S22 and GB8CDD on SU8. Trade stands, bring and buy, refreshments and licensed bar. Car parking and picnic area. Details from J. Clegg, G3FQH, QTHR.

28 June—Longleat Mobile Rally, Longleat Park, Warminster, Wilts. Talk-in on 144MHz, callsign GB3LMR. New site closer to house. Restaurant available. Please see display ad for details of camping etc. Details from G4FRG, QTHR.

28 June—Rolls Royce Radio Club (Barnoldswick) Mobile Rally, Sports & Social Club, Barnoldswick. Trade stands, refreshments, bring and buy stall etc. Radio talk-in. Details from L. G. Logan, G4ILG, QTHR.

28 June—Bangor & DARS Mobile Rally. New venue: Crawfordsburn Scout Camp, Crawfordsburn County Park, nr Bangor (Co Down). Usual attractions, bring and buy, refreshments, coastal walks, beach within ½ mile. Further details tba. Enquiries to club sec Roy Evans, GI4KZN, Tel Bangor 4072.

12 July—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.

19 July—Cornish RAC Mobile Rally, at the Cornwall Technical College, Pool, Camborne. Details from G2ABC, QTHR.

26 July—Anglian Mobile Rally, Stanway School, Colchester, Essex. Open 10am-5pm. Talk-in on 144MHz. Further details from G3YAJ, tel 0206 39 3938.

26 July—Scarborough ARS Mobile Rally, The Spa Ocean Room, The Sea Front. Open 10.45am. Talk-in on S22 and GB3NY (RB0). Refreshments, licensed bar, bring and buy, raffle etc. Free admission. Help available for RAIBC members wishing to attend if contacted in advance. Details from Margaret Crofts, G4JAQ, 43 Broadlands Drive, East Ayton, Scarborough, N. Yorks YO13 9ET, tel 0723 862638.

9 August—Derby & District ARS Mobile Rally. Lower Bemrose School, Littleover, Derby, site as previous years. All usual attractions. Details from hon sec Jenny Shardlow, G4EYM, QTHR, tel Derby (0332) 556875.

16 August—Preston ARS 13th Annual Mobile Rally, Walton-le-Dale County High School, Bamber Bridge, Preston (one mile from M6 junction 29). Talk-in on S22. Usual attractions including bring and buy stand. Open 11am. Details from G4KMC, ex-G8SIV, QTHR.

6 September—Vange ARS Mobile Rally, Nicholas School, Basildon, Essex. 10am-5pm. 144MHz talk-in station, callsign GB4VMR. Many attractions including trade stands, bring and buy, raffle, and refreshments. Details from Albert Smith, G4FMK, QTHR, tel 03743 3805.

13 September—Telford Mobile Rally, Telford New Town Centre Malls, Shropshire. All usual attractions plus some unique to this rally. Full catering and licensed premises on site. Over 50 trade stands. Further details from G8DIR, tel Shrewsbury 64273; G8UGL, tel Telford 584173; or G3UKV, tel Telford 55416, all QTHR.

20 September—Peterborough Mobile Rally. New venue: Wirrina Sports Stadium. Talk-in on vhf, uhf and hf, GB3PMR. Many facilities, plenty of free parking, overnight caravan sites by arrangement. All the usual radio attractions in the sports hall, bring and buy, bar, refreshments available. Details from D. T. Wilson, G4KSW, 4 Conway Avenue, Peterborough, tel 76238, after 2pm and weekends.

27 September—Harrow Mobile Rally. A new venue is being negotiated, details to follow. Further information from Phil Dunbar, G8FRG, QTHR, tel 0279 39851, ext 251, office, 32486, home.

Special event stations

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

GB4STD, 7-8 April
Open days, St Dunstans headquarters, 191 Old Marylebone Road, London N1. Operating on 144MHz and hf. Details from Ted John, G3SEJ, QTHR.

GJ3DVC 18-19 April
In association with the Lions Club of Jersey, the Jersey ARS will operate this station from Mont Orgueil Castle, St Martin, Jersey, from 1000 18 April until 2200 19 April on all bands 3·5-28MHz. Special QSL cards. QSL direct to GJ2LU, QTHR, including two ircs, or via RSGB QSL Bureau.

GB4STD, 27 April-2 May
Exhibition in connection with International Year of Disabled People, St Dunstans, Ian Fraser House, Ovingdean, Nr Brighton, Sussex. Operating on 144MHz and hf. Details from Ted John, G3SEJ, QTHR.

GB4STD, 7-8 July
Open days, St Dunstans, Ian Fraser House, Ovingdean, Nr Brighton, Sussex. Operating on all bands using audible aids. Details from Ted John, G3SEJ, QTHR.

Election of RSGB regional and area representatives for the period July 1981 to June 1984

Regional representatives

Not later than first post on Friday 24 April 1981 any five corporate members resident in a particular RSGB region may nominate any other qualified corporate member resident in the region for the office of regional representative by delivering their nomination in writing, together with the written consent of such person to accept the office if elected, to the Membership & Representation Committee at RSGB headquarters. Each such nominator shall be debarred from nominating any other person for this election of regional representatives.

The names of the present regional representatives are given on page 317 of this issue, and the composition of each region is given below.

The composition of each region, subject to any minor border adjustments, is:

Region 1 Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.
Region 2 All that part of Humberside north of the River Humber, North Yorkshire, South Yorkshire, West Yorkshire.
Region 3 Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.
Region 4 Derbyshire, all that part of Humberside south of the River Humber, Leicestershire, Lincolnshire, Nottinghamshire.
Region 5 Bedfordshire, Cambridgeshire, Northamptonshire.
Region 6 Berkshire, Buckinghamshire, Oxfordshire.
Region 7 Greater London south of the River Thames, Surrey.
Region 8 Kent, East Sussex, West Sussex.
Region 9 Cornwall, Devon.
Region 10 Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan.
Region 11 Clwyd, Gwynedd.
Region 12 Grampian, Highlands, Orkneys, Shetlands, Tayside, Western Isles.
Region 13 Borders, Fife, Lothian.
Region 14 Central, Dumfries and Galloway, Strathclyde.
Region 15 Northern Ireland.
Region 16 Essex, Norfolk, Suffolk.
Region 17 Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.
Region 18 Cleveland, Durham, Northumberland, Tyne & Wear.
Region 19 Greater London north of the River Thames, Hertfordshire.
Region 20 Avon, Gloucestershire, Somerset.

In the event of no nomination being received from the corporate members in any region by 24 April 1981, the Council reserves the right to make an appointment.

Any representative who on 30 June 1981 will have held office for only 12 months or less, may continue in office for a further period of three years. It would assist the Membership & Representation Committee if the representatives concerned would notify the committee of their wish to take advantage of this extension by 24 April 1981.

Note. The regions in England and Wales are based on the counties as set out in the schedules to the Local Government Act 1972.

The Channel Islands and the Isle of Man are not dealt with by that Act.

The regions in Scotland are based on the county boundaries which became effective on 1 April 1975.

Area representatives

Not later than first post on Friday 24 April 1981 any five corporate members resident in an area may nominate any qualified corporate member resident in that area for the office of area representative, by delivering their nomination in writing together with the written consent of such person to accept office if elected, to the Membership & Representation Committee at RSGB headquarters.

Any representatives who on 30 June 1981 will have held office for only 12 months or less may continue in office for a further period of three years. It would assist the Membership & Representation Committee if the representatives concerned would notify the committee of their wish to take advantage of this extension by 24 April 1981.

An area is a conveniently-sized geographical district or town which has at least 10 members.

In the case of London, area representatives may be nominated for groups of postal districts. In the case of other large conurbations, area representatives may be nominated on a geographical basis such as North Birmingham, South East Manchester etc.

Ballots

In the event of more than one person being nominated for a particular office a ballot will be conducted, details of which will be published in the June 1981 issue of *Radio Communication*.

Resignations

If, at any time and for any reason, an elected representative wishes to resign his office, he should notify headquarters, who will advertise the vacancy. Local members cannot automatically appoint another member to undertake the duties of a representative who has resigned.

The Council reserves the right to call upon any representative to resign his office if, in their opinion, he is considered to be unsuitable or unsatisfactory.

RSGB committees, 1981

(The President is an ex-officio member of all committees)

Education: J. Anthony, G3KQF, (chairman); D. H. Adams, GW3VBP; G. L. Benbow, G3HB; L. E. Newnham, G6NZ; G. C. Oxley, G8MW; D. M. Pratt, G3KEP; W. A. Scarr, G2WS; F. C. Ward, G2CVV.

Finance & Staff: E. J. Allaway, G3FKM, (chairman); J. Anthony, G3KQF; P. Balestrini, G3BPT; J. Bazley, G3HCT; P. F. D. Cornish, G3COR; D. S. Evans, G3RPE; B. O'Brien, G2AMV; R. F. Stevens, G2BVN.

HF: J. Bazley, G3HCT, (chairman); E. J. Allaway, G3FKM; R. J. Eckersley G4FTJ; S. H. Jesson, G4CNY; J. D. Kay, G3AAE; D. J. Lawley, G4BUO; F. M. Smith, G8KG*; C. J. Thomas, G3PSM.

HF Contests: D. J. Andrews, G3MXJ, (chairman); E. J. Allaway, G3FKM; J. Bazley, G3HCT*; D. S. Booty, G3KKQ; G. C. Dobbs, G3RJV*; R. L. Glaisher, G6LX; M. Harrington, RS20249; D. J. Lawley, G4BUO; P. A. Miles, G3KDB; E. L. Mollart, RS10977*; R. J. Taylor, G4BEL*; D. Thom, G3NKS; R. S. Unsworth, G3WPF.

IARU: R. J. Hughes, G3GVV, (chairman); E. J. Allaway, G3FKM; D. J. Andrews, G3MXJ; P. Balestrini, G3BPT; J. Bazley, G3HCT; R. Bellerby, G3ZYE*; D. S. Evans, G3RPE; K. A. M. Fisher, G3WSN; C. E. Godsmark, G5CO; R. F. Stevens, G2BVN.

Interference: P. F. Jobson, G3HLF, (chairman); J. Anthony, G3KQF; N. Foot, G8MCQ; A. S. Kessler, G4DXA*; J. E. Martin, GU3YIZ*; K. H. Parker, G8HTA; J. E. Swayne, G3BLE*; J. W. Swinnerton, G2YS; C. L. Turner, G3VTT.

Membership & Representation: J. Anthony, G3KQF, (chairman); E. J. Allaway, G3FKM; D. J. Andrews, G3MXJ; R. G. Barrett, GW8HEZ; J. Bazley, G3HCT; D. S. Evans, G3RPE; L. N. G. Hawkyard, G5HD; J. Heathershaw, G4CHH; G. I. Knight, GM8FFX; W. F. McGonigle, GI3GXP; B. O'Brien, G2AMV; H. S. Pinchin, G3VPE.

Microwave: C. W. Suckling, G3WDG, (chairman); B. Chambers, G8AGN; S. J. Davies, G4KNZ; M. W. Dixon, G3PFR; D. S. Evans, G3RPE; J. N. Gannaway, G3YGF; T. J. Groves, G4KUJ*; H. Griffiths, G4CNV, D. T. Hayter, G3JHM*; K. S. Hutchinson, G4ALN*; C. J. Morcom, G3VEH*; P. G. Murchie, G4FSG; H. W. Rees, G3HWR; K. L. Smith, G3JIX*; P. E. F. Suckling, G4KGC; M. H. Walters, G3JVL.

Propagation Studies: R. G. Flavell, G3LTP, (chairman); L. W. Barclay, G3HTF; T. Damboldt, DJ5DT*; W. M. Dunell, G3BYW; D. S. Evans, G3RPE*; G. H. Grayer, G3NAQ*; M. Harrison, G3USF*; R. J. Hughes, G3GVV; C. E. Newton, G2FKZ; A. M. Pomfret, G3LZZ*; J. Spurling, G4AQI; G. M. C. Stone, G3FZL; A. Taylor, G3DME.

Rally & Exhibition: N. Miller, G3MVV (chairman); P. Balestrini, G3BPT; L. N. G. Hawkyard, G5HD; R. S. Hewes, G3TDR; R. A. Kingstone, G4HHB; W. J. McClintock, G3VPK; G. W. Norris, G3ICI; M. Shardlow, G3SZJ; E. W. Yeomanson, G3IIR.

Raynet: E. W. Yeomanson, G3IIR (chairman); P. Balestrini, G3BPT; M. G. Barker, G8CAC; E. R. L. Bassett, RS16075; G. Cluer, G4AVV; B. L. Goddard, G4FRG; G. R. Jessop, G6JP; G. B. Lear, GW2HPG*; D. J. Maud, G8MBB.

Technical & Publications: D. S. Evans, G3RPE (chairman); R. J. Eckersley, G4FTJ; M. H. Emmerson, G3OQD; J. N. Gannaway, G3YGF; T. G. Giles, G4CDY; P. J. Hart, G3SJX; J. P. Hawker, G3VA; R. S. Hewes, G3TDR; P. J. Horwood, G3FRB*; P. A. Holliday, G3UVZ; A. W. Hutchinson, editor; M. H. McFadden, GI3VCI*; R. O. Phillips, G4IQQ; H. W. Rees, G3HWR; R. F. Stevens, G2BVN.

Telecommunications Liaison: J. Bazley, G3HCT, (chairman); E. J. Allaway, G3FKM; P. Balestrini, G3BPT; S. A. G. Cook, G5XB; D. S. Evans, G3RPE; K. A. M. Fisher, G3WSN; C. E. Godsmark, G5CO; R. J. Hughes, G3GVV; D. M. Pratt, G3KEP; R. W. Price, G4BSO*; R. F. Stevens, G2BVN; C. J. Thomas, G3PSM; F. C. Ward, G2CVV.

VHF: C. J. Morcom, G3VEH, (chairman); M. S. Appleby, G3ZNU; A. H. B. Bower, G3COJ, G. Cluer, G4AVV*; M. Dennison, G3XDV; T. P. Douglas, G3BA; A. H. Dormer, G3DAH*; K. E. S. Ellis, G5KW*; K. A. M. Fisher, G3WSN; J. Hum, G5UM*; R. W. L. Limebear, G3RWL*; J. R. Morris, G4ANB; G. Shirville, G3VZU*; G. M. C. Stone, G3FZL; R. J. Taylor, G4BEL; I. F. White, G3SEK; E. W. Yeomanson, G3IIR*.

VHF Contests: R. J. Taylor, G4BEL, (chairman); D. J. Andrews, G3MXJ*; D. S. Booty, G3KKQ*; L. N. G. Hawkyard, G5HD; F. Mathews, G8ACJ; W. J. McClintock, G3VPK; M. Pharaoh, G3LCH; J. H. Quarmby, G3XDY; C. Sharpe, G2HIF; G. M. C. Stone, G3FZL; C. W. Suckling, G3WDG*.

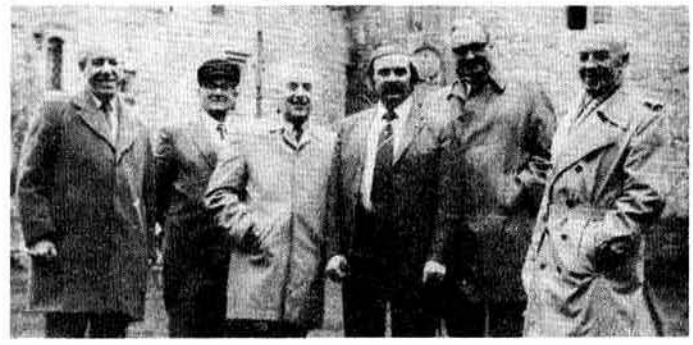
*Corresponding/liaison members

Education Committee lecture

Arising from an invitation from the college principal, a lecture/demonstration was presented at the United College of the Atlantic, St Donat's Castle, South Glamorgan, during the evening of 23 January 1981. This college provides a two-year sixth-form course for 350 students, of whom only 50 are from the UK. One of three colleges, the others being in Vancouver and Singapore, the St Donat's College is at present engaged in setting up an amateur radio station to allow contact between the sister colleges.

Three short talks were given by Messrs W. A. Scarr, G2WS; G. C. Oxley, G8MW; and D. Adams, GW3VBP; and were reinforced with demonstrations of simple equipment by the speakers assisted by Mr L. Newnham, G6NZ. During the lively discussion which followed, questions on QSL cards, third-party traffic, cb operation and the role of the RSGB were answered. Many of the students were interested in the call letters assigned to their country of origin.

Before leaving the college, members of the committee were pleased to learn that a tutor and two students had achieved success in the December RAE. The Education Committee wishes to thank the principal of Atlantic College and Mr J. Devonshire, the teacher responsible for amateur radio in the college, for the opportunity to present these talks. Thanks are also extended to Mr D. Adams, GW3VBP, for the local arrangements.



Members of the Education Committee at St Donat's Castle. L to r: D. Adams, GW3VBP; G. C. Oxley, G8MW; F. C. Ward, G2CVV; J. Anthony, G3KQF, chairman; L. Newnham, G6NZ; and W. A. Scarr, G2WS

CONTEST NEWS

21/28MHz Telephony Contest 1980 results

The last paragraph of the 1979 contest remarked that it would be difficult to imagine conditions to be better in 1980. To reread that report would almost suffice for this year. The difference would be the welcome increase in the number of logs submitted in all sections except to UK receiving. One further difference would be the winner of the UK transmitting. This year the positions of the leading two stations were transposed; G3FXB, with over 1,300 contacts (nearly 900 on 28MHz) and 136 multipliers (64 on 28MHz) took over the winner's mantle from G3MXJ who had very similar figures in 1979.

G3OZF held on to third place, and C5AAP likewise comfortably kept the leading place in the overseas section. Here the increased support brought out a large number of stations in Japan, eastern Europe and North America.

The Powditch Trophy for stations in the UK who operated on 28MHz only was won by GW4BLE who made 1,300 contacts with 74 multipliers. This will give some idea of the number of stations operating from overseas.

The receiving section was again won by BRS32525 with a very substantial margin. The Powditch Receiving Trophy goes to BRS25429 for his 28MHz operation. Overseas receiving was dominated completely by the USSR with 20 logs out of 26 submitted.

A total of 20 check logs was received from overseas and three from G stations. These are gratefully acknowledged by the HF Contests Committee. Dare we say again that perhaps next year conditions could be as good.

