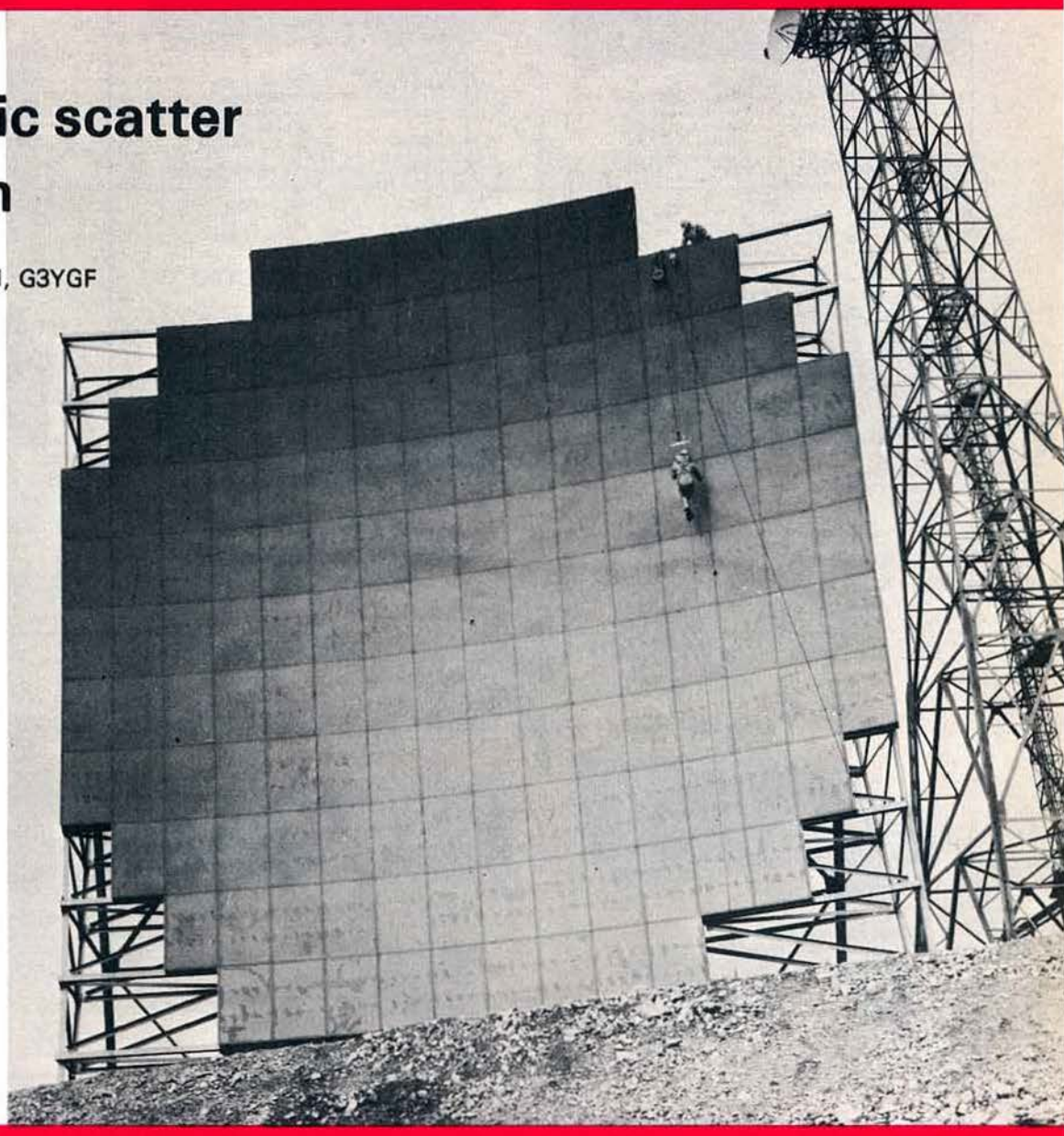
August 1981

RADio COMmunication

In this issue

Tropospheric scatter propagation

by J. N. GANNAWAY, DPhil, G3YGF



COMMERCIAL SIZE

British Telecom riggers at work on one of the two 60ft tropospheric scatter antennas at Mormond Hill, Scotland, which were brought into service recently to serve the Fulmar oil field. With many of the North Sea installations stationed more than 100 miles offshore, the only terrestrial wideband radio transmission practicable is trans-horizon radio, using tropospheric scatter.
A British Telecom photo

Journal of the Radio Society of Great Britain

RSGB

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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
Catronics' Price:	**£726**

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
Catronics' Price:	**£547**

25W PEP version also available TS130V at **£450**

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
Catronics' Price:	**£198**

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
Catronics' Price	**£785**

NEW TS530S

BUILDING ON SUCCESS

TS530S Brief Specification

Frequency range:	9 bands, 160m–10m
Modes:	CW, USB, LSB
Final Power Input:	220 watts PEP (SSB) 180 watts DC (CW)
Receive Sensitivity:	0·25μV at 10dB s/N
Catronics' Price:	**£561**

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
Catronics' Price:	**£371**

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.
Catronics' Price:	**£276**

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
Catronics' Price:	**£329**

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
Catronics' Price:	**£305**

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

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

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TRIO *pacesetter in amateur radio*

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

The TS-830S has every conceivable operating feature built-in for 160–10 metres (including the three new bands). It combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455kHz second IF. Its optional VFO-230 remote digital VFO provides five memories.

TS-830S FEATURES:

- LSB, USB and CW on 160–10 metres, including the new 10, 18, and 24MHz bands. Receives WWV.
- Wide receiver dynamic range. Junction FETs in the balanced mixer, MOSFET RF amplifier at low level, and dual resonator for each band.
- Variable bandwidth tuning (VTB). Varies IF filter passband width.
- Notch filter (high-Q active circuit in 445kHz second IF.
- IF shift (passband tuning).
- Built-in digital display (six digits, fluorescent tubes), analog subdial, and display hold (DH) switch.
- Noise-blanker threshold level control.
- 6146B final with RF negative feedback. Runs 220W PEP (SSB)/180W dc (CW) input on all bands.
- Built-in RF speech processor.
- Narrow/wide filter selection on CW.
- SSB monitor circuit to check transmitted audio quality.
- RIT (receiver incremental tuning) and XIT (transmitter incremental tuning).

OPTIONAL ACCESSORIES:

- SP-230 external speaker with selectable audio filters.
- VFO-230 external digital VFO with 20Hz steps, five memories, digital display.
- AT-230 antenna tuner/SWR and power meter/antenna switch; 160–10 metres, including three new bands.
- YG-455C (500Hz) and YG-455CN (250Hz) CW filters for 455kHz IF.
- YK-88C (500Hz) and YK-88CN (270Hz) CW filters for 8·83MHz IF.

(VFOs for TS-830S, TS-130 Series, and TS-120S are compatible with all three series of transceivers.)

TS830S £726.00 inc VAT
Carriage £4.50.

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

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 band:
- Built-in speech processsor.
- Narrow/wide filter selection on both CW (500Hz or 270Hz) and SSB (1·8kHz) with optional filters.
- Automatic selection of sideband 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 £547.00 inc VAT
TS-130V £450.00 inc VAT
Carriage £4.50.

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

LOWE ELECTRONICS Ltd
CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817

TRIO *pacesetter in amateur radio*

TS-530S *building on proven success*

The all new TS530S is firmly based on the reputation of the TS520 series and incorporates many of the features of the superb TS830S. Included are the three new bands and, of course, the rig has both digital and analogue frequency readout. Also available for the TS530 is a complete range of matching station accessories, the SP230 speaker, the VFO240 and, of course, the AT230 antenna tuning unit.

TS530S features:
- Single conversion receiver and transmitter using 8·83MHz IF.
- LSB, USB and CW on 160-10 metres including the new 10, 18 and 24MHz bands.
- Built-in digital display with six digits and also analogue dial.
- IF shift (passband tuning).
- RIT (Receiver Incremental Tuning) and XIT (Transmitter Incremental Tuning).
- Built-in speech processor.
- Narrow and wide filter switching.
- Noise blanker threshold level control.
- Also retained are the rugged reliable 6146B PA valves and the easy-to-use controls.

Optional Accessories:
- SP230 external speaker with selectable audio filters.
- VFO240 external matching VFO.
- AT230 antenna tuner/SWR and power meter/antenna switch, 160 to 10 metres bands.

TS-530S **£561.00**
carriage £4.50

NEW

TR-9500 *70cm FM, SSB and CW multimode mobile*

The TR9500 a 70cm multimode mobile giving SSB, FM and CW operation in a compact rig based on the phenomenally successful 2 metre 9000. Combining the convenience of FM with the "DX ability" of SSB on the 70cm band this is the rig all discerning VHF and UHF amateurs have been waiting for. Used alongside your existing 2 metre equipment a new spectrum of contacts becomes available. Repeaters, satellite working, simplex and with the addition of your 2 metre rig Duplex communications are at your fingertips.

Of course the matching accessories, SP120 speaker, BO·9 system base and PS20 power supply, are all available to enable you to build a base station system second to none.

The TR9500 features:
- FM, USB, ESB and CW.
- Similar in size to the TR9000.
- Two digital VFOs.
- Multiple scan facilities for various modes.
- Six memories, five for simplex or repeater shift – and the sixth memory for a non-standard offset.
- Digital frequency display.
- Covers 430 to 440MHz.
- Up/down microphone for manual band scan.
- RIT (Receiver Incremental Tuning) for SSB and CW.
- RF gain control.
- Mobile mounting bracket.
- Led indicators for on air and busy.

Optional Accessories.
- PS20 fixed station power supply.
- SP120 fixed station external speaker.
- BO9 system base – with power switch, send/receive switch, memory back up power supply and headphone jack.

TR-9500 **£472.00**
carriage £4.50

NEW

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TRIO

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TRIO R-1000

"Hear there and everywhere"

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 240V AC.

RECEIVER WITH DC KIT FITTED £299 inc VAT.
SP-100 MATCHING EXT SPEAKER £26·45 inc VAT.
CARRIAGE BY SECURICOR £4.50.

SR9 DAIWA

2mtr FM TUNABLE/XTAL RECEIVER
£46.00 inc VAT carriage £1.50

XTLS £2.50/CH

SL-1600A

16 CHANNEL 2mtr SCANNING RECEIVER
£39.50 inc VAT carriage £1.50

MF-083 8-Channel

Marine Scanner + FM Broadcast
£85.10 inc VAT carriage £1.50

Lowe Electronics Open Day

The Directors and Staff of Lowe Electronics have great pleasure in inviting you to our first open day to be held on Saturday the 15th August, here at Matlock. All the members of staff will be in attendance including back room boys and girls. You will have the opportunity to meet them and find out how we tick. There will be conducted tours of the building by G3PCY and G8GPY. The RSGB Practical Wireless and the girls from CLUB 24, the LOWE CARD people will be in attendance. We hope you will join us in making it a successful day.

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Have you thought about selling or trading in your QSL cards?

Not so daft as it seems, since our collectomaniac Director – John Wilson – is willing to buy or trade in QSL cards. They must be postally used, in other words have stamps on, and been sent to you from abroad. Particular interests are cards from former African colonies and places like Ascension, St Helena and so on.

If you are interested, why not contact John Wilson at Matlock, it's an easy way to turn waste paper into money.

LOWE SRX 30D

. . . . . a familiar name, but a whole new receiver

A familiar name, but a whole new receiver behind it. Building on all the excellent features of the SRX-30, including the drift cancelling system covering 500kHz to 30MHz; the selectable sidebands and AM; the easy to use tuning system; we now introduce the all new SRX30D which incorporates the suggestions made by our customers. Outstanding new features are:

- Extended coverage 200kHz-30MHz
- Digital readout in large green display units which give true unambiguous frequency information—even when you switch sidebands or use the clarifier.
- All new frequency synthesis using Plessey SL6 1641 double balanced modulator ICs for a new high standard of performance.
- All new audio system which produces outstandingly good quality on the built in speaker, and is capable of driving external hi-fi speaker units for even better sound.
- All new IF filters with optimum bandwidth for mode in use. Automatic filter selection from mode switch.

There is so much that is impressive about the SRX30D that you have to see it and handle it to really appreciate the performance.
We predict that the SRX30D will be a landmark in low cost, high performance SWL receivers. Just consider how much you should pay for a receiver covering 200kHz-30MHz with accurate digital readout; high performance USB/LSB/AM with switched filters; drift cancelling frequency synthesis; built in mains supply and built in speaker; high quality construction and advanced design—and so much more.
Then look at our price for the SRX30D and you will be even more impressed.

£195.00 inc VAT Securicor carriage £4.50

Accessories for the short-wave listener

		Inc VAT	Carr
HF5	80-10m HF vertical. No radials required when on ground post	48.50	4.50
EIS	Small egg insulator. Glazed ceramic 40cm long	.30	.25
EIL	Large egg insulator. Glazed ceramic 50cm long	.45	.36
SIL	Ribbed strain insulator for dipole end or centre. 70cm long	.35	.36
MIZUHO			
KX2	Top quality 500kHz-30MHz aerial tuner. Perfect match for R1000	29.90	1.50
AX1	Aerial switching system. Handles 6 aerials & 6 receivers	27.03	1.00
APM1	Audio peak and notch filter. Variable bandwidth active filters	33.00	1.00
SR1	Mini rack for above the system	14.09	1.50
MP1	Rack mount for APM1	5.20	1.00

TRIO

pacesetter in amateur radio

Trio 8400 the new way to 70cm FM mobile, a fully synthesized 430 440MHz 10 watt output, mobile transceiver with memories, 2 separate VFO's all in a truly amazing compact package. Complete with up/down frequency shift microphone and car mounting bracket the TR8400 is the way to go 70cm is on the move.

TR-8400 *70cm FM mobile*

£329 inc VAT. Securicor carrriage £4.50

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 accessories and it becomes the obvious choice for your shack.

TR-9000 *2 Metre Multimode*

£372 inc VAT. Carriage by Securcior £4.50

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 development for repeater shift, priority, and scan. The TR-7800 by Trio, the only FM mobile.

TR-7800 *The Ultimate 2 Metre Mobile FM rig*

£275 inc VAT. Carriage by Securicor £4.50

LOWE ELECTRONICS Ltd

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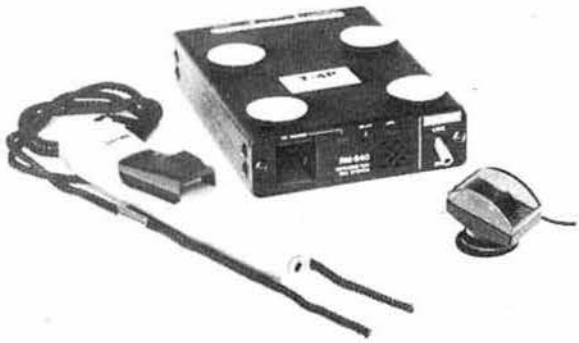
DAIWA *Distributed in the UK by Lowe Electronics Limited.*



The Daiwa infrared mike system comprising of a control box, sensor and infrared mike enables you to dispense with the hand mike and cable when operating in your car or shack. By using an infrared beam audio is transmitted from the mike to the sensor and then to the control box which activates the transmitter. To transmit, press the locking switch on the mike and talk. To receive, release the switch and your rig immediately returns to receive. When you have finished your contact return the mike to its slot in the control box and the mike nicad battery is maintained at full charge. For those of you who like fresh air and drive with all the windows open there is a matching wind shield available at an additional 75p. So there we are, the latest in technology to bring safely to your mobile operation, the Daiwa infrared mike.

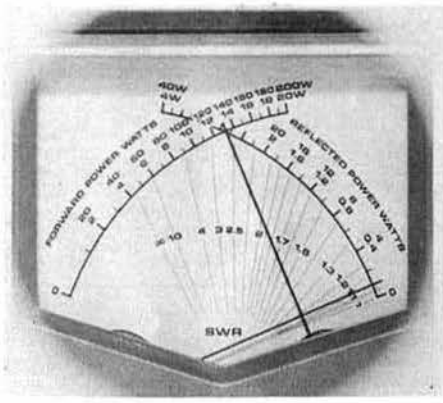
*the **DAIWA** Infrared mike £45 inc VAT carr. £1.00*

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** CNA 1001A Automatic Antenna tuner £129.50 inc VAT high power model £190 inc VAT*



*the **DAIWA** cross needle 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*

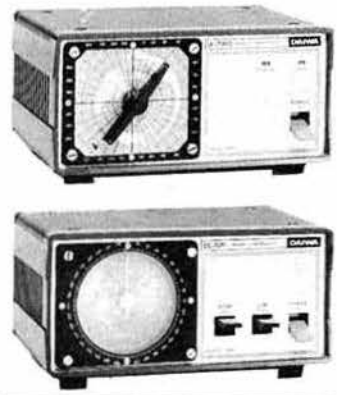
The Daiwa range of rotators are probably the best amateur rotators available. The quality of construction is up to the high standards we have come to expect from Daiwa and the rotator system is of a completely new design which eliminates "out of sync" operation and for the first time gives a true 360°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



*the **DAIWA** rotator systems*

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

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FROM AOR *authority on radio*

THE AR240A

2 metre hand held synthesized 144–146MHz 1½ watt transceiver
AR240A £158 inc VAT

THE AR22

a 2 metre FM pocket synthesizer 141–149 MHz receiver
AR22 £83.00 inc VAT

THE AR740A

the 70cm hand held version of the popular AR240A.
Price to be announced

AERIALS *only a small section of our vast range, ring for full details*

THE NEW BUTTERNUT RANGE

the HF5V III 5 band vertical £65.00 inc VAT
the TRB160 160 loading coil for above £25 inc VAT
the 2MCV 2 metre colinear £22.00 inc VAT

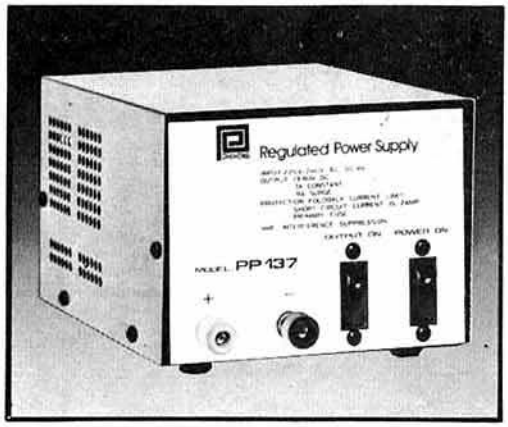
THE HOKUSHIN RANGE

the 2E 2 metre ⅝ whip £8.50 inc VAT
the 2NE 2 metre ⅞ whip £13.00 inc VAT
the 430E 70cm ⅝ over ⅝ £11.50 inc VAT

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 PRICES AS OF THE 1st JULY 1981

HEAD OFFICE AND SERVICE CENTRE
LOWE ELECTRONICS LTD, CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629 2817 or 2430. TELEX: 377482. OPEN TUES FRIDAY 9 5.30, SAT 9 5 CLOSED FOR LUNCH 12.30 TO 1.30

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

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EASY ORDER FORM ON PAGE 689

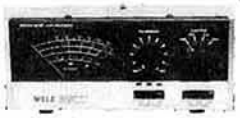
2m FM 25 Watts AZDEN PCS 3000
£219 inc VAT

Here's a really super action packed FM mobile transceiver. Particularly ideal for the operator with very little room to accommodate the standard size of transceiver. The detachable head unit may be mounted remote from the main transceiver (optional cable kit necessary) so it can be tucked away in the smallest of spaces. Apart from this novel practical feature, there is a host of technical features. A microcomputer control panel takes care of frequency control, 8 memories, band and segment scanning, all selected by touchpad controls with back illumination. Full coverage of 144 to 146MHz is available on 25kHz or 12½kHz steps, a bar LED signal and RF meter gives positive readout as does the large LED frequency display. Other features include high/low power switching, repeater shift, tone burst, tone entry indicator, ni-cad memory back-up and much more. Why not send today for the full colour brochure?

TRIED 10m FM?
AZDEN PCS 2800 £179 inc VAT

Here's a real new opportunity to enjoy something different in amateur radio—10m FM. Already very popular in the U.S.A., 10m FM has the advantage of greater coverage than the VHF bands, plus the opportunity of European and Intercontinental contacts via sky wave. The calling frequency is 29·6MHz and there is already quite a bit of UK activity around this frequency. The PCS2800 covers the range 28-30MHz in 10kHz steps with a 100kHz repeater shift—yes you can even work the American repeaters! A 6 channel memory enables all the popular frequencies to be loaded into it with full scanning of both the memories and the complete band. The 10 watt output is more than adequate for 10 metre contacts and, of course, the front control head can be removed to make a really compact installation. The unit comes complete with microphone, mobile mounting bracket, etc.