UK TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3FXB	541,288	28	G3SEM/A	35,568
2	G3MXJ	504,960	29	G4JMO	25,051
3	G3OZF	443,700	30	G4ANH	22,176
4	G3LDI	349,125	31	G4DBW	21,156
5	G3VPW	345,588	32	G8VF	18,084
6	G3UFY	318,000	33	G4IDJ	17,066
7	GW4BLE*	296,400	34	G4GNK	17,028
8	G4AFJ	288,624	35	G4KBX	15,660
9	G3RRS	283,338	36	GM4HQF*	15,120
10	G4GIR*	255,948	37	G4DXA*	14,256
11	GM4FDM	250,560	38	G3ZGA	12,987
12	G4IUF	231,705	39	G3KSH	10,902
13	G4APL*	218,790	40	GM4JCM	8,772
14	G4CP	217,764	41	G3UHT	8,436
15	G2VJ	190,836	42	G4KAL	8,184
16	GM3RAO	186,300	43	G4KLN	7,872
17	G3WTM	171,456	44	G4DXW	7,665
18	G4DUW	166,803	45	G4FKS	7,068
19	G2QT	153,732	46	G4IXE	6,384
20	G3MJT*	152,073	47	G4DZI	6,298
21	G4FMO	125,855	48	G4BYY	3,363
22	G3VAO	107,004	49	G3SWX	3,268
23	GI4KCE*	102,648	50	G2AJB	1,938
24	GW4IGR	102,303	51	G4KDL	1,776
25	GW4IUK*	77,271	52	G3TGR	1,512
26	G4IPL	51,675	53	G3IRM/M	1,350
27	G4FJT	50,796			

* 28MHz only

UK RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS32525	117,208	5	BRS40634	20,790
2	A9191	44,100	6	BRS28198	17,820
3	BRS25429*	40,152	7	BRS26407	15,912
4	BRS15822	28,710	8	BRS44511	3,825

*28MHz only

OVERSEAS TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	C5AAP	41,684	28	OH7SC	6,426
2	VE1AVX	27,804	29	HA4XX	6,336
3	HA5KKG	22,518	30	HA5KFL	6,180
4	VS6CT	15,225	31	RA9CIU	5,712
5	9J2BO	14,697	32	UA0CBW	5,670
6	UA3QDW	14,520		YU1FJK	5,670
7	UB5VAZ	14,190	34	YU7AJD	5,400
8	HA5KKN	13,794	35	UA6ALL	5,304
9	WB2KTM	13,770	36	LZ1YE	4,998
10	UA6AZA	12,840	37	HA5LX	4,950
11	YO6AWR/P	12,078	38	YU2QM	4,800
12	YU7PEP	12,012	39	UA3UO	4,680
13	UJ8JCQ	11,088	40	OX3AI	4,641
14	UB5HDX	10,899	41	UA3DAT	4,635
15	KA2EWT	10,440	42	JA1DQT	4,560
16	YO6VZ	9,072	43	UD6HB	4,536
17	HA8KSZ	8,850	44	UA6UDB	4,320
18	YU2OG	8,844	45	N7DF	4,242
19	OH7TC	8,760	46	OH5RZ	4,212
20	UL7MAR	8,694	47	K1WJ	4,182
21	UB5QAV	8,316	48	EA8TY	4,158
22	UA9AKJ	8,160	49	HA5NK	3,840
23	SM0JHF	7,605	50	KA1BIJ	3,822
24	HA7SQ	7,296	51	W9MMZ	3,774
25	UA0TO	7,200	52	DA1BJ	3,726
26	JA1SGX	6,570	53	UH8HAI	3,600
27	RA3DKE	6,435	54	LZ2KKZ	3,597
55	UA9AKO	3,528	108	UA4FAZ	1,128
56	HA0KLF	3,468	109	ZL2BED	1,110
	N4MO	3,468	110	HA5KDB	1,107
58	HA2KRZ	3,300		HA7PQ/2	1,107
	UA9CFC	3,300	112	RF6FEU	1,050
60	HA7TM	3,270	113	OK3YK	1,026
61	LZ2YJ	3,240	114	OK2BWH	1,008
62	HA5NG	3,111	115	JA4KWU	999
63	LZ1CW	3,108	116	JA4UQY	990
64	UB5LU	2,925	117	DJ0ZF	984
	YU3TOJ	2,925	118	VO1AW	975
66	OK3KXR	2,700	119	UM8MAA	945
67	LA2AD	2,556	120	JA1AAT	924
68	UA9AGO	2,442	121	YO2KHL	840
69	OH4PW	2,418	122	UA9COI	780
70	RB5QFL	2,343		WA3DMH	780
71	UA9XWU	2,340	124	UA9LCU	765
72	W0CDC	2,250	125	W1CTR	756
73	SM7CZO	2,160	126	YO8ATT	702
74	N4DMX	2,145	127	YO6BJV	684
75	KF8K	2,142	128	LU8CW	675
76	UW9WB	2,100	129	YO7ARY	672
77	OK2PDL	2,079	130	JA1BUI	630
78	UD6DER	2,040	131	N6AA	624
79	UA9OIE	2,013		UA3LAI	624
80	KA8EYY	1,998	133	UA3TAM	600
81	JA6QZ	1,980	134	HA5NK	594
	UA3TN	1,980	135	OH2DN	588
83	JT1AN	1,860	136	SM4BTF	546
84	UA9YFU	1,815	137	JA1EDQ	528
85	HA1KVK	1,782	138	JA1NTK	504
86	YO7ARZ	1,749	139	KA1BXN	468
87	UA3DJU	1,680	140	K7NW	459
88	OK1AGN	1,656	141	JA6EFT	420
89	OH7KJ	1,650	142	OK1KIR	408
90	UB5VCC	1,603	143	UA0FCL	396
91	EA7VE	1,500	144	LA9PT	375
92	JA1CQT	1,488	145	OK1KZ	360
93	UC2WAZ	1,470	146	EA2OJ	306
94	OK1DKS	1,452	147	EA2CR	270
95	JA7KM	1,440	148	RB5EUV	204
96	JF3BFS	1,431	149	UA3ST	203
97	CT4MS	1,410	150	EA3ARX	180
98	LZ1KDP	1,404	151	W2CC	165
99	VE1BFZ	1,365	152	HA7KSV/2	108
100	YO4ASV	1,344	153	W7QK	96
101	UA9CIQ	1,320	154	JI1PCN	90
102	YU3TFS	1,272	155	PA0HTR	66
103	UA9CIY	1,268		UA6LXL	66
104	OH7NW	1,254	157	YU4VWQ	63
105	WA2UDT	1,251	158	WA6JUR	42
106	YO4KCC	1,200	159	HA5KHZ	30
107	YU7SF	1,155	160	JF3EGT	12

OVERSEAS RECEIVING

Posn	Station	Points	Posn	Station	Points
1	UA3-142-1256	14,472	14	UB5-059-558	2,988
2	UB5-073-1610	11,304	15	UQ2-037-84	2,058
3	UA4-095-320/G	10,500	16	SP9-3354-KA	1,944
4	UB5-073-3137	10,429	17	UP2-038-892	1,911
5	UA1-143-181	9,477	18	UA9-154-1537	1,701
6	UA3-151-311	8,883	19	UQ2-037-93	1,551
7	UA9-084-200	8,832	20	YO2-12261/CS	864
8	UA3-142-59	7,590	21	G4WP/SWL9K2	720
9	UA3-142-1182	7,125	22	DL-P40-1802206	693
10	UA9-146-020	6,615	23	UB5-078-992	630
11	UA1-136-588	5,814	24	UA3-170-1078	588
12	UB5-060-2119	4,473	25	JA1-7777	456
13	UA4-152-361	3,654	26	JA8-3769	160

RSGB 21MHz CW Contest 1980 results

As can be seen from the results, the number of entries is considerably down on last year. Conditions undoubtedly had an adverse effect, but even taking that aspect into account the support from the UK was disappointing. Opinions vary widely, as the quotes below show, but quite a number of stations requested that the contest be extended to 2000gmt (an hour later) to take advantage of the Caribbean dx before the band closes.

Log keeping as usual was of a very high standard, though one or two stations have been penalized for undeclared duplicates and a failure to enclose a list of multipliers worked.

Comments

QRP

"Enjoyed the party", *W4IV;* "Vy bad condx", *OZ5KU;* "Last year 36 per cent QSOs were dx, this year 70 per cent, *G4BUE;* "Both new antennas didn't work", *G4CZB;* "Plenty of G activity – must use a beam next year", *G3KKQ;* "Next year hope to have an indoor beam", *G8PG.*

Other sections

"Most enjoyable test but oh where have all the Gs gone?", *ZD8TC;* "Thoroughly enjoyable – plan to be back next year", *K2PZ;* "Without doubt the most boring contest of the year. Activity from G minimal", *9J2BO;* "Enjoyed the contest very much", *W3PYZ;* "Thank you for a nice contest", *JI1PCN;* "My first RSGB contest", *JH3WKE;* "G stations have a good eye to hear my signals", *JR1JUR;* "Notice a change in the WX, scraped the snow off the car yesterday morning!", *G3AAE/VP9;* "Nice short, sweet contest, looking forward to the next one", *ZB2EO;* "Condx between OH and G poor", *OH1FM;* "Quite enjoyed the test but feel it would be better linked with 28MHz", *G4CP;* "Hope that messrs 4CP, 3WPF and 3OZF forget to send their logs in", *G3TMA;* "As promised, this year I've sent in a log!", *G3MZV;* "This must be one of the finest contests in the calendar", *G3UFY;* "All in all very enjoyable", *G3PSM;* "A disappointing contest – no propagation in the south", *G4BUO;* "Most enjoyable", *G5PQ;* "I'm not on the 'wanted list' this year", *G3PDL;* "A contest of sensible time and duration", *G2RO;* "Conditions – 'yeugh' ", *GM4EJI;* "My first cw contest for 17 years – most enjoyable", *G3OZF;* "Enjoyed the contest", *G3JKS;* "Most enjoyable – look forward to next year", *GW3MPB;* "This was my first-ever contest – frustrating during the first hour to have the band full of 599 Gs

that you cannot work", *G3OJM;* "The first time I have submitted an entry – enjoyed the contest", *G3JQJ;* "Herewith log to keep me out of 'Black List' ", *G6GH;* "Tried for multipliers this year – it didn't work!", *G3DQL;* "Enjoyed the event again", *G2HDR;* "Quite interesting to hear several Gs not replying to the UI8, UM8, UH8, UJ8 stations calling them!", *G4BWP/9K2.*

Finally thank you for your support, comments and anecdotes.

G3HCT.

BRITISH ISLES SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	G3WPF	63,882	16	G4DUW	24,123
2	G4CP	61,050	17	G3JKS	23,166
3	G3HVX	53,265	18	GW3MPB	22,308
4	G3TMA	50,274	19	G3JJG	19,116
5	G3MZV	49,585	20	G3KSH	18,576
6	G3UFY	45,648	21	G3OJM	9,555
7	G3PSM	42,048	22	G4COU/A	8,514
8	G4BUO	41,313	23	GM3PPE	6,132
9	G2QT	39,396	24	G3COJ	6,039
10	G5PQ	36,570	25	G3JQJ	4,071
11	G3PDL	36,300	26	G3AWR	3,960
12	GM3OXC	32,154	27	G6GH	2,640
13	G2RO	30,624	28	G3DQL	2,600
14	GM4EJI	26,460	29	G2HDR	2,442
15	G3OZF	25,200	30	G4FKS	1,776

QRP BRITISH ISLES SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	G4BUE	14,595	5	G3KKQ	1,092
2	G4ARI	4,200	6	G8PG	384
3	G3VMY	3,528	7	G3IRM	192
4	G4CZB	2,451			

QRP REST OF EUROPE SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	OZ5KU	1,350	3	OZ1CCB	450
2	UB5CI	693	4	YO5TA	105

QRP REST OF WORLD SECTION

Posn	Callsign	Points	Posn	Callsign	Point
1	VE3KZ	960	3	WA0VBW	693
2	W4IV	816	4	JA0BMS/1	117

REST OF EUROPE SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	YO2BKK	5,760	21	OH6MK	1,380
2	UB5ZAW	4,932	22	YO4BMJ/9	1,200
3	UB5LAE	4,797	23	OK3VSZ/P	1,080
4	UW3ZV	4,092	24	UA3QBC	987
5	UB5QAV	4,059	25	DL1OO	945
6	YU4YA	3,600	26	YO8DD	903
7	YU7ECD	3,366	27	OH1FM	816
8	ZB2EO	3,300	28	UA1OAI	756
9	UA1OAD	3,000	29	UA3XN	744
10	UB5ZFH	2,730	30	OK1TW	540
11	UA6ADV	2,322	31	UA3TAM	510
12	UB5ZAT	2,220	32	UA3TAG	480
13	YU7NGO	2,133	33	OK1DAV	435
14	UW3PU	2,079	34	UA3EAL	360
15	UA6AJO	1,836	35	OK3TBN	240
16	UA4FAT	1,740	36	OK1ATZ	210
17	UA4CK	1,628	37	OK3YDP	180
18	UB5QCK	1,620	38	OH2DN	165
19	UB5QBG	1,540	39	G4FAM/OE2	99
20	SM0JHF	1,386	40	YU7SF	36

REST OF WORLD SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	UJ8JAS	5,382	23	UM8MBA	720
2	ZD8TC	4,125	24	UA9WBO	696
3	K2LE	3,846	25	JH3WKE	630
4	K2PZ	2,970	26	JA1KRU	588
	UA9CAL	2,970	27	JR1JUR	522
6	UL7QF	2,400	28	PY1VT	432
7	9J2BO	2,370	29	G3AAE/VP9	396
8	UH8HBR	2,160	30	UA9LBM	390
9	UA9UCK	1,920	31	JA8CJY	330
10	UA0HAO	1,890	32	JA1BSU	285
11	AA4NN	1,539	33	K7NW	240
12	UA9FV	1,272	34	UA9CBR	228
13	W3ARK	1,161	35	JR1FRW	216
14	UA9CFV	1,128	36	JA4ESR	214
15	VE3MFT	1,080	37	JA4XHF	204
16	W3PYZ	984	38	KL7HBK	150
17	JI1PCN	966	39	JA2KPV	96
18	W1CNU	882	40	JH1MTR	81
19	AL7H	837	41	UA9CIQ	42
20	ZS6AJY	768	42	JA1AAT	6
21	JA6CNL	756	43	JA1OCL	3
22	JK1OPL	735			

Check logs and late entries received from UA9CGL, UA1TBQ, UA9UAR, G4BWP/9K2, YO4BII, UV3FL, G3FXA/P, G4BYG, G3HRY, UH8EAA, G4FDC, and LZ2VU.

1,296MHz Cumulative Contest 1980 results

There can be no doubt that the band occupancy on 1,296MHz is improving steadily, and that the availability of commercial equipment for this band is partially responsible. Stations, too, are using higher powers and better preamplifiers with a significant improvement in their performance.

The general idea of 1,296MHz cumulative contests is popular and does more to stimulate activity than any other type of event, but opinions vary as to the best timing. However, there appears to be no overwhelming reason to introduce any change for 1981, and unless the committee suddenly receives a flood of correspondence to the contrary, the event will be repeated later in the year.

The majority of stations submitted logs for Session 7 although conditions were much better during several of the earlier sessions. Session 4 produced the best dx, such as it was.

The Hillbillies, in the guise of G4HWA, G4APA, G8KWI and G4FON are to be congratulated not only upon returning the highest score in the event but also upon enduring 10h of darkness operating /P on the Berkshire Downs in winter. Roger Taylor, G4BEL, from the comfort of The Rampart, was the runner-up. *G2HIF*

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Sessions
1	G4HWA/P	6,569	59	ZL53b	G8SFI	288	3; 4; 7
2	G4BEL	5,340	52	AM51b	GW8HZK/P	228	4; 6; 7
3	G3XDY	5,300	39	AM76c	PA0THT	386	4; 6; 7
4	G3TDG	4,746	–	AL51g	–	–	4; 5; 6
5	G8IFT	3,920	43	YM50d	G3XDY	220	4; 6; 7
6	G8DKK	3,031	38	ZL08d	PA0EZ	384	2; 3; 7
7	GW8HZK/P	2,859	27	YL05j	G4BEL	243	3; 5; 7
8	G3TQF	2,219	–	ZM24d	G3XDY	175	4; 6; 7
9	G8LMW	2,092	–	ZM24d	–	–	3; 6; 7
10	G8FMK	1,860	20	ZL26h	G3XDY	151	2; 5; 7
11	G8AYY	1,411	26	ZM41b	G4BEL	131	3; 4; 6
12	G8ART	1,380	25	ZM45d	GW8HZK/P	150	1; 2; 7
13	G4CCH	1,238	20	ZN48h	G8GTP	114	1; 5; 7
14	G8GXE	1,118	32	ZL48h	G4HWA/P	61	2; 3; 7
15	G3WHK	1,114	38	ZL49d	G4HWA/P	84	2; 3; 7
16	G4ERP/P	503	7	ZL01j	G3TDG	150	1; 2; 5
17	G4FZL	454	15	ZM25f	G8FAK	73	1; 2; 4
18	G3XWZ	318	5	ZN64d	G4KCT	85	1; 2; 4
19	G4FSG	80	6	AM66g	G4FAW	20	1; 4; 5
20	G8ABI/A	34	–	ZL39c	G4HWA/P	75	3; 4; 5

Check logs acknowledged with thanks from G3IEM (381pt from Session 6 only), G8KAX (380pt from Sessions 3 and 5 only), G4FRE/A (273pt from Session 4 only).

432MHz Cumulative Contest 1980 results

The 1980 432MHz Cumulative Contest proved to be as popular as ever, with the return to an eight-day interval between sessions meeting with general approval. Conditions varied from poor during Sessions 1 and 2 to very good during Session 6. Nearly one third of the contestants claimed a best dx of over 400km in this session.

The standard of log-keeping was high, but the increasing tendency for stations to omit data from their 427 cover sheets and/or to submit logs only for their three scoring sessions did little to help the adjudication.

Many stations well known for their activity on 432MHz and whose callsigns appeared in contestants' logs failed to send in their own entries. The reasons for this are not clear and it would be interesting to know if these stations are deterred more by the timing of the event or by their QTHs.

Congratulations to the winner, Roger Taylor, G4BEL, and to the runner-up, Liverpool University ARS, G3OUL, both of whom submitted immaculate computer print-outs of their entries.

G2HIF

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Sessions
1	G4BEL	1,250	195	AM51b	PE1DPX	402	3; 5; 6
2	G3OUL	889	119	YN46f	G3KEF	407	3; 6; 7
3	G8CXK/P	834	174	ZM45j	F1EZQ	665	4; 5; 6
4	G4CQR	747	–	ZL49d	GD2HDZ	422	4; 5; 6
5	G3TDG	735	–	AL51g	–	–	3; 4; 6
6	GD2HDZ	698	66	XO68b	G4JUG/A	435	4; 6; 7
7	GW8HZK/P	680	114	YL05j	G8PNN	375	3; 4; 7
8	G3WHK	674	146	ZL49d	GD2HDZ	420	2; 4; 6
9	G3XDY	625	99	AM76c	DK2NH	623	4; 6; 7
10	G8RZP	569	134	ZL48a	PA0EVH	428	3; 4; 6
11	G8TFI	535	131	ZL38c	GD2HDZ	392	3; 4; 6
12	G4CCH	520	104	ZN48h	G8ABP	381	2; 6; 7
13	G8DKK	506	106	ZL08d	PA0VVH	435	3; 5; 7
14	G8OHM	450	102	ZM41f	G8PWX	270	4; 5; 6
15	G4GFX	365	77	YM79a	PA0FRE	–	2; 4; 6
16	G8FMK	350	92	ZL26h	PA0FRE	365	4; 5; 6
17	G4FZL	332	80	ZM25f	GD2HDZ	275	3; 5; 6
18	G3AMW	325	63	ZN19f	G3GIM	274	2; 4; 6
19	G8GXE	312	106	ZL48h	GD2HDZ	403	2; 3; 5
20	G4DDC	310	161	ZL47f	PA0EZ	418	3; 4; 6
21	G8KAX	291	77	AL32g	F1EZQ	542	2; 6; 7
22	G8IFT	289	79	YM50d	GD2HDZ	259	4; 6; 7
23	G4BVY	268	172	YM79a	–	–	1; 3; 5
24	G8MKD	240	68	ZM41h	GD2HDZ	260	1; 4; 6
25	G8IEM	212	67	ZK05d	G4CCH	286	2; 3; 6
	G8CDL	212	67	ZL08d	PA0FRE	338	4; 6; 7
27	G3XWZ	205	63	ZN64d	PA0FRE	410	2; 4; 6
28	G8ABI/A	197	–	ZL39c	G3OUL	265	3; 4; 5
29	G8ART	180	56	ZM45d	GD2HDZ	298	1; 2; 7
30	G8TLL	178	40	AM73g	PA0EZ	330	5; 6; 7
31	G4FSG	111	24	AM77a	PA0EZ	263	1; 5; 6
	G8LMW	111	–	ZM24d	–	–	1; 3; 7
33	G8LXY	56	29	ZL09f	G3XDY	113	3; 5; 6

Check logs acknowledged with thanks from G3RSD/P, GW3XWZ/P (20pt from Session 3 only) and PE1EWR. G4FRE/A (82pt from Session 4 only).

70MHz CW Contest results

Overall conditions were very poor for this contest, although a few operators found a lift at the start. Entries are, however, significantly up on the January 1980 event, with 26 single-operator and five multi-operator stations, compared with a total of 17 stations last year.

The contest seems to have satisfied most competitors, although the scoring system and timing were commented on by a few. G3XBY reported an average scoring rate of 8·8 contacts per hour, with many more still to work at the end of 5h. He would have liked one more hour. This slow rate was due to the very poor conditions prevailing. G4APA/P found plenty of activity and found 5h about right. The majority of entrants made no comments and therefore the rules seem to be a reasonable compromise.

Congratulations go to G3UKV, winner of the single-operator section, who also won in 1979 and 1980. His comments included: "thoroughly enjoyed the contest – what a marvellous band." Winner of the new multi-operator section was GD4IOM, who was also responsible for giving a number of entrants their best DX. Certificates go to the winner and runners-up in each section.

Check log acknowledged with thanks from G3VPS/P.

G3FZL

SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3UKV	283	43	YM28h	GM3YOR	371
2	G3XBY	229	44	ZM52j	GM3WOJ	331
3	G3JXN	170	48	ZL39e	GD4IOM	405
4	G3UUT	161	33	AM61e	GM3WOJ	408
5	G3PSP	149	39	ZL29f	GD4IOM	390
6	G3NPI	141	35	ZM76f	GD4IOM	340
7	G3JEQ	133	35	ZL59f	GD4IOM	425
8	G3PGN	117	32	AL22j	GD4IOM	430
9	G5UM	110	26	ZM35b	GM3WOJ	302
10	G3OIC	107	25	ZM41e	GD4IOM	265
11	G3TCT	106	32	ZL56d	GW3UCB/P	253
12	G3LVP	105	28	AL33c	GD4IOM	461
13	G3TCU	98	30	ZL58f	GD4IOM	430
14	G3BPM	94	33	ZL48d	GW3TAA/P	215
15	G4HMG	90	28	ZL38e	GD4IOM	390
16	G8VN	70	18	ZM03d	G3JXN	180
17	G4ARI	61	17	ZM24j	G8GP	159
18	G4FKI	52	26	AL31a	G3UKV	220
19	G3YYF	48	14	AK03e	G3XBY	215
20	G3FIJ	47	15	AL05e	G3TCT	138
21	G3OZT	43	13	ZK13b	G3XBY	170
22	GM3TAL	41	7	YQ73a	G3UKV	386
23	GM3YOR	39	7	YQ65f	G3UKV	375
24	G4HYG	8	2	YN28c	G3XBY	171
25	G5HD	7	3	XK09d	GW3CBY	90

MULTI-OPERATOR

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GD4IOM	313	25	XO67d	G3LVP	461
2	GW3TAA/P	221	37	YM55f	G3PGN	243
3	G4CVI	172	41	ZL59f	GM4GEJ/A	575
4	GW3UCB/P	163	26	YN75f	GM4IGS	298
5	G4APA/P	79	18	YN79d	G8GP	227
6	G3FVA	39	13	YN49e	GD4IOM	175

National DF Final 1980 results

The 1980 RSGB National DF Final, run by the Dartford Heath DF Club in the garden of England was held on 14 September. Eighteen teams assembled for a first transmission at 1250 on Shipbourne Common. Station C provided a good signal strength, being located in Hayes Wood, 11km from the start. It was operated by Paul Homer and John Everist.

Station A however, although providing an easily readable signal, was not all that strong. This transmitter was located 6km to the south of the start and was manned by Charlie Oliver and Colin Merry, who were operating a specially-built QRP transmitter from an island in the River Medway near Tonbridge.

Not all competitors managed to identify station B. Those teams who did obtained a bearing slightly west of south, and a half-quadrant was issued to the remainder. This station was situated among scrubland on the edge of the Ashdown Forest near Five Hundred Acre Wood (a possible decoy!).

Most competitors opted to find Station C first, which entailed a long run through a pine forest. All teams were well-spaced on arrival making "clocking in" very easy. Next favourite as a first transmitter was station B, the farthest at about 25km from the start as the rf flies. This station, manned by Peter Woollett and Phil Wolfe, turned out to be a very long climb out of a valley for those who entered from the west. It was then a drive back towards the start location to access station A via a network of footpaths and bridges along the riverbank to where the hidden transmitter was located under a sea of brambles by a railway embankment.

Roger Parsons completed the hunt first at 1532. The rendezvous was held at Hever Village Hall where the mighty Nascom presented the tabulated results in record time (program copyright 1980, G4CDM). The 1950 Council Trophy and various prizes were presented by Peter Balestrini, then President of the RSGB.

Posn	Name	Club	Time of arrival TX "A"	TX "B"	TX "C"
1	Roger Parsons	Burton	1532	1412	1459
2	Mike Hawkins	Chelmsford	1434½	1408	1448
3	Ian Butson	Colchester	1439½	1535½	1400½
4	Trevor Gage	Mid-Thames	1508	1433	1545
5	Eric Mollart	Mid-Thames	1441½	1547	1403
6	Dave Holland	South Manchester	1554	1406	1454
7	Peter Lisle	Mid-Thames	1557	1404	1504
8	Paul Tyler	Mid-Thames	1527	1414	1601
9	Chris Plummer	Mid-Thames	1603	1426	1524
10	George Whenham	Coventry	1527	1615	1416½
11	Brian Bristow	Mid-Thames	1620	1548	1416
12	Bill North	Mid-Thames	1620½	1444	1547½
13	A. Simmons	Mid-Thames	1556	1629½	1454½
14	G. Taylor	–	–	1428½	1533½
15	Bill Pechy	Mid-Thames	1601½	–	1426
16	Paul Yates	Salisbury	1621	–	1421
17	Chris Wells	Mid-Thames	1621½	–	1546
18	Derek Newman	Slade	–	1535	–

10GHz Cumulative Contest 1981 rules

0900–2000gmt, 19 April, 17 May, 21 June, 19 July, 16 August and 13 September

Three activity periods will count towards the final score. Entrants unable to operate for three periods are strongly encouraged to send in logs as a record of their activity, but will not be eligible for an award. Such logs will be included in the table of results.

During each activity period, a station may change location once (see general rule 5b). For the purpose of the contest the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

Entrants from stations outside the UK will be accepted, whether or not they are RSGB members.

Stations operating inside the UK must list on their cover sheet the national grid references of all sites used.

Awards will be made to the winner, the runner-up, the leading fixed station operating from his/her home QTH, the leading non-UK station and to the highest placed station who has not won an award before in this event. In addition, the leading UK station will receive the annual Alpha award.

Except where modified before, the following general rules for vhf/uhf/shf contests, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 10b, 11b, 12a, 13–24.

All entries and checklogs to VHF Contest Committee, c/o Dr C. W. Suckling, G3WDG, 46 Windsor Close, Towcester, Northants.

Contests calendar

4 April	1,296MHz Trophy & SWL *(Rules in March issue)*
4–5 April	SP DX (CW) *(Rules in April issue)*
5 April	432MHz Trophy & SWL *(Rules in March issue)*
5 April	Ropoco 1 *(Rules in March issue)*
11–12 April	EEC DX *(Rules in March issue)*
12 April	Low Power *(Rules in February issue)*
18–19 April	Second Spring BARTG VHF/UHF *(Rules in March issue)*
18–19 April	SP DX (Phone) *(Rules in April issue)*
19 April, 17 May, 21 June, 19 July, 16 August, 13 September	10GHz Cumulative *(Rules in April Issue)*
19 April, 17 May, 21 June, 19 July, 16 August, 13 September	Microwave *(Rules in April issue)*
25–26 April	HM The King of Spain *(Rules in April issue)*
25–26 April	Italian QRP Club Field Day *(Rules in April issue)*
25–26 April	Helvetia *(Rules in March issue)*
26 April	DF Qualifying Event Burton-on-Trent *(Rules in April issue)*
26 April	144MHz CW *(Rules in March issue)*
2–3 May	144MHz & SWL *(Rules in April issue)*
2–3 May	432/1,296/2,304MHz *(Rules in April issue)*
10 May	DF Qualifying Event Chelmsford/Colchester *(Rules in April issue)*
17 May	Region Round-up (CW) *(Rules in March issue)*
24 May	144MHz Low Power & SWL *(Rules in April issue)*
30–31 May	CQ WW WPX CW *(Rules in March issue)*
31 May	DF Qualifying Event Coventry
7 June	70MHz & SWL
13–14 June	HF NFD *(Rules in February issue)*
21 June	DF Qualifying Event Dartford Heath
27, 28 June	Summer 1·8MHz
4–5 July	VHF NFD & SWL *(Rules in March issue)*
12 July	DF Qualifying Event Salisbury
19 July	3·5MHz Field Day
26 July	DF Qualifying Event South Manchester
2 August	144MHz QRP & SWL
9 August	DF Qualifying Event Oxford
11–12 August	Meteor Scatter
16 August	70MHz Trophy & SWL
23 August	DF Qualifying Event Slade
30 August	Ropoco 2
5, 6 September	SSB FD
***5–6 September**	144MHz Trophy & SWL IARU VHF (144MHz)
20 September	DF National Final Mid-Thames
***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

Microwave Contest rules

0900–2000gmt, 19 April, 17 May, 21 June, 19 July, 16 August, 13 September

The following bands will be active on these dates: 2·3GHz – 19 July; 3·4GHz – 19 April; 5·7GHz – 21 June and 13 September; and 24GHz – 17 May and 16 August. Each band will be scored separately and each band leader will receive a certificate. In the case of 5·7 and 24GHz, only the highest scoring day will count, although logs should be sent in for both activity periods.

During each activity period, a station may change location once (see general rule 5b). For the purpose of the contest, the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period. Entrants must include the national grid references of each site used on the cover sheets. A separate cover sheet is required for each band entered.

This contest has no connection with the 10GHz Cumulative Contest, except for the dates and timing of the event.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 10b, 11a, 12a, 13–24.

All entries and checklogs to VHF Contest Committee, c/o Dr C. W. Suckling, G3WDG, 46 Windsor Close, Towcester, Northants.

144MHz Contest rules

1600–1600gmt, 2–3 May 1981

The following general rules, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4f, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13–24.

All entries and check logs to: VHF Contests Committee, c/o Mr M. Pharoah, G3LCH, 49 Streathbourne Road, London SW17.

144MHz Low Power Contest rules

0900–1700gmt, 24 May 1981

The transmitter output must not exceed 25W p.e.p.

The following general rules, published in the January 1981 issue of *Radio Communication* will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13–24.

All entries and check logs to: VHF Contests Committee, c/o Mr F. Mathews, G8ACJ, Easedale, Woodway, Merrow, Guildford, Surrey GU1 2TF.

432/1,296/2,304MHz Contest rules

1600–1600gmt, 2–3 May 1981

Multi-operator stations may operate concurrently using a maximum of two different callsigns.

Individual band and overall tables will be published.

On 432MHz scoring will be by the radial ring system and at 1pt/km on the other bands.

The following general rules, published in the January,1981 issue of *Radio Communication* will also apply: 1, 2, 3, 4d, 5a, 6a, 7a & b, 8b, 9, 10b, 11a, 12a, 13–24.

All entries and check logs to: VHF Contests Committee, c/o Mr M. Pharoah, G3LCH, 49 Streathbourne Road, London SW17.

DF Qualifying Event Burton-on-Trent

Date: 26 April 1981
Map: OS Sheet 128, 1:50,000 series, Derby and Burton-on-Trent.
Assembly: 1300bst for start at 1320bst.
Location: Picnic area beside Foremark Reservoir, ngr 335 243.
Competitors requiring tea are asked to notify Mr R. Parsons, School House, Newborough, Burton-on-Trent (tel 02837 5496, home, 0283 216161 ext 649, office) not later than 19 April 1981.

DF Qualifying Event Chelmsford/Colchester

Date: 10 May 1981
Map: OS Sheet 168, 1:50,000 series, Colchester and the Blackwater.
Assembly: 1300bst for start at 1320bst.
Location: Fordham Heath, opposite The Star PH, ngr 945 264.
Competitors requiring tea are asked to notify Mr R. Brocks, 30 Rowan Drive, Heybridge, Maldon, Essex (tel 0621 55707, home, 0245 67111, ext 2039, office) not later than 2 May 1981.

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
Mondays					
1100	G4IRI	3·550	A1/A3J	Bolton, Lancs	
1200	G3GNS	1·910 3·550	A1 A1	Locking, Avon	
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][13]
2030	G2FKO	145·525	F2	Bideford, Devon	
Tuesdays					
1830	G4CWN	144·100	A1/A3J	Stoke-on-Trent, Staffs	
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	G4BFJ G4DKK	144·625	F2/F3	Banstead, Surrey Tooting, SW London	
2000	G3VHE	145·350	F2	Swindon, Wilts	[1]
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]
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]
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][12][13]
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	
2 00	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	
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	
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]

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
[13] Horizontal

CLUB NEWS

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published in the July issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **June** issue should reach them by **18 April**, and for the **July** issue by **13 May**.

Club programmes are given in order of date, subject, time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR W. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT

Ainsdale (AARC)—13 and 21 April. Ainsdale Scout HQ. Full details from G2CUZ.

Bolton (B&DARS)—1 April (Talk on Raynet, by Eric Walton, G4FSN), 15 April (Talk on police radio, by J. McLoughlin, G3NNR), 22 April (Natter night, RAE and cw classes). Horwich Leisure Centre, Horwich, Nr Bolton. Sec Alan Hartley, G8PRH.

Bury (BRS)—14 April ("Amateur television", by G8HBR), 7.30pm. Informal meetings on other Tuesdays in month for cw tuition and practice, constructional projects and natter and noggin sessions. Mosses Community Centre, Cecil Street, Bury. Details from Chris Marcroft, G4JAG, tel Ramsbottom 2168.

Manchester (South Manchester RC)—3 April ("14MHz cw tx", by T. Winter, G4AOK), 10 April (" 'Atomic' experiments", by T. Gleeson, G8TUG), 17 April (No meeting), 24 April (Homebrew contest), 1 May (Mini df), 8pm. Informal meetings, Mondays, 8pm. Sale Moor Community Centre, Norris Road, Sale. Further details from David Holland, G3WFT, tel 061-973 1837.

St Helens (StH&DARC)—Please note change of venue: now at Conservative Association Rooms, Boundary Road, St Helens. 2 April ("Mountaineering in the Himalayas", by Mike Dermott); 9 April ("Raynet", by Eric Walton, G4FSN, and Paul Gaskell, G8PQD), 16 April (Club quiz), 23 April (Tape/slide lecture), 27 April (Evening visit—Greenall Whitley Brewery—details from club sec), 30 April (Club 2m df foxhunt competition 1981—first leg (of four)), 7.45pm. Club nets: Sundays, 11.30am, 145·575MHz (S23) and Wednesdays, 7.30pm on 1·95MHz. Details from sec Paul Gaskell, G8PQD, tel St Helens 25472.

Thornton Cleveleys (TCARS)—Please note change of venue: now at The Sports Centre, Victoria Road, Cleveleys. 6 April ("Model railway engineering", by G4ATM), 13 April (Natter night), 20 April (Easter Monday—informal meeting), 27 April ("Early days in radio", by G6DN), 7.30pm. RAE classes Fridays, 7pm. Slow morse transmissions now Tuesdays and Wednesdays, 1·975MHz, 7pm. Sec A. Parr, G3IWP.

Wirral (WARS)—1 April ("Motor rallying", by G8VPF), 15 April (Surplus equipment sale), 7.45pm. Sports & Recreation Centre, Grange Road West, Claughton, Birkenhead. PRO Gordon Lee, G3UJX, tel 051-677 1518.

Wirral (W&DARC)—8 April (SOTA Communications Systems Ltd, talk and demonstration of their products), 22 April (Lowe Electronics Ltd, talk and demonstration), 8pm. Sports Concourse, West Kirby, Wirral. Publicity sec J. Mills, G8NOY.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094 786 333.

Doncaster (DMI of HEARC)—Mondays and Thursdays, 7.30pm. New venue: Royal Naval Association Building, North Bridge, Doncaster. The new facilities include an operating room, a construction and general meeting room, a lecture room and a licensed bar. Details from sec Robert Lane, G4AWU.

Halifax (Northern Heights ARS)—1 April (AGM), 15 April (Construction competition judging), 22 April (Committee meeting), 29 April (Visit to Bradford Industrial Museum), 13 May ("HF aerials", by G3NXM), 7.45pm. Bradshaw Tavern, Bradshaw, nr Halifax. One of the members who had all his mobile gear stolen from his car was, fortunately, insured. It makes last month's remarks on amateur radio insurance seem very pertinent. Sec G8NUC.

Hornsea (HARS)—Wednesdays; 15 April ("Lasers", by G8TKY), 29 April (Slide and tape lecture on Welsh Contest Group's 1979 CQ WW), 8pm. The Mill, Mill House, Attic Road, Hornsea. Apart from keeping their side up in various contests, most members of the club will have been involved in a Raynet exercise in early March. A recent visitor was Pete, G4EJP, a past-chairman and now DA1PR. G3PWN continues to conduct the very successful cw classes at the beginning of each meeting. Sec Mrs J. Heathershaw, G4CHH.

Hull (H&DARS)—3 April (Contest preparation), 10 April (DF hunt), 24 April (RAE questions and answers), 1 May (Contest preparation), 8 May (Logbook keeping and QSL past and present), 8pm. RAE classes are held at 9pm each Friday. Kingston Community Centre, Fountain Road, Hull. Rally is on 7 June, for which preparations are well advanced. Details from rally manager, G8EAH, QTHR. New sec Mrs Heather Cunliffe, 12 Pearson Avenue, Hull, tel 0482 447355.

Leeds (White Rose RS)—8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Club net 8pm, Thursdays. RR2 and a number of area reps will be available at the White Rose Rally on 12 April. See you there. Sec G4GDL.

Scarborough (SARS)—Mondays 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. At the recent AGM a new committee was elected under the chairmanship of G4FLM (G4JAQ was re-elected as sec). It has already met to formulate a programme for the coming year which will be published as soon as possible. Robin, G8MWS, the new contest manager, has high hopes for the coming year. Sec G4JAQ, tel Scarborough 862638.

UK FM Group Northern—5 April, 3 May, 7.30pm. The Royal Hotel, Church Street, Barnsley. This group runs GB3NA, the Barnsley 144MHz repeater. If you would like to help support this machine, contact sec G8PLJ.

Wakefield (W&DARS)—7 April (AGM), 21 April (On the air/natter night), 5 May ("Inland waterways", an illustrated lecture by G4JKH). 19 May (Junk sale), 2 June (144MHz df hunt, 7.30pm, Holmfield House), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec Rick, G4BLT, can often be heard on GB3NA, if you want further details. Tel Wakefield 255515.

Wharfedale Repeater Group—The hq at Otley Chevin not only serves a fine ale, but also does a good pie and pea supper. On the technical side GB3WF has given trouble-free service for nearly two years, mains failures being the main problem. This will be overcome soon.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320

Atherstone (AARC)—The club has recently become affiliated to RSGB, and on 9 April a talk on Raynet will be given by Norman Read, G8CXL. The regular pattern of meetings is second Thursday in each month (Talk, demonstration, visit, etc), third Thursday in each month (Informal), 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G8SYE, tel Atherstone (08277) 5995.

Birmingham (Midland ARS)—The programme details of the first meeting in the new club premises had not been finalized when this was written but the date has been fixed for 21 April, 8pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (University of Birmingham ARS)—Club night has changed to Fridays during term, 7.30pm. Tuesdays (RAE classes), 7.30pm. Club room, second floor Students' Union (above shop). Sec G4LCM (QTHR as G8VNC).

Coventry (C Technical College ARS)—On 9 February, the new shack was opened by Tony Gillham, disc jockey of Mercia Sound—Coventry's commercial radio station. The station was then operated on 21MHz, the first contact being made by another Mercia disc jockey—Jim Lee, G4AEH. The event was featured in the local news bulletin next morning and later the club's pro, Glenn Ross, G8MWR, was interviewed in a half-hour programme devoted entirely to amateur radio. On 4 May club members will visit the studios of Mercia Sound. The club meets regularly on Mondays, 7pm. Winfray Annexe of the college. Sec G8ISJ. *All* visitors welcome.

Hereford (HARS)—The club is looking for a guest speaker who would be prepared to talk on a topical amateur radio subject at a special meeting of local amateur radio clubs to be held in Hereford. Expenses and overnight accommodation at a local hotel would be paid by the club. Anyone interested or who can recommend a speaker should contact the secretary. Regular meetings are held on the first and third Friday in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Kidderminster (K&DARC)—14 April ("Amateur television", by G5KS and G8GUN), 28 April (Informal night on the air—vhf and hf), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Malvern Hills (MHRAC)—14 April (RSGB tape and slide lecture). Regular meetings start with a morse class on the second Tuesday in each month, 7.30pm. The Foresters' Arms, Wilton Road, Barnards Green, Malvern. Sec G4BVY, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Shrewsbury (Salop ARS)—16 April ("Power generation", by G. Blakeley, G4CBM), 23 April (Natter night), 30 April ("Astronomy—getting started", by Dave Goodwin, G8KSC), 7 May (Natter night), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3VWH, tel Shrewsbury (0743) 51833.

Solihull (SARS)—21 April ("Colour tv servicing", by Tim Brady, G8HEB). On 2 May there will be a beer and skittles evening—full details available from the secretary. Regular meetings on the third Tuesday in each month, 7.30pm. The Manor House, High Street, Solihull. Club nets (G3GEI), Fridays, 9.30pm on 1,960kHz, and (G8ZLJ), Thursdays, 9pm on S19 or next lowest vacant channel. Sec G4JDL, tel 021-745 3098. Morse classes available.

Stoke-on-Trent (North Staffs ARS)—The club meets on the first and third Mondays in each month (Lectures, etc), other Mondays (Natter nights, Raynet and club station, G4BEM), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. New sec G8FGR, 61 Westacre, Bucknall, Stoke-on-Trent ST1 6AF.