"WELZ" TELLS THE TRUTH



MODELS

SP200	1·8-160MHz 20W-200W-1kW	£59.95 (n.c.)
SP300	1·8-500MHz 20W-200W-1kW	£79.95 (n.c.)
SP400	130-500MHz 5W-20W-150W	£59.95 (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.

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

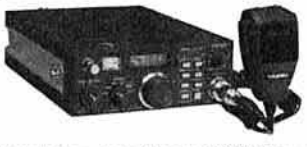
The message is beware of super cheap power supplies—they could destroy your transceiver! The SEIF unit is different. It's a really rugged unit with a heavy duty transformer ideal for running 10-15W mobile rigs. Completely stabilised and protected, this unit will give you good, reliable performances.

£24.95 inc VAT
£2.00 carriage

NEW GLOBAL TV FILTER HP4A
£5.95 (50p)

We are pleased to announce the introduction of the new GLOBAL HP4A TV filter. Even more effective than earlier models, its double action filters both inner and outer coax conductors. Ideal for both VHF and HF operators, it is now so effective it should solve most cases of interference caused by RF down the TV aerial lead. Keep one handy!

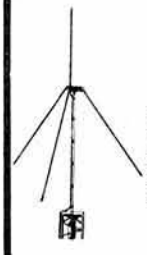
NEW YAESU FT290 £229.00



Just released from Japan the new FT290 offers all-modes in a highly portable package. LCD readout, 10 memories, high/low power switching, etc. Our units are factory authorised UK models. Order yours today!

NEW WELZ DUMMY LOAD
50 OHMS 50 WATTS
DC 450MHz
£6.95 (£1)

Here's a new item that is manufactured by WELZ and is a true laboratory type piece of equipment at a price you can afford. This 50ohm dummy load will handle powers of up to 50 watts and is fitted with PL259 plug. Not to be compared with some inferior units about, this model is rated at up to 450mHz with a VSWR of 1:1 and is offered at this price because of a special bulk purchase.



AMAZING PRICE!
10 METRE GROUNDPLANE
£17.95 carr. £3

Here's your chance to purchase a full size 10 metre groundplane at an amazingly low price. It comes complete with mounting bracket SO239 and instructions. Ideal for DX, Oscar, CB etc.

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SPECIAL SUMMER OFFER!

LOWER PRICES & FREE CREDIT!

FDK THE NUMBER ONE FM RIG—M700EX

£189 inc. VAT

1–25 watts—variable
Priority channel scanning
Large digital readout

CREDIT

Deposit £63.00

Balance 12 months at £10.50

The Multi-700EX is fast becoming a standard in the 2 metre FM mobile world having all the features you have come to expect without being too complicated! Variable power output up to 25 watts, programmable priority channels, channel scanning, reverse repeater, easy to read digital display and excellent reliability.

FDK ALL MODES WITH 70cms OPTION—M750E

£289 inc. VAT

2m FM/SSB/CW
10 watts or 1 watt
Bright digital readout

CREDIT

Deposit £96.00

Balance 12 months at £16.08

The Multi-750E operates like a dream! All modes 144–146MHz (4MHz option) with 1 watt or 10 watts output on all modes. Tone-burst, repeater shift, RF gain control, noise blanker, dual vfo, etc. And if you want to operate on 70cms you don't have to purchase a separate rig. The matching Expander 430 will give you instant QSY from 2 metres to 70cms at the touch of a button.

Dear Customer

This month I have put together for you one of the very best offers ever to be made in the amateur radio business. I have selected two of our top selling models and by buying in bulk have clipped £10 off the price of each unit. I have also arranged a free credit scheme on both of these models as a special summer deal. Compare the specification with other models and see just what remarkable value these transceivers represent. We have already sold many hundreds of these excellent units and I know that you will be happy with the model of your choice.

Peter Waters

NOTE: Credit cards cannot be used for deposit

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Amount enclosed _____ **You might find it easier just to 'phone us with your Access/Barclaycard number**

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All prices include VAT

PRICE LIST – AUGUST 1981

Carriage charge in brackets

TRIO PRICE CHANGES – PHONE FOR LATEST INFORMATION

TRIO

TS830S	160-10m transceiver 9 bands	£639.52 (5.00)
VFO230	Digital VFO with memories	194.45 (6.00)
AT230	All-band ATU power meter	106.72 (2.25)
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	28.75 (1.00)
YK88CN	270Hz CW filter	28.75 (1.00)
TS530SE	160-10m trans 200w pep digital	505.00 (4.50)
VFO520S	External VFO	98.90 (4.50)
YG3395C	CW filter 8 pole	37.95 (.50)
DK520	DG5 to older TS520	10.35 (.75)
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	26.45 (.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	399.00 (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)
YK88S	2nd SSB filter option	26.45 (.50)
VFO120	External VFO	89.70 (4.50)
SP120	Base station external speaker	25.30 (1.25)
SP40	New mobile speaker unit	26.89 (1.50)
AT130	100W antenna tuner	72.89 (1.50)
PS20	AC power supply TS120/130V	44.85 (4.50)
PS30	AC power supply TS120/130S	85.10 (4.50)
MA5	5 band mobile aerial system	74.75 (4.50)
TL922	160-10 metre 2KW linear	595.70 (4.50)
MC50	dual impedance desk microphone	24.15 (1.50)
MC35S	Fist microphone 50K impedance	13.80 (1.00)
MC30S	Fist microphone 500ohm imp.	13.80 (1.00)
LF30A	HF lowpass filter. 1kW	18.40 (1.00)
RD300	1kW oil filled dummy load	48.30 (1.50)
TS770E	2m/70cm all mode transceiver	730.25 (4.50)
SP70	External speaker unit	18.40 (1.00)
TR9000	2m synthesised multimode	345.00 (4.50)
TR9500	70cm all-mode	t.b.a.
BO9	Base plinth for TR9000	32.20 (4.50)
TR7800	2m FM synthesised mobile	268.00 (4.50)
TR2300	2M FM synthesised portable	166.75 (4.50)
VB2300	10W amplifier for TR2300	49.45 (1.50)
MB2	Mobile mount TR2300/VB2300	17.25 (1.00)
RA1	Rubber flexible antenna	6.90 (.50)
PS1200	AC power unit and charger	29.50 (1.50)
TR2400	2m FM synthesised handheld	198.95 (4.50)
ST1	Base stand and quick charger	43.70 (1.50)
BC5	12V quick charger	17.25 (1.50)
SC3	Soft carrying case.	11.50 (.50)
LH1	Hard leather holster	18.50 (.50)
PB24	Spare battery pack/charger lead	14.26 (1.50)
TR3200	70cm FM portable transceiver	164.45 (4.50)
PL1	Spare power/charge lead	1.30 (.15)
R1000	Gen. Coverage Receiver	285.20 (4.50)

YAESU

FT101Z	160-10m 9 band transceiver FM	529.00 (n.c.)
FT101ZD	as above but with digital FM	599.00 (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	690.00 (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.)
144V107V	901 2 metre transverter	101.20 (n.c.)
50V107V	901 6 metre transverter	69.00 (n.c.)
430V107V	901 70cms transverter	175.95 (n.c.)
SP107P	External speaker in cabinet	57.50 (2.50)
SP107	External speaker in cabinet	27.60 (2.00)
DMST107	12 channel memory	88.15 (n.c.)
CW	CW filter for FT107	23.00 (.50)
AM	AM filter for FT107	23.00 (.50)
YM34	500ohm desk mic FT707/FT107	18.80 (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	529.00 (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 9 band	385.00 (n.c.)
FT225RD	with digital readout	565.00 (n.c.)
YH55	8ohm headphones	9.95 (1.25)
FF501	Low pass filter	19.95 (.75)
QTR24D	24 hour quartz clock	25.70 (1.50)
FP12	230v AC 12 amp DC p/supply	78.20 (2.50)
FP4	230v AC 4 amp DC p/supply	41.40 (2.50)
FSP1		9.60 (1.00)
FRG7	0·5-30MHz communications Rx	189.00 (n.c.)
BHRG7	Battery holder for FRG7	5.00 (1.00)
YC500J	Frequency counter	189.75 (n.c.)
YC500S	Frequency counter	270.25 (n.c.)
YC500E	Frequency counter	345.00 (n.c.)
FRG7700	1981 version of FRG7000	309.00 (n.c.)
FRG7700	MEM As above with freq mem	380.00 (n.c.)
FT207R	144-146MHz synthesised h/h	199.00 (n.c.)
NC1A	Ni-cad 230v AC charger	18.98 (1.50)
NC2	Ni-cad 230v AC fast charger	39.68 (1.50)
NC9	Ni-cad 230v AC charger	7.48 (.75)
NBP9	Spare ni-cad battery pack	16.68 (.75)
FLC2	Heavy duty case	20.70 (.75)
PA2	12v PSU	16.68 (1.00)
FBA1	Ni-cad pack charging adaptor	2.59 (.35)
FT225R	144-146MHz 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	5.00 (1.50)
NEW	FT290 All-mode	229.00 (–)

FDK VHF/UHF EQUIPMENT

M700EX	2m FM 25 watt trcvr. 12v DC	189.00 (n.c.)
M750E	2m FM/10W trcvr 12v DC	289.00 (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	89.90 (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

STOP PRESS
New Microwave Morse Tutor that speaks to you! £99.00 (–)

MMT28/144	10m linear transverter	99.00 (1.75)
MMT144/28	2m linear transverter	99.00 (1.75)
MMT432/28-S	70cm linear transverter	149.00 (1.75)
MMT432/144-R	70cm linear transverter	134.00 (1.75)
MMT70/28	4m linear transverter	115.00 (1.75)
MMT70/144	4m linear transverter	184.00 (1.75)
MMT1296/144	23cm linear transverter	184.00 (2.25)
MML144/25	2m 25W linear amplifier	59.00 (1.75)
MML144/40	2m 40W linear amplifier	77.00 (1.75)
MML 144/100	2m 100W linear amplifier	129.00 (2.75)
MML432/20	70cm 20W linear amplifier	77.00 (1.75)
MML432/50	70cm 50W linear amplifier	119.00 (2.75)
MML432/100	70cm 100W linear amp	228.65 (2.75)
MM2000	RTTY to TV converter	169.00 (1.75)
MM4000	RTTY Tcvr with keyboard	289.00
MMC28/144	10m converter	27.90 (.65)
MMC50/28	6m converter	27.90 (.65)
MMC70/28	4m converter	27.90 (.65)
MMC70/28LO	4m converter	29.90 (.65)
MMC144/28	2m converter	27.90 (.65)
MMC144/28LO	2m converter	29.90 (.65)
MMC432/28-S	70cm converter	34.90 (.65)
MMC432/144-S	70cm converter	34.90 (.65)
MMC435/51	70cm ATV converter	34.90 (.65)
MMC435/600	70cm ATV converter	27.90 (.65)
MMC1296/28	23cm converter, 10m output	32.20 (.65)
MMK1296/144	23cm converter, 2m output	59.80 (1.75)
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)
MMR15/10	15db attenuator, BNC terms	9.90 (.65)

JAYBEAM ANTENNAS

TB3	HF 3 element Tribander Beam	167.90 (4.50)
VR3	HF Vertical Triband	42.50 (3.00)
4 metre Antennas		
4Y/4M	4 element yagi	20.70 (3.00)
PMH2/4M	2 way phasing harness	12.20 (1.00)
2 metre Antennas		
DC1/WB	Wide band discone (100-470MHz)	41.40 (2.50)
LR1/2M	Omnidirectional vertical	24.15 (2.50)
C5/2M	5dB glass fibre colinear	44.30 (3.50)
5Y/2M	5 element yagi	11.25 (2.00)
8Y/2M	8 element yagi	14.50 (2.50)
10Y/2M	10 element 'long yagi'	31.00 (3.50)
PBM10/2M	10 element Parabeam	36.80 (3.50)
PBM14/2M	14 element Parabeam	44.85 (4.50)
5XY/2M	Crossed 5 element yagi	22.75 (3.00)
8XY/2M	Crossed 8 element yagi	28.40 (3.50)
10XY/2M	Crossed 10 element yagi	37.70 (4.00)
X6/2M/X12/70cm	Dual band crossed yagi	38.50 (4.50)
PMH/2C	2 way phasing harness	7.50 (.75)
Q4/2M	4 element quad yagi	23.70 (2.50)
Q6/2M	6 element quad yagi	31.40 (4.50)
D5/2M	Double 5 slot-fed yagi	20.15 (2.50)
D8/2M	Double 8 slot-fed yagi	27.15 (4.00)
SVMK/2M	Kit for vertical polarisation	7.25 (1.50)
UGP/2M	ground plane	10.15 (1.50)
HO/2M	Mobile 'halo' head only	4.50 (1.50)
HM/2M	Mobile 'halo' with 24" mast	5.40 (1.75)
PMH2/2M	2 way phasing harness	9.90 (1.00)
PMH4/2M	4 way phasing harness	23.00 (1.75)
70cm Antennas		
C8/70cm	8dB glass fibre colinear	50.00 (3.50)
D8/70cm	Double 8 slot-fed yagi	20.70 (2.50)
PBM18/70cm	18 element Parabeam	25.30 (2.50)
MBM48/70cm	48 element Multibeam	28.75 (3.00)
MBM88/70cm	88 element Multibeam	39.30 (4.50)
8XY/70cm	Crossed 8 element yagi	34.15 (3.50)
12XY/70cm	Crossed 12 element yagi	42.32 (4.50)
PMH2/70cm	2 way phasing harness	8.50 (1.00)
PMH4/70cm	4 way phasing harness	18.00 (1.50)
23cm Antennas		
D15/1296	Double 15 slot-fed yagi	34.00 (1.50)
PMH2/23cm	2 way phasing harness	25.40 (1.00)
Matching Transformer		
MT75/50	Impedance transformer 75/50Ω	3.60 (.50)
Chimney Lashing Kit		
DL	Double lashing chimney kit	8.25 (2.00)
Wall Brackets		
W6	6" wall bracket (1¼" masts)	2.65 (1.00)
W21	21" wall stand-off bracket	10.35 (3.00)
W24HD	24" wall stand-off bracket,	14.70 (4.50)
Masts (Aluminium)		
SPM	16' × 1" Portable Mast	15.15 (3.00)
PME	4" extension for double arrays	2.50 (2.00)
A4	4' 6" × 1¼" straight	3.80 (1.50)
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.)

G-WHIP MOBILE ANTENNA RANGE

Tribander Helical for 10/15/20 metres	24.75(2.00)
LF40m Coil for above	6.55(.50)
LF80m Coil for above	6.55(.50)
LF160m Coil for above	6.55(.50)
LF telescopic resonator whip	3.35(.75)

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Base mount single hole fixing + 3m cable	4.50(.50)
AERIAL ROTATORS (complete with control boxes)	
CDE AR40 (5 core cable)	59.80(1.50)
Channelmaster 9502 (3 core)	42.00(2.00)
Sky King SU2000 (3 core)	36.00(2.00)
Sky King SU4000 (6 core)	75.00(2.50)
KR 400RC (5 core) complete	£99.00(2.00)
CDE alignment bearing	7.75(1.00)
Channelmaster alignment	11.75(1.00)
HF ANTENNAS (various manufacturers)	
Mini-Products HQ-1 20/15/10m 2 el	96.50(2.50)
Mini-Products C4 20/15/10m vert dipole	48.50(2.00)
Mosley TD3JR 20/15/10m wire dipole	34.50(1.50)
Mosley "Mini-Beam" 20/15/10m 2 el. 600W	99.00(2.00)
Mosley "Mini-Beam" 20/15/10m 2 el. 2kW	129.00(2.00)
Mosley TA32 20/15/10m 2 el.	89.70(2.00)
Mosley TA33 20/15/10m 3 element	133.40(2.50)
Mosley Mustang 20/15/10m 3 element 2kW	166.75(4.00)
Hy-Gain 12AVQ 20/15/10m vertical	43.00(2.00)
Hy-Gain 14AVQ 40-10m vertical	60.00(2.00)
Hy-Gain 18AVT/WB 80-10m vertical	87.00(2.50)
HF5 80-10m vertical 200 watts	48.00(2.00)
Radial Kit for HF5	28.00(2.00)
Sagant EL40X 80-40 Balun fed dipole (79')	36.00(1.50)
Jaybeam TB3 HF 3 element Tribander	167.90(4.50)
Jaybeam VR3 HF Vertical Trihand	42.50(3.00)
Western DX5V 5-band	89.00(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	25.00(n.c.)
All band Doublet 1·8-30MHz + 470Ω feeder	22.50(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.)
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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	94.00(n.c.)
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. New stock just arrived!	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)
MISC STATION ITEMS	
SEIF 13·8V 4 amp AC power supply	22.95(2.00)
PS125 6 amp AC power supply	28.00(2.00)
EK121 Katsumi Electronic Keyer	29.00(1.00)
EKM12 Matching side tone monitor	10.95(1.00)
CW2A general purpose morse oscillator	6.95(.65)
Telegraph CW key (manual)	10.50(.75)
YW3 Twin SWR/Pwr/Field strength meter	11.36(.50)
MF210 Self powered 2M FM monitor	12.95(.50)
FX1 d/l station w/meter 700kHz-250MHz	28.00(1.00)
DM81 700kHz-250MHz dip meter	51.75(1.00)
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12BY7A driver valves	2.75(.50)
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Cigar lighter plugs	.55(.10)
UR67 cable 50Ω per metre	.69(.10)
UR43 cable 50Ω per metre	.23(.05)
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BL40X balun 50Ω	11.25(.35)
3 core rotator cable. Per metre	.22(.05)
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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	12.50(1.00)
Trio HCM10 Digital World Clock	55.20(1.50)

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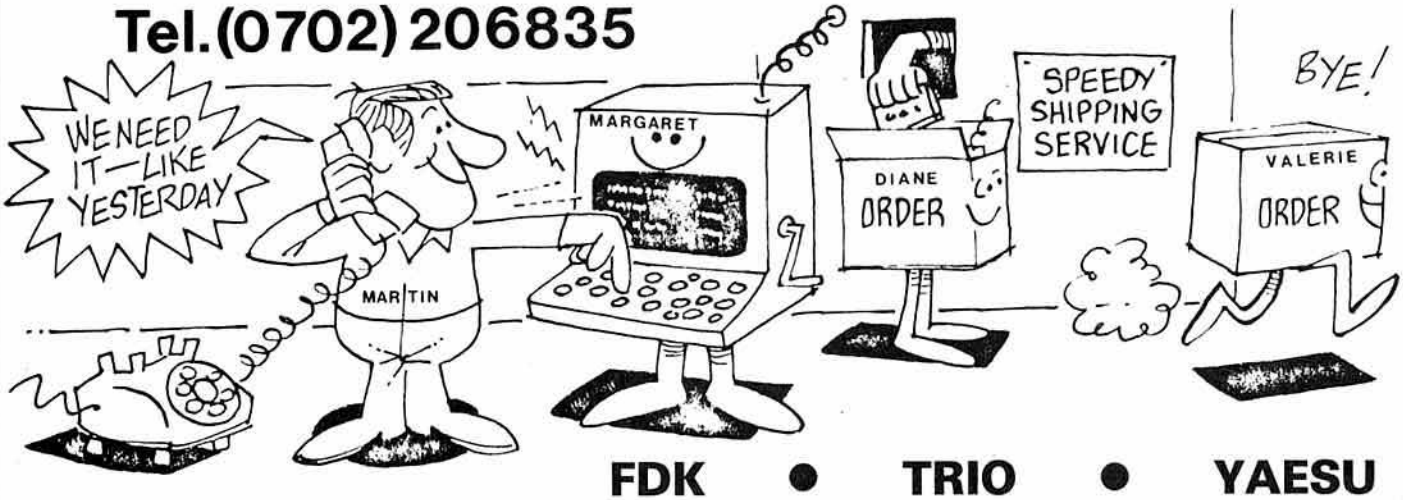

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Goods required .....
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Please charge to credit card No. .....

Thanet Electronics

IC-2E £169 incl.

The Largest Selling Amateur Transceiver in the World!

CHECK THE FEATURES

FULLY SYNTHESIZED — covering 144-145.995 in 400 5kHz steps.