Some members of the North Staffs ARS. L to r: (front) G4HUO (chairman), G4CJM, G3VTE (vice-president), G8YPD, G4DPV (treasurer), G8TFJ, G8FGR (secretary); (back) Dave (swl), Gary (swl), G8YCR, G8JBZ, Graham (swl), G4CJD, G8WGI, G4DVA, G3TJP and G8UAR. *Photo:* Steve Mollatt, G8KXM

Opening of Coventry TCARS's new shack. L to r: Gary Hudson (Mercia news); Jim Lee, G4AEH (Mercia dj); Richard Lawley (Mercia engineering); Tony Gillham (Mercia dj); Glenn Ross, G8MWR, (club pro); Jim Witt, G8ISJ, (club secretary); and Derek Warriner, G8UGM, (shack manager). *Photo:* R. G. Bailey, G3WCQ

Worcester (W&DARC)—27 April (Construction contest and skittles/buffet night), 8pm. Old Pheasant, New Street, Worcester. Sec G4EKG, tel Evesham (0386) 41105.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Bolsover (BARS)—New club. Wednesdays, 8.30pm. Angel Hotel, Bolsover. Sec Alan Turford, G8HPQ, tel Chesterfield 824972.
Derby (DADARS)—1 April (Foolish junk sale), 8 April (Talk on the High Peak railway, by Alan Rimmer), 15 April (Natter night), 22 April ("The Crich Tramway", by John McCann), 29 April (Technical film show), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Derby (Nunsfield House ARG)—3 April (An evening with "Nascom"), 10 April (Quiz and buffet evening), 17 April (Open evening), 24 April (Technical film show), 7.45pm. Nunsfield House, Boulton Lane, Alvaston. Sec Ian Cage, G4CTZ, tel Derby 71875 or 799452.
Grimsby (GARC)—2 April ("The RSGB", a talk by Region 4 RR Martin Shardlow, G3SZJ), 16 April (To be arranged), 22 April (Visit to police HQ). New Alexandra Social Club, Cleethorpes. Sec Trevor Matthews, G3RGC, tel Grimsby 884060.
Loughborough (LFARC)—Every Friday, 7.30pm. Brush Sports & Social Club, Fennal Street, Loughborough. The club will be manning a demonstration station, GB2GCR, at "Steam 81", an event at the Quorn and Woodhouse Station of the Great Central Railway, on Easter Sunday and Monday, 19 and 20 April. Sec Brian Goodall, G8BUB, tel Shepshed 3558.
Louth (L&DARC)—14 April (Radio Humberside visit) Eastgate Union Church, Eastgate, Louth. Sec R. M. Padbury, G4GAB.
Melton Mowbray (MMARS)—17 April ("Some aspects of the law, and births, marriages and deaths", a talk by G3NVK. This meeting will be held at the Register Office, High Street, Melton Mowbray; numbers are strictly limited on this visit, please contact Richard Winters, G3NVK). The club 144MHz fm net is on Friday evenings at 1930 on 145·575MHz. The normal venue is St Johns Ambulance Hall, Asfordby Hill, Melton Mowbray, third Friday in each month, 7.30pm (except June, July and August). The society boasts some 50 paid-up members with 13 students who have just passed the RAE and a further 23 on the RAE course at the Melton Mowbray College of Further Education. Treasurer, Richard Winters, G3NVK, tel Melton Mowbray 63369.
Nottingham (ARCON)—It would seem that ARCON is having trouble with large attendances and lack of space; at a recent junk sale visitors were being turned away. This should be resolved when building operations are completed at the Sherwood Community Centre. Information from Mike Shaw, G4EKW. Meetings Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham.
Scunthorpe (SARC)—7 April (Junk sale), 14 April ("TV transmission", by G8HUA), 21 April (Crossword, G8TIY), 7.30pm. Grange Farm Hobbies Centre, Franklin Close, Scunthorpe. Sec Joe Sheardown, G8TIY, tel Scunthorpe 732438.
Spalding (S&DARS)—3 April (Open evening), 1 May (Discussion on rally), Pinchbeck Teachers Centre, Pinchbeck, Spalding. 3 May (Spalding Rally at Spalding Grammar School, Haverfield Road, Spalding). Sec Gordon Parker, G4EMK, 29 Saxon Way, Bourne *(Note change of address).*

That is all the information received by RR4 for April. If your club is not mentioned, your club secretary has not been doing his job. G3SZJ can be contacted by letter, telephone or on the air.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.

Chilton (Rutherford Laboratories RC) G4DRL—Contact sec for meeting details. P. A. Braham, Building R18, Didcot, Oxon OX11 0QX.
High Wycombe (Chiltern ARC)—Last Wednesday in each month, 8pm. John Hawkins Ltd Canteen, Victoria Street. Contact sec P. B. Shears, G8TLK.
Maidenhead (M&DARS)—21 April (Black box clinic). Sec J. Patrick G3TWG, tel Bourne End (06285) 25275.
Reading (RARC)—14 April (Beginner's night/on the air), 28 April (Demonstration and talk by Richard Porter, G3UXK, of Microwave Modules Ltd), 12 May (HF NFD/alignment evening). Sec Chris Young, G4CCC.
Vale of the White Horse (VWHARS)—7 April ("QTH locators", by John Morris, G4ANB), 5 May ("Interference", by Don Franklin, British Telecom), 5 June ("The RSGB", by RSGB general manager D. Evans), 8pm. White Hart, Harwell Village. Details from G4FLX, tel Wallingford 37482, or G3SEK, tel Didcot 812584.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY. Tel Stoke Fleming 505.

Camborne (Cornish RAC)—2 April (AGM), 7 May (Sale of surplus equipment), 7.30pm. SWEB Clubroom, Pool, Camborne. The club has now about 250 members—180 of whom are licensed. Cornish net weekdays on 3·714MHz at 10am and on Sundays at 11am on 3·692MHz. Full details from pro Ron, G2ABC, tel Truro 78393.
Exeter (EARS)—Second Monday in each month, but informal meetings on the first, third and fourth Mondays at the Scout Hall, Okehampton Street, Exeter. The club will set up a station for "An international weekend on the air" for the disabled on 1, 2 and 3 August at St Loyes Training College, Exeter, with call signs GB2IYD and GB8IYD. RAE classes continue and over 30 people will be sitting the next exam. 13 April (Inter-club quiz), 7.30pm. Community Centre, St Davids Hill, Exeter. Full details from pro Geoff Draper, 1 Carlyon Close, Heavitree, Exeter EX1 3AZ.
Exmoor (ERC)—Every Thursday, 7.30pm. "Loughrigg", East Street, South Molton. Fifty per cent of those taking the last RAE passed, and another RAE course is being held on Mondays at 7pm at "Homedale", Brayford. Full details from Mrs Pat Jemmison, "Homedale", Brayford, Nr Barnstaple, tel Brayford 327.
Newquay (N&DARS)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. 4 April ("SCRs and triacs", by G3XFL), 22 April (144MHz foxhunt). Full details from Bob Lawrence (now G4LDA, congrats) 29 Greenhill Road, Wadebridge PL27 6AY, tel Wadebridge 3649.
Plymouth (PRC)—Alternate Mondays, 7.30pm. Tamar Sec School, Paradise Road, Millbridge, Plymouth. Preparations are going ahead for the Plymouth Rally on Sunday 24 May, and club meetings are well attended. Full details from Mrs Trisha Day (now G4KYY, congrats) c/o G3ZYY, tel Saltash 5913.
Torbay (TARS)—Every Friday with a special meeting on the last Saturday in each month, 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. The club has a net with Hamlyn, with which Torquay is twinned, on 14·280MHz on Sundays at 10am, and a party from Hamlyn hopes to come over early in April. Torbay net on 3·756MHz Mondays, Wednesdays and Fridays at 1030am and on Saturdays at 10am. Full details of all club activities from pro Les Mays, G2CWR, tel Paignton 558714.

RR9 would remind all members that the Region 9 ORM is on Sunday 5 April, 2–5pm, at the Lord Eliot Hotel, Liskeard. Talk-in on S22. Hope to see you there along with the President, the general manager and zonal rep.

L to r: Jack Anthony, G3KQF, RSGB executive vice-President, talking to Jack Petchy, G3HOO, and Alan Dunford, G3XOF, about the Zycom 25800

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Cardiff (CRSGBG)—13 April ("My visit to the Denver Convention 1980", by Ellis Evans, GW3CDH), 11 May (Film show), 7.30pm. The Pantmawr Inn, Pantmawr Estate, Cardiff. Further details from Joe Brooke, GW3GHC.
Swansea (SARS)—Thursdays, fortnightly, commencing 16 April ("Winning NFD—how to achieve it", by Alan Davies, GW3INW). The secretary is anxious to contact willing operators/swls who would be prepared to give a lecture/s of mutual interest to club members at future meetings. Club net each Sunday, 1000gmt, 28·530MHz. Net controller Cen, GW4BIQ. Technicians Common Room, 2nd Floor, College House, Swansea University. Further details from Roger Williams, GW4HSH, tel Swansea 404422.

REGION 11—RR P. H. Hudson, GW3IQ, Silhill, Dinas Dinlle, Caernarvon

Dolgellau (Meirion ARS)—2 April (AGM), 7 May ("Royal Signals activities", by GW4KEV), 3 June ("Amateur radio direction finding", by GW3GKZ), 1 July ("VK trip and targets", by GW4KDP), 7.30pm.

Ship Hotel, Dolgellau. Sometime between March and May it is hoped to hold a picnic for yls and visitors.

REGION 13—RR. A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 19 April ("Antarctica", by GM3JDX/VP8HE), 17 May ("Video", by GM4DTH), 7.30pm. Provosts Land, Leslie, Fife. Details GM4HBG, tel Glenrothes 771057. The club is host to the 1981 Scottish Amateur Radio Convention to be held in Glenrothes on Saturday 12 September, details from GM3YBQ, tel Kirkcaldy 65789.

REGION 15—RR I. J. Kyle, GI8AYZ, 2 Galgorm Gardens, Ballymena, Co Antrim BT42 1BA. Tel 0266 2024

Ballymena (BRC)—Thursdays (Natter night). Wednesdays (Morse and RAE classes), 8pm. 70 Nursery Road, Gracehill. Details of future events will be on GB2RS. Sec GI4HCN.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. Planned meetings include "Sophisticated test equipment" and "The Short Sunderland". 90 Belmont Road, Belfast. Attendances now top 60. Details of the Parkenaur Rally on 17 May are available from GI8RJW or GI8TAX. Sec GI3USS.

Jordanstown (Ulster College ARC)—GI4FZU. Enquiries to Students Union, Block 11, NI Polytechnic, Jordanstown.

Omagh (West Ulster ARC)—Second Monday in each month. McAleer's, Campsie, Omagh. Sec GI8TST, tel Omagh 46837.

RR15—I hope to get around to all affiliated clubs and societies before my term of office expires on 30 June. Nominations for RR and AR posts are required as soon as possible.

REGION 16—RR M. S. Appleby G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.

Braintree (B&DARS)—First Monday in each month (Informal), 8pm. Third Monday in each month (Formal), 7.45pm. 20 April ("Members' lecture evening"—members are invited to give talks of 10 to 15min duration on any topic). Braintree Community Centre, Victoria Street. Details from Alan Heritage, G4EOG, tel Braintree 25109.

Chelmsford (CARS)—7 April ("Weather and radio propagation", by Michael Hunt, admission by (free) ticket only), 5 May ("Interference", by G3PMX), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE (ex-G8KQE), tel Silver End 83094.

Colchester (CRA)—2 April ("Some of the latest amateur radio equipment", by Peter Walters, G3OJV), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—8 April (Brains trust), 29 April (AGM), 8pm. Club Room, Rose and Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

G8TVL (organizer), G8LDR (operating), G8XBE, G8XDU, G4JKS, G3JKS (club chairman), G4CNH and Ken Blatchford, all members of Verulam ARC, watching the action at G8VER in St Albans when a special event station in February helped to raise nearly £400 for the city hospital

Lowestoft (L&DARC)—3 April (Junk sale), 24 April (Visit to BBC Radio Norfolk), 7.30pm. North Suffolk Teachers' Centre, Lovewell Road. Details from Terry Weatherley, G3WDI, tel Lowestoft 63216.

Norwich (Norfolk ARC)—Wednesdays, formal meetings alternate with informal meetings and morse classes. 1 April (AGM), 29 April (Visit to Food Research Institute), 7.45pm. Crome Community Centre, Telegraph Lane East. Details from P. Gunther, G8XBT, tel Norwich 610247.

Vange (VARS)—Thursdays, with first meeting of the month as regular junk sale. 9 April (HF station on the air), 16 April ("Whistlers", by G8NJL), 23 April ("Oscar", by G4FUF), 30 April (DF hunt), 8pm. 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.

Fareham (F&DRS)—1 April (Receivers and modulation), 15 April (RSGB slide show), 6 May (Transmitters and tvi). Sec G4ITG, tel Fareham (0329) 234904.

Fareham (HMS Collingwood ARS)—Club night every Wednesday at 7.30pm. Ex-Service personnel welcome. Sec G8OWJ, tel Fareham (0329) 234139.

Guernsey (GARS)—3 April (AGM). Ordinary meetings Tuesday and Friday of each week. The Lodge, La Corbinerie, The Oberlands, St Martins. Sec GU8OVO, tel Guernsey (0481) 21430.

Poole (PRAS)—The AGM will take place at Poole Technical College on 1 May, 7.30pm. Sec Phil Ciotti, G3XBZ.

Royal Naval ARS—21st anniversary year; the following programme has been arranged: 18-21 April (HMS *Belfast* activity period, GB2RN/G4HMS, details from G3HZL), 16 May (Anniversary dinner at HMS *Mercury*, Petersfield, details from G3JFF), 14 June (Mobile rally at HMS *Mercury*, details from G4DIU), 10 October (AGM and social at HMS *Mercury*, details from G3LIK). Weekly nets: 0900 Sundays and 1900, Wednesdays, 3,660kHz; 1900 Tuesdays, 3,520kHz; 2000 Tuesdays, 145·400MHz. Monthly code run from G3BZU on 3,520kHz at 2000 on the first Tuesday in each month, Sec G3LIK, tel 0705 55880.

Southampton (SRSGBG)—Change of venue, club meetings and RAE class will be held every Wednesday at 7.30pm, Toc H House, Little Oak Road, Bassett, Southampton. For future events contact, G4COM, tel Fairoak (042133) 3017.

South Dorset (SDRS)—7 April (AGM 7.30pm prompt). Civilian Canteen, Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Cheshunt (C&DRC)—1 April (Junk sale), 8 April (Informal), 15 April (Visit to Brookmans Park), 22 April (Informal), 29 April (RAE revision), 8pm. The Church Rooms, Church Lane, Wormley, Herts. Sec Mike Bragg, tel Waltham Cross 32114.

Chiswick (ABCARC)—21 April ("Simple wire antennas and beams", by G5ZA), 7.30pm. The Committee Room, Chiswick Town Hall, W4. Sec G3GEH, tel 01-992 3778.

Edgware (E&DRS)—9 April ("Film sound tracks", by A. Masson, G3PSP), 23 April (Should we abolish the RST system), 7.30pm. The Watling Centre, 145 Grange Hill Road, Burnt Oak. Sec G3MNO, tel 01-907 1237.

Southgate (SRS)—9 April (A talk on the sinking of the Titanic by a Marconi representative, Mrs B. Hancy, historian GEC/MIMC), 7.45pm. The Scout Hut, Wilson Street, Winchmore Hill Green N21. Sec Val Austin, tel 01-360 5832.

St Albans (Verulam ARC)—28 April ("Antennas for the lf bands", by G3XAP), 7.45pm. Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, Nr St Albans, Herts. Sec Hilary Claytonsmith, G4JKS, tel St Albans 59318 for details.

Wanstead (East London RSGBG)—12 April ("Technical topics and the dc conversion rx", by Pat Hawker, G3VA), (please note new date) 3pm. Wanstead House, The Green, Wanstead E11. Sec G3PKQ, tel 01-558 2928.

The West of Scotland ARS morse class in the club shack. L to r: GM4GIH, GM8XZF (who has since passed the test), GM4HYF, Colin (swl, standing behind), GM8IHQ and GM8YVG. *Photo:* **Allan Dimmick**

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ

Bristol (BRSGBG)—27 April (Talk and film by Ted Halliday, G3JMY, on his recent visit to USA) 7.15pm. Queen's Building, Bristol University. Sec G8GLQ, tel Bristol 621253.

Bristol (North Bristol ARC)—Please note change of secretary—now G4EUV. Meetings Fridays, 7.30pm. Self Help Enterprises, Braemar Crescent, Northville, Bristol.

Cheltenham (CARS)—2 April (Joint meeting with G3SSO and Smiths Industries Radio Society to hear about vmos devices, by Siliconix Ltd), 17 April (Natter night). 7.30pm. The Old Bakery, Chester Walk, Clarence Street (rear of public library). Sec G4ILI, tel Cheltenham 43891.

Cheltenham (Smiths Industries RS)—2 April (Joint meeting with G3SSO at Cheltenham ARA HQ). Sec G8UJJ, tel 0242-67 2175.

Yeovil (Y&DARC)—2 April ("Transmitting loop aerials" by G3MYM), 9 April ("Ground wave propagation", by G3MYM), 16 April ("Equivalent circuits", by G3MYM), 23 April ("Not-so-common aerials", by G3MYM), 30 April (AGM). Tuesday evenings 2m fm club net, new time, now 2030—new frequency, S14 + or — QRM. Sec G3NOF, tel Yeovil (0935) 24956.

MEMBERS' ADS

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the 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: **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

Going digital, Avo 8 Mk5, comp with case, leads, £50 ono. *Wanted:* R1155 rx, preferably comp, no mods etc. RF ammeters, 500mA, 1A. G3OZE, QTHR. Tel York 59769, ask for Len.

FT480R, three months old, £295. G-whip plus lf whip, used once, £20. FET meter, as new, £20. GW4EVJ, QTHR. Tel 0792 843948.

AR88LF, rack mounting, spare valves, manual, spkr, £30. Ferrograph REH5 three speed, reel tape recorder, tapes 4 × 7in, 2 × 10in, two spare spools, £20. Buyers collect. *Wanted:* Drake MS4 spkr. Tittensor, 7 Westridge Drive, Beaumont Park, Huddersfield. Tel 0484 652129.

BS5 scan board for TS520 series, additional unit for SM220 monitorscope to give panoramic display, as new, £25. J. W. Henderson, 53 Dumyat Drive, Falkirk FK1 5PA. GM4HKW. Tel 0324 25559.

Icom 701, linear feed box for Icoms, HQ1 minibeam, matched 6SJ6Cs, broadband mobile antenna transformer, dummy load, various transformers, hv lt. *Wanted:* Variable wide spaced capacitors for atu, ex-TU5B? G3NZT, QTHR. Tel Newby Bridge 31550.

Trio TS120S 200W p.e.p. with ACPS30, £415. FT101 with 160m, £210. Hygain 12AVQ vert antenna, £32. Mosley Elan 2-el beam, 10/15m, £45. G4JFE, QTHR. Tel 0635 41613, Berks.

RTTY station, complete: 'PLX system plus mods, keyboard, tu, tone generator, built-in psu, 9in professional monitor, £130. Pye uhf base station R460/T461, SU0 toneburst, mint cond, £80. Storno 500, two nicads, charger, S20, S22, R5, toneburst, helical antenna, leather carrying case, spares, manual, £50. 2m linear, QQV6/40, built-in psu, £25. G4GLP, QTHR. Tel Camberley 24706.

FT227RB, no mods, mint cond, boxed, £175. Trio TR3200, mint cond, 6ch, £130. Icom IC2E, as new, £140. G8LGE, QTHR. Tel 0924 825025.

CDE rotator AR20L, near new cond, £25 ono. Carr paid. G8XLN, QTHR. Tel 0724 64574.

Arac 102 28 2/10m a.m. fm ssb rx, £60. Osker SWR200 power/swr meter, £20. Adonis AM502G compressor mic, £25. Telex CB88 lt wt boom headset, £20. Pye PF1 tx/rx, base charger (CE), £35. Elaviscript 3 22 range pen recorder, £30. HP65 card programmable calculator, cards, etc, £40. G4DIW. Tel Wivenhoe (020622) 4120.

Drake SSR1 rx, gen cov, solid-state, £95. G4JPQ, QTHR. Tel Stowmarket 3870, evenings.

SR9 2m rx, xtalled for S20, S22, vgc, £30. TM56B scanning rx, 2m, fully xtalled for 10 channels, 12V, 240V ac, vgc, £55. Tel Weymouth 786930.

TR7010 Trio ssb tx/rx, 12V base or mobile mount incl, used little, in orig packaging, £90 or offers. 10-el Jaybeam long Yagi, £8. 46-el Jaybeam multibeam, 70cm, £15. G8JDH, QTHR. Tel Andy, 01-650 5465, evenings, 0689 39427, daytime.

Heathkit SB104A 100W all solid-state tx/rx, SB614 remote vfo, professionally built, £320 ono. G3VKP, QTHR. Tel Cambridge 842488, day, Cambridge 842978, evenings.

Digital voltmeter LM1010Z, Solartron, good wkg order, comp with tech manual, £30 ono. Buyer inspects and collects. G4BNA, QTHR. Tel Swindon 29965.

Trio R300, eight months old, exc cond, owner had great results with it, £120 ono. RS42604, 24 Rigby Close, Waddon, Croydon, Surrey CR0 4JU. Tel 01-686 6520.

Complete station: FT101, fan, cw filter, 160 10m matching, three sets spare valves, HQ1 miniquad, AR40 rotator, pwr/swr meter, approx 40ft coaxial and control cable, comp manuals, instructions, plugs, leads etc, £450 ono. G3YEC. Tel Three Rivers (03763) 27064.

Trio 7200G, R3 7, S20 24, S0, S8, £90. Handheld Starphone on RB2, £20. G8WQV. Tel Medway 221061.

Jaybeam 4-el 4m Yagi, 4Y/4M, £10. 5-el 2m crossed Yagis, 5XY/2M, £10. Both exc cond, only erected briefly. Buyer/s collect. G8DV, QTHR. Tel Cheltenham (0242) 20195.

Yaesu FT7, £200. HQ1 minibeam, £70. G3WMU. Tel Brighton 688105, day, 605704, evening.

Complete 2m ssb/cw station, Trio TR7010 tx/rx, recently serviced, Microwave Modules 100W linear, Lunar low noise preamp, mic, stand, manuals, leads, etc, all for £225 ono. May split. Buyer collects or carriage at cost. G8RWG, QTHR. Tel Camberley (0276) 32195.

Drake TR4CW, RV4C remote vfo, spkr, ac psu, Drake 7075 mic, £370 ono. Tel 0474 534694.

BC221AK freq meter, 400 cycle modn, orig charts, hb psu, £12.50. G3GAD, QTHR.

PF1 pocketphones, xtalled, SU8, two sets nicads, £30. Zenit B camera, X2 teleconverter, MIR 1 38mm lens, electronic flash unit, £50 lot or may split. G8GMU, QTHR. Tel 0203 611101, after 6pm.

4m fm Ultra 4B6 with nicad, xtal for 70·26, £27. G3SLI, QTHR. Tel Reading (0734) 479850.

Variac 2kVA, banish bad mains, £30. Transformer, 6·3V, 6·3A, 2,000V insulation, £4. Leach relays, 220V tpdt, £2. Various 24V relays, £1. Cathode circuit overload relay, £3. All new or good. Plus post/carriage. GD3TIU, QTHR. Tel 0624 3417, after 4 April.

FT101 Mk 1, incl 160m band, good cond, £275. FC301 antenna tuner unit, as new, £85. G2CBC, QTHR. Tel 0733 65080.

Robot 800 Super terminal, rtty/ASCII/morse, sstv keyboard, very recent purchase, used few hours only, £495 ono. G3XUA. Tel Nottingham 52461, office.

Trio R1000, as new, £240. Datong FL2 multimode audio filter, £80. Datong vlf converter, £20. All in perfect cond, matched pair of 6KD6 valves, new, £5. G4IZG, QTHR.

Drake TR4CW, RV4C remote vfo, spkr, ac psu, Drake 7075 mic, £370 ono. Tel 0474 534694.

Heathkit HR1680 amateur bands comms rx with Joymatch atu and antenna, built by ex-professional radio engineer, incl handbook, mint cond, £150. Buyer collects. Hercus, 28 Brunswick Place, Aberdeen AB1 2TF. Tel Aberdeen 51306.

Liner 2, internal 3N204 preamp, known history, £75 pp. GW8AAP, QTHR. Tel 07456 3561.

Eddystone EA12 rx, plinth spkr, handbook, exc cond, £200. Yaesu YO100 scope with book, as new, £85. Buyer collects or carriage by arrangement. G2AK, QTHR. Tel Aldridge (0922) 52518.

KW2000B, exc cond, ac supply, l/spkr, calibrator, 2X6146Bs final, 160 10 irt, itt, irtt, vox ptt, some spare valves, manual, buyer to arrange transport, bargain, £240 ono. Lewis. Tel 0872 863198 (Cornwall).

ZX80 Sinclair, new early December 1980, comp with manual, leads, powerpack, all boxed, £75. GM4GXD, QTHR.

Collectors' items—war surplus: BC453B Q-fiver, £5; 19 set atu variometer, Russian inscription, £8; RF24 and RF26 vhf converters, each £5; Class C wavemeter xtal unit, £3; Class D wavemeter, £5; RAF A1134 amplifier intercom, in case, £5; Infra-red image converter tube CV147, £3; National HRO mobile vibrator psu, cased, £7; AM power unit type 270, 600V dc 200mA, in beechwood box, £12. Partridge Joymatch receiving atu, £2. Joystick mobile car-top harness, £3. Minimitter MW/1 base-loaded 160m mobile whip and coil, £9. 2m halo, £3. Hermes long carriage semi-electric Swiss commercial typewriter, some accounting features, cover, £80. All agreed carriage extra or collect. G2FKS. Tel 0223 47220.

KW204 ssb/cw, 160/10, fb cond, £150 ono. Eddystone 898 dial, £10. MFJ cw filter, £10. Prefer collect. G4LA, QTHR. Tel 0434 603085.

TenTec XC1 harmonic generator, seven ranges 1kHz-1MHz, £8. Antenna rotator CDE, with controller, 30m cable, £50 ono. Drake R4B rx, Drake T4XC tx, homebrew 230V psu, mint cond, will not split, £500. Technical Associates speech compressor, £10. Heathkit code oscillator MD1416, £4. Yaesu 2m handheld tx/rx FT207R, NC9C charger, leather case, helical antenna, nicads dud so low price, £170. Yaesu Monitorscope YO100, mint cond, £70. Heath linear amplifier 2kW SB220, mint, £420. Heath dummy load, 50Ω, 1kW Cantenna, £18. Altai condenser mic, hand, dual impedance, £10. Versatower P40, 40ft, ground post, 2yr old, earth mounted, buyer excavates and removes, £240 ono. Mosley Mustang MP33 3-el tribander, new cond, fitted with G3JKF antenna processor, 30m UR67 feeder, £140 ono. Homebrew power-unit, 12V dc, 20A, untested, as seen, £5. Equipment may be viewed at Crawley, Sussex, by arrangement. All large items buyer collects; small items carriage extra. Ken Franklin, G3JKF, tel Crawley (0293) 28080, or Reg Cole, G6RC, tel Crawley 882072.

GEC BRT400E gen cov rx, good cond, works, offers. G4GGL, QTHR. Tel Reg 0707 51351.

Sound Air 2m monitor rx, mint cond, £50. Trio 2200GX, immac, 12 channels fitted, nicads, charger, carrying case, helical, £120 ono. Car cassette player, comp with spkrs, negative earth, £20. G8YKO, 46 Ladbrooke Road, Ashton-under-Lyne, Lancs.

Racal 17 with ssb converter, in metal case, mint cond, spot on, £285. Regency aircraft scanner rx. G8XHV. Tel Grimsby 71211.

FT7B, FP12 dc psu, YC7B digital, all in mint cond, boxed, the lot, £365. C-scope 950D metal detector, mint, £60. 48-el 70cm Jaybeam, never been used, £25. G4FQF, QTHR. Tel Romford 47998.

Yaesu FT221, inc five xtals, £300. Yaesu FT227R, £150 ono. Stolle 2050 rotator with 8-el Yagi, cables, £40. Hansen FS602 p.e.p., rms, as new, £30. Redifon R408 communications rx, 13kHz 28MHz, 15 bands, xtal filter, details on request, £450. G8VIZ, QTHR.

Smart R107, 17·5-1·2MHz, three band, ae trimmer, bfo, noise limiter, spkr, antenna etc, 24 × 15 × 13in, £20. Rayer, Reddings, Longdon Heath, Upton-on-Severn, Worcs. Tel 2244.

Trio TS180S hf solid-state tx/rx, 160 10m, variable rf power, dfc, four memories, scan etc, extra ssb filter fitted, unmarked, as new, £545. Might part exchange something interesting. G4JKP, QTHR. Tel Leicester (0533) 899958.

Eddystone 770U rx, 150 500MHz, Admiralty version, £90. MM432/144, 70cm transverter, £95. 5FP7 sstv crt, scan coils, £10. Pye F460 uhf base, £125. *Wanted:* SX42. NC183D or similar rx, any condition, cash waiting. W.H.Y.? G4AFY, QTHR. Tel Kidderminster (0562) 63358.

Icom IC201 multimode, £225. Bearcat 220 rx, £180. FDK Quartz 16, S20 23, 1, R3 7, 0, £85. TTU type CV89 plus sc/dc converter, £20. GEC vdu type 4000, £30 ono. G8BRG, QTHR. Tel 0636 892531, after 6.30pm.

Sommerkamp FL200B and FR100B with top band, £150 ono. Buyer collects. G4HTS. Tel 061-865 3873.

Trio R820, the ultimate rx, immac, orig packing, inspect and collect, £500. Tel 061-439 1346.

QSY HB9, definitive, 40ft strong steel lattice tower, telescopic, winch, etc, two 46-el 70cm multibeams, multibeams free with tower, or separate, no sensible

offer refused over £40. Buyer inspects and collects. *Wanted:* Valves type 7651, YL1110. Juson, 25 Church Lane, Sarratt, Rickmansworth, Herts. Tel Kings Langley 62105.

Manuals: Collins latest KWM2R/A, £8; Normal KWM2/A, £5; 62S1, £5; Hallicrafters SX101A, £3; Drake TR6, £2; all new, plus postage. Hygain 153BA, £35. Various glass and metal valves, AR88, HRO, Hallicrafters etc, state types required, sae for reply. G3DAM, QTHR.

Drake TR7 and a.m., cw filters, NB7, AUX7 programmed 0-1·5MHz, FA 7, £800 ono. Desk mic, £15. MN7, and B1000, £90. Manual, £10. PS7, £70 ono, excellent, little used. Going homebrew. G4FKR, QTHR. Tel Sparsholt (near Winchester) 557.

TS520 cw filter, vfo 520, SP520, all immac, orig packings, manuals, carriage extra or buyer collects, £375 ono. G4GLC, QTHR. Tel 0509 212583, after 6pm.

Trio TS520 12V/240V, £295. Matching TV502 2m transverter, £85. Amtech cw filter, £15. All manuals. G6AS, QTHR. Tel 021-706 3709.

Drake R4C, all xtals, noise blanker, matching MS4 spkr, cost over £500, offered at £250. Drake DC4 power supply, £50. Drake hand mic, £10. FRG7, unused, fitted extra filter for ssb, £150. Buyers collect. G4LW, QTHR. Tel Trowbridge 3166.

Transformers, two Gardener filament transf, 6·3V, 20A, and 6·3V, 12A, Parmeko 6·3, 6A, 5V, 3A, 400-0-400 at 0·15A, Sprague capacitors, 50mfds, 2·5kV, not Elytro, pair 81Js, pair TY125 with ceramic bases, part exchange for 70cm rx converter, or any 70cm gear. Gm4JEJ, 1 Osborne Terrace, Arbroath.

CR100 (B28) rx, wkg, 60kHz 30MHz, six bands, manual, buyer collects, £10. G4CWM. 18B Oakdale, Harrogate, N Yorks. Tel 0423 67586.

BXL 50ft telescopic tilt-over tower, hd motor, remote control, fb cond, £295. TA33 hd director, £45. Datong filter FL1, £42. Datong UC1, £90. Creed rx model 75, silence cover, £15. G3TLC, QTHR. Tel 0603 45244.

FT101 Mk2, comp serviced, boxed, as new, £275. 9R59DS comm rx, boxed, as new, £60. Pye Cambridge, fitted S0, S20-21, R5, R7, fitted toneburst, £60 ono. G3YTW, QTHR.

Trio TS520 tx/rx, mint cond with built-in 12V power supply, spare pa valves, £275. Trio TS7600 fm 2m tx/rx, comp with RM76 remote microprocessor scanning/display unit, £210 ono. GW3YKZ, QTHR. Tel 0633 858314.

Standard C8800, £200. FT250 (same as FT200), G3LLL clipper, spare valves, homebrew psu for low power stages, full 10m coverage, £200. 6ft diameter solid aluminium dish, £25. G8CDL, QTHR. Tel Luton 28667.

Trio TS120V with cw filter, mic, rx input for transverter, £300 ono. G8FUL NOT QTHR. Tel Saffron Walden 24919, evenings.

IC240, good cond, orig accessories, £120. PF70, 2m, three channels, toneburst, charger, £70. Doug Mounter. Tel Watton (0953) 882110.

Icom IC215, channels R0 7, S8, S19 23, incl nicads, helical antenna, £110. G8HCK, QTHR. Tel 0274 33466, ext 80515, daytime.

Yaesu Musen FRG7, mint cond, in orig packing, fitted cw filter, £160. Converter 144 146MHz, Daiwa atu, £22. Datong morse tutor, £35. Buyer collects. Tel Wakefield 270525.

Heath SB610 scope, £65. Heath V7AU vvm, £15. 10XY, brand new, £27. All plus postage. RTTY gear cheap, incl 7BERP, 7B, autos, tables etc, fully secure box car trailer, 8 by 4 by 4ft. G3LDI, QTHR. Tel Wymondham 603463, evenings.

FT227R with a.r.e. scanner, n/c mic, £185 ono. Palm 4, eight xtals, extra nicad, £125 ono. G8PRR. Tel 01-340 4339.

FT101Z, as new, £399. TR7010, 2m, ssb, 144·1 144·35, £95. Tel 01-640 6020.

FT480R 2m multimode, few months old, prefer buyer examines/collects, £315. G8VQJ, QTHR. Tel Bury St Edmunds (0284) 5004.

HROMX, nine coils, needs attention, manual, £15. Codar AT5 tx, £6. Codar preselector, 1·5-30MHz, £5. Class D wavemeter, manual, £6. BC221N, manual, £10. Woden UM1 modulation transformer, £5. Collect or carriage extra. R. Mathews. Tel Stafford 780437.

Collins 30L1 linear in new cond, £450. G3UFZ, QTHR. Tel Bishops Stortford (0279) 723088.

Heath HW101 tx/rx with Heath 23 psu, ssb/cw, 10/80m needs attention, almost completed 2m transverter, separate ps, spare pa valves, manuals included, £99. G4DAB, QTHR. Tel 01-440 1208.

Trio TR2200G, R2, R7, RR7, S19 20, S22, nicads, orig cond, £80. Set teletype manuals/parts, list model 33-page printer, £5. G8FSL, QTHR. Tel 01-360 5221.

Creed 7B teleprinter, £25. KW2000E tx/rx and psu, moderate use only, offers. Buyer collects either. J. S. Cushing, G3KHC, 20 Kildowan Road, Goodmayes, Essex IG3 9XW. Tel 01-590 3801.

70cm Pye fm Compact handheld on 433·2, SU8, incl nicads, nice cond, £39 ono. 2m rig, *PW* Nimbus, well-built, £50. Phone for details. Pentax "K" (or "M") mount 135mm telephoto lens by Carenar, new, unused, boxed, £29 ono or w.h.y.? Dave, G4KOB. Tel 051-924 4228.

Bearcat 220FB, scanning vhf, uhf rx, four months old, £190. G4JFQ. Tel 0373 66512.

Liner 430, fitted Modular Electronics PAU2 preamp, covers 432-432·48, 432·5-432·98, for beacons 433-433·48, Oscar 8, £150. Two 18-el 70cm Parabeams, incl phasing harness, £15 pair. Buyer collects or carriage extra. G8OBD, QTHR. Tel Cambridge (0223) 833754, most evenings/weekends.

1155 rx, wkg, good superficial cond, unmodified, psu, £20 ono. Carriage extra. *Wanted:* LB Bantam fm/a.m. M. J. W. Webb, G3OOQ, QTHR. Tel 0789 5973.

Drake R4C, £285. T4XB, £220. R4, £120. All in exc cond. G3VLX, QTHR. Tel 0689 26584.

FRSDX400, quality communications rx, 160-10m, cbwwv, 4-2m fm unit, a.m., fm, cw, ssb filters, squelch, all orig exc cond, handbook, large circuit diagram, £155. Tel Liverpool (051-722) 3849.

TS700G with rx preamp, MC50 dual/imp bench mic, vgc, manual, orig packing, TS520, 240V only, mint cond, comp with DG5 display/counter, MC50 mic, used little, as new, offers. Securicor extra. G4GEL, QTHR. Tel Reg, 0707 51351.

FRG7, exc cond, no mods, fine tune, manual, orig packing, MM144/28 converter, YH55 headphones, £160 the lot. Buyer collects. *Wanted:* HF tx/rx, KW2000 or similar. G4LEX. Tel Southampton 737265.

FT101ZD, fan, dc mic, FV901DM, used little, £640. T158 with elect eng module, PC100C printer, full manuals, £140. TS510/PS510, rx wkg, tx needs attn, £75. IBM1052 keyboarded 1/0 golfball printer, £150. IBM3982 same without keyboard, £130. Airmec deviation meter type 409, needs cal, £50. Sanborn dual channel vs chart rec, £45. Pye Compact on RB10, xtals for RB14, SU8, £50. *Wanted:* Z80-based micro, p/exch? G3PYW. Tel Maldon (0621) 56188.

Sommerkamp FR100B hamband rx, 80 10m, WWV, £85. Auto-transformer, 300W, new, £5. 600W ex-Admiralty, £8. Collins mech filter, 1·5kHz, unused, CR150 for spares, part-converted for hamband, £10. G3AVL, QTHR. Tel 051-264 8001.

Icom IC245E multimode, homebrew keypad and psu, £280 ono. Will exchange plus cash for uhf Westminster or/and any synth 2m rig. G8SDC, 175 Spies Lane, Halesowen, West Midlands.

G3PLX/Catronics rtty vdu, pcbs and major ics, programmed 74188s, 2513, 1013, 6 × 2102, xtal, £40. *WW* synthesized fm tx/rx, pcbs, little-built, £8. Crispino Messina, Via Di Porto 10, 50058 Signa (FI), Italy. Tel 0573 367851, business hours.

RTTY, full duplex and receive only for Nascom (1 or 2) available as replacement monitor (2 × 2708 1 × 2716) or as stand alone program on tape, qbf, ry test included, user message store, full menu listing, sae for details. G8AMG, QTHR. Tel Rushden (09334) 56074.

AR88D, needs alignment, £30. Cossor single beam scope, needs attention, £10. Alloy ex-dinghy mast, 21ft, £5. From ex-Army 18 set, RF24 unit, valves type AR6, ATP4, VR65. G4EUW. Tel Brightlingsea (020630) 3071.

R1155, £10. Two dual standard tvs, good tubes, £5 each. VC97, £5. Cossor Mk2 1035 scope, £20. *Wanted:* tube GEC-LD924E. Manual counters: Venner TSA/3336/2: Advance TMC/1; Racal 815R: scope Telequipment S32A; circuit counter (circuit board) (XO circuit). D. A. Griggs, 5 Collinwood Avenue, Muswell Hill, London N10 3EH.

Yaesu CPU2500RKSt, 25W keystep 2m tx/rx, four-memory channels, scans 10, 25kHz, keypad mic, superb cond, incl manual, £250 ono. Mamiya 330F, incl case, accessories, as new, orig packing, only five films through, offers £125 ono. Tel Nantwich (0270) 64050.

Heath scope spares, 5DEP1 crt, mains transformer for 104550, tb switch, front panel for 104550, main case for 104540, £50. G8HEO, QTHR.

Yaesu FT221R, FT301S, FP301, FL110, FV301, FC301, YO301, all unmod, boxed, manuals; Creed 75RP with workshop manual; Bird 500W Termaline; Burns wavemeter TC101; AVO7, 1kV A generator, tents, stoves, Portapotti, mast, heliax cable, offers? SAE junk list. G4FTF, QTHR. Tel Ipswich 77992.

FDK Multi U11, 70cm mobile tx/rx, fitted SU8, SU16, SU18, SU20, RB0, RB2, RB4, RB6, RB10, RB14, auto toneburst, 10W out, good cond, comp with mobile mount etc, scans over four channels, £135. G8VEH, QTHR. Shoreham (Sussex) 3706.

Yaesu FL50B and FR50B, mint cond, fitted top band, instruction manuals, £125. G4KTY. Tel 06286 65536.

QTH: modern four-bed detached house, situated on slopes of wooded Cotswold valley, mill stream, 68ft tower, approx three-quarters acre, £59,700. G4BMX, QTHR. Tel 0453 883808.

FT101E, immac cond, no mods, all leads and accessories, orig packing, used little, £430. Prefer buyer inspect and collect. G4FAZ, QTHR. Tel Yeovil (0935) 29003 or if no reply, Weymouth (03057) 71053.

Two Panda txs, both comp, one wkg, one GR59 rx, £10 each. Pye Vanguard AM25B 2m a.m., comp, £25 ono. Buyer collects or carriage extra. G4APF, QTHR.

FT200, FR200, superb cond, £200. FT100, £120. IC700 rx, £75. Buyer collects. G3NSG, QTHR. Tel Barnoldswick 813892.

Radio Shack Quick Printer Two, as new, cable to TRS80 keyboard, prints two lines per second on 2in aluminium coated paper, will connect to RS232 and Centronics parallel, £120 ono. G4AON, QTHR. Tel Dave, 037-781 367, after 6pm.

Creed 7E 250V motor, £30. Tektronix 535 'scope, £200. Yaesu FT2FB, fully xtalled, dc supply, £120. RTTY term, pll type board only, £35. AR240 h/held auto toneburst, £140. All ono. G8DWQ, QTHR. Tel Giles, Epping 72469.

Eddystone 840A rx 0·5-30MHz, wkg order, £40 ono. Buyer collects or exchange for wkg hf tx, same value. G4KRH. Tel Billericay (02774) 58582.

Plessey PR155 communications rx, comp with PV157 lf/mf selectivity unit, continuous coverage from lf to 31MHz, incl new hf bands, professional equipment in exc cond, best offer over £300. G3AAE, QTHR. Tel 01-508 3669.

HW7 QRP tx/rx, £25. PSU, £5. Atlas 180, wkg receive, but requires pa transistors, offers. Grieveson, 6 Spinney Bank, Kings Sutton, Banbury, Oxon OX17 3RL.