POWER OUTPUT — 1.5W with the 9V rechargeable battery pack as supplied — but lower or higher output available with the optional 6V or 12V packs.

BNC ANTENNA OUTPUT SOCKET — 50 ohms for connecting to another antenna or use the Rubber Duck supplied.

SEND/BATTERY INDICATOR — Lights during transmit, but when battery power falls below 6V it doesn't light indicating the need for a recharge.

FREQUENCY SELECTION — by thumbwheel switches, indicating the frequency.

+5kHz SWITCH — adds 5kHz to the indicated frequency.

DUPLEX SIMPLEX SWITCH — gives simplex or plus 600kHz or minus 600kHz 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.

A Full range of accessories in stock.

IC ML1	
10 Watt Mobile Booster For IC 2E	£49.00
BP5 11 Volt Battery Pack	£30.50
BP4 Empty Battery Case For 6 x AA Cells	£5.80
BP3 Standard Battery Pack	£17.70
BP2 6 Volt Pack	£22.00
BC30 Base Charger For Above	£37.00
BC25 Mains Charger As Supplied	£4.25
DC1 12 Volt Adaptor Pack	£8.40
HM9 Speaker/Microphone	£12.00
CP1 Mobile Charging Lead	£3.20
LC 1/2/3 Cases	£3.50 each

IC-251E £495 incl.

IC-451 £599 incl.

Icom produce a perfect trio in the VHF base station range ranging from 50 Meters thru 2 Metres to 70 Cms. Unfortunately you are not able to benefit from the 5M product in this country, but you CAN own the 215E for your 2 Metre station and the 451E for 70cms.

Both are really well designed and engineered multi-mode tranceivers capable of being operated from either the mains or a 12 volt supply. Both contain such exciting features as scan facilities, automatic selection of the correct repeater shift for the band concerned, full normal and reverse repeater operation, tuning rate selection according to the mode in use, VOX on SSB, continuous power adjustment capability on FM and 3 memory channels. Of course they are both fitted with a crystal controlled tone burst and have twin VFOs as have most of ICOMs fully synthesized transceivers. These two transceivers have now become really popular throughout the world — so why not pop a note on our ansafone for more details?

Thanet for ICOM

ICOM

the amateur's professional friends

Several new products from Icom will be introduced onto the market shortly and when we recently saw the prototypes in Japan we realized just how popular they are going to be. Just to wet your appetites here are a couple of examples:—

AVAILABLE NOW!

IC-290E

£359 incl.

The IC-290E incorporates all the features you could want in a multimode mobile to make it easy to use when driving. A standard 600kHz repeater offset shift is built into its computer's memory but if necessary this can be altered from the front panel for unusual shifts that may be required (such as say 1.6MHz for some transvertors). There are five programmable memories and these can be used in either simplex or duplex mode. Any one of these memories can also be designated as a PRIORITY CHANNEL which can be checked once every five seconds if you wish for that private message you may be expecting. Scanning can be controlled either from the front panel or from the HM10 microphone. There are options to scan the whole band, any selected part of it, or just the memory channels. You do NOT lose the repeater shift when scanning or using either of the VFOs in simplex. Unlike many of its competitors you do have TWO VFOs which can also prove a very useful feature. Further improvements include a brighter frequency readout, an LED bar-type S-Meter and power output meter and the ideal tuning rates of 25kHz per step on FM and 100Hz per step on SSB. Both these rates can be changed to 1kHz steps by use of the TS button on the front panel. For repeater operation both + and — shifts are available and it is possible to listen on the repeater input channel merely by pressing a button. International controls allow you to vary scan speed, scan delay times, etc. Semi break-in CW, and CW sidetone are also available.

Put all these features into an attractive case, add the world wide renowned ICOM quality and performance, and you must see that this is the choice for you. And just as an extra, remember that you get a full two years' warranty if you purchase your transceiver direct from THANET or one of our agents listed in this advertisement.

IC-25E

£259 incl.

Again ICOM seem to have got everything right with its new 25W FM mobile. It is one of the smallest around and yet is packed with features which make it really handy to use while still maintaining the very high quality expected in ICOM transceivers.

Like its bigger multimode brother, the IC-25 has TWO VFOs, FIVE MEMORIES (which can be used in either simplex or duplex mode) a PRIORITY CHANNEL (which can be any one of the frequencies stored in the memories) full DUPLEX and REVERSE DUPLEX operation and a crystal controlled tone burst. Again the display is brighter and there is an LED Bar-type S-Meter and relative power output meter. The choice of frequency steps is 25kHz and 5kHz. Like the IC-290 multi-scanning functions are available either from the front panel or remotely using the HM-10 scanning microphone.

Again we feel that this beautifully designed and constructed piece of equipment is bound to "sell like hot cakes" — and again remember that if you buy one directly from Thanet you will get a full two years' warranty and any work will be carried out in our excellently equipped workshop. One of our engineers has been out to ICOM in Japan for a two week course to learn the "tricks of the trade".

What about other new products? — well you may well ask but we won't be giving too much away just yet. But how about a 70cm version of the IC-2E and a fully automatic antenna tuner to start off with?

Buy direct from us and get two years warranty on all equipment

Thanet for ICOM

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

PROFESSIONAL EQUIPMENT FOR THE AMATEUR

ICOM

IC-720A £849 incl.

The main problem that the amateur of today has to deal with is deciding just which rig out of the many excellent products available he is going to choose. Technology is advancing at such a rapid rate and getting so sophisticated that many cannot hope to keep up! Perhaps one way of dealing with the problem is to look at just what each model offers in its basic form without having to lay out even more hard earned cash on "extras". The IC-720A scores very highly when looked at in this light. How many of its competitors have two VFOs as standard, or a memory which can be recalled, even when on a different band to the one in use, and result in instant retuning AND BANDCHANGING of the transceiver? How many include a really excellent general coverage receiver covering all the way from 100kHz to 30MHz (with provision to transmit there also if you have the correct licence)? How many need no tuning or loading whatsoever and take great care of your PA, should you have a rotten antenna, by cutting the power back to the a safe level? How many have an automatic RIT which cancels itself when then main tuning dial is moved? How many will run full power out for long periods without getting hot enough to boil an egg? How many have band data output to automatically change bands on a solid state linear AND an automatic antenna tuner unit, when you are able to add these to your station?
Well you will have to do quite a bit of hunting through the pages of this magazine to find anything to approach the IC-720-A. It may be just a little more expensive than some of the others — but when you remember just how good it is, and of course the excellent reputation for keeping their secondhand value you will see why your choice will have to be an IC-720A!

IC-2KL £799 incl.

To compliment the excellent IC720A HF Transceiver, ICOM have produced the IC2KL linear amplifier. It is of a similar size and matches the IC720A perfectly. It produces 500W output on SSB, CW, AM and RTTY, needing 80—100W of drive. As with the IC720A, it will operate from 1.6MHz to 30 MHz continuously at full output power, but you still need an antenna that matches! It will follow the IC720A, automatically changing bands WITH NO TUNING — the operating is done from the prime mover. This automatic facility can be overridden for use on rigs other than the IC720A, but can be added to the IC701 and the IC720. The IC2KL employs a heat pipe cooling system for the heatsink of the power transistors. This is a new technology used to transfer the heat, has a high conductance, several hundred times that of copper and a very quick response. The use of this system enables a very compact design, for which ICOM is the leader.
This advanced design includes protection circuits against Mismatching, Overheating, Overcurrent, Overdriving, Over Output Power, and the PA units unbalancing. Its spurious emissions are more than 60 dB below peak power output and third order distortion more than 30 dB below each tone of a two tone test, could a valve linear even be as good as this?
The IC2KL has a matching power supply the IC2KLPS delivering 40vDC at 25A continuous for 10 minutes maximum.

IC 2KLPS (Power Pack) £199

Thanet for ICOM

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

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

TWO YEARS WARRANTY ON ALL EQUIPMENT

£169 incl.

IC-730

£574 incl.

ICOM's answer to your HF mobile problems — the IC730. This new 80m—10m, 8 band transceiver offers 100W output on SSB, AM and CW. Outstanding receiver performance is achieved by an up-conversion system using a high IF of 39MHz offering excellent image and IF interference rejection, high sensitivity and above all, wide dynamic range. Built in Pass Band Shift allows you to continuously adjust the centre frequency of the IF pass band, virtually eliminating close channel interference. Dual VFO's with 10Hz, 100Hz, and 1KHz steps allows effortless tuning and what's more a memory is provided for one channel per band. Further convenience circuits are provided such as Noise Blanker, Vox, CW Monitor, APC and SWR Detector to name a few. Provided the IC730 is kept connected to its supply its CPU will remember your instructions — even when turned off! Built in fan keeps the finals cool and remember there is no tuning up to be done. A built-in Speech Processor boosts talk power on transmit and a switchable RF Pre-Amp is a boon on todays crowded bands. Full metering, WWV reception and connections for transverter and linear control almost completes the IC730's impressive facilities. Use this rig as a high class mobile or with a suitable 13v psu as your main base station. Give us a ring and ask for a full spec to be sent to you.

IC-202S

£169 incl.

The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW; Large Battery capacity (HP11 type) or Nicads if you wish; A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m; Each of the four 200k Hz band positions allows operation anywhere in 2m (Supplied with 144-144.2 and 144.2-144.4); Top of the band Oscar xtals available for "cross-pond working"; It has a DC socket ans SO239 sockets for mobile or base station working, barefoot or a s a prime mover; Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig. The 70cm twin of the 202S having very similar features, covering the frequency range of 432-435.2 MHz. Their versatility is well worth an enquiry.

IC-260

We may still have a few of these available at a very special price — call us for details

IC-24G

The famous IC240 has been approved, given a face lift, and renamed the IC24G. Many thousands of 240s are in use, and its popularity is due in part to simplicity of operation, high receiver sensitivity and superb audio on TX and RX. The new IC24G has these and other features; Full 80 channels (at 25KHz spacing) are available and readout is by channel number — selected by easy to operate press button thumbwheel switches. This readout can clearly be 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 12½ KHz 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.

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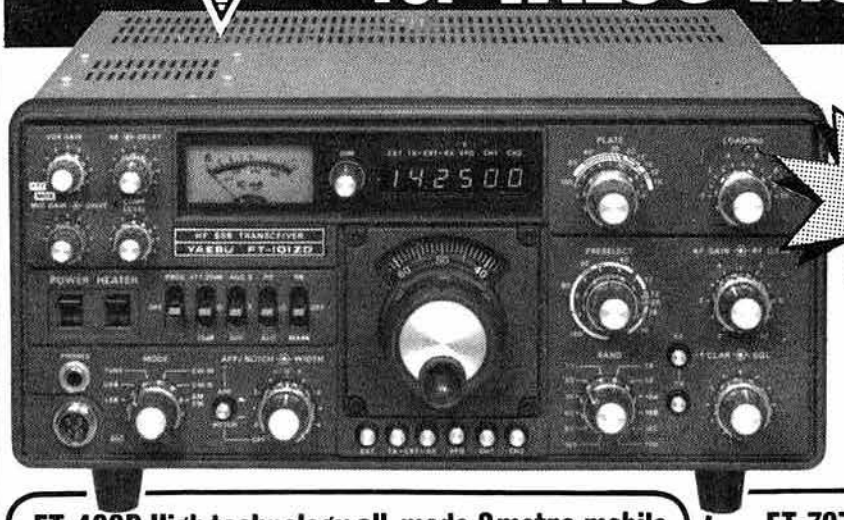

NEW

FT-101ZD Mk. III

Now from YAESU comes the latest version of the renowned FT-101-AM/FM option, notch filter, audio peak filter, variable bandwidth-UNBEATABLE VALUE

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

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

FT-707 All solid-state HF mobile transceiver

The definitive HF mobile rig, digital, variable IF bandwidth, 100 watts 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-

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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.

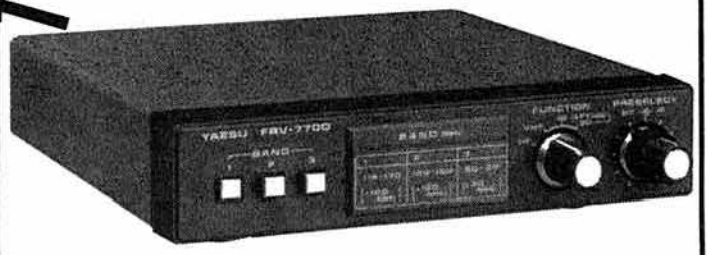
YAESU

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

FRT-7700

ATTENTION FRG·7700 owners!

Exploit the full potential of your receiver with YAESU's new FRT-7700 antenna tuner and FRV-7700 converter.



FRV-7700

New on two!

FT-290R All-mode 2m portable

10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray, 2·5 watts out.

New on seventy!

FT-780R All-mode 70cm mobile

4 memories, memory and bandscan from microphone, conservative 10 watts out–All the features of the FT–480 on 70cm.

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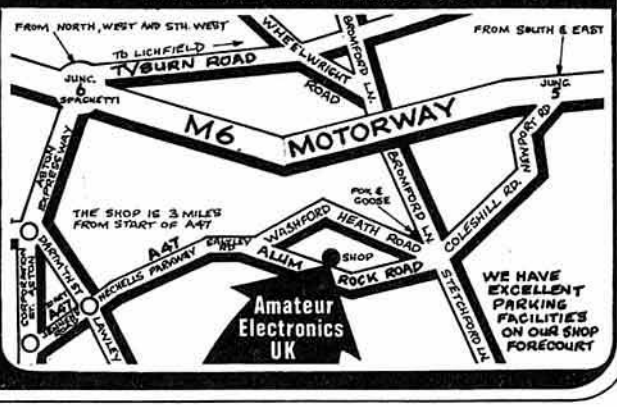

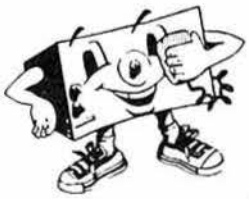

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YAESU HF TRANSCEIVER

FP707 £109 FT707 £529 FC707 £80

FV707DM £178

FDK

2m–70cm MULTIMODE

MULTI 750
2m MULTIMODE
£289

70cm
EXPANDER
£169

ICOM

IC-2E
HANDHELD
£169

STANDARD PORTABLES

C58 2m MULTIMODE £247
C78 70cm FM £219

YAESU FT7700

GENERAL COVERAGE HF RECEIVER £309

TRIO HF TRANSCEIVER

SP230 £33.72 TS830 £726 VFO230 £220 AT230 £121

BREDHURST ELECTRONICS, HIGH STREET, HANDCROSS, SUSSEX. 0444 40086

TO ORDER ANY OF THE ABOVE ITEMS SIMPLY WRITE, ENCLOSING A CHEQUE OR PHONE YOUR CREDIT CARD NUMBER

Bredhurst electronics

HIGH STREET, HANDCROSS, W. SUSSEX. 0444 400786

MULTIMODES—MULTICHOICE

YAESU FT480R

£359, inc. VAT & CARRIAGE

TRIO TR9000

£371, inc. VAT & CARRIAGE

ICOM IC260E

£339, inc. VAT & CARRIAGE

FDK MULTI 750E

£289, inc. VAT & CARRIAGE

2m RECEIVER

AR22

FEATURES INCLUDE

- ★ Full band coverage, 141·000–149·995MHz
- ★ Direct frequency reading in 5kHz steps by digital thumbwheel and slide switch
- ★ Automatic electronic RF tuning system for wide band coverage
- ★ Compact and lightweight
- ★ Rugged, reliable double sided glass-epoxy printed circuit board
- ★ High performance mini rubber flexible antenna, **£3.00**
- ★ Includes nicads and charger

Marine Band version now available

£83 inc VAT & carriage

NRD 515 RECEIVER

£948 inc. VAT & carriage

SPEAKER £27.60

TRANSCEIVERS

H.F.	
TRIO TS 130V	£450
SWAN 100 MX	£418
YAESU FT 707S	£454
TRIO TS 130S	£547
TRIO TS 530S	£561
YAESU FT 707	£529
YAESU FT 101Z (FM)	£529
YAESU FT 101ZD (FM)	£599
SWAN ASTRO 150 150	£613
TRIO TS 830S	£726
YAESU FT 107M	£690
ICOM IC 720A	£849
YAESU FT 902DM	£799
2M FM MOBILES	
F.D.K. Multi 700EX	£189
ICOM IC 255	£255
TRIO TR 7800	£276
HANDHELD F.M.	
ICOM IC 2E	£169
TRIO TR 2300	£166
TRIO TR 2400	£198
STANDARD C 78 (70cm)	£219
MULTIMODES	
YAESU FT 290R (portable)	£229
STANDARD C 58 (portable)	£247
F.D.K. Multi 750E	£289
ICOM IC 260E	£339
TRIO TR 9000	£371
YAESU FT 480R	£359
ICOM IC 251E	£495
TRIO TR 9500 (70cm)	£482

RECEIVERS

H.F.	
YAESU FRG 7	£189
LOWE SRX 30D	£195
TRIO R 1000	£305
YAESU FRG 7700	£309
YAESU FRG 7700 with memories	£389
J.R.C. NRD 515 complete with speaker	£975
2M F.M.	
SEARCH 9	£45
A.O.R. AR 22	£83
F.D.K. TM 56B	£89
BEARCAT 220 FB Scanner	£258
SX 200N Scanner	£264
MARINE	
SEARCH 9	£45
A.O.R. AR 22	£83
F.D.K. TM 56B	£89
BEARCAT 220FB Scanner	£258
SX 200N Scanner	£264
AIRBAND	
R 517 Handheld	£49.50
BEARCAT 220FB Scanner	£258
SX 200N Scanner	£264

MORSE EQUIPMENT	
HK 707 Up/Down Key	£10.50 (£0.50)
MK 704 Squeeze Paddle	£10.50 (£0.50)
EK 121 Elbug	£29.95 (£0.75)
EKM 12 Matching side-tone monitor	£10.95 (£0.50)
EK 150 Electronic Keyer	£74.00 (—)
EK 1024 Memory Keyer	£126.00 (—)

ACCESSORIES

SAFETY MICROPHONES	Price Carriage
ADONIS MM 202S clip on	£20.95 (£0.50)
ADONIS MM 202H Head band + Up/Down	£29.00 (£0.50)
ADONIS MM 202FV Swan neck + Up/Down	£30.00 (£0.50)
DAIWA RM 940 Infra red link	£45.00 (£0.50)
DESK MICROPHONES	
YAESU YM 34 (Dual Impedance)	£18.80 (£1.50)
TRIO MC 50 (Dual Impedance)	£24.15 (£1.50)
SHURE 444D (Dual Impedance)	£29.95 (£1.50)
SHURE 526T series II Power Mic	£39.95 (£1.50)
ADONIS AM 502 Compressor Mic	£39.00 (£0.75)
ADONIS AM 802 Compressor Mic 30/P's	£59.00 (£0.75)
TEST EQUIPMENT	
DRAE WAVE METER 130-450MHz	£24.95 (—)
FX 1 WAVE METER (700k – 250MHz)	£28.00 (£0.75)
TRIO DM 801 DIP METER (Upto250MHz)	£51.00 (£0.75)
DUMMY LOADS	
DL 20 30W Max) PL259	£5.00 (£0.50)
DL 60 (60W Max) PL259	£8.80 (£0.50)
DL 60 (60W Max) N Type	£16.50 (£0.50)
DL 150 (150W Max) PL259	£14.95 (£0.75)
DRAE POWER SUPPLIES	
Fully protected for peace of mind (That includes OVER-VOLTS TRIP)	
4 AMP continuous 8A surge	£27.95 (£1.50)
6 AMP continuous 10A surge	£44.95 (£2.00)
12 AMP continuous 20A surge	£69.00 (£2.00)
24 AMP continuous 40A surge	£99.00 (£5.00)

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For further information on any of the above items, please contact:

BREDHURST ELECTRONICS,

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TO ORDER ANY OF THE ABOVE ITEMS SIMPLY WRITE, ENCLOSING A CHEQUE OR PHONE YOUR CREDIT CARD NUMBER

Radio Shack Ltd for Amateur Radio

R. L. DRAKE PRODUCTS

Model	Description	Inc. VAT	Carr.
TR-7/DR-7	Transceiver/Gen. Cov. Receiver Digital	£1035.00	5.00
PS-7	Power Supply 120/240v for TR-7	207.00	5.00
PS-75	Sideband Duty P.S.U. for TR-7 120/240v	138.00	5.00
RV-7	Remote V.F.O. for TR-7	132.25	2.00
MS-7	Matching Speaker for TR-7 and R-7	29.90	2.00
R-7/DR-7	Digital Receiver 0-30MHz.	989.00	5.00
SL-300	CW Filter for TR-7 and R-7 (300Hz)	39.10	0.50
SL-500	CW Filter for TR-7 and R-7 (500Hz)	39.10	0.50
SL-1800	SSD/RTTY Filter for TR-7/R-7 (1800Hz)	39.10	0.50
SL-4000	AM Filter for R-7 Receiver (4000Hz)	39.10	0.50
SL-6000	AM Filter for TR-7 and R-7 (600Hz)	39.10	0.50
AUX-7	Range Prog. board and 1 Receive module	32.20	1.00
RRM-7	Range receive modules for Aux-7 (500kHz)	5.75	0.50
RTM-7	Range tcve. modules for Aux-7 (500kHz)	5.75	0.50
NB-7	Noise Blanker for TR-7	66.24	1.00
NB-7A	Noise Blanker for R-7 Receiver	66.24	1.00
FA-7	Fan for TR-7 and PS-7	20.70	2.00
MMK-7	Mobile mounting kit for TR-7.	34.50	2.00
MN-7	ATU/RF Wattmeter. 160-10m (250w)	124.20	5.00
MN-2700	ATU/RF Wattmeter 160-10m (2kw)	207.00	5.00
WH-7	RF Wattmeter/VSWR Bridge (HF)	59.80	2.00
SP-75	Speech Processor	79.35	2.00
CW-75	Electronic Keyer	59.80	2.00
P-75	Phone patch	59.80	2.00
7804	Service Manual for TR-7	18.50	2.00
7805	Service manual for R-7	18.50	2.00
7037	TR-7 Service Kit	37.95	1.00
L-7E	Linear Amp 2kw 10-160m with tubes (2)	897.00	10.00
3-500Z	Tube for L-7E and L-75E	69.00	2.00
L-75E	Linear Amp 1kw 10-160m with tube (1)	549.70	5.00
TV-42LP	Low Pass Filter 100w	10.35	1.00
TV-3300LP	Low Pass Filter 2kw	18.40	1.50
7073	Hand Microphone for TR-7	18.40	1.00
7077	Desk Microphone for TR-7	29.90	2.00
DL-300	Dummy Load 330w	20.70	1.00
DL-1000	Dummy Load 1000w	37.95	2.00
CS-7	Remote control ant. switch 5 way (7 line)	115.00	5.00
B-1000	Balun for MN-7 and MN-2700 4:1	20.70	1.00
Manuals	Spare Operating Manuals.	6.00	1.00
Interface	R-7/TR-7 connecting cable	20.70	1.00
AK-75	Multiband Antenna	23.00	2.00
AA-75	Antenna Insulator Kit	2.30	0.50
HS-75	Headset	995.00	1.00

COMMERCIAL SPECIFICATION RECEIVERS AND TRANSCEIVERS

R4245	Commercial Specification Receiver	2129.00	5.00
TR4310	Commercial Specification Transceiver	2294.25	5.00
RR-3	Marine Specification Receiver	1380.00	5.00
TRM	Marine Transceiver MF and HF	1265.00	5.00
MRT55C	VHF 55 Channel	549.70	5.00
Cabinet	5" for RR-3, R4245 and TR4310	158.70	5.00
MN4438	General coverage tuner	239.20	5.00

ENDS OF LINES (Whilst stocks last)

SPR-4	Programmable Receiver	345.00	5.00
DC-PC	DC Power Cord for SPR-4	3.45	1.00
XTAL	Accessory Range Crystals	6.44	0.50
FL-500	500Hz CW Filter for R-4C	39.10	0.50
FL-4000	4000Hz AM Filter for R-4C	39.10	0.50
FL-6000	6000Hz AM Filter for R-4C	39.10	0.50
MS-4	Matching speaker for 4 line	29.90	2.00
AC-4	DSU for TR-4/T-4X Series	50.00	5.00
DC-4	AC/DC PSU for TR 4	84.50	5.00
FF-1	Fixed Frequency Control for TR-4	27.60	1.00
34-PNB	Noise Blanker for TR-4C	69.00	1.00
RV-4C	Remote VFO for TR-4C	92.00	5.00
CW-MOD	500Hz CW Mod for TR-4(C)	52.90	2.00
RCS-4	5 Way Coax Remote Antenna Switch	84.50	2.00
WV-4	VHF Wattmeter 100/1000W 20/200MHz	59.80	2.00
AA-10	2m Linear 1:10 Watts	39.95	1.00
1525-EM	Encoder Microphone	34.50	1.00
PS-3	6Amp 13-6 VDC Power Supply	69.00	5.00
SD-AUTO	SD-240/120 Auto Transformer	19.95	3.00
MC50	Deluxe dual impedance desk microphone	24.15	1.50
MC35S	First microphone 50k impedance	13.80	1.00
MC30S	First microphone 500ohm impedance	13.80	1.00
LF30A	HF lowpass filter. 1kW rating.	18.40	1.00
RD300	1kW oilfilled dummy load	48.30	1.50
TS770E	2m/70cm all mode dual band transceiver. European repeater shifts	730.25	5.00
SP70	External speaker unit for all TS700 series	18.40	1.00
TR9000	2m synthesised multimode mobile/fixed station transceiver	345.00	5.00
PS20	AC power supply for TR9000	44.85	5.00
BO9	Base plinth for TR9000	32.20	5.00
TR7800	2m FM synthesised mobile/fixed station 25W transceiver	268.00	5.00
SP40	Mobile speaker unit for TR7800, TR9000 and TR8400.	26.89	1.50
RM76	Microprocessor control unit for TR7600/7625	60.95	1.50
TR2300	2m FM synthesised portable transceiver	166.75	5.00
VB2300	10W amplifier for TR2300	49.45	1.50
MB2	Mobile mount for TR2300 and VB2300	17.25	1.00
RA1	Rubber flexible antenna for TR2300 or TR2200GX	6.90	0.50
PS1200	AC power unit and charger for TR2300/3200/2200 (Non Trio item)	29.50	1.50
TR2400	2m FM synthesised handheld.	198.95	5.00
SMC24	External mic/speaker for 2400	13.80	1.00
ST1	Base stand and quick charger	43.70	1.50
BC5	12V quick charger	17.25	1.50
SC3	Soft carrying case. Includes belt hook	11.50	0.50
LH1	Hard leather holster type case	18.50	0.50
PB24	Spare battery pack and charger lead	14.26	1.50
TR8400	70cm FM synthesised mobile transceiver. 430-440MHz	279.00	5.00
PS10	Base station power supply for TR8400	63.00	5.00
TR3200	70cm FM portable receiver. 3 channels fitted	164.45	5.00
PB10	Pack of 10 NiCad batteries for TR2300/3200/2200 series.	10.35	0.50
PL1	Spare power/charge lead for TR2300/3200/2200 series.	1.30	0.15
R1000	Synthesised 200kHz-30MHz receiver. Price includes dc kit fitted	285.20	5.00
SP100	External speaker unit—Matching aerial tuner. See KX2 in Mizuho section	26.45	1.50
HC10	Digital station world time clock	55.20	1.50
HS5	Deluxe headphones for all Trio equipment	21.85	0.75
HS4	Economy headphones	10.35	0.75
TS830S	160-10m transceiver with the new bands. Successor to the TS820	639.52	5.00
VFO230	Digital VFO with memories and digital readout	194.45	5.00
AT230	All band ATU and power meter. Matches TS830S	106.72	1.50
SP230	External speaker unit with switched filters.	33.14	1.50
DS2	Optional dc pack for TS830S.	39.90	1.50
DFC230	Digital frequency remote controller. Four memories, etc	163.13	1.50
*NB	The DFC 230 will drive the TS830/130 or TS120 series rigs		
YK88C	500Hz CW filter	26.45	0.50
YK88CN	270Hz CW filter	28.75	0.50
SM220	Station monitor scope	197.80	4.50
BS8	Panoramic display for TS830/180/820 series	48.30	0.50
BS5	Scan board as above for TS520 series.	48.30	0.50
R820	The ultimate amateur band receiver	690.00	5.00
YG455C	500Hz CW filter	58.65	0.50
YG455CN	250Hz CW filter	60.95	0.50
YG88A	6kHz AM filter	34.50	0.50
TS180S	160-10m solid state transceiver. Digital memory system. 200W pep	679.65	5.00
VFO180	External VFO	96.60	1.50
SP180	External speaker unit with high and low pass filters	36.80	1.50
AT180	Matching 200W antenna tuner and powerful meter	95.45	5.00
YK88C	500Hz CW filter	26.45	0.50
YK88S	Second SSB filter option	26.45	0.50
PS30	AC power supply for TS180S.	85.10	5.00

TRIO EQUIPMENT

TS130S	8 band 200W pep mobile transceiver	491.05	5.00
TS130V	8 band 20W pep mobile transceiver	404.34	5.00
DFC230	Digital frequency remote controller. Four memories etc	163.13	1.50
TS120V	80-10m 20W pep mobile transceiver	347.30	5.00
TL120	200W pep linear for TS120V.	128.80	5.00
MB100	Mobile mount for TS120/130 series.	17.25	1.00
YK88C	500Hz CW filter	26.45	0.50
YK88CN	270Hz CW filter	28.75	0.50
YK88SN	1-8kHz SSB filter	25.30	0.50
VFO120	External VFO	89.70	5.00
SP120	Base station external speaker unit	25.30	1.25
SP40	New mobile speaker unit	26.89	1.50
AT130	100W antenna tuner including new amateur bands.	72.89	1.50
PS20	AC power supply for TS120/130V	44.85	5.00
PS30	AC power supply for TS120/130S	85.10	5.00
MA5	New Trio 5 band mobile aerial system. Absolutely complete.	74.75	5.00
TL922	160-10 metre 2kW linear. 3-500Z tubes included	595.75	5.00

TELEX COMMUNICATIONS INC.

HFC-91	Underchin headphones.	6.21	1.00
HMC-2	Underchin headphones.	9.20	1.00
HTC-2	Twin Receiver headphones	14.72	1.00
BOOM MICROPHONE HEADSETS			
CB-88	3-2-20 ohms with power microphone	41.40	2.00
CM-1320S	3-2-20 ohms Single Headphone Hi-impedance microphone	36.80	2.00
DUAL MUFF HEADPHONES			
C-610	Dual Receiver magnetic	6.90	2.00
SWL-610	Dual Receiver magnetic	8.28	2.00
C-1210	Dynamic, foam-padded	18.86	2.00
C-1320	3-2-20 ohms. Telex's Best	26.22	2.00
MICROPHONES (battery powered)			
PROCOM 1	High Output	11.96	2.00
PROCOM 11	Variable gain	17.95	2.00
CB-73R	Dynamic, noise cancelling	23.92	2.00
CB-73S	as above with 6-wire lead	25.30	2.00

MACROTRONICS

CM-800	HAM Interface for TRS-80	230.00	5.00
TM-800	Deluxe RTTY and morse for TRS-80	362.25	5.00
TM-650	Deluxe RTTY and morse for PET	328.91	5.00
RR-1	RITTY Riter Editor for TM-800	32.95	1.00
ESK	Electra Sketch (Editor and Animations Compiler)	9.90	1.00

VIBROPLEX

Presentation	Super de luxe Semi Automatic Bug Keys	89.70	2.00
Original	De Luxe Semi Automatic Bug Keys	59.80	2.00
Original	Standard Semi Automatic Bug Keys	46.00	2.00
Lightning	De luxe Semi Automatic Bug Keys	59.80	2.00
Lightning	Standard Semi Automatic Bug Keys	46.00	2.00
Champion	Semi Automatic Bug Keys	43.70	2.00
Vibto-Keyer	De luxe Paddle for Electronic Keyer	59.80	2.00
Vibro-Keyer	Standard Paddle for Electronic Keyer	46.00	2.00

ADVANCED ELECTRONIC APPLICATIONS

MM-1	Morsematic Special Keyer	124.20	2.00
MK-1	Keyer	49.45	1.00
ISO-144	2m Antenna	34.50	2.00

TEN-TEC EQUIPMENT

TRANSCEIVERS			
515	Argonaut, 5W. 3-5 30MHz	276.00	5.00
546	Omni-D, Digital, Series C. SSB/CW 1-8 30MHz.	736.00	5.00
570E	Century/21, 70W. CS, 3-5 29MHz 240 volts	230.00	5.00
580	Delta, 200W. SSB/CW, 1-8 30MHz	469.20	5.00
POWER SUPPLIES			
210/E	115/230 VAC. 13VDC. 1A	27.60	2.00
280	117/230 VAC. 13-5VDC. 18A	92.00	5.00
LINEAR AMPLIFIER			
444	Hercules, 1kW with 115/230 VAC. Power Supply	920.00	10.00

ACCESSORIES			
206A	Crystal Calibrator	18.86	2.00
208A	Notch/CW Filter for Model 515	29.90	2.00
212	Crystal, for Model 515, 29·0-29·5MHz	3.45	0.50
213	Crystal, for Model 515, 29·5-30·0MHz	3.45	0.50
215P	Microphone, ceramic with plug	18.40	2.00
215PC	Microphone, ceramic with plug and coil cord	21.85	2.00
217	500Hz 8 pole Ladder Filter for Models 545/546	36.80	1.00
218	1·8KHz 8 pole Ladder Filter for Models 545/546	36.80	1.00
219	250Hz 6 pole Ladder Filter for Models 545/546	34.50	1.00
228	Antenna Tuner	59.80	2.00
243	Remote VFO for Models 545/546	103.50	5.00
247	Antenna Tuner	43.70	2.00
273	Crystal, for Model 570, 28·5-29.0	3.45	0.50
276	Crystal Calibrator for Model 570	18.86	1.00
277	Antenna Tuner/SWR Bridge for Model 570	57.50	2.00
282	250Hz 6 pole Ladder Filter for Model 580	35.65	1.00
283	Remote VFO for Model 580	112.70	2.00
285	500Hz 6 pole Ladder Filter for Model 580	32.20	1.00
289	Noise Blanker for Model 580	29.90	1.00
1140	DC Circuit Breaker for Models 545/546 and 580	4.60	1.00
1150	Overvoltage Protector for Models 552/262 Series	9.20	1.00
1170	DC Circuit Breaker for Model 570	6.90	1.00
KEYERS			
645	Ultramatic, Dual Paddle	55.20	2.00
670	Single-Paddle Keyer	23.00	2.00

ENDS OF LINES (whilst stocks last)

TRANSCEIVERS			
544	Triton IV 200W. SSB/CW 3·5-30MHz with digital readout	399.85	5.00
545	Omni-A. Analog. Series B. SSB/CW. 1·8-30MHz	448.85	5.00
POWER SUPPLIES (when bought with Ten-Tec transceiver)			
252MO/E	115/230 VAC. 13VDC. 18A for Omni	79.35	5.00
262M/E	230 VAC. 13VDC. 18A. deluxe with VOX (Triton)	85.10	5.00
ACCESSORIES			
212	29·0-29·5 Crystal for Models 540/544	3.45	0.50
213	29·5-30MHz Crystal for Models 540/544	3.45	0.50
240	160m Converter for Models 540/544	57.50	2.00
241	Crystal Oscillator for Models 540/544	23.00	1.00
249	Noise Blanker for Models 540/544	18.40	1.00
AC-4	SWR Meter Lower Power	6.90	1.00
KR-5A	Single-paddle keyer, 6-14VDC	25.30	2.00
KR-50	Ultramatic, dual paddle, 117 VAC/6-VDC	57.50	2.00

J BEAM ANTENNAS

4 metre Antennas		
4Y/4M	4 element folded dipola yagi with 1½" boom	20.70
PMH2/4M	2 way phasing harness for two 4m yagis	12.19
2 metre Antennas		
DC1/WB	Wide band discone (100-470MHz)	41.40
LR1/2M	Omnidirectional vertical gain colinear	24.15
C5/2M	5dB glass fibre colinear, omni-directional	44.27
5Y/2M	5 element golded dipole yagi with 1" boom	11.27
8Y/2M	8 element folded dipole yagi with 1" boom	14.49
10Y/2M	10 element folded dipole 'long yagi' with 1½" boom and trombone support	31.05
PBM10/2M	10 element Parabeam with 1½" boom and trombone support boom	36.80
PBM14/2M	14 element Parabeam with 1½" boom and 45° braces	44.85
5XY/2M	Crossed 5 element yagi with 1½" boom	22.77
8XY/2M	Crossed 8 element yagi with 1½" boom	28.40
10XY/2M	Crossed 10 element yagi with 1½" boom	37.72
X6/2M/X12/70cm	Dual band crossed yagi	38.52
PMH/2C	2 way phasing harness for circular polarisation	7.47
Q4/2M	4 element quad yagi	23.69
Q6/2M	6 element quad yagi	31.40
D5/2M	Double 5 slot-fed yagi with 1" booms	20.12
D8/2M	Double 8 slot-fed yagi with 1" booms	27.14
SVMK/2M	Mounting kit for vertical polarisation for 2 slot-fed yagis	7.24
UGP/2M	Unipole and ground plane	10.12
HO/2M	Mobile 'halo' head only	4.55
HM/2M	Mobile 'halo' with 24" mast	5.40
PMH2/2M	2 way phasing harness for two 2m aerials	9.89
PMH4/2M	4 way phasing harness for four 2m aerials	23.11
70cm Antennas		
C8/70cm	8dB glass fibre colinear, omnidirectional	50.02
D8/70cm	Double 8 slot-fed yagi with ½" booms	20.70
PBM18/70cm	18 element Parabeam yagi with 1½" boom	25.30
MBM48/70cm	48 element Multibeam yagi with trombone mounting	28.75
MBM88/70cm	88 element Multibeam yagi with trombone mounting	39.33
8XY/70cm	Crossed 8 element yagi complete with phasing harness and 'N' type connector	34.15
12XY/70cm	Crossed 12 element yagi complete with phasing harness and 'N' type connector	42.32
PMH2/70cm	2 way phasing harness for two 70cm yagis	8.51
PMH4/70cm	4 way phasing harness for four 70cm yagis	18.05
23cm Antennas		
D15/1296	Double 15 slot-fed yagi with 'N' type connector	34.04
PMH2/23cm	2 way phasing harness for two 23cm antennas	25.41
Mobile Antennas		
TAS 2M	5/8 wave glass fibre whip with 4 metres of coaxial cable	15.29
U5	70cm Colinear 5·6dB with 4 metres of coaxial cable	17.25

Carriage on all the above Antennas—£5.00

HY-GAIN ANTENNAS

18HT	6-80m Vertical Tower	258.75
12AVQ	10-20m Trapped Vertical	48.50
14AVQ/WB	10-40m Trapped Vertical	60.37
18AVT/WB	10-80m Trapped Vertical	87.40
18V	10-80m Vertical	31.97
TH6DXX	6 element beam for 10/15/20.	235.75
TH3MK3	3 element beam for 10/15/20.	180.55
TH3JR	3 element beam for 10/15/20.	130.52
TH2MK3	2 element beam for 10/15/20.	126.21
HY-QUAD	2 element quad for k0/15/20 .	194.35
DB 10-15A	10 and 15m beam.	132.25
205A	5 element 20m beam	235.75
204BA	4 element 20m beam	178.25
203BA	3 element 20m beam	135.12
155BA	5 element 15m beam	135.12
153BA	3 element 15m beam	72.16
103BA	3 element 10m beam	58.65
105BA	5 element 10m beam	105.80
402BA	2 element 40m beam	181.70
511	Heavy duty spring	11.84
499	Flush body mount	11.84
417	De luxe spring	9.02
492	Miniature spring	4.60
LA-1	Lightning arrestor	23.34
LA-2	In-Line Lightning arrestor	3.80
BN-86	Ferrite balun	15.52
TELREX	TB5EM 5 element beam for 10/15/20	368.00

CDE ROTATORS

AR-20XL		39.67
AR-22XL		49.45
AR-30		47.15
AR-40		54.62
CD-45		113.85
HAM-4		166.75
BT-1	(Big Talk)	91.42
T2-X	(Tail Twister)	228.85

BENCHER PRODUCTS

BY-1	Keyer Paddle (Black base)	28.75
BY-2	Keyer Paddle (Chrome base)	37.95
BY-3	Keyer Paddle (Gold plated)	92.00
ZA-1A	Balun 3·5-30MHz for dipoles.	12.65
ZA-2A	Balun 14-30MHz for beam antennas	13.80

HUSTLER ANTENNAS

AMATEUR ANTENNAS WITH MOUNTS		
4-BTV	4-Band Trap Vertical 10-40m.	66.70
5-BTV	5-Band Trap Vertical 10-80m.	86.25
BBLM-144A	5/8 Wave 2m Magnetic, 17' coax	28.75
BBLT-144A	5/8 Wave 2m Trunk lip and coax	26.45
CGT-144	2m Colinear, Trunk lip and coax	29.90
G6-144B	6db 2m Base Colinear	59.80
G7-144	7db 2m Base Colinear	89.99
HT-144	"Hustleoff" 2m 5/8 wave mobile	19.99
SFM	5/8 Wave 2m Magnetic and coax	22.99
SFS-144	5/8 Wave 2m Speedy Mount	15.99
MONITOR ANTENNAS		
DCX	40-700MHz Receiving Discone	13.80
DCL	Discone as above with 50' coax	20.70
UHT-1	140-500MHz Unit Gain and 15' coax	6.50
ACCESSORIES		
BM-1	Bumper Mount	11.95
C-29	Stainless Steel Spring	7.95
C-32	Chrome Ball Mount	5.50
HLM	Deluxe Trunk Lip Mount	11.95
MM-1	Universal Single Hole Mount	5.98
MM-3	Universal Single Hole Mount and coax	11.95
QD-1	Quick Disconnect Fitting	9.99
RSS-2	Resonator Impact Spring	4.95
SSM-1	Stainless Heavy Duty Ball and Spring	21.95
SSM-3	Stainless Heavy Duty Spring	10.95
RESONATORS AND MASTS		
RM-10	10 metre Resonator	6.95
RM-10S	10 metre High Power Resonator	11.95
RM-15	15 metre Resonator	6.94
RM-15S	15 metre High Power Resonator	11.95
RM-20	20 metre Resonator	9.60
RM-20S	20 metre High Power Resonator	14.49
RM-40	40 metre Resonator	11.50
RM-40S	40 metre High Power Resonator	15.99
RM-80	80 metre Resonator	12.60
RM-80S	80 metre High Power Resonator	24.95
MASTS		
MO-1	Mast for Wing Mounting	14.95
MO-2	Mast for Bumper Mounting	14.95
SF-2	2m 5/8 Antenna fits Hustler Mounts	8.50

CARRIAGE EXTRA. PLEASE CHECK FOR DETAILS.