Plessey series SL600 tx/rx board, comp with KVG XF9B filter, ul sideband xtals, Anzac MD108 mixer, £20. Tel 01-574 2582, evenings.

Anowden AS1000, 2m, 11 channel fm combination base/mobile/portable, fitted four popular repeaters, four simplex, unique design, enables portable unit to slide out of mobile unit, fits into separate case with strap, comp with mic, mobile mount, mains charger, in situ for nicads, boxed, as new, unwanted 1980 Welsh Rally prize, valued at £240, my price £160 ovno or part exchange 2m multimode. G4HBU, QTHR. Tel Bristol 611093.

EA12 rx, recently aligned spare valves, handbook, good cond, £140 ono. Geloso amateur bands converter, 10-80m, 4-6MHz output, £10 ono. G4KWL. Reading (0734) 81330.

TR2400, hardly used, £160. TR7500 and psu, faulty, hence £130 for both. FL2100B, £230 ono. FT101EE, £350. FV101B, £50. Europa transverter, £30. SP101, £15. Reason for sale, gone computing. Prefer buyers collect. C. H. Brain, G4GUO, QTHR. Tel Worthing 45400, evenings and weekends.

HF mobile is fun, Trio 120S in perfect order, guaranteed October 1981, no spare time forces sale, offers over £350. G4LBC. Tel Paul, Hull (0482) 857352.

FRG7 with SMC fitted digital readout, Gilfer 4kHz filter, £100. Dymer DP40 passive preselector, £35. Stephens James Mk2 atu, £10. Carriage extra. *Wanted:* Heath SB620 spectrum analyser. Karagianis, 20 Lea Road, Sonning Common, Reading RG4 9LJ. Tel Kidmore End 2085.

FT101, fitted cw filter, top band, orig packing, handbook, £300. Evans. Tel 021-236 3436, office hours only.

FT200 incl FP200 mains psu/spkr, set spare valves, can be heard on air often, good cond, £250 ono. G4BLR, QTHR. Tel 0908 312243, evenings.

2m and 10m preamps, Microwave Modules and SEM types available, one of each type only, £10 each. Shinwa 2m high pass filter, £5. Shinwa 2m band pass filter, £5. Tel Morden, Surrey, 01-648 0028, after 6.30pm, ask for Kim.

SB102 tx/rx, 80-10m ssb/cw, £230. SB610 monitorscope, £60. SB650 f/display, £70. SB600 spkr, £30. HP23B psu, £40. All handbooks, good wkg order, comp, £400. Sanyo RP8880 fm/lw/mw/mb/5sw/xtal calibration vsb/lsb bfo, cost £185, accept £95. G4HBU, QTHR. Tel Bristol 611093.

Labgear LG300 tx, exc cond, spare 813, with or without lovely psu, no reasonable offer refused. G3LP, QTHR.

Hilomast PNAM2 48ft wall-mount pump-up, compressor, top-guys, brackets, £285. Drake RV7 vfo (mint), £99. Macrotronics cw/rtty PET interface, £40. 432MHz linear, 4CX250B, brass cavity, £45. MM432/28 transverter (recent), £95. McHenry, G3NSM, 26 Charlbury Road, Oxford. Tel 0865 56321.

RTTY test sets, crt indicator CT473, CT490, £25 each. Marconi sig gen CT394, 10-485MHz, £65. Solartron oscilloscopes CD1183, db 10MHz, £90. CD1014-3, db 5MHz, £70. 700μA meter, ideal rev counter, £2. Cooper. Tel Eversley 734312.

TR2400, good specimen, used little, three month warranty, bought TR9000, therefore obsolete, need money, box, accessories, case, eight-element Yagi, £180 ono. Tel Grantham 85402, after 6pm.

PA module 437BGY/H, unused, no info, Toyocom 10-2A, Snelgrove F10-7-49, ITT 024DC, Snelgrove 9MHz lsb, xtal filters, BLW60 rf op transistors, matched, 2N5643 40W 2m, offers. W.H.Y.? Bill Waldron, 100 Porthmawr Road, Cwmbran, Gwent. Tel 033 64477.

Collins KWM2, 516F2 ac/psu, quality for £350. G3VXZ, QTHR. Tel Maidenhead 27350.

TS820, recent model, 12V inverter supply SP820,

MC50 mic, £500. TR2300 nicads, Drake 10W amplifier, Icom IC3PA power supply, £150. KW600 linear, £120. Datong FL1 audio filter, £30. KW107 atu, £70. G3REO, QTHR. Tel Coniston 329.

Trio TR7010 2m ssb tx/rx with BF900 preamp, as new cond, mic, mobile bracket, orig packing, used fixed station, £105. GM3VMB, QTHR. Tel 047556 712.

Yaesu FL50, FR50, 80-10m, tx/rx, fitted calibrator and vox, comp set spare valves, incl two pas, mint cond, £150. G3XMR, QTHR. Tel Cheltenham 25609.

FT101, modified for LLL processor and 1·8MHz, spare valves, £265. FT227R, 143·5-149·5, £175 ono. G2HHV, QTHR. Tel Batley 470667.

Trio battery operated ham clock, mint cond, £15. Trio AT180 antenna tuner, in new cond, £75. No offers. Carriage paid to your QTH. Ward, GI3ZCK, QTHR. Tel 0232 56221, business hours.

IC202E, as new, nicads, mobile mount, £130. G3TGL, QTHR. Tel 021-458 3458.

IC251E, new August last, small amount of base station use only, as new cond, all accessories, manual, packing, etc, as supplied, £375. Will deliver up to 50 miles. G8CCI, QTHR. Tel Oxford (0865) 880229.

Collins tx/rx 618S1, 120 xtals, £150. Collins R278GR, 1,750 channel rx, with manual, £200. SCR720 (A1 Mk5), rf unit, modulator unit, int psu, £250. Mint APR4 with TN 16, 17, 18, £225. Tel Abson 2843, evenings.

FT/FP200 tx/rx, 80-10m, good order, G3LLL clipper processor, spare valves, no tvi, orig packing, could deliver, £210. Trio 9R59D gen cov rx, 160-10m bands covered with generous bandspread, as new cond, £39. Could deliver. G4JYQ, QTHR. Tel 0704 77411.

Trio TS515 tx/rx with PS515, £225. Yaesu FT227R 2m fm tx/rx, £160. FDK Multi 11 2m fm 10W/1W fixed, 23 channels, auto scanning on four channels, £140. Cunningham, 10 Elmfield Drive, Skelmanthorpe, Huddersfield. Tel Huddersfield 863818, evenings.

Trio TS120V and 500Hz cw filter, £295. Yaesu FT501 and FP501, cw filter, superb digital 500W tx/rx, £325. Both exc cond, manuals, cables etc, orig boxes, free Securicor delivery 250 miles. G3HHD, QTHR. Tel 061-983 317.

ASCII keyboard, Keytronic, top commercial quality, parallel output, current production cost £101, unused, £35. Micro bits, all new: TIL311 hex displays, £4; 8255s, £2; 8251s, £2; Thomson vdu chips and prom, £8. 2102s, £1. All plus p/p. G3XSJ NOT QTHR. Tel Bristol 685280.

Valves: four TT21, £3.50 each; one 6146, £3; four QY3125, £7 each. Bases, £1.50 each. Mains transformer 1,250/1,450V, £10. Others available. Smoothing chokes, 6in scope tube CV1385, £5. Prefer buyer collect. G3XEF, QTHR. Tel Mike, Whitchurch (0272) 837529.

Trio R1000, orig packing, dc kit fitted, as new, £270 ono. SP100, separate spkr, £22 ono. SEM Z-Match, £42 ono. D. Mathews. Tel 01-876 7868.

FT101EE with dc supply, fan, speech processor, mic as new, property silent key, £350. Trio 820S digital readout, cw filter, as new, £450. Dentron MT3000A 3kW atu, unused, all items orig packing, carriage extra. G3KGM, QTHR. Tel 01-300 0767, evenings.

KW600 linear, £140. G2HKW, QTHR. Tel Chandlers Ford 65566.

FT101 Mk1, cw filter, fan, 3LLL speech processor, £240 ono. 2200GX, full set xtals, £100 ono. *Wanted:* FL2100 or similar linear. G3NXC, QTHR. Tel 021-706 3109, after 7.30pm.

FT101E fan 350Hz cw filter, 12V/240V, mic, manual, all leads, immac cond, swr/power meter, 50Ω dummy load, £425. G4GJH. Tel 0388 745126.

Yaesu FT227R, FT207R, charger, Microwave Modules MMT432/144R modular 40W amp, 35ft steel mast, 9-el 2m, 16-el, 70cm, Tonna antennas, 2 × 25m, silver-plated polythene dielectric 50Ω coaxial, very low loss, Osker swr bridge, coaxial relay, 2m mobile disguise antenna. G8OAK, QTHR. Tel 01-640 9967.

FDK Quartz 16, 2m fm tx/rx, S20-23, R0-8, mobile mount, £120 ono. Soligor 800mm, £8. Telephoto lens with case, £100 ono. G8ECZ NOT QTHR. Tel 0632 710834.

Collins TCS tx, orig cond, £15. Homebrew a.m./cw tx, 35W, copy KW Vanguard, incl power supply, good cond, £20. Canadian ws No 68, £10. Watkins, 5 Culmore Road, Halesowen, West Midlands. Tel 021-552 1838, day, 021-559 1117, night.

Trio 2400, brand new, unused, real leather case, £160. Gotting German tx/rx, 2m, 40W, split-mode operation when required, no frills, just quality, current list £885, accept offers around £300. G8IXY. Tel South Benfleet 50978, evenings/weekends.

Power supply, 13·8V at 30A, fully regulated and protected, professional unit in 19in rack mount with case, £40 ono. IC215, good cond, R0-9, S20-24, S33, RR7, large nicads, helical, accessories etc, £90 or offers. G3YEK NOT QTHR. Tel 01-903 0720 (Wembley).

Gem type quad spider, suitable use with bamboo canes, £5. G4CJY, QTHR. Tel 0494 30018.

Trio R1000 rx, spotless, £235. Stolle Memomatic rotator, good wkg cond, antenna mast, double slot-fed 2m Yagi, buyer collects, £40. G8DHZ, QTHR. Tel Uxbridge 36438.

KW2000E, exc cond, incl mains psu, offers or exchange good quality 2m base station. Tel 0323 29296. G4CLT, QTHR.

Heath SB401 tx, SB303 rx, SB600, c/w, cw, a.m., filters, xtal pack, all cables, vgc, £275. G4FHQ, QTHR. Tel 021-748 2841.

HF5 10-80m vertical antenna, full instructions, perfect cond, £25. G3HRU, QTHR. Tel Leeds 677178.

Pye AM10B Cambridge dash mount, fitted R0-1, R7, S20, S22, a.m./fm, toneburst, preamp, £40. 2708 eproms, £2.50 or eight for £18. Hartley 13A 5MHz/dB scope, perfect, £20. Marconi vtvm, £10. Marconi vswr, £10. Cossor vdu with keyboard, wkg, £40. R1155 hf rx (500kHz-18MHz) with psu/amp, £25. Matching T1154 tx, incomplete, £5. 500W pa unit, incl 813, auto-tfmr, 1,200-0-1,200V, 0·5A transformer, £20. All items ono. Prefer buyer collects. G8MLK NOT QTHR. Tel 01-289 7415, evenings.

BC348 rx, good cond, £45. BC221 mains psu, orig charts, £20. Tubes: VCR97, 5in; VCR139 2·75in, £6 each. Buyer collects. J. Wilkes, 7 Testwood Crescent, Totton, Southampton SO4 3NJ.

Pye Westminster W15FM, fully-converted, fitted S20, S22-23, S8, R2, R6-7, S0, toneburst, improved front end, full manual, £75 ono. 5/8λ mag mount whip, £10. Slim Jim, £3. £80 for lot. Prefer buyer collects. G8SEC. Tel Rochdale 42321.

Trio TS520, perfect immac cond, fitted cw filter, comp with manual, orig packing, £325. Trio VFO520 ext vfo, mint cond, £75. G4GFU, QTHR. Tel Maidstone 70725.

IC202S, three months old, xtals for satellite and beacon, £140. 7A commercial power supply, 13·8V, (suitable for IC202S and linear) £20. F9FT 9-el portable antenna, £15. Morecroft, G8OOC, 107 Fulham Palace Road, London W6 8JA.

B. Brookes Electronics digital display unit for SRX30, as new cond, never fitted, costs £44 new, accept £24. *Wanted:* 770R. R. Bunney, 33 Cherville Street, Romsey, Hants SO5 8FB. Tel 517497.

Volumes all soft-cover bound: *Wireless World* 1950-6, 1959-60; *RSGB Bulletins* 1957-9; exc cond, will consider splitting, what offers? G3LYR, QTHR. Tel Bristol 560843.

Pye Cambridge 2m dash mounting, finished in matt black, a.m./fm selectable via front panel switch, six channel, auto-toneburst fitted, fully serviced, aligned, incl circuits, S20, S22, 145·8, R3, dash mounting bracket, £65. G4GJH. Tel 0388 745126.

FT101 Mk2, fan, mic, £250. MMC144/28LO, £15. MMC432/28, £15. Pye PF1 tx, £7. 0·8-1·5GHz cavity wavemeter, £7. KW77 rx, £40. *Wanted:* NC1 charger for FT202R. G4AEQ, 26 Ripstone Gardens, Highfield, Southampton SO2 3RE. Tel 0703 559881, evenings.

Robot 400 slow-scan television, fast/slow/fast converter, eight months only, connects to mic and spkr sockets of hf rig, audio cassette picture storage, £510 ono. Ikegami tv camera, Tamron 1:16 lens, video or rf, manual, £52. Tel 0793 771153.

TR2200GX, VFO30G, seven channels, nicads etc, both boxed, vgc, £135, or p/ex modern solid state d/b 10MHz scope, Solartron CD1016 d/b scope, manual, slight eht fault, £25. 4ft high 19in rack cabinet, ideal RA17 type equipment, £20. *Wanted:* TTL, cmos, ic op amp cookbooks. G4DRK, QTHR. Tel 01-890 2535, 4-6pm.

Standard C828M 2m fm tx/rx, 10/1W, S21-23, S20, R3-7, numerous North American xtals, comp with spkr/mic, mobile bracket, manual, ac/psu, 220/12V dc, £125. G3WLJ, QTHR. Tel Northwood (Middx) 27193.

Drake T4XB AC4 ps, R4B rx, seven extra xtals, exc cond, £365, no offers. Buyer inspects and collects. G2UZ, QTHR. Tel Leeds 784074.

Atlas 215, as new, h/phones, winches, £300. Kawai, E360 electronic organ, four months old, unused, offer near £1,500. Would consider exchange same value. Wide interests. Top quality pcbs, ex-computer. Poles. SAE details. GW3CBA, QTHR. Tel Barry 741520.

IC240, immac cond, orig packing, guarantee, receipt, quality 5/8 mobile ant, £150 the two. 180A welding set, 240 or 415V input, cables, holder, £140. G4JSX NOT QTHR. Tel Welford (085881) 570.

Tektronix oscilloscope 585A, plug-in type 82, dc 85MHz, good cond type 81 plug-in adaptor. Tektronix trolley, £150. Eddystone 770U 150-500MHz rx, tuner section faulty, hence £20. G3MOL, QTHR. Tel Brighton (0273) 777716.

Trio 7200G mobile mount, handbook, S20-22, R0, R3-R8, £95. KW 7·1MHz trap, new, unused, Datong morse tutor, seven months guarantee remaining, £38. Tel Daventry 5687, evenings.

Trio 2200G five channel, nicads, charger, case, vgc, mobile mount unused, 5/8λ whip, used little, £95. G8LKZ NOT QTHR. Tel Retford (0777) 701913, after 6pm.

TS120V, as new cond, Shure 202 mic, £300 ono. Magnum 2 transverter, comp with spare new 6/40, £75 ono. GM4BDJ, QTHR. Tel 0875 53025.

2m handheld 10-channel self-scanning rx battery charger, £50. Marconi Atlanta communication rx, 15kHz/28MHz ac rack fitted, clean, manual, £75. Partridge Joystick Joymatch, £15. Tel 0926 640416, after 7pm.

FT201 80-10m cw filter, new pa valves, orig packing, realigned by importers, £300. Hamgear PM11F preselector xtal calibrator, 160-10m, 1MHz 10kHz, pips throughout range and beyond, 240V ac, £20. BC221M frequency meter, 125kHz-20MHz calibration charts, £22. Spares valves for FT201/101, brand new, four 6JS6C, two 12BY7A, £25. SEM Z-Match, 80-10m, mint, £38. Buyers collect or pay carriage. G5KV, QTHR. Tel 04912 2713.

FT401B tx/rx, mint cond, 560W p.e.p., spkr, mic, handbook, £250. FT75B mobile tx/rx, 80-10m, 100W p.e.p. input, 12V dc, 240V ac psus, mic, xtals, mount, handbook, £195. Would consider selling ac psu separately. TR2200G 2m tx/rx, 1W, fitted five channels: R4, R6, S20, S22, S24, auto-toneburst, VB220GX 10W pa, charger, case, mic, handbook, £110. Would consider selling VB220GX separately. G-whip antenna with 40, 80, 160, coils, extender rod, £15. John Burling, G4CKA. Tel Macclesfield (0625) 25154.

40ft Versatower, attached to modern detached house, lounge, dining room, kitchen, bathroom, three beds, third bedroom fitted as shack and darkroom, garden, garage, £31,000 ono. G6AIQ. Tel Romsey 513982.

Microwave Modules 2m and 4m converters, mint cond, £20 each or exchange for sstv monitor, homebrew or w.h.y.? Must work. RAIBC member. Raynes, 20 Blair Walk, Immingham, South Humberside, DN40 1HZ.

FT202R, 6ch handheld, nicads, charger, £80. Wilson 2m handheld, 6ch, 2W, helical, nicads, charger, 4ch fitted, extra xtals for common USA repeater/simplex channels, £75. Pye Bantam 2m, fm, nicads, £39. G8DVN. Tel 0623 882174, work, 0636 892000.

Trio TS900 with both psus, cw filter, unused mobile, used as second rig only so as new, fully checked by main dealers, a unique chance to buy the best Trio tx/rx ever, £410. Tel 0382 543113, or 0738 27044.

Multi 700E, exc cond, £150. G8TMR, QTHR. Tel Liverpool (051) 523 2483.

FT202R 2m handheld, six channels, nicads, charger, ext mic, good cond. £90. G8EOT. Tel 01-441 5029, evenings.

Eddystone EA12, fine versatile rx, good cond, worked 200 countries on it, £155. Yaesu FT2FB, 12 channels, 10W, tx/rx faulty on receive, fitted 12 channels, comp with mount, £35. Tel Mike, Ashby (0530) 413973.

TS520SE, still under Lowe guarantee, sudden cash requirement forces reluctant sale, used for just a few hours, boxed, as new, £395 ovno. G4KDK, QTHR. Tel John, Gosport 83700.

9R59DS Trio rx, exc cond, £48. G3KBR, QTHR. Tel 0223 47930.

Yaesu FT901DM tx/rx, £595. Trio TS120S, 200W tx/rx, £315, FT207R, NC2 charger, £150. All new or as new, boxed, manuals, etc, Drake R4C, NB, extra xtals, £295. Jim Taylor, 5 Luther Road, Winton, Bournemouth. Tel 0202 510400.

FT101E with Holdings fm unit, both in exc cond, £395. Both units would split. G3ZIG, QTHR. Tel Dereham 4634.

FDK 2m multi, palm size, 40 channels, helical, nicads, charger, hand mic, all in exc cond, £120. G8VGV. Tel Plymouth 266906, after 5pm.

TR2300, nicads, charger, case, £135. TR7010 2m ssb synth, £100. EHT psu, 600V, 1,200V, 300mA, bias supply, heaters, cw case, meters, £8 ono. Selection of mags, *PW* etc. G8UXU NOT QTHR. Tel 01-467 2016 or Orpington 38869.

FT901DM, as new, hardly used, 12V leads, handbook, mic, a beauty but I need the cash, £675 ono. A. T. Simpson, G3YRB, QTHR. Tel Croydon (684) 3974.

Telford Electronics 2m xtal controlled/vfo tx, TC5, TC6, £50. Heathkit 1012U scope, 5in, £35. Pye FM10D Cambridge, xtals for 145MHz, comp with mobile mount etc, £30. 13 vols *SW Magazine*, 1965-77, most comp, in binders, open to offers. All items wkg, in good cond, all open to offers. Collect or carriage extra. G4AZD. Tel Colchester 66264.

HW32A ssb 20m tx/rx, 200W, HP23 ac power pack, 120/240V, five new spare valves incl pas, manual, £105. Icom 215 15ch, orig packing, £100. Heath HA201A 2m, 10W linear, manual, £22. Sentinel auto preamp, 2m, £15. Inspect, collect. G3KRH, QTHR. Tel 01-455 5039.

Trio TS120V, fitted with 500Hz cw filter, AT120, PS20, all mint cond, £400. Trio YK88CN, 270Hz cw filter, £20. G3FJQ, QTHR. Tel 0704 24442.