COLLINS EQUIPMENT

KWM-380	Amateur HF Transceiver	1,794.00	10.00
KWM-380 OPTIONS			
AC-3801	Noise Blanker	120.75	5.00
AC-3802	Speech Processor		
AC-3803	Control Interface	82.80	2.00
AC-3810	CW Filter. 500Hz	59.80	1.00
AC-3811	CW Filter. 250Hz	59.80	1.00
AC-3812	RTTY Filter. 1·7kHz	59.80	1.00
AC-3813	AM Filter. 6·0kHz	36.80	1.00
KWM-380 ACCESSORIES			
AC-2801	Rack Mount	82.80	2.00
AC-2808	Blower Kit	120.75	2.00
AC-2821	DC Standby Power Cable	33.35	2.00
MM-280	Handheld Microphone	23.00	2.00
MM-281	Handheld Noise cancelling mic	27.60	2.00
SM-280	Desk Top Microphone	47.15	2.00
SM-281	Desk Top Noise cancelling mic	51.75	2.00
AC-2827	CW Key	17.25	2.00
AC-2828	Microphone Foot Switch	21.85	2.00
AC-2829	Headphones	40.25	2.00
AC-2830	Lightweight Headphones	21.85	2.00
KWM-380 BOOKS			
NTN	Owners Manual	4.00	1.00
NTN	Service Manual	20.00	2.00

SMC SERVICE

Free Finance on many items. Two-year guarantee on Yaesu. Free Securicor on major Yaesu items. Access and Barclaycard over the telephone. Biggest Branch, Agent and Dealer network. Ably staffed, courteous, Service Department. "B Services" Securicor contract at £3.50!! Biggest stocks of amateur equipment in UK. Twenty-two years of professional experience.

GUARANTEE

Yaesu's *own* warranty does not extend outside Japan. Repairs are the responsibility of the UK dealer selling the set. SMC's two-year guarantee is backed, as UK distributors, by daily contact with the factory and many tens of thousands of pounds of spares and test equipment. Avoid hawkers offering sets without serial numbers, spares, service or advice back-up.

FREE FINANCE

On regular priced items from: Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hy Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year. You pay no more than the cash price!!

YAESU MUSEN

As UK agents we show some major Yaesu items; VHF multimode handportable, general coverage Rxs, multimodes for VHF and UHF FM Tx/Rxs for VHF, UHF and VHF/UHF, four HF transceivers (SSB, CW, FSK, AM, FM) and a fistful of VHF and UHF handhelds. NB: 150 Yaesu accessories complement the above – check the last two pages for a smattering of our range of accessories.

FULL RANGE OF MATCHING ACCESSORIES

FT290R

£229 inc.

VAT @ 15% & POSTAGE

- ★ 144 146MHz (144–148 possible)
- ★ Multimode USB, LSB, FM, CW
- ★ 2·5W PEP, 2·5W RMS/300mW out
- ★ LED's; "ON AIR", "BUSY". MC meter; S,PO
- ★ Integral telescopic antenna
- ★ Bandwidth 2·4kHz and 14kHz @ 6dB
- ★ Optically coupled main tuning
- ★ 100Hz backlite LCD Frequency display
- ★ 10 memory channels. "five-year" backup
- ★ FM: 25kHz to 12·5kHz steps
- ★ SSB: 1kHz to 100Hz steps
- ★ Any TX/RX split with dual VFOs
- ★ ±600kHz repeater split 1,750kHz burst
- ★ Mobile mounting bracket available
- ★ Matching 10W linear Amplifier
- ★ Up/down tuning from microphone
- ★ AF output 1W @ 10% THD
- ★ 58(H) × 150(W) × 195(D) (1·3kg)
- ★ RX, 0·70mA, TX; 800mA (FM maximum)
- ★ 8 "C" Nicads or Drys. 8·5–15·2V DC External

NB: 22% more battery life and 83% more capacity for 17½% more cost with SMC 2·2 "C" NiCads (2·2A/hr) at £2.70 each inc.!!

FRG7

- ★ "Industry standard" receiver.
- ★ 0·5–30MHz.
- ★ SSB (LSB/USB), CW, AM.
- ★ Selectivity of ±3kHz at –6dB.
- ★ Wadley-loop triple conversion.
- ★ 10kHz Direct dial readout.
- ★ Well calibrated "sharp" preselector.
- ★ AM Automatic noise suppression circuit.
- ★ Antenna Hi to 1·6MHz, 50 ohm to 30MHz.
- ★ 3 position RF attenuator.
- ★ 3 position AF filter (LP, WBP, NBP).
- ★ 110–240Vac and 12Vdc.
- ★ Lights; battery economy switch.
- ★ Illuminated edge type "S" meter.
- ★ Optional Battery holder £5.00.

£199 inc. VAT @ 15% & SECURICOR

FRG7700

NEW MATCHING ATU LPF AND FOUR VHF CONVERTERS

- ★ Incredible new receiver.
- ★ 0.15–30MHz.
- ★ SSB (LSB/USB), CW, AM, FM.
- ★ 2.7kHz, 6kHz, 12kHz, 15kHz, @ –6dB.
- ★ Up conversion 48MHz first IF.
- ★ 1kHz digital plus analogue display.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500ohm to 2MHz, 50ohm to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Constantly variable tone control.
- ★ 110 and 240Vac and 12Vdc option.
- ★ 12 channel memory option.
- ★ Signal meter calibrated in "S" and SIMPO.
- ★ FRG7700M £389. Memory option £83.95.

£309 inc. VAT @ 15% & SECURICOR

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
GJICD	Geoff	Jersey	(0534) 26788
G4EQS	Simon	Redcar	(0642) 480808

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Leeds 16, Yorkshire.
Leeds (0532) 782326
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S.M.C. (Jack Tweedy) LTD
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire.
Woodhall Spa (0526) 52793
9-5 Tuesday Saturday

FT780R

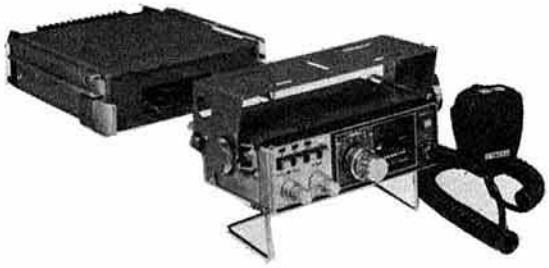
- ★ 430–434MHz (440–445) possible).
- ★ USB-LSB-CW-FM (A3J, A1, F3).
- ★ Input 30W (PEP A3J and A1/F3).
- ★ GaAs Fet RF for incredible sensitivity.
- ★ NMOS four bit micro control.
- ★ Bandwidth 2·2kHz and 14kHz @ −6dB.
- ★ "Dial set" clears unwanted non-integral steps.
- ★ Very bright blue display to 100Hz.
- ★ Display indicates Tx and Rx (inc RIT).
- ★ Manual tone switch on microphone.
- ★ String LED displays for S and PO.
- ★ Digital receiver independent tune (±10kHz).
- ★ Advanced effective noise blanker.
- ★ FM; 100kHz, 25kHz, 1kHz, steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Repeater access by use of dual VFO's.
- ★ Four easy write in memory channels.
- ★ Memory scanning with slot display.
- ★ Up/down tuning from microphone.
- ★ Priority channel on any memory slot.
- ★ Satellite mode allows tuning on Tx.
- ★ Scanning for busy or clear channels.
- ★ Size (case): 10"D, 2.3"H, 6.9"W.
- ★ LED's on air, clear, hi/low, FM mod.
- ★ FP80 mains PSU + SC1 console available.

£409 inc. VAT @ 15% & SECURICOR

CPU2500RS

- ★ Covers 144 to 146 or 148MHz
- ★ 25/3 watt or 10/1 watt models (S)
- ★ CPU controlled digital synthesiser
- ★ 10kHz (+5kHz up) synthesised steps
- ★ Optional 25kHz steps in St version
- ★ 6 digit readout + memory channel number
- ★ Main tuning, by optically coupled encoder
- ★ Up/down tuning/scanning from microphone
- ★ Scanning for empty or occupied channels
- ★ Band scanning up or down the band
- ★ Four normal memory channels
- ★ Further memory for 'odd' split
- ★ Can scan memory channels only
- ★ ±600kHz plus any split (to 4MHz)
- ★ Sub audio tone squelch option
- ★ Manual (EU) and Auto (UK) tone burst
- ★ High or low (÷10) power switch
- ★ Low noise mosfet RF stage
- ★ LED's for: 'on Air' and 'Busy channel'
- ★ VSWR and reverse polarity protection
- ★ Punch in frequency on keyboard mic (K)
- ★ 0·5A Rx, 2·5A LTx, 6A HTx (25) @ 13·6V DC
- ★ 13·6V DC±10%
- ★ Case; 7" W, 2¾" H, 10¼" D
- ★ Sensitivity; 0·3 μV for 20dB (QS)

£235 inc. VAT @ 15% & SECURICOR



FT720RV

FT720 Control Head
- ★ Four easy write-in memory channels
- ★ Rx Priority channel (auto check)
- ★ Scanning of band/memory for empty/busy
- ★ Up/down tuning/scanning from mic.
- ★ Optically coupled tuning control
- ★ Manual and automatic tone burst
- ★ String LEDs for 'S' and PO7 status LEDs
- ★ 1½W of audio to internal/external speaker
- ★ 3·3 (4·3)" D×6" W×2 (2·2)" H
  720RV 10W, 2M deck. **720RVH** 25W, 2M deck
- ★ 144–146MHz (144–148MHz possible)
- ★ 12½kHz synthesizer steps, 600kHz shift
- ★ 0·3μV for 20dB quieting
- ★ Rx 0·5A, Tx RV 3·5A, RVH 6·5A
- ★ 5·8 (6·5)" D×6" W×2 (2·2)" D
  720RU 10W, 70cm, deck
- ★ 430–434MHz
- ★ 25kHz synthesizer steps, 1·6MHz shift
- ★ 0·5μV for 20dB quieting
- ★ Rx 0·5A, Tx 4·5A
- ★ 5·8 (6·5)" D×6" W×2 (2·2)" D
  S72 Switching box
- ★ Pushbutton band change between two decks
- ★ Auto change of synthesizer steps/splits

£253 inc. VAT @ 15% & SECURICOR

FT480R

- ★ 144–146MHz (143.5–148.5 MHz possible).
- ★ USB-LSB-CW-FM (A3j, A1, F3).
- ★ 30W PEP A3j, 10/1W out A1 F3.
- ★ Bandpass filter no tune design
- ★ Excellent dynamic range sensitivity.
- ★ Bandwidth 2.4kHz and 14kHz at −6dB.
- ★ Semi break in with side tone.
- ★ Very bright blue 100Hz digital display.
- ★ Display shows Tx and Rx freq (inc RIT).
- ★ String LED display for "S" and PO.
- ★ Digital receiver offset tuning.
- ★ Advanced effective noise blanker.
- ★ FM; 25, 12½, 1kHz steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Any TX Rx split with dual VFO's.
- ★ ±600kHz standard repeater split
- ★ Four easy write-in memory channels.
- ★ Memory scanning with slot location display.
- ★ Up/down tuning/scanning from mic.
- ★ Priority channel on any memory slot.
- ★ Satellite mode allows tuning on Tx.
- ★ Scanning for busy or clear channels.
- ★ Size (Case): 8.3" D, 2.3" H, 6.9" W.
- ★ LED's; "On Air" Clar, Hi/Low, FM mod.
- ★ Matching FP80 Mains PSU available.

£359 inc. VAT @ 15% & SECURICOR

FT101ZDFM

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2·4kHz down to 300Hz.
★ 8 pole filters for razor edge selectivity.
★ Selectable CW fixed bandwidth CW-W and CW-N*.
★ Semi-break in with sidetone for excellent CW.
★ Digital plus analogue frequency displays.
★ 6146B PA's with 6dB of negative feedback.
★ 180W PIP and −31dB 3rd order intermod.
★ RF speech processor fitted−adjustable level.
★ VOX built-in and is adjustable from the front panel.
★ Wide dynamic range for big signal handling.
★ High usable sensitivity, for those weak ones.
★ Superb noise blanker−adjustable threshold.
★ Attenuator; 0-10-20dB, front panel switch.
★ AGC: slow-fast-off, front panel switchable.
★ Clarifier (RIT) switchable on TX, RX or both.
★ Low level transvertor drive output facility.
★ Universal power supply 110-234V ac and 12V dc*.
★ Incredible range of matching accessories.
4 models, Digital/Analogue−AM/FM.

FT101ZAM	£515.00 inc	SP901	£28.75 inc
FT101ZFM	£529.00 inc	FV101Z	£121.90 inc
FT101ZDAM	£585.00 inc	FV101DM	£225.00 inc
FT101ZDFM	£599.00 inc	FV901DM	£223.45 inc
FL2100Z	£385.25 inc	WMT101Z	£12.00

*Option **£599 inc.** VAT @ 15% & SECURICOR

FT107M

★ 160-10 metres (including 10, 18, and 24MHz).
★ USB-LSB-CWW-FSK-AM multi-mode.
★ Full broad band "no tune" power amplifier.
★ 240W PIP. 75 per cent power output at 3:1 VSWR.
★ 12 memory channels with clarifier on memory.*
★ Digital Memory Shift gives offset from memory.*
★ Up/down scanning control from the microphone.*
★ Variable IF bandwidth−16 poles of selectivity.
★ Bandwidths: 6kHz*, 2·4kHz-300Hz, 600Hz-300Hz.*
★ Selectable CW "fixed" widths CW-W and CW-N.*
★ Tunable Audio Peak (AFP) and Notch filter.
★ Diode ring mixer for very high Rx dynamic range.
★ Noise blanker−front panel adjustable threshold.
★ AGC: slow-fast-off switchable from the front panel.
★ Attenuator 0-20dB, plus RF gain on front panel.
★ RF speech processor fitted−front panel adjustable.
★ Digital (100Hz) plus analogue frequency displays.
★ Meter Reads; Vcc, Ic, ALC, Compression and SWR.
★ Semi-break in with side tone. Vox built in.
★ Choice of built-in or separate power supply units.

FT107M	£690.00 inc	FC107	£102.35 inc
FT107MDMS	£775.00 inc	FP107	£97.75 inc
FV107	£92.00 inc	FP107E	£106.95 inc
FTV107	£110.40 inc	Filter (crystal)	£23.00 inc
SP107	£27.60 inc	WMT107	£12.00

*Option **£690 inc.** VAT @ 15% & SECURICOR

FT902DM

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2·4kHz down to 300Hz.
★ Audio Peak and independent notch controls.
★ AM, FSK, USB, LSB, CW, FM, (TX and RX).
★ Semi-break in, inbuilt Curtis IC Keyer.
★ Digital plus analogue frequency displays.
★ 6146B's with negative feedback.
★ VOX built-in and adjustables.
★ Instant write in memory channel.
★ Tune up button (10sec, of full power).
★ Curtis Keyer−lambic, single or straight.
★ Switchable AGC and RF attenuator.
★ Optional 350 or 600Hz CW, 6kHz, AM filters.
★ Clarifier (RIT) switchable on TX, RX or both.
★ Audio Peak and tunable notch filter.
★ Plug in modular, computer style constructor.
★ Fully adjustable RF Speech processor.
★ Ergonomically designed with necessary LEDS.
★ Incredible range of matching accessories.
★ Universal power supply 110-234V ac and 12V dc.

FT902DM	£799.00 inc	YR901	£369.00 inc
FT902DE	£713.00 inc	YVM1	£142.60 inc
FT902D	£724.50 inc	YK901	£115.00 inc
YO901P	£302.45 inc	FTV901 (2)	£263.35 inc
FC902	£126.50 inc	WMT901	£12.00

*Option **£799 inc.** VAT @ 15% & SECURICOR

FT707

★ 80-10 metres (including 10, 18 and 24MHz bands).
★ USB-LSB-CWW-CWN-AM (Tx and Rx operation).
★ 100W PEP, 50% power output at 3:1 VSWR.
★ Full "broad band" no tune output stage.
★ Excellent Rx dynamic range, power transistor buffers.
★ Rx Schottky diode ring mixer module.
★ Local oscillator with ultra-low noise floor.
★ Variable IF bandwidth−16 crystal poles.
★ Bandwidths 3kHz*, 2·4kHz 300Hz, 600-350Hz*.
★ AGC: slow-fast switchable from the front panel.
★ VOX built-in and adjustable from the front panel.
★ Semi-break in with side tone for excellent CW.
★ Digital (100Hz) plus analogue frequency display.
★ LED Level meter reads: S, PO and ALC.
★ Convenient concentric AF/FR gain controls.
★ Indicators for: calibrator, fix, int/ext VFO.
★ Receiver offset tuning (RIT-clarifier) control.
★ Advanced noise-blanker with local loop AGC.
★ 25kHz crystal calibrator feature.
★ Internal, xtal or external VFO control.

FT707	£529.00 inc	*FTV707	£82.00 inc.
FT707S	£455.00 inc	70TV	£80.50 inc
FP707	£109.25 inc	144TV	£101.20 inc
FC707	£80.50 inc	430TV	£175.95 inc
FV707DM	£186.30 inc	WMT707	£10.00

*Option **£529 inc.** VAT @ 15% & SECURICOR

FT208R

- ★ 144–148MHz (144–148 possible)
- ★ 12·5/25kHz synthesizer steps
- ★ 4 bit CPU synthesizer control
- ★ Keyboard entry of frequencies/splits
- ★ LCD digital display with backlight
- ★ Ten channels of memory
- ★ Memory back up "five-year lifetime"
- ★ Up/down manual tuning
- ★ Manual or auto scan for busy/clear
- ★ Priority channel with "check back"
- ★ Memory scanning feature
- ★ Scan between *any* two frequencies
- ★ Scan with auto pause/restart
- ★ Any split + or − programmable
- ★ Quick change NiCad pack
- ★ 1,750Hz tone oscillator
- ★ ±600kHz repeater split
- ★ Built in condenser microphone
- ★ 500mW AF to int/ext speaker
- ★ External speaker/mic option
- ★ 2·5 or 0·3W RF output
- ★ Rx: 20mA squelch 150mA max AF
- ★ Tx: 800mA at 2·5W RF
- ★ 0·25μV for 12dB SINAD
- ★ Dual conversion 16·9MHz and 455kHz
- ★ Keyboard provides 16 tone DTMF
- ★ 168(H) × 61(W) × 49(D)mm
- ★ C/w NiCad pack and helical

FT208R
£195 inc.
VAT @ 15%
& POSTAGE

FT708R

- ★ 430–440MHz (440–450 option)
- ★ 25kHz synthesizer steps
- ★ 4 bit CPU chip frequency control
- ★ Keyboard entry of frequencies/splits
- ★ LCD digital display with backlight
- ★ Ten channels of memory
- ★ Memory back up five-year lifetime cell
- ★ Up/down manual tuning
- ★ Manual or auto scan for busy/clear
- ★ Priority channel with search back
- ★ Memory scanning feature
- ★ Scan between any two frequencies
- ★ Auto scan restart
- ★ Any split + or − programmable
- ★ Quick change NiCad pack
- ★ 1,750Hz tone oscillator
- ★ ±7·6MHz EU split standard
- ★ Built in condenser microphone
- ★ 500mW AF to int/ext speaker
- ★ External speaker/mic available
- ★ 1W or 100mW RF output
- ★ Rx: 20mA squelch, 150mA (max AF)
- ★ Tx: 500mA at 1W RF
- ★ 0·4μV for 12dB SINAD
- ★ Dual conversion 46·255MHz and 455kHz
- ★ Keyboard offers 16 tone DTMF
- ★ 168(H) × 61(W) × 49(D)mm
- ★ C/w NiCad pack, helical

FT708R
£199 inc.
VAT @ 15%
& POSTAGE

FT207R

- ★ 144–148MHz (144–148 possible)
- ★ 12·5kHz synthesizer steps
- ★ 4 bit CPU chip for freq. control
- ★ Keyboard entry of frequencies
- ★ Keyboard lockout safety features
- ★ Digital display to hundreds of Hertz
- ★ Display auto shutdown timer
- ★ Four channels of memory
- ★ Memory back up disable
- ★ Up/down manual tuning
- ★ Bandscan for busy or clear channels
- ★ Memory scanning feature
- ★ ±600kHz split built in
- ★ Any split + or − programmable
- ★ Easy change NiCad packs
- ★ BNC antenna connector
- ★ "On Air" and "Channel Busy" LEDs
- ★ Built in condenser microphone
- ★ 200mW AF to internal/external speaker
- ★ External speaker/mic available
- ★ 2·5/0·2W of RF output
- ★ Rx: 35mA squelch, 150mA full vol.
- ★ Tx: 250mA low, 800mA high
- ★ 0·3μV for 20dB quieting
- ★ Double conversion 10·7MHz and 455kHz
- ★ Two tone encoder built in
- ★ 1·7 (2·2)" D × 2·5 (2·7)" W × 6·7 (7·2)" H
- ★ C/w NiCad pack, helical and case

FT207R
£175 inc.
VAT @ 15%
& POSTAGE

FT202R

FT202R:

- ★ 144–146MHz (144–148 possible)
- ★ 6-channel capability
- ★ 1 watt of FM RF output minimum
- ★ Rx: 30mA/200mA—squelch/500mW
- ★ Tx: 400/500mA—300mW/1W
- ★ Dual conversion 10·7MHz and 455kHz
- ★ 67 × 49 × 171mm
- ★ Built in speaker and mic, remote option
- ★ Operates on "AA" NiCads or drys
- ★ C/w helical, case, xtalled S20, 21, 22

FT404R:

- ★ 430–440MHz (Tx 2MHz, RX 5MHz spread
- ★ 6-channel capability
- ★ 2·5W of FM RF output
- ★ Rx: 7mA/160mA—squelch/400mW AF
- ★ Tx: 400/900mA–200mW/2·5W
- ★ Dual conversion 21·4MHz and 455kHz
- ★ 68 × 55 × 171mm
- ★ Built in speaker and mic, remote option
- ★ Operates on quick charge NiCad pack
- ★ C/w NiCad pack, helical, case, 1 channel

FT202R
£109 inc.
VAT @ 15%
& POSTAGE

FT404R

FT404R
£179 inc.
VAT @ 15%
& POSTAGE

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
GJICD	Geoff	Jersey	(0534) 26788
G4EQS	Simon	Redcar	(0642) 480808

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

NEW

★ **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 Tuesday Saturday

ASCOT

These are a complete range of mobile antenna accessories developed and manufactured in the UK.

They are extremely rugged, designed to withstand extremes of weather using: fine stainless steel whips, A100 nylon bases, chrome plated brass ferrules, heat treated silver plated beryllium copper contacts and polished stainless steel shock springs.

From the list below, choose the base ($\frac{1}{4}$, $\frac{5}{8}$, $\frac{1}{2}$) choose the whip (long or short) and the cable assembly required (cable or magnetic). Then add an accessory if required.

340	Base. Stand 1/4λ 60-550MHz	**£2.00**	£0.35
310	Base. Swivel 1/4λ 60-550MHz	**£3.65**	£0.35
344	Base. Sprung 1/4λ 60-120MHz	**£5.55**	£0.45
440	Base. Stand 5/8λ 145MHz	**£2.35**	£0.35
330	Base, Swivel 5/8λ 145MHz	**£4.35**	£0.35
341	Base. Sprung 5/8λ 145MHz	**£6.35**	£0.45
350	Base. Fine tune 1/2λ 45MHz	**£6.35**	£0.45
351	Base. Sprung 1/2λ 145MHz	**£7.00**	£0.55
057	Whip, tapered SS 127cms	**£1.70**	£0.85
056	Whip, parallel SS 63cms	**£0.65**	£0.65
085	Mount cable 5/8 & 1/4λ	**£2.65**	£0.55
085LR	Mount cable 5/8 & 1/4λ	**£3.35**	£0.55
092	Mount Mag. 5/8 & 1/4λ	**£9.35**	£0.75
084	Mount cable 1/2λ	**£4.35**	£0.55
088	Mount cowl 1/2λ	**£5.00**	£0.35
091	Mount Magnetic 1/2λ	**£9.35**	£0.75
089	Gutter clip adaptor	**£4.35**	£0.55
093	Boot lip adaptor	**£3.30**	£0.45

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE EXTRA AS INDICATED

hy-gain

The TH3jnr is a 3 element triband (10-15-20m) beam whose compact design (longest element 24·2ft, boom 12ft turning radius 14·3ft) makes it ideal where space is the limiting factor. Separate and matched air dielectric Hy-Q traps are used for each band giving a 52ohm fed with a 1·5:1 VSWR at resonance, 8dB Av gain, 25dB F.B. ratio and a power handling of 600W P.E.P. By using a 1¼in boom the antenna presents only 3·4sq ft of surface area (equals 87lb of load at 80mph). The mast to boom clamp accepts 1-1¾in masting and, like all the hardware, is Iridite treated to mil specs.

12AVQ	Vertical 10-20m inc.	**£37.50**	£1.50
14AVQ/WB	Vertical 10-40m inc.	**£52.50**	£1.50
18AVT/WB	Vertical 10-80m inc.	**£79.00**	£1.50
14RMQ	Roof mounting Kit	**£26.50**	£1.50
18V	Vertical 10-80m inc.	**£27.80**	£1.50
18HT	"HY Tower" 10-80m	**£279.00**	£10.90
103BA	3 Ele Yagi 10m	**£52.50**	£1.50
105BA	3 Ele Yagi 10m	**£98.00**	£2.75
153BA	3 Ele Yagi 15m	**£65.00**	£2.05
155BA	5 Ele Yagi 15m	**£117.50**	£4.15
203BA	3 Ele Yagi 20m	**£139.00**	£3.45
204BA	4 Ele Yagi 20m	**£189.00**	£5.10
205BA	5 Ele Yagi 20m	**£245.00**	£6.60
402BA	2 Ele Yagi 40m	**£175.00**	£4.55
DB10/15A	3 Ele Yagi 10-15m	**£127.00**	£3.40
TH3JNR	3 Ele Yagi 10-15-20m	**£138.50**	£2.15
TH2MK3	2 Ele Yagi 10-15-20m	**£119.00**	£2.25
TH3MK3	3 Ele Yagi 10-15-20m	**£179.00**	£4.05
TH5DXX	"Thunderbird" 5 Ele	**£199.00**	£4.70
TH6DXX	"Thunderbird" 6 Ele	**£245.00**	£5.90
HYQUAD	2 Ele Quad 10-15-20m	**£209.00**	£4.25
18TD	Dipole Tape 10-80m	**£69.90**	£2.00
BN86	Balun 1:1·3 30MHz	**£13.50**	£1.00
LA1	Lightning Arrestor	**TOS**	£0.65

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE EXTRA AS INDICATED

J-BEAM

As well as 2m antennas featured here, the range covers 4m through 23cms. All models offer good 50ohm matches and bandwidths by incorporating such innovations as the inverse balun. Technical details are quoted in accordance with ICE (ICE138 + 138A) and I.E.E.E. (RV481 RE252 Jan 65) recommendations. (Sae for catalogue.)

The 8XY/2m is basically two 8 element yagis mounted at right angles on a common 9ft boom. It is suitable for horizontal, vertical or circular (with PMH/2c) polarisation. 9·5dB gain in each plane. 47° horizontal beamwidth, 10lb weight, 64lb wind load at 100mph an elegant answer to a single antenna installation.

JAYBEAM 2 METRE

HO/2M	Halo, head only	-3·0dB	**£3.95**	£0.55
HM/2M	Halo, 24in mast	-3·0dB	**£4.70**	£0.65
UGP/2M	Ground plane	0·0dB	**£8.80**	£1.50
C5/2M	Colinear omni vert	4·8dB	**£38.50**	£1.50
LR1/2M	Colinear	4·5dB	**£21.00**	£1.50
5Y/2M	Yagi 5 ele	7·8dB	**£9.80**	£0.50
8Y/2M	Yagi, 8 ele	9·5dB	**£12.60**	£1.50
10Y/2M	Long Yagi, 10 ele	11·4dB	**£27.00**	£1.50
14Y/2M	Long Yagi, 14 ele	13·0dB	**£31.30**	£1.50
D5/2M	Yagi, 5 over 5 slot	10·6dB	**£17.50**	£1.50
D8/2M	Yagi, 8 over 8 slot	12·3dB	**£23.60**	£1.50
PBM10/2M	10 ele parabeam	12·4dB	**£32.00**	£1.50
PBM14/2M	14 ele parabeam	13·7dB	**£39.00**	£1.50
Q4/2M	Quad, 4 ele	10·0dB	**£20.60**	£1.50
Q6/2M	Quad, 6 ele	12·0dB	**£27.30**	£1.50
5XY/2M	Yagi, 5 ele cross	7·8dB	**£19.80**	£1.50
8XY/2M	Yagi, 8 ele cross	9·5dB	**£24.70**	£1.50
10XY/2M	Yagi, 10 ele cross	11·3dB	**£32.80**	£1.50
PMH2/C	Harness, Cir. Polar		**£6.50**	£0.45
PMH2/2M	Harness, 2 way		**£8.60**	£0.75
PMH2/2ML	Hrns, 2 way long		**£9.60**	£1.00
PMH4/2M	Harness, 4 way		**£20.10**	£1.50

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE EXTRA AS INDICATED

Kenpro

KR600RC
£115

360 round type meter
Max: load 200kg.
Rot. 600kg/m, brake 400kg/m.
1¼in-2¼in masts
Lower casting optional.

KR400RC
£79

360° round type meter.
Max: load 200kg.
Rot. 400kg/m, brake 1,500kg/m.
1¼in-2¼in masts.
Lower casting optional.

KR500
£75

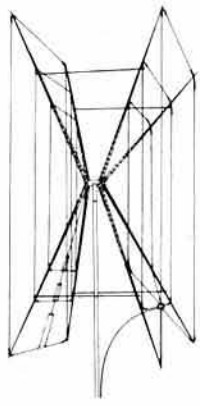
Elevation Rotator (180°).
Up to 50kg of Load.
1¼in-2¼in mast.
1¼in-1¾in boom.

KR250
£39

Twist and switch controller.
Rotator 200kg/m.
Brake 600kg.
1in-1¼in masts.

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE (POST OR ROAD) FREE

Gem Quad



A light strong, boomless, quad antenna covering 10-15-20m. The centre spider is aluminium and the spreader arms (13·6ft and 2·2lb) are of a glass fibre tridectic construction. (Thin rods forming a triangle with tape criss-crossing for light, rigid, low wind resistance structure.)

The double cone shape offers optimum spacing between loops and maintains these critical measurements even under severe weather conditions. This optimum spacing provides "monobander" performance; high gain, maximum capture area, low angle radiation, low SWR and good F/B and F/S ratios. The toroidal balun supplied provides single 50 ohm coaxial feed on all bands, with no lossey coils, traps or switches.

2 element 18' × 18' × 9½'; TR 9½'; 8dB Gain; 25dB F/B
3 element As 2 ele plus 6·5 boom; 8·9dB Gain; 30dB F/B.
4 element As 2 ele plus 13' boom; TR 22'.

GQ2E	2 Ele Antenna	**£124.00**	£3.75
GQ2E	3 Ele Antenna	**£187.00**	£6.45
GQ4E	4 Ele Antenna	**£249.00**	£7.05
GQCK1	Conversion Kit 1 Ele	**£63.00**	£2.90
GQCK2	Conversion Kit 2 Ele	**£125.00**	£4.70
GQSPIDER	Centre piece (spare)	**£26.25**	£1.25
GQSPREADER	Spreader Arm (spare)	**£9.85**	£1.50

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE EXTRA AS INDICATED

CDE

AR40
£57

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

CD45
£99

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

HAM IV
£165

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

T2X
£235

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

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE (POST OR ROAD) FREE

SOUTH MIDLANDS COMMUNICATIONS LIMITED

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.*

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.

STANDARD			HEAVY DUTY		
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

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

*New reinforced head unit with provision for K065 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 quaity models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and R.M.S. in-line wattmeter 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
Impadance: 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: 6¼ × 2¾ × 4¼"

FS300 £35

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

FS7 £31

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

FS711 £28

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ±10%. SWR 1:1-3:1 ±3%
Indicator 5 × 2¾ × 1¾"
coupler 3¾ × 2¾ × 1¾"

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

FS300 £27

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

SWR3S £20

WIDE RANGE POWER & SWR
SWR3S 3·5-150MHz 20 & 200W
Power RMS ±10%. SWR 1:1-3:1
Power Max: 200W 3·5-30MHz
50W 50-150MHz
Size: 6 × 2¾ × 2½". Antenna/switch

SWR50B £20

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

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

SMC=HS

OMNIDIRECTIONAL VERTICAL HF, VHF, UHF ANTENNAS

HF TRAPPED VERTICAL

The SMCHF5V covers five bands, 10 to 80 metres. Only 15ft 9in high, about 1¾in diameter and weighing 6½lb but with PEP handling (within the 1·5:1 VSWR bandwidth) of 500W on 10-20m and 200W on 40 and 80m. It is suitable for ground mounting on a good earth stake (with or without radials) or in an elevated position with resonant wire radials or the SMCHF5R trapped radial kit.

The SMCHF5R consists of five solid rods (between 6½ft and 7¼ft) sloping downwards at 45° to the antenna. It is the perfect answer to restricted locations. Power; 150W PEP, weight 4lbs.

SMCHF5V £35.00 **SMCHF5R £26.00**
(Carriage on either or both together £1.50)

2 METRE COLINEAR

144MHz, 6·5dB gain and low angle of radiation from two ⅝λ phased sections. Height 3·1 metres. Three 48cm radials project from the bottom chrome-plated brass boss. A good 50ohm match offers better than 1·5:1 VSWR at resonance for 100W PEP plus performance over 4MHz of operational bandwidth. Weatherproof design with a SO239M connector recessed 30cm up the detachable 3·2cm OD support tube. Supplied complete with mounting plate and U bolts for 1¼in mast. Weight 1·5kg.

SMCGP144W (P&P £1.50) **£21.70**

70CMS COLINEAR

432MHz, 6·8dB gain and ultra low angle of radiation from three ⅝λ phased sections to a maximum height of 1·7 metres. Three 17cm radials project from the bottom chrome-plated brass boss. A good 50 ohm match offers better than 1·5:1 VSWR at resonance for 100W PEP plus performance over 10MHz of operational bandwidth. Excellent weatherproof design with a SO239M connector recessed 23cm up the detachable 3·2cm OD support tube. Supplied complete with two extruded mast clamps and U bolts capable of taking masts up to 2¾in. Weight 1·1kg, Projected area 0·034 square metres.

SMCGP432X (P&P £1.00) **£24.35**

2 METER AND 70CMS COLINEAR

144MHz 2·8dB gain and 432MHz 5·7dB of gain single 50ohm feed. 1·1m high. 100W PEP.

SMC 70N2V (P&P £1.00) **£24.00**

VHF/UHF DISCONES

The SMCGDX1 is a vertically polarized, 3dB gain, 500W PEP, 50ohm, broad-band antenna. It is constructed of eight horizontal rods (each 40cm) radiating from a central boss, thus forming the disc, and eight rods (each 90cm) radiating from the boss but sloping downward at 45° to form the cone. This configuration produces a 1·5:1 VSWR over the range 80 to 480MHz.

The SMCGDX2 is a development of the GDX1 with every other disc rod extended by 72cm and every other cone rod extended by 1·3m. This reduces the lower frequency limit to 50MHz.

The SMCVHFL is a skeleton discone with three off 8in cone and three off 24in disc elements suitable for listening anywhere between 65 and 520MHz.

All models use a SO239M coax connector, (in the GDX versions it is recessed into an extension of the support mast—which doubles as the coaxial feed) and are supplied with mounting hardware to 1¼in mast.

SMCGDX1 (P&P £1.50) **£36.00**
SMCGDX2 (P&P £1.50) **£41.70**
SMCVHFL (P&P £1.50) **£14.65**

NB: PRICES EXCLUDE VAT (15%)
CARRIAGE EXTRA AS INDICATED

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

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Region 9—W. J. Colclough, G3XC
Region 10—(*To be appointed*)
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Region 12—F. Hall, GM8BZX
Region 13—(*To be appointed*)
Region 14—(*To be appointed*)
Region 15—J. T. Barnes, GI3USS
Region 16—(*To be appointed*)
Region 17—H. G. Cunningham, G8FG
Region 18—W. Ricalton, G4ADD
Region 19—R. J. Broadbent, G3AAJ
Region 20—B. L. Goddard, G4FRG

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Post vacant

HF manager
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Video tape and film library co-ordinator
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Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ.

RSGB QSL BUREAU
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PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

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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 cannot wait for the next issue of *Rad Com.* Items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone before 10am on Wednesdays, although no guarantee of inclusion can be given. Once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Midlands	G8QZ	G2CVV	1800
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)			
N from Carlisle	G4LAA	(Vacancy)	0930
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	(Vacancy)	1030
SE from Lincoln	G3NRO	G8OFQ	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/G4FZZ	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	G4GWJ/G4KYY	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G3NRO	G8OFQ	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM/GM3VTB	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM8TKA	GM3MSG	1100
Brighton and coast	G3ZYE/G8GEZ	G4JGJ/MA	1100
Huntingdon, Cambs	G8BBK	(Vacancy)	1100
Jersey	GJ8KNV	GJ4ICD/GJ4JWA	1100H
Gwynedd	GW4KEV	GW8TTM	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100

H = horizontal polarization

QTC
Amateur radio news

RSGB Headline News
The Society has recently introduced a new service, *RSGB Headline News*. Propagation data, up-to-date dx news, and details of rallies and special event stations are available from a three-minute recording updated each Tuesday and Friday. The telephone number is 01-837 4118.

QSL Bureau
GW series. GW3ANU has thousands of unclaimed QSL cards and wishes to clear his shack. Will GW amateurs who do not wish to QSL please notify GW3ANU and GW8UZU. The remainder should send adequately-stamped saes to obtain their cards if prior arrangements through local clubs do not exist. Within four weeks of this notice being published all unclaimed cards will be destroyed.

G4LAA-G4LZZ and G8UAA-G8ZZZ series. The sub-manager for these series, Mr C. Lennox, now has the callsign G4LXU.

Holiday closure
The *Radio Communication* editorial office in Chelmsford will be closed from Saturday 15 August to Sunday 23 August inclusive.

Planning permission fees
New draft regulations came into effect on 1 April 1981, and the Society wrote to the Department of the Environment asking for information regarding fees payable for amateur radio installations. This was necessary as the regulations were not considered to be clear as to the amount payable. We give you below an extract from a letter received from the Department of the Environment.