Drake SPR4, broadcast and amateur bands, seven extra xtals, £235. Texas uhf 5W power transistors, new, tested, £1. G8ZNR. 9 Roland Close, Chelmsford CM1 5ED. Tel 440325.

HRO mx rx, needs electrical attention, £35. Pye Consol marine, 530-3,800kHz, 860-2,000m, £20. Black and white tv, sound needs fixing, ideal vdu, £15. Airmec millivolt meter type 784, £10. Tel Cosham 380147.

FT200B, FP200, vgc, comp with manual, spare driver, finals, prefer buyer inspects, collects, but could deliver reasonable distance, £200. G4FVW, QTHR. Tel 0460 73726.

TS180S tx/rx, dfc, memories, dual ssb filters, cw filter, matching vfo, comp with manuals, orig packing, exc cond, still under guarantee, £600. 12V psu to suit, £35. G3UKS, QTHR. Tel Maidenhead 32553.

Yaesu FRG7000 digital gen cov rx, 150kHz 30MHz, five months old, mint cond, £230. Ken Ballance, G3KNB, QTHR. Tel 021-553 5551, day, Stafford (0785) 662105, evening.

Datong FL1 frequency agile audio filter, £38. G3BFR NOT QTHR. Tel 045-36 3994, evenings.

Power unit for kilowatt linear, 80-10m, per *SW Magazine*, Dec, GW4BCD 2X4CX250B design, 2kV, 600mA, 300V, stbv screens, VAR bias, £45 ono. Buyer collects. G3JNY, QTHR. Tel 863058.

FT101EE, £330. FV101 ext vfo, £50. Three pairs 6JS6C, new, £18. Service manual, £7. YD844 desk mic, £9. G4FXT, QTHR. Tel Chesham 75736.

4m phone Pye Cambridge, boot AM10B, cont gear, spare cable, cradle xtalled 70·26, 70·355, 70·365, 70·375, £36. Dash AM10D, l.e.d.s, cradle xtals 70·26, 70·355, 70·375, 70·48, 70·65, £39. Spare valves, orig manual for above, £5. G3SLI, QTHR. Tel 07344 79850.

Trio TR7800, six months old, under warranty, comp with back-up nicads, mobile bracket, mint cond, £235. Prefer buyer collects but will deliver local Birmingham. G4IMB, QTHR. Tel 021-747 6753, evenings.

Surplus service manuals: Bendix SCR522, MN26, TA12; Farnsworth BC312, RCA AR88, ET4332; Wilcox-Gay osc/vfo; Collins tx 32S3; rx 75S3; Marconi CR100; Hallicraft S27D; GEC BRT400; Drake R4B; tx T4XB; Lea Radio ADF8, £2.50 each plus postage. Enquiries sae G3ANK, QTHR. Tel 01-302 0865.

Drake SSR1 gen cov rx, kHz digital readout, £110. Owen, 43 Kilvert Road, Hereford. Tel 0432 54580, evenings.

Trio WR310, mint cond, narrowband filter, manual, boxed, £100. Trio JR500S, clean cond, manual, ideal rig swl beginner, £85. C. Antwis, 18 Park Lane, Frodsham, Warrington, Cheshire WA6 6RY. Tel Frodsham 32516.

Siemens model 745E professional communication rx, high performance spec, 12 push button ranges, all valve operation, lf/hf, calibrator, variable i.f., exc ssb performance, buyer collects, comp with used spares and service manual. Tel Bob Sharp, Rosneath, Scotland, Clynder (0436) 83 765.

Codar AT5 tx, 12ms solid state psu, 12RC remote control switch unit, manual, good cond, £35 or exchange for hf beam rotator. G4IUI. Tel Chorley 62988.

Eimac SK600 socket and SK606 chimney, both unused, with 4X150A, £20 plus postage. G3LLZ, QTHR. Tel Swindon 38069.

TS820S with Sherwood 350Hz filter, dc-dc supply, service manual, £520 ono. Collins 75A4 with three filters, Heathkit SB301/401/600 dual 400Hz cw filters, set up for full QSK, manuals for all above, offers? G5CMX, QTHR. Tel Penn 3956.

FT200 incl FP200, vgc, £200. HW100 incl psu, £150. GW3RKV. Tel 09913 470.

MML144/40 2m linear amp and rx preamplifier, still under guarantee, £60 ono. G3DNX, QTHR. Tel 061-480 9994.

Communication rx, Eagle RX80 0·5-30MHz in four ranges, bandspread for amateur bands, £60 ono. Pye Vanguard AM25T, converted for 2m fm S14, S20, xtals, £35 ono. Homebrew psu, 13·8V at 20A continuous, £25. G4KZY. Tel Southampton 583624.

FT7B, YC7B digital readout, FF501 filter, 18AVT antenna, 10-80m atu, £450 ono. 87 Station Road, Barnet, Herts. Tel Mark, 01-440 7135.

Sony video recorders: CV2100 Ace plus manual, 20 tapes, inspection invited, offers. *Wanted:* Icom 202S. Liner 2 hf beam, rotator, tower. Tel 0244 374584.

KW1000 linear, beautiful, £150. Viceroy tx, KW77 rx, l/spkr, KW pp meter/tone osc, swm, in-line 3in scope, Datong speech processor, xtal mic, wkg stn for £150. Will throw in incomplete a.m. 150W rack tx, final QY3125, make linear. Telequipment scope S42, £10. G3EFK, QTHR.

FL200B ssb tx, 80-10m, spare valves, 200W p.e.p., £100. G4IPB, QTHR. Tel Long Eaton (06076) 4067, after 6.30pm.

Creed 54 teleprinter, comp with integral perforator, orig loop, power supply, all ac/mains, exc cond, £45. Bentley, 27 De Vere Gardens, Ilford, Essex. Tel 01-554 6631.

KW204 tx, top to ten ssb, cw, a.m., manuals, fb cond, £140. 444 mic, £18. New KW107 Super Match, reasonable offer. G4FXI, QTHR. Tel Aylesbury 21542.

Yaesu FT202R, six channel handy, NC1 fast charger, nicads, boxed, unused, £100. Ascot 5/8 whip, sprung mount, glass fibre base, blank off, £8. Postage extra. G3UFU, "Apple Holt", Queens Grove, Pen Selwood, Wincanton, Somerset. Tel 0747 840 138.

Mobile rig, 10W p.e.p., synthesized 28·4-28·9MHz, fitted noise blanker, £95 or exchange for portable or handheld on 2m fm or ssb. GM3LIB, QTHR. Tel 0506 410491, after 6pm.

Philips transistor stereo GF528, compact record player, four speed, requires new pickup arm assembly, 6W per channel music power, service sheet, no spkrs, 8Ω, £5. Electronic ignition assembled kit, capacitor discharge, untested, £5. G3MBL, QTHR. Tel 01-445 4321.

Swan 100MX mobile/fixed tx/rx, £330. VHF/uhf power amplifier, chassis incl three-off 4X150A, £20. 6-el Jaybeam quad, £20. Alba 22in colour tv, £50. Olivetti Lettera 32 typewriter, £25. G4JQP, QTHR. Tel 0761 34216.

Microwaves Modules MM2000 rtty to video converter, three months old, matching psu, £145. Racal drive unit MA79G, 1·30MHz, usb, lsb, dsb, cw, fsk, a.m., partners RA117 and RA17, mint cond, in standard Racal cabinet, full manual, £350. Racal preselector, MA197B, 1·30MHz, self-powered, 19in rack mounting, good cond, manual, £50. Berco constant voltage stabilizer type CVS4, mains in, 200-250V ac out at ±0·5 per cent, maximum load 56A, £25. G4JQN. Tel Westbury (Wilts) (0373) 864478, evenings.

Antenna rotator, control box, AR22R, good cond, powerful, about 50ft cable, £25. Hansen swr meter, £6. G3WLX, QTHR. Tel 084-46 643.

Icom IC701, IC701PS, desk mic, as new, boxed, £550 ono. Western DX34 4-el hf beam, £100 ono. G3MLO, QTHR. Tel 0303 862059, evenings.

FT207R, used little, perfect cond, £140 ono. G4ICV, QTHR. Tel Cirencester (0285) 61955, 8-9pm.

Heath HR1680, 80-10m, ssb/cw rx, £100 ono. Or exchange Palm 2/4, cash adjustment. G4JQP, QTHR. Tel 0761 34216.

FL2000B linear, recently serviced, 1·2kW ssb input, £145. LAR linear omni-match, new, £14. W2AU balun, £5. Two new Reyco antenna traps, 14MHz, £10. Shure dynamic handheld mic, as new, £8. G3WUD. Tel 01-902 7211.

TW transverter, 60W out, 2m separate psu, exchange for solid state 2m ssb or fm base rig. £80. G4JFE, QTHR. Tel Newbury 41613.

Microwave Modules MMD050/500 dfm, £19. Burns wavemeter TC101, £12. Himound straight key HK707, £3. G3TMT, QTHR. Tel Lindfield (04447) 3492.

FT207R Yaesu synth handheld, 2·5W/200mW output, memories, scanning priority channel, helical whip, cw carrying case, base charger, nicads, £160. G8VSA, QTHR. Tel 021-742 1761.

TR2200G, R0, R2 7, S20 22, exc cond, no mods, charger, mic, carry case, nicads, £100. Set *Radio and tv servicing*, 1957-72, offers? G4KLP. Tel Hornchurch (4024) 47246, evenings.

Icom 260, £250. Would take IC202, TR7010 px. SSTV, Trio R1000, £230. RX, new Leicester. *Wanted:* little British-made diesel gen for field day/Raynet lighting. Gomer, G8UNZ, QTHR. Tel Colchester 74427, ext 10, daytime.

Modular Electronics 20225P linear, 3W ip for 25W op with rf preamp, ideal for Icom 202S, 215 etc. G8SRE, QTHR. Tel Ashford (Middx) 54823.

2m xtals, 8MHz and 45MHz types, sae for list, £1.20 each. Pye solid-state rx, now a.m./fm, six channel on 2m, £20. Car radio with eight-track cassette player, £5. Thumbwheel decode switches, BCD coded, 50p each. G3NGK, QTHR. Tel 01-462 2178, evenings.

FRG7, six months old, mint cond, no mods, 10 hours use, selling due to arrival of an hf station at last, £160 ono. G4HUN, QTHR. Tel Hitchin (0462) 52521, work.

2200GX, 2W portable, fitted R0 simplex, S17, S20 23, R2 3, R5 7, nicads, charger, case, strap, λ/4 wave, helical, £100. G4KTE. Tel Blackpool (0253) 736684.

FT221R preamp etc, £250. IC245E, £200. TE20D rf sig gen, £20. 6-el 2m quad, £12. Stolle automatic rotator, £25. Buyer collects. Equipment of G8OCT, emigrating. Contact G4DLB, QTHR. Tel Banbury (0295) 65492, after 6pm.

TR2300, as new, orig packing, 5/8 mag mount, £120. KW204 tx, £60, incl free Heathkit Mohawk rx, wkg, good for spares. G4FAQ, QTHR. Tel 0902 68802.

Trio TR7500, unused on transmit, exc cond, £175. TR2200GX, as new, 12 channel, nicads, mobile mount, £110. Heathkit HW101 tx/rx, homebrew power supply, no mic, £175. York, 10 Severn View Road, Thornbury, Bristol. Tel. Thornbury (0454) 418460.

Liner 2, preamp, good cond, £90. TC7 Mk2 rx, band-searcher module, 2m converter, £45. Buyer collects. G4ADD, QTHR. Tel Brian, 021-748 5268.

Teleprinter Creed 7E, spare brushes, ribbons, paper, comp with GPO terminal unit containing 80/80 supply, recently overhauled, £35 ono. Buyer collects. G3XBN. Tel Brighton (0273) 509830, daytime, 0273 419033, evenings and weekends.

TS130S, virtually brand new, £440. TR220GX, £120. Fully xtalled, charger, nicads, Yaesu FT223 xtal controlled mobile rig, 2/10W, 20 channel capability, fitted two simplex, three repeater channels, £110. FT101E, mint, external spkr, £435. Tel 0858 64384.

Cossor 1049 scope, £8. 62A scope, £1. VCR97, £1. 5A variac, £2. 5-10 amplifier and psu, £2. Buyer collects. *Wanted:* circuit Ultra-Valiant. *Rad Com* May, June 1970, March 1969, Jan 1966, July 1959. G8ALB, QTHR. Tel 890 0444.

FT101ZD (WARC), nine-band tx/rx, boxed, as new, comp with fan, YE7A mic, spare pa valves, going mobile, £495. G4KSI. Tel Hatfield (07072) 65182.

Liner 2, 2m ssb, preamp, piptone, manual, mobile bracket, spare mic, comp with homebrew QQV0640A linear and psus, £130 ono. May split. Gone G4LBH, ex-G8KYU, QTHR. Tel Luton 415846.

Webster bandspanner, hf mobile antenna, 80-10m, feeder, bumper mount, base spring, comp, £30. Heathkit HM102 swr/power meter, £22. Jap twin meter, swr/power, £9. Postage extra. All good cond. Peel. GD3RFH, QTHR. Tel 062484 3209.

KW Atlanta tx/rx, comp with external vfo, Shure mic, spare set valves, manual, etc, £250. G4JCY, QTHR, West Sussex. Tel 0444 51522.

14AVT, unused, £30. CSC 100MHz freq counter, £50. Three 4CX250B with bases, all unused, £50. Two unused 9MHz ssb filters, £30. Solid-state 300W output hf linear, stab psu, £130. GM3RUI, QTHR. Tel 0224 741741, after 19.4.81.

FT227RB scanner with 5/8, exc rig, low swr, swap for IC2E with cash adjustment, £200 ono. G8ZLM. Tel Bill, Daventry (03272) 2475, evenings or weekends.

Eddystone high stability communications rx, table model 880/2, 0·5-30·5MHz, in 30 bands, usb, lsb, cw, in exc cond, no mods, external spkr, detailed handbook, comp spare set of valves, £230 ono. Tel 0602 622763, evenings.

Vintage radio, large number of service sheets and manuals from 1933 onwards, mainly broadcaster supplements, offers invited. Armature for Wolf drill Part No 237C3, new, £6. Taylor meter, 500μA, 4in square movement, new, £4. Tel 051-264 8001.

FT202R, incl 5ch mic, charger, £85. Microwave Modules linear, 25W, £20. Pye P5002 handheld, incl man, 4ch, three batts, body holster, £175 ono. Yaesu FT224, fitted 7ch, needs tx fixing, slight fault, incl man, £50. G8NAT, QTHR. Tel Peterborough (0733) 48989.

Belcom FS1007P 2m fm 10W base station, scans 16 channels, full automatic or manual, channel skipping, priority, digital clock, fitted seven simplex and five repeater channels, £85 ono. G3THA, QTHR. Tel Formby (07048) 77169.

Trio JR599 Custom Special hf rx, 160-2m, vgc, £165. FDK TM56B 2m rx, £50. SR9 2m rx, xtalled for S20, S22, £35. Tel Weymouth 786930.

FR101S, 160-10m, 4m and 2m, BC, all mode incl fm, ac/dc leads, £320. Need cash for vhf station. GM8YJU. Tel Keith 031-661 6467, 6-8pm, weekdays only.

TS520S, xtal filter, DS1A dc unit, £450. DG5 digital display, £80. VFO520S remote vfo, £80. SP520S spkr, £12. The lot, £610. All units in mint cond, hardly used. Four unused sections of triangular galvanized lattice mast, connectors, base plate, each section 9ft, ideal for beam, £60. Could deliver for cost of fuel. G3XHK. Tel 01-979 8779.

First class tx/rx, Trio TS510, power pack, loudspkr, as new in appearance and performance, £200. G3AO, QTHR. Tel Chinley 50639.

FT901D, keyer, filters, FTV901 + 430. G3MRQ, QTHR. Tel 0327 60380.

R390A US Navy rx, 0·5-30MHz, manual etc, £425 ono. NEC CQR700 rx, £75 ono. Zagorski, 7 Reid Road, Invergordon, Ross-shire, Scotland.

IC202S ssb portable, 144·0-144·4, 144·8-145·0, full size nicads and charger if required, £140 ovno. G4HGU. Tel 051 722 7728, after 6pm.

Drake R7/DR7 digital rx, unused, brand-new, boxed, £825 ono. R7/TR7 tx/rx cable kit available, £15 ono. Genuine reason for sale. Tel 0602 54047, anytime.

WANTED

Keyboard converter, ASCII to RS232 and RS232 to tv converter. Exchange 25W pm mobile tx or 100W pm tx, or vdu keyboard RS232. Tel 01-204 3777, evenings, 01-573 3811, day.

Urgent: by swl, Sony ICF5900 portable five-band rx (dual conversion system) must be in vgc. G4DXX NOT QTHR. Tel 0524 417437, ask for Len, 9am 5pm.

Open-reel tape recorder, three-speed, two-track or four-track stereo, must be reasonable cond. Tapes for FI Cord 101 pocket open-reel recorder. 26 Weston Avenue, Addlestone, Surrey. Tel Graham, Weybridge 51918.

Creed 7ERP or similar reperf machine, must be in good wkg order. G4JXI, QTHR.

OBITUARIES

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

Mr K. R. Davis, GJ3GPL
Kenneth Davis died on 28 September 1980. He had held a licence for 30 years and for many of them was a member of the RSGB. He worked mainly on 7 and 14MHz and preferred cw.

Mr S. Deans, GM3XDN
Sam Deans died on 22 November 1980. He was a keen cw operator and a founder member of the Greenock & District ARC.

Mr N. H. Hales, G2DTO
Mr Hales died on 27 September aged 77. He was well known on the air and started working the radio bands in the 'twenties, continuing until his death. He was a founder member of the Whips Radiomobile Group, in August 1959, and a member of the VHF Century Club, and the Five Band Club. He had several successes in vhf contests.

Mr K. Haley, G2FZX
Ken Haley died on 19 December 1980, aged 70. He had been a member of the RSGB for many years and had been licensed since the 'thirties. He was interested in mobile working and was a keen constructor, always willing to give help and advice to beginners in the hobby. He was well known on 3·5MHz.

Mr E. Hoare, G3RZD
Ernie Hoare died on 29 January. He was a very enthusiastic microwave operator, and although he had no professional connections with electronics, his equipment, which was all home-constructed, was of a very high standard. In recent years his main interest was 10GHz, and he was always ready to exploit the latest techniques. He was finishing off 10GHz narrowband equipment and getting started on 24GHz at the time of his death. His many accomplishments included numerous cross-Channel contacts both on 1·3GHz in the early days, and more recently on 10GHz. He had also spent much time experimenting with amateur tv and 432MHz.

Mr G. Jackson, GW4HGA
Geoff Jackson died on 23 November 1980. He started as G8NPB in 1977 but gained his Class A licence a year later. He worked almost exclusively on the hf bands and was particularly interested in SV stations. He was a founder member and treasurer of the Nevill Hall ARC, and was also active in the local Raynet and the RSARS.

Mr. E. Passmore, CBE, S79EC
Eric Passmore, who died earlier this year, had long been associated with the SEA Net.

Mr A. M. Robertson, GM8BER
Albert Robertson died on 2 January. He was a founder member of the Greenock & District Club and held various positions in the club, including that of honorary chairman. He was a keen 144MHz operator.

Mr A. C. Simpson, G8LWE
Albert "Sandy" Simpson died on 8 December 1980, aged 64. He had been licensed for just over four years. Although blind for many years he was keen to get his Class A licence. He was a member of the Medway ARTS.

Mr J. J. Springate, G3CAZ
John Springate, a long-time member of the RSGB and a founder member of the Maidenhead & D ARC, died on 2 February. He was a keen dx operator on the hf bands and had participated actively in the affairs of the club over many years.

Mr C. A. Taylor, CB, FCIS, G3AEH
Chris Taylor died on 4 January, aged 65. He was active on hf up to the time of his death.

Mr J. Timms, BRS43133
Jack Timms, who died on 23 September 1980, aged 61, was a keen swl on all bands. He was a member of the Doncaster DMIoHEARC.

Also

Mr M. P. Ball, RS39971, on 20 January;

Mr G. R. Barmby, G2BRY, on 26 November 1980;

Mr R. C. Burgoyne, RS42960;

Mr E. R. Dolman, G2DCG, on 17 December 1980;

Mr E. D. Farnsworth, G8FOB;

Mr. D. A. Hanley, G2RY;

Mr J. H. Johnstone, RS22315;

Mr R. R. Marsden, G8BWJ, on 18 November 1980;

Mr A. E. Parker, VK4ZJS in February 1980; and

Mr D. F. Watton, G4AYZ.