"Thank you for your letter of 30 May about fees for applications for planning permission to erect radio masts and aerials.

"It is ultimately the role of the Courts to interpret the regulations, but it may be helpful if I let you have the department's opinion about the fees payable.

"Where the application is for permission to erect a mast or aerial within the curtilage of an existing dwellinghouse, 'for purposes ancillary to the enjoyment of the dwellinghouse as such', then the application will come within the 'householder' category and the fee will be £20. This rate would apply to a mast or aerial in the garden, or on the roof, of the applicant's house."

Stolen equipment
From a car at Granton Docks, Edinburgh, on 31 May: Standard C8800 144MHz fm serial number EO10176, and 5λ/8 whip and mag mount. Any information to J. B. French, G8TIJ, or the police.

From a car in Edinburgh: FT707, serial No OE010534; Hurricane 350 linear amplifier, serial No 134775—both modded. Information to GM4BWT, tel 031-668 1119, or Edinburgh police.

REGIONAL REPRESENTATIVES ELECTION RESULT

REGION 3

H. S. Pinchin, G3VPE...139 votes
L. W. Ross, G8MWR...24 votes

REGION 8

K. A. Crouch, G8KEN...45 votes
A. K. Baker, G4GNX...41 votes
G. D. Edy, G4AXD...21 votes
There were eight invalid votes

Glenrothes & D ARC presents

SCOTAM '81

11am to 5pm, 12 September 1981
at the
Lomond Centre, Glenrothes, Fife
(just off the Kirkcaldy-Tay Bridge road in NE Glenrothes)

RSGB bookstall and id cards (bring licences)
Lectures **Trade stands**
Luncheons, snacks and licensed bar
Admission: £1

A dinner/dance will be held in the Ship & Stern, Main Street, Thornton, commencing 7.30pm.

Tickets, at £5.50 per person, must be purchased before 9 September 1981 from Ken Riddoch, GM3ZSP, 181 Kinghorn Road, Burntisland, Fife; tel (0592) 872727.

Nominations for election to the 1982 Council of the RSGB

The Society's Articles of Association require that members who are entitled to vote be notified of those Council members who retire at the end of each year. The Council members who retire on 31 December 1981 are as follows:

ORDINARY MEMBERS
Mr R. Bellerby, G3ZYE, who is eligible and willing to accept nomination for re-election.
Mr G. M. C. Stone, G3FZL, who is not eligible for re-election, under Article 26.

ZONAL MEMBERS
Zone B
Mr J. Anthony, G3KQF, is to become the Society's President on 1 January 1982. This creates a vacancy on Council for a member to represent Zone B.

Zone C
Mr W. J. McClintock, G3VPK, who was co-opted during 1981 and who is eligible and willing to accept nomination for election.

Zone D
Mr L. N. G. Hawkyard, G5HD, who is eligible and willing to accept nomination for re-election.

Zone F
Mr I. J. Kyle, GI8AYZ, who was co-opted during 1981 and who is eligible and willing to accept nomination for election.

Zone G
Mr G. Knight, GM8FFX, who is eligible but does not wish to stand for re-election.

NOMINATION PROCEDURE
The vacancies on the 1982 Council may be filled either by the re-election of retiring members of the Council who are eligible or by the election of any qualified Society member. In both cases a proper nomination must reach the secretary at RSGB HQ not later than 10 October 1981. A member who has been a corporate member of RSGB for not less than three years immediately prior to nomination is qualified to serve on Council. Members standing for election as zonal members must be resident in the appropriate zone, as must those who make zonal nominations.

At the Society's 1974 annual general meeting, changes were made to the Society's Articles of Association. One change concerned the period of office which Council members could serve. More specifically, having been elected to Council for a three-year period, a Council member could only be re-elected once and would then be required to stand down from Council for one year prior to any further nomination.

The changes to Article 26 were not retrospective, and thus could only have taken effect from 1 January 1980. One member of Council is affected by Article 26 this year, as indicated above.

Any 10 or more fully-paid-up corporate members may nominate any qualified member for election to Council by delivering, in one closed envelope, to the secretary of RSGB, their respective nomination in writing. (As a safeguard it is recommended that each candidate be nominated by more than 10 members.)

The nominated member must also enclose:
(i) Written consent to accept office if elected.
(ii) A statement indicating if he/she will have passed their 70th birthday either prior to 1 January 1982 or within the three-year period commencing 1 January 1982. This information is necessary under the Companies Act.
(iii) A statement saying if his/her nomination for Council is for ordinary or zonal membership.
(iv) A statement declaring any commercial interests in the field of amateur radio. The candidate may use a maximum of 150 words as a statement of address to be circulated with the ballot forms. This statement of address should contain biographical details of the candidate as well as any other information he/she would like to convey. Bona-fide statements will receive the minimum of editing cosistent with good style and factual accuracy; however, statements in excess of the maximum will be cut to 150 words.
(v) A suitable black and white photograph (head and shoulders), if he/she wishes.

Complete nominations should be addressed to: D. A. Evans, Secretary, RSGB, 35 Doughty Street, London WC1N 2AE, and must arrive not later than 10 October 1981. All nominations received will be acknowledged by return of post.

Tropospheric scatter propagation

by J. N. GANNAWAY, DPhil, G3YGF*

Introduction

This article is intended to demonstrate the potential of communications using tropospheric scatter (troposcatter) on the vhf, uhf and microwave bands. The troposcatter propagation mode is regularly used for dx working at vhf, but the predictability of the mode and its potential on the higher frequency bands are not widely appreciated. The nature of troposcatter propagation is explained and an expression for the path loss is given, taking into account the characteristics of the sites at each end. By combining this expression with calculations of the equipment performance at each end of the path, it is possible to predict the signal-to-noise ratio that should be obtained between the two stations under normal conditions, or to estimate the maximum range that can be expected from a given site.

Paths that involve only line-of-sight propagation are not very common, and usually the signals will have been scattered off or diffracted around several obstacles on the way. As the length of the path increases, so does the number of obstructions or the angles through which the signals have to be diffracted. Under these conditions signal levels will decrease very rapidly with distance, and signals arriving by other propagation mechanisms may be stronger. Propagation beyond the horizon can occur by a variety of methods, usually either by atmospheric ducting or by the signals reflecting off an object which is high enough to be visible to both stations. This object can be, for example, an aircraft, an aurora, or an ionization trail from a meteor. However, these phenomena are only very short-lived, and a more permanent mechanism would be desirable. Satellites or moonbounce are more predictable but, apart from the case of geostationary satellites, can only be used for some of the time.

The mechanism of troposcatter

Troposcatter uses the weak, but reliable reflections that can be obtained from the dust particles, clouds, and refractive index variations that occur in the atmosphere in the region 1,000 to 50,000ft asl, and this mechanism can be used for reliable dx working over distances of many hundreds of kilometres. A brief illustration of the structure of the relevant part of the atmosphere is shown in Fig 1. The air density decreases with height, and reaches one third of its sea level value by about 30,000ft. The refractive index of the atmosphere depends on such properties as its temperature, density and—hence—pressure, humidity, or the presence of liquid water, so variations in any of these properties can scatter the signals. The scattering process is more efficient at lower altitudes where the atmosphere is denser, and where turbulence associated with the weather can have marked effects on the signal levels and characteristics.

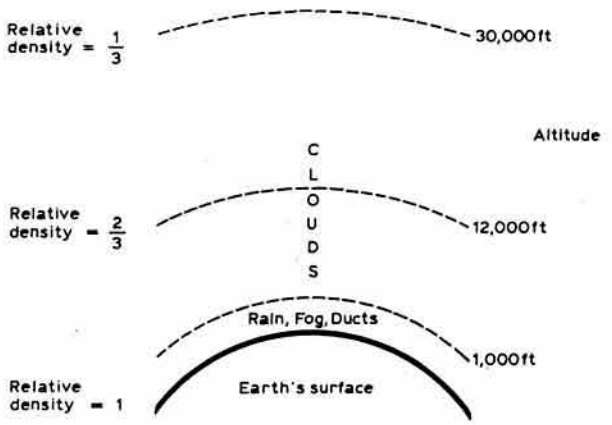

Fig 1. Diagram showing the structure of the lower atmosphere

In practice this mechanism is used by pointing both antennas along the great circle path between the two stations at as low an angle of elevation as possible. The two beams will intersect in a common volume of the atmosphere near the centre of the path, as can be seen from Figs 2 and 3. Propagation will be line-of-sight to the common volume from the transmitter. A very small fraction of the power passing through this volume will then be scattered in all directions by the irregularities in the atmosphere, and some of it will be in the direction of the receiver. This power then propagates by line-of-sight to the receiver. The height of the bottom of this scattering volume will depend on the path length, and to some extent on the horizons of the sites used at each end, but will be typically 2,000ft on a 100km path, and 30,000ft on a 500km path.

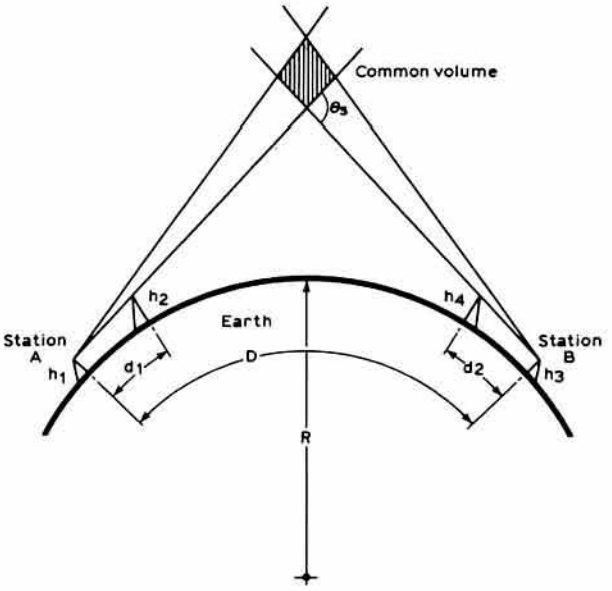

Fig 2. The geometry of a troposcatter path

The loss in the scattering process is usually so large that the equipment is unlikely to have enough spare capability to overcome the extra losses introduced by any additional obstructions in the path. The path loss increases by about 10dB for every degree of horizon angle at each station, and on paths of over 100km by about 9dB for every extra 100km of path length, so the choice of a site with a good horizon is vitally important; it can make a difference of several hundred kilometres to the range obtainable.

Derivation of an expression for the path loss

The angle through which the signal is scattered is an important characteristic of a troposcatter path, as the loss involved increases with angle; the angle involved being usually only a few degrees. The relevant details of a troposcatter path are shown in Fig 2. The heights of each station are h_1 and h_3, and h_2 and h_4 are the heights of the obstructions forming the horizon at each station, at distances of d_1 and d_2 respectively. All heights are with respect to sea level. R is the mean effective radio radius of the earth, 1·33 times the physical radius, 6,371 × 4/3, ie 8,497km, which allows for the amount by which the atmosphere refracts the signals towards the earth's surface under normal conditions. θ_S is the scattering angle which is determined by the path geometry, and consists of three terms: one depending on the overall path length, and two being characteristic of the sites at each end.

*Dept of Engineering Science, Parks Road, Oxford

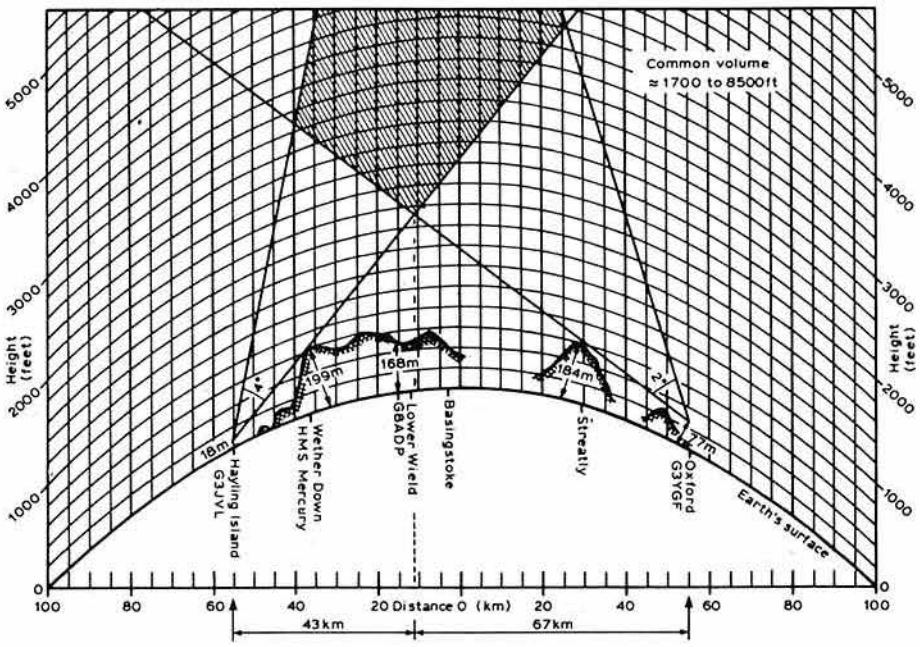

Fig 3. Path profile plot for the Oxford to Hayling Island path

$$\theta_s = \frac{D}{R}\times\frac{180}{\pi} + \underbrace{\left(\frac{h_2-h_1}{d_1} - \frac{d_1}{2R}\right)\times\frac{180}{\pi}}_{\theta_A} + \underbrace{\left(\frac{h_4-h_3}{d_2} - \frac{d_2}{2R}\right)\times\frac{180}{\pi}}_{\theta_B} \quad \text{(degrees)}$$

term in path length | contribution from site A | contribution from site B

The units used for the various distances do not matter, provided that they are the same in each term. It would be convenient to use metres or kilometres throughout. The path loss can now be expressed as the sum of several components:

(1) The free space loss [1]

$$L_{fs} = 32{\cdot}5 + 20\log D + 20\log F \quad \text{(dB, km, MHz)}$$

(2) The loss in the scattering process

$$Ls = 21 + 10\theta_S + 10\log F \quad \text{(dB, degrees, MHz)}$$

This is an empirical expression derived from observed signal levels, and shows the variation of scattering efficiency with frequency and scattering angle. The loss increases by 10dB/° of scattering angle.

These expressions are plotted in Fig 4, which shows the free space loss and the sum of the free space and scatter losses for comparison, indicating that much greater losses are involved in troposcatter, and that they increase very rapidly with distance.

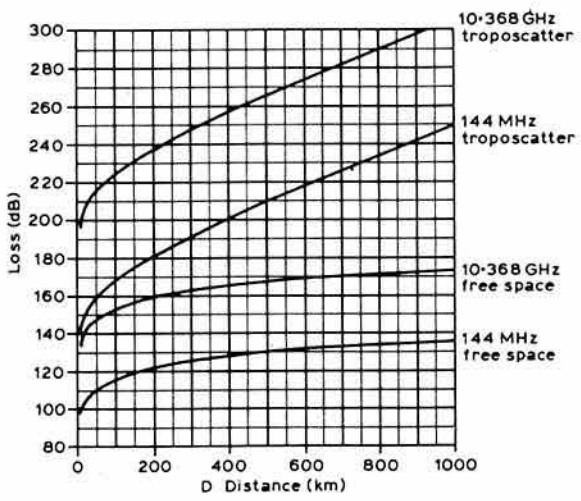

Fig 4. Comparison of troposcatter and free space path losses

(3) The aperture to medium coupling loss [2]

$$L_{am} = 2 + 2\frac{\theta_S}{a} \quad \text{(dB, degrees)}$$

Where a is $\sqrt{\theta_1\theta_2}$, the geometric mean of the two antenna beamwidths. This takes into account the size of the two beams and the way in which they cross in the atmosphere, which affects the efficiency of coupling between them. It implies that there is no point in increasing the size of the antennas above a certain gain on a given path, as the expected increases in gain will not be realized when very high gain antennas are used. This condition occurs when the antenna beamwidths approach the scattering angle, ie a few degrees. This term will be negligible except on the higher frequency bands where antennas with a beamwidth of a few degrees can be realized conveniently, eg a 4ft dish on 10GHz has a 2° beamwidth.

(4) Loss due to variation of the mean radio refractive index of the atmosphere

$$L_n = 0{\cdot}2\,(N-310) \quad \text{(dB)}$$

N is the refractive index expressed in millionths above unity—the nominal value is 1·00031—and will be affected by the climatic conditions mentioned earlier. If N varied by 30 units, this would affect the path loss by 6dB, so it has a significant effect and probably accounts for the seasonal variations referred to later.

Calculation of the path loss

The total troposcatter loss is the sum of all these terms. It is convenient to split it into two parts; one being the basic loss which only depends on the distance and frequency, and the other being the variable losses due to the nature of the sites used and the climatic conditions.

The first part, the troposcatter loss between two stations on a smooth earth [3], is obtained by taking the terms which are either constant or depend on path length or frequency.

$$L = \underbrace{55{\cdot}5 + 20\log D + 30\log F}_{(32{\cdot}5+21+2)} + \underbrace{\frac{D}{R}\times 1{,}800/\pi}_{\text{Path length dependent part of } \theta_S} \quad \text{(dB, km, MHz)}$$

This loss is plotted against distance in Fig 5 (a) and (b) for the frequencies 10,368 and 144MHz. These graphs can be used at other frequencies by adding $30\log\frac{F}{10{,}368}$ or $30\log\frac{F}{144}$ to the value obtained from the appropriate curve. Values of this term for the various amateur bands are given in Table 1. The remaining terms are the variable ones which depend on the sites or propagation conditions and weather, so these should then be added to the loss obtained from the graph:

$$L_V = \underbrace{10\theta_A}_{\text{site A}} + \underbrace{10\theta_B}_{\text{site B}} + \underbrace{\frac{2\theta_S}{a}}_{\text{Parts of } \theta_S \text{ dependent on site A and site B}} - 0{\cdot}2(N-310) \quad \text{(degrees, dB)}$$

Table 1. Corrections to the path loss in Fig 5 for different frequencies

Band	Correction (dB) to be added to the loss given in Fig 5(a) (10,368MHz)	Fig 5(b) (144MHz)
24GHz*	+11	+67
10GHz	−0	+56
5·6GHz	−8	+48
3·4GHz	−15	+41
2·3GHz	−20	+36
1,296MHz	−27	+29
432MHz	−41	+14
144MHz	−56	0
70MHz	−65	−9

*An additional allowance must be made for water vapour absorption on this band

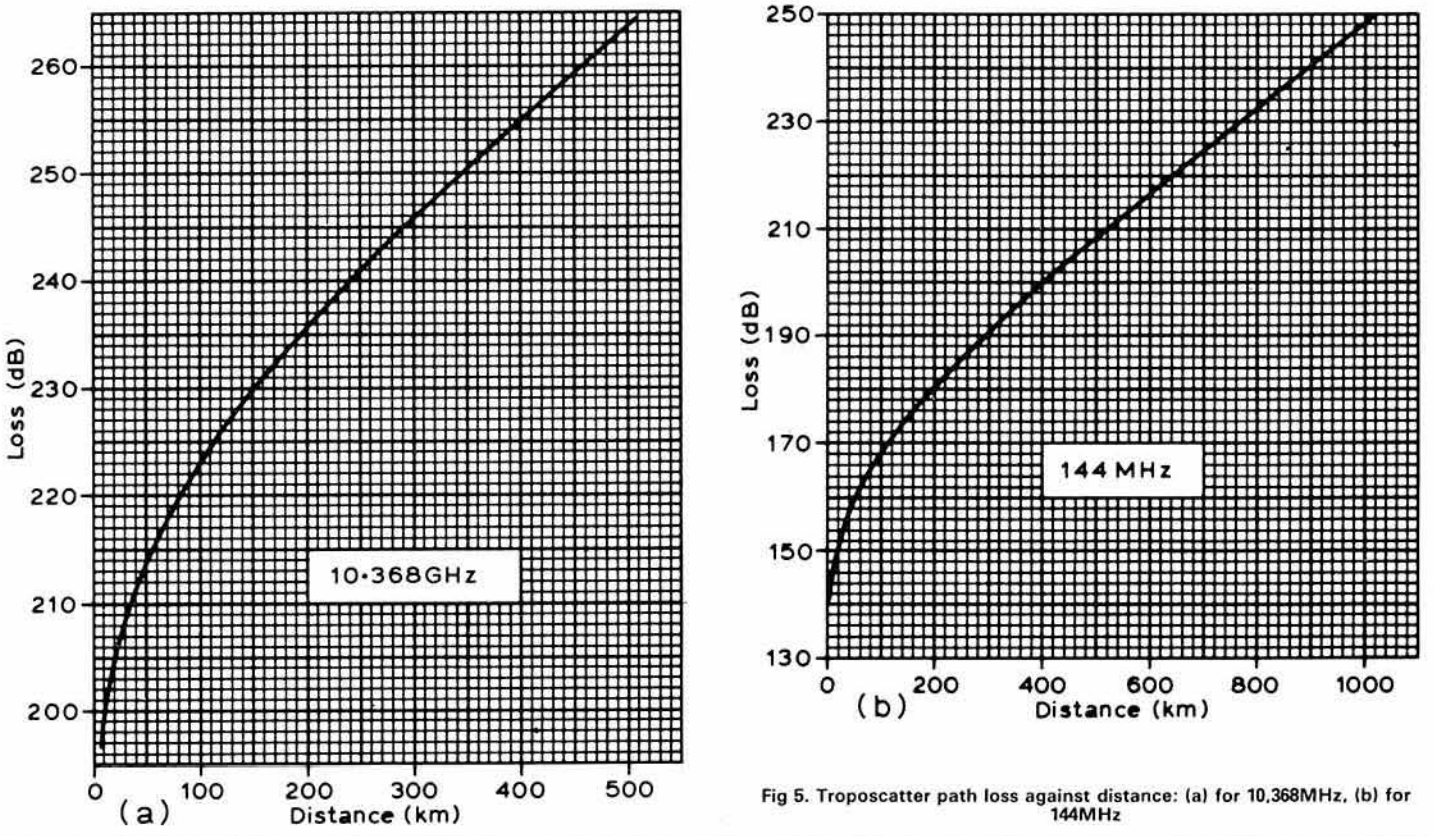

Fig 5. Troposcatter path loss against distance: (a) for 10,368MHz, (b) for 144MHz

For most purposes the total loss can be taken as the loss from the graph plus the contribution from each site. The other two terms will have little effect, and the value of N is not likely to be known accurately.