16mm Marx Brothers or L & H sound feature. G8APX, QTHR.
Racal low-frequency converter for RA17 rx. J. Knight, W6YY, 4710 Viro Road, La Canada, CA USA 91011.
Vibroplex single paddle or w.h.y.? G5LH, QTHR.
Digital readout for Trio TS520SE, must be in perfect cond. Will collect Devon/Cornwall area, otherwise satisfaction or money back guarantee required. A. G. Edwards, G3HNP. Tel Bere Alston 840751.
Probe assembly, operating manual and/or service manual for Hartley oscilloscope type 13A. G4FUS, QTHR. Tel 076-122 267.
EC10 Mk1 plans for power supply for rx, will pay any costs, involved, copier available. Tel 01-657 3630, evenings.
Mechanical filter 500Hz bandwidth, for 455kHz i.f., either Collins or Kokusai with data. DX4OU tx with or without vfo, must be in good cond. G4GFQ, QTHR. Tel Blackpool (0253) 867308.
2m converter for communication rx. 2m tx/rx mobile, 2m base station antenna, all cheap and simple for beginner. Pyatt, 23 Arundel Drive, Orpington, Kent.
Neumanns U87 and AKG D202E1 mic. Pre-1974 recordings of Radio 1, mw and vhf, anything at all, particularly "Beatles story" and "Insight" series. Daytime and evening shows, good prices paid. Can copy and return. G4FAQ, QTHR.
Sweep generator or wobbulator in the hf range. Telequipment D83 or D75 oscilloscope. Tel Derby (0332) 760809.
Antenna site for small group of hf contest-minded amateurs, permanent or temporary sites considered within 30-40 mile radius Reading. Radio-minded farmer with space to spare ideal. Exchange facilities for use of the antennas outside contest periods. Tel Maidenhead 32553.
KW-Zee Match. Twin swr and power meters. G8IX, QTHR. Tel Stoke-on-Trent (0782) 24941.
Codar preselector (either model), preferably wkg. Self-powered 2m converter SEM X2 perhaps? G8YIR. Tel 08894 78981 (Staffs).
Electroniques gen cov front end unit, 1·6MHz i.f. valve version, to buy or exchange ham band only type. G4EMB, QTHR. Tel 0621 816459.
Digital frequency readout counter, suitable for Yaesu FT101E, like YC601 similar. Hilo pump-up mast or similar. Collection can be arranged. G4HAF, QTHR, Wolverhampton. Tel Codsall 3509, anytime.
Mary Craven's German QSO book. G4GAR, QTHR. Tel Bristol (0272) 629691.
Any scope of 10MHz or greater bandwidth, would consider faulty instrument. Tel Broughton-in-Furness 237.
Secondhand Datong morse tutor. Will collect or pay postage. G8EVK, QTHR. Tel 0903 64167.
7094 valve, gen cov rx suitable for swl, CR100 etc. G3SRZ, QTHR. Tel Par (072681) 3375.
CW filter, 500Hz. YG88C for TS820 etc. G3JMO, QTHR. Tel 0642 828851.
Argonaut or similar required by prospective G4 going QRP. Tel Aldershot 316729, evenings.
APR9 units, mixer amplifier, power supplies, indicator, remote control, connecting leads, etc. Case for BC348, unmodified. *For sale:* Collins R390 rx, handbodk, exc, £225. R278GR, 1,750ch, 225-400MHz, £180. G3FOQ, QTHR. Tel Cambridge 870882, late evening.
VFO for Yaesu FT75 tx/rx, must be in good cond. Handbook or circuit for vfo. Information required on EMI oscilloscope type WM1. G2BCY, QTHR. Tel 0632 654780.
Jaybeam 2m 6-el quad and AR40 or similar rotator. Must be complete and in good cond. Details, price and phone number to G8THS, QTHR.
CW filter for TS520S. Hygain 18V antenna. Exchange Bird 1,000H or 1,000C element for 250H, or sell for £20 each. Details to G3KOU, QTHR. Tel 02357 66462.
LF xtal impedance meter. TS710, AN/TSM2 or similar, pref with manual. Offers to E. David, 8 Hamlea Close, London SE12 8EU. Tel 01-852 3594.
HQ1 or similar mini-beam. 18AVT/WB vertical. Prices and details to G3OPL, QTHR. Tel Thanet 57916, after 6.30pm.
QTH in Woking, Weybridge, West Byfleet or surrounding districts around £50,000. Similar for sale here at QTHR, £38,750. G4GPB. Tel 0243 789204.
Information: parts or comp units for radio set AN/ARR8B, vhf/uhf wideband panoramic rxs, made by Dynamic Electronics NY. Others for USAF in 1950s. BC348J, N or Q. G8LIU, QTHR. Tel Uxbridge (0895) 30006.
Variable capacitors split stator, 150 + 150μF (for use in Z-Match atu) or close value. G3FCM, QTHR.
Good quality solid-state gdo. *Radio Communication Handbook.* G3AO, QTHR. Tel Chinley 50639.
SSB unit for Grundig Satellit 2000. Tel Chester 676240.

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 7700 or FRG 7700M 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 7700 + AMTECH 200 ATU £309.00
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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 **£43.95**—The Amtech 200 **£29.95**—What can you lose? So get cracking MAKE A GOOD START! HAVE PEAK PERFORMANCE FROM THE OFF.

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R0	4·0277	8·0555	12·0833	14·9888	18·1250	44·9666
R1	4·0284	8·0569	12·0854	14·9916	18·1281	44·9750
R2	4·0291	8·0583	12·0875	14·9944	18·1312	44·9833
R3	4·0298	8·0597	12·0895	14·9972	18·1343	44·9916
R4	4·0305	8·0611	12·0916	15·0000	18·1375	45·0000
R5	4·0312	8·0625	12·0937	15·0027	18·1406	45·0083
R6	4·0319	8·0638	12·0958	15·0055	18·1437	45·0166
R7	4·0326	8·0652	12·0979	15·0083	18·1468	45·0250
S8	—	—	12·1000	14·9444	18·1500	44·8333*
S9	—	—	12·1020	14·9472	18·1531	44·8416*
S10	—	—	12·1041	14·9500	18·1562	44·8500*
S11	—	—	12·1062	14·9572	18·1593	44·8583*
S12	—	—	12·1083	14·9555	18·1625	44·8666*
S13	—	—	12·1104	14·9583	18·1656	44·8750*
S14	—	—	12·1125	14·9611	18·1687	44·8833*
S15	—	—	12·1145	14·9638	18·1718	44·8916*
S16	—	—	12·1167	14·9667	18·1750	44·9000*
S17	—	—	12·1187	14·9694	18·1781	44·9083*
S18	—	—	12·1208	14·9722	18·1812	44·9166*
S19	—	—	12·1229	14·9750	18·1843	44·9250*
S20	4·0416	8·0833	12·1250	14·9777	18·1875	44·9333
S21	4·0423	8·0847	12·1270	14·9805	18·1906	44·9416
S22	4·0430	8·0861	12·1291	14·9833	18·1937	44·9500
S23	4·0437	8·0875	12·1312	14·9861	18·1968	44·9583

SR = Series Resonance
*HC25 only

Also in stock: R0 to R7 and S8 to S23 for following: Belcom FS1007, FDK TM56, Multi 11 Quartz 16 and Multi 7, Icom IC2F, 21, 22A and 215, Trio Kenwood 2200, 7200, Uniden 2030 and Yaesu FT2FB, FT2 Auto, FT224, FT223 and FT202.
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	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery A	B
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	3	200 (total)	30 to 99·999kHz	—	£10.50
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	5	50	1·00 to 1·499MHz	£9.00	£6.00
	6	10	1·50 to 1·999MHz	£4.75	£4.20
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	8	10	2·60 to 3·999MHz	£4.55	£3.70
	9	10	4·00 to 20·999MHz	£4.55	£3.60
	10	10	21·00 to 24·000MHz	£6.00	£5.40
3rd OVT	11	10	21·00 to 59·999MHz	£4.55	£3.60
5th OVT	12	10	60·00 to 99·999MHz	£5.00	£4.00
	13	10	100·00 to 124·999MHz	£6.15	£5.20
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Unless otherwise requested fundamentals will be supplied with 30pF load capacity and overtones for series resonance operation.

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We've always aimed to hold in stock the widest possible range of Amateur Radio equipment, no matter who makes it. So, this month, as well as featuring such brands as YAESU, ICOM, TRIO/KENWOOD, STANDARD, MICROWAVE MODULES etc, we are giving particular prominence to a really marvellous new receiver from SONY . . . not a name you expect to find in these pages.

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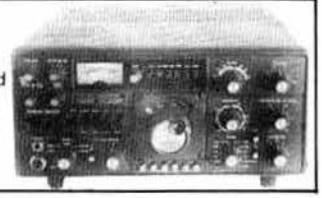

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Still the finest value-for-money communications receiver on the market at only

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

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

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But then we've always said that the only way to buy a rig is to compare as many alternatives as possible side by side, and then choose the one that's right for you. So, whether the equipment you're looking for is new or secondhand, a major line-up or just some bits and pieces, Brenda (G8SXY) and Bernie (G4AOG) invite you to come and see London's widest selection of gear . . . and have a cup of Brenda's coffee too!

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VOX and speech processor as standard. 10 watts output SSB/CW/FM — 5 watts AM Mains or Battery, large LED frequency display.

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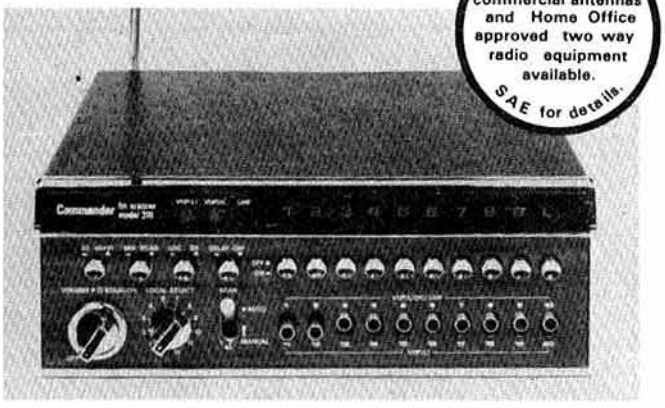

A compact unit suitable for fixed or mobile service, giving the option of scanning in user programmed order up to 20 channels in the 430-470 MHz, 140-175 MHz or 68-88 MHz frequency ranges.

Manual/automatic and fast/slow scan with channel lockout and delay. Mains or battery operation. Vehicle Mount Supplied.

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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.

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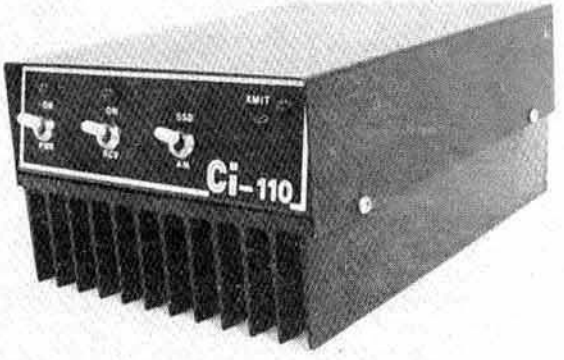
Ci-110 Mk2 POWER AMP



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.

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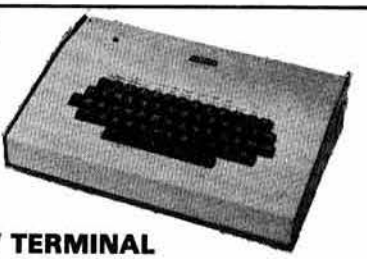

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- All the transmission and editing modes of RTTY at 110 baud with both upper and lower case characters.

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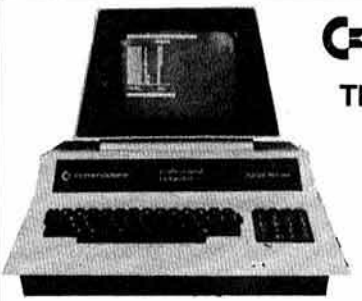

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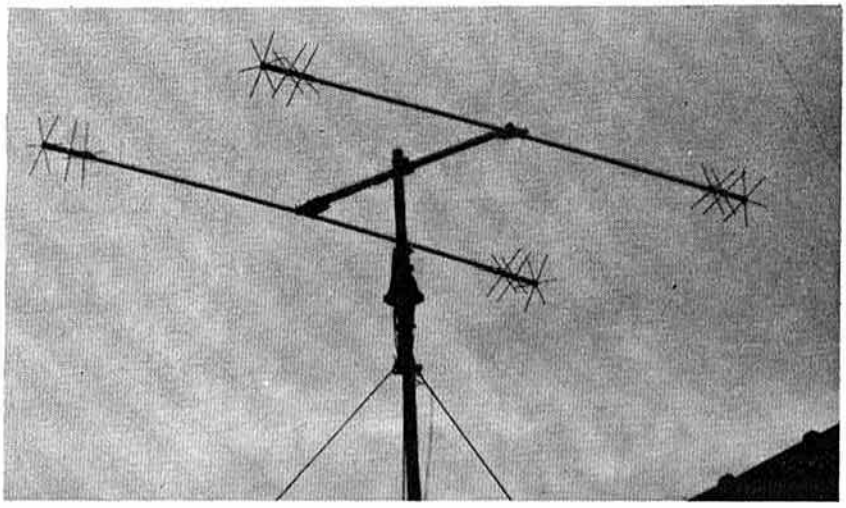
SPECIFICATION

Element length	11 feet
Boom length	60 inches
Turning radius	7 feet
Operating frequencies	10m, 15m, 20m
Forward gain (ref D pole = 1:00)	3·6 dB
SWR at resonance	1·5 to 1:00 maximum
Power rating	1400 watts PEP
Input impedance	50 ohms
Wind resistance	80 mph
Weight	14 lbs
Rotator requirements	AR40

SAE for details, Coax UR43, UR67 and 5 core available



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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.

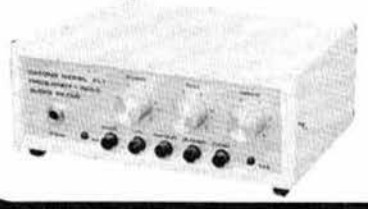
Model D75 RF Speech Processor

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.



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Full details free on request.
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NEW PRODUCT — TWO METRE CONVERTER MODEL DC144/28

A high performance two metre to 28 MHz converter designed both for use with Model PC1 to give general coverage with ten metre receivers, or as a stand-alone converter where low noise and high signal handling capability are important. It features a 3SK88 low noise MOSFET into a high level hot carrier diode mixer followed by a J310 post amplifier. Variable attenuators at input and output allow optimum gain distribution in all applications. Other features include: plated through PCB, interstage screening, SO239 connectors. Appearance is like Model VLF.

VERY LOW FREQUENCY CONVERTER MODEL VLF

If your communications receiver gives poor results below 500 kHz Model VLF is the answer. It also adds MW and LW coverage to amateur bands-only receivers for news,time checks etc.
Connected in series with the antenna Model VLF allows you to tune the 0 to 500 kHz range (and above at reduced sensitivity) using the ten metre band (28 - 30 MHz) on your normal receiver.

NEW PRODUCT — PREVIEW — MORSE KEYBOARD MODEL MK

A keyboard operated morse sender with a host of features to make CW sending a dream.
The comprehensive character set includes procedure signals and there are four separate 64 character message memories with programmed pause capability. Plus a buffer memory for perfect sending despite imperfect typing. Memory contents are retained when switched off and four internal pen cells give an amazing 300 hours life. All you have to do is plug it into your key jack.

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Model Datest 1 Transistor Tester
Model Datest 2 Transistor Tester
R.F. Speech Processor
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.

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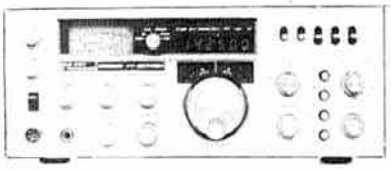

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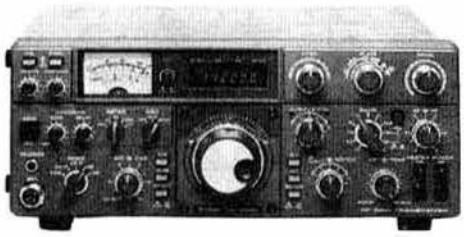

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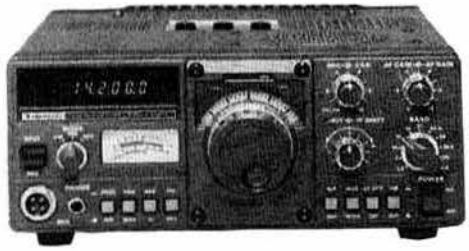

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For the discerning DXER comes the modern NRD-515 general coverage receiver ● Full of all performance advantages offered by any receiver ● All modes of operation PLL Digital VFO ● Solid state ● Up conversion type double conversion ● Frequency coverage 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

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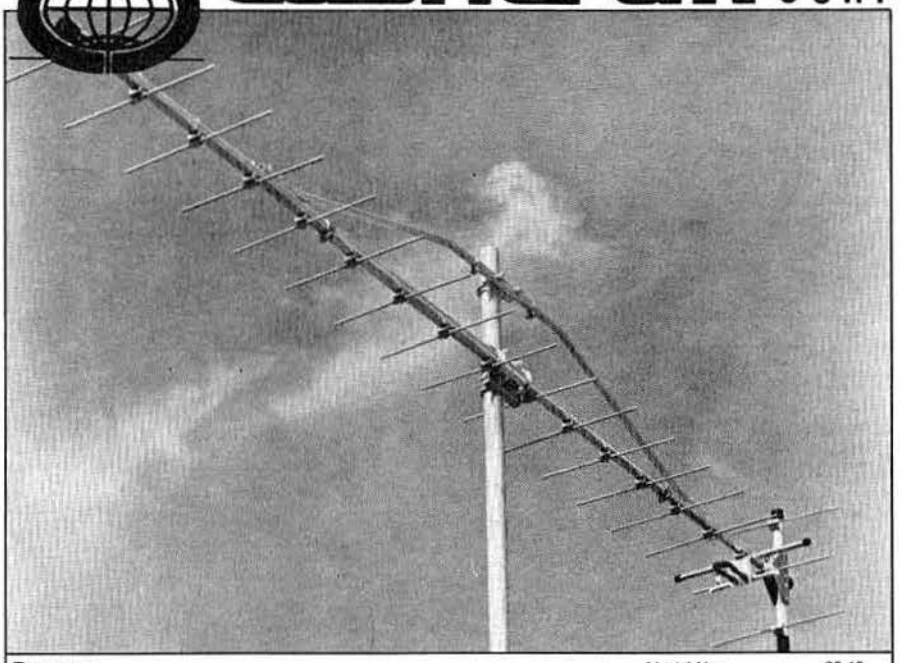

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Whatever your choice of 2 metre activity, Boomers will fill your needs. For FM at the high end use the 214FB or 228FB. For CW/SSB on the low end use the 32-19 or 214B, in EME, DX or regular QSO's Boomer will perform for you. Now 220 MHz has been added to complement the Boomer series. Models are available for the bands from 50 through 220 MHz.

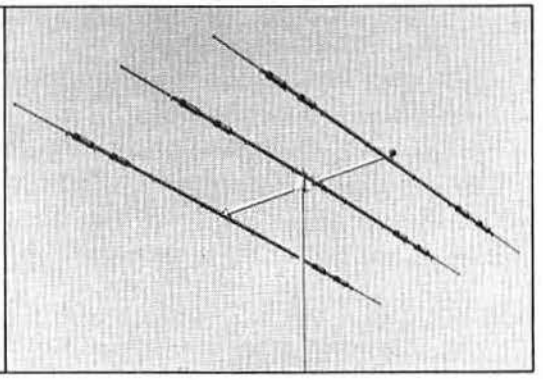
Power dividers are available separately.

Model No.	32-19
Frequency range (MHz)	144-146
Forward gain dBd	16.2
Front to back ratio dB	24
SWR (typical)	1.2:1
Impedance (ohm)	50
Weight (lb)	12
(kg)	5.44
Length (ft)	22
(m)	6.71
Turning radius (ft)	11
(mm)	3.35
Windload (ft²)	3.5
(m²)	.33

A3 3 Element 20/ 15/ 10 metres

Make friends of your neighbours with A3 compact dimensions low profile and small turn radius. Satisfy your budget with A3 economy pricing. You will also realise savings by using a lighter weight tower and rotator. This is one compact beam that has the strength and power of most larger antennas.

Forward Gain	8 dBd
Front to back Ratio (Avg)	25 dBd
VSWR	1.2-1 Typical
Bandwidth (Avg)	500 KHz
Power rating	2000 W PEP
Feed Point impedance	50 ohms
Boom (ft-in)	14' × 1.63" × 150"
(cm)	426.7 × 4.13-3.81
Weight (lb)	27
(kg)	2.19
Turning Radius (ft)	15.50
(m)	4.72



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Model ATV-3

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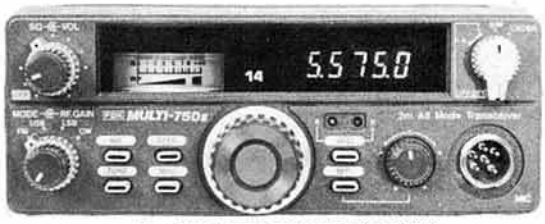

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Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by E T Heron & Co Ltd, Essex and London