Once the details of the sites are known, the values of θ_A and θ_B can either be calculated using the expression for θ_S given earlier, or the loss ($10\theta_A$) can be found directly using the graph in Fig 6. In this, d is the distance to the first obstruction, and Δh is the height of the obstruction above the site, see Fig 2.

$$\Delta h = h_{obstruction} - h_{site}$$

The actual height of the site does not appear explicitly in the expressions, only in as much as it determines where the first obstruction is and its height relative to a site. It can be seen from the original expression for θ_S that both the elevation angle that the obstacle presents and its distance from the site are the important parameters in determining the path loss. There is little to be gained by going higher at a site if the object forming the horizon is far away, but significant improvements are possible if the obstacle is very close. A distant horizon is the key feature of a good site which, in simple terms, might be described as a place having a "good view".

It is also very useful to calculate the loss from the site-dependent terms separately, as it provides a means of accurately comparing the merits of various sites and is independent of frequency. Path profile plots [6] should be performed for each direction of interest at each site to find the object causing the horizon and thus the values of d and h. A very good site can give negative values of this loss and so reduce the overall path loss. This loss is typically in the range -5 to $+10$dB.

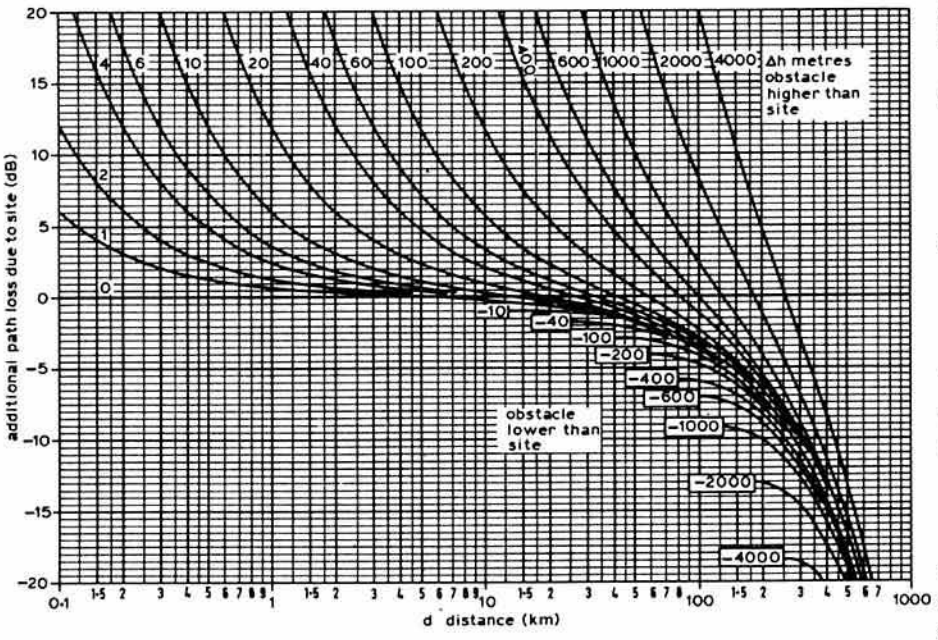

Fig 6. Graph showing the effect of site geography on path loss

Example of path loss calculation

As an example, consider the Oxford–Hayling Island path, a distance of 110km. Taking the distances from the path plot in Fig 3, the site losses are:

$$\theta_A, \text{Oxford} = 57{\cdot}3\left(\frac{184-77}{26{,}000\text{m}} - \frac{26}{17{,}000\text{km}}\right)$$

$$\theta_A = 0{\cdot}23 - 0{\cdot}09 = 0{\cdot}14^\circ \quad \text{Loss} = 10\theta_A = 1{\cdot}4\text{dB}$$

$$\theta_B, \text{Hayling Island} = 57{\cdot}3\left(\frac{199-18}{18{,}000\text{m}} - \frac{18}{17{,}000\text{km}}\right)$$

$$\theta_B = 0{\cdot}57 - 0{\cdot}06 = 0{\cdot}51^\circ \quad \text{Loss} = 10\theta_B = 5{\cdot}1\text{dB}$$

The total loss due to the sites is 6·5dB.

The same results can be obtained by using these values of Δh and d in Fig 6.

Site A: $d = 26$km, $\Delta h = 107$m
Site B: $d = 18$km, $\Delta h = 181$m

Next, θ_S is needed to calculate the coupling loss. θ_S is the sum of the horizon angles at each site, plus the term in the total path length, $\frac{57{\cdot}3d}{R}$.

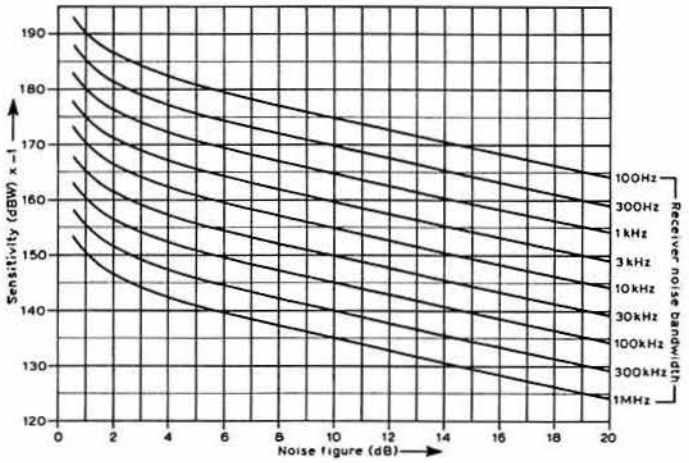

Fig 7. Graph of effective receiver sensitivity as a function of noise figure and bandwidth

$$\theta_S = \underset{\text{Oxford A}}{0{\cdot}14} + \underset{\text{Hayling Is B}}{0{\cdot}51} + \underset{\text{Path length term}}{57{\cdot}3 \times \frac{110\text{km}}{8{,}497\text{km}}} = 1{\cdot}4°$$

Now the coupling loss can be found. The antennas, 2ft and 4ft dishes, have beamwidths of 4° and 2° on 10GHz, so the mean is 2·5°. The coupling loss is then $\frac{2{\cdot}8}{2{\cdot}5}$, approximately 1dB, which is negligible as expected.

The path loss from the graph in Fig 5 for a path of 110km is 244dB at 10GHz, so the total loss is:

Path loss = 224 + 6·5 + 1 = 232dB on 10,368MHz

The path loss on 144MHz can be found in a similar manner. The site losses will be the same, as they are independent of frequency, and the coupling loss will be even smaller since θ_S is the same but the antenna beamwidths are much larger, typically 20 to 30°. The path loss from the graph is 168dB, so the total loss is:

Path loss = 168 + 6·5 + 0 = 175dB on 144MHz

These values are the mean values of loss averaged over a year. There are many factors that will affect this value slightly, and these are discussed later.

Equipment performance

Now that the path losses (pl), are known, the next step is to calculate the capability of the equipment at each end of the path—the path loss capability (plc) [5]. This is the number of decibels of loss that must be inserted between the transmitter and receiver antennas to give a 0dB signal-to-noise ratio in the receiver. The difference between the two terms gives the signal-to-noise ratio to be expected in the receiver: s:n = plc − pl.

The plc can be found for any two sets of equipment, and is the sum of the transmitted effective isotropic radiated power (eirp) and the effective receiver sensitivity (ers): plc = eirp + ers.

The eirp is the sum of the transmitter power in decibels relative to 1W (dBW), and the antenna gain is in decibels relative to an isotropic radiator (dBi), the feeder loss in decibels: eirp = transmitter power (dBW) + antenna gain (dBi) − feeder loss (dB).

Calculation of the ers is slightly more involved. The noise level of the receiver is expressed in decibels below 1W, but as a positive number of decibels. The noise level can be found from the expression for thermal noise, $-10\log(kTB)$, where k is Boltzman's constant, $1{\cdot}38 \times 10^{-23}$ WK^{-1} Hz^{-1}, T is the receiver noise temperature which is related to the more familiar noise figure by the relation $nf = 10\log(1 + \frac{T}{290})$, and B is the receiver bandwidth in hertz. Values for this noise level can be found from the graph in Fig 7 which is for modes such as ssb or cw which have no detector threshold. For a.m. detectors the threshold is 2·6dB, but for fm the situation is more complicated [7], and the threshold increases with modulation index up to about 10dB for wideband fm. These values represent reductions in the receiver's sensitivity. Feeder loss and antenna gain are included as for eirp: ers = receiver noise level (dBW, a positive number of decibels) + antenna gain (dBi) − feeder loss (dB) − threshold (dB).

Examples of plc

The plc will now be calculated for the equipment used on the path mentioned earlier on both 144 and 10,368MHz.

144MHz

G3JVL (transmit)		G3YGF (receive)	
Transmitter 20W	+13dBW	Receiver, nf 5dB, bandwidth 2·5kHz	+166dBW
Feeder loss	−1dB	Feeder loss	0dB
Antenna, 14-el	+14dBi	Threshold (ssb)	0dB
	eirp = +26dBW	Antenna, 4-el	+6dBi
			ers = +172dBW

so plc = eirp + ers = 198dB.

10,368MHz

G3JVL (transmit)		G3YGF (receive)	
Transmitter, 5W	+7dBW	Receiver, nf 8dB, bandwidth 500Hz	+169dBW
Feeder loss	−2dB	Antenna, 4ft dish	+39dBi
Antenna, 2ft dish	+34dBi	Feeder loss	−2dB
	eirp = +39dBW	Threshold (cw)	0dB
			ers = +206dBW

so plc = 245dB.

The path losses calculated earlier are 232dB (10,368MHz), and 175dB (144MHz). The predicted signal-to-noise ratios can now be calculated:

	Predicted value	Observed value
10,368MHz:	245 − 232 = 13dB	10dB
144MHz:	198 − 175 = 23dB	17dB

The 144MHz measurement was only done on one day, so it is likely to be rather inaccurate, but the 10,368MHz measurements were done over a period of many months and show good agreement with the predicted values. The discrepancy is probably due to the seasonal and climatic variations, for which no allowance has been made, although there will always be a few decibels of uncertainty in the equipment parameters, antenna gains etc.

The potential of troposcatter communications

Details of various systems and the range that can be expected between two stations using them are given in Table 2 to illustrate the performance that should be expected under flat conditions from good sites. The loss contributions from the sites are assumed to be zero, and the figures are given for a signal-to-noise ratio of 0dB in a 100Hz bandwidth, representing a weak cw signal. The range obtained when using ssb in a bandwidth of 2kHz, a factor of 13dB larger, will be reduced by about 130km on each band. The equipment is typical of that which might be used for a serious entry in a portable contest. The noise figures given may seem rather high, but are those of the overall system, which may be significantly higher than those of the preamplifiers on their own.

Table 2. Range obtainable by troposcatter propagation on various amateur bands

(100Hz bandwidth receiver)

Freq (MHz)	Path loss (dB)	Range (km)	Equipment	Antenna gain
144	240	870	100W, 3dB nf, 2× 16-el Yagi	18dBi
432	247	790	100W, 3dB nf, 2× 25-el loop Yagi	22dBi
1,296	258	760	100W, 3dB nf, 4× 25-el loop Yagi	24dBi
2,304	262	720	50W, 3dB nf, 6ft dish	31dBi
10,368	234	240	100mW, 10dB nf, 4ft dish	39dBi
10,368	254	440	1W, 3dB nf, 4ft dish	39dBi

Table 3 gives the troposcatter range between two systems which are capable of moonbounce communication to illustrate the relative magnitudes of the problems involved. For distances approaching 1,000km, the challenge represented by the two modes of communication can be seen to be comparable. These tables also show that the range attainable by troposcatter need not, in theory, vary much with frequency. In practice, however, physically smaller antennas tend to be used on the higher frequencies, and it is also harder to generate comparable powers on the higher bands. In view of the rapid advances being made in receiver and transmitter technology, however, the potential of the microwave bands for longer distance communication should not be ignored.

Table 3. Troposcatter range of equipment capable of moonbounce operation

Freq (MHz)	EME path loss (dB)	Tropo range (km)	Equipment	Antenna gain
144	252	990	500W, 3dB nf, 100Hz, 4× 16-el Yagi	21dBi
432	262	940	500W, 3dB nf, 100Hz, 20ft dish	26dBi
1,296	271	890	500W, 3dB nf, 500Hz, 16ft dish	34dBi
2,304	276	860	100W, 3dB nf, 500Hz, 16ft dish	40dBi
10,368	289	790	50W, 3dB nf, 1kHz, 12ft dish	50dBi

Oscilloscope traces showing rapid fading on troposcatter signals received from G3JVL on 10,368MHz over a 110km path in March 1979

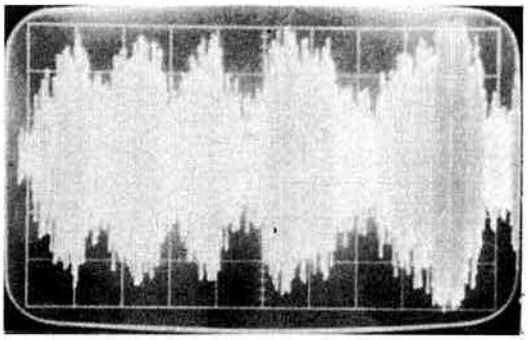

Photo 1. Continuous carrier, 50ms/cm, showing fading at around 10Hz

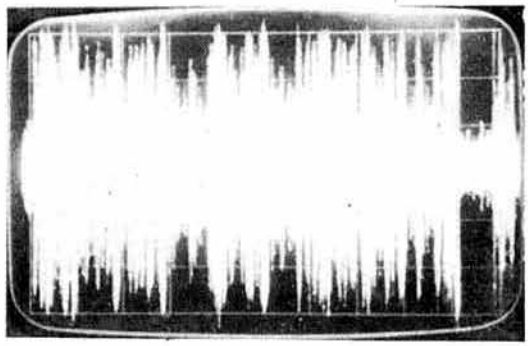

Photo 3. Continuous carrier showing fading on a longer time scale, 0·6s/cm

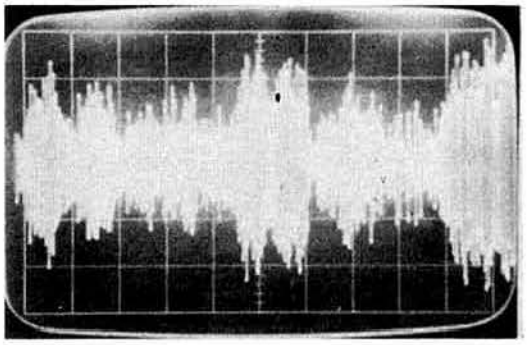

Photo 2. Continuous carrier, 50ms/cm, showing more random fading

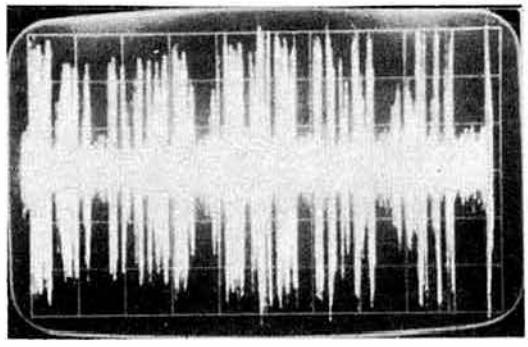

Photo 4. Morse code from G3JVL showing occasional deep fading, 0·6s/cm

Characteristics of troposcatter signals

Several different types of fading are experienced on troposcatter signals [4]. The effects are more severe at high frequencies, so are easier to observe and describe. At 10GHz the note of the carrier can appear quite rough, being modulated by the scattering process at frequencies up to about 50Hz. An example of this rapid fading is shown in Photos 1 and 2, which are oscilloscope photographs of a continuous carrier received over a 110km path from G3JVL to G3YGF, showing both the depth of the fading and range of frequencies over which it occurs. At times it produces a waveform that resembles 100 per cent amplitude modulation. Photo 3 shows the fading on a longer time scale, and the occasional very deep fades can corrupt cw as shown in Photo 4, where in the V of G3JVL the dash has been broken up into two dots.

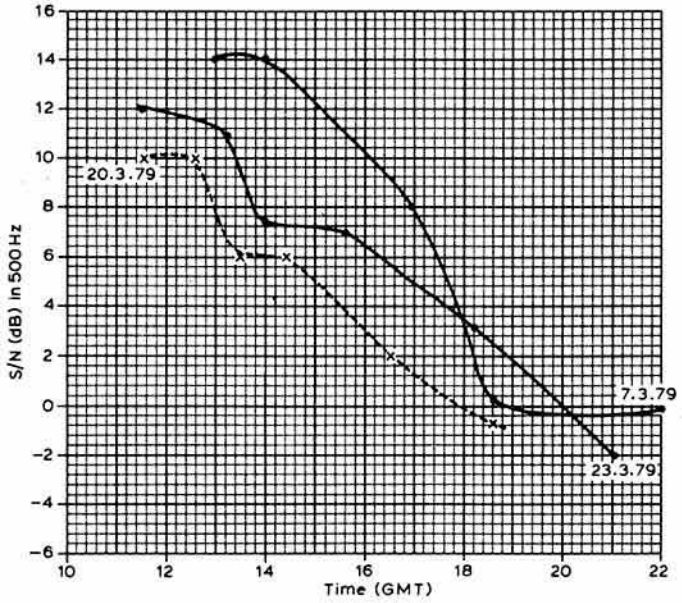

Fig 8. Plots of signal strength against time showing diurnal variations

There is also fading over a period of minutes and, in the longer term, signals tend to show a diurnal variation of about ±5dB, often peaking in the afternoon when atmospheric turbulence caused by convection currents from the warm ground is at a maximum. Plots of signal level showing this effect are given in Fig 8. There is also an annual variation of similar amplitude, with signals peaking in the summer, and being at a minimum in the winter. The daily and annual variations are probably the result of corresponding variations in the average value of N over the path. These fading effects will all exist at lower frequencies, but the rates and depth of the short-term fading will be correspondingly slower, and can be seen as the slow fading on vhf dx signals which has a period of several minutes.

The rapid fading is caused by the signal being scattered from various regions of air, each of which may be in turbulent motion, and moving relative to each other. This motion can cause both frequency and amplitude modulation of the signals. Frequency modulation results from the signals being scattered from air masses that are moving at different speeds, so there will be random doppler shifts on the signals. At 10GHz a speed of 30mph will produce a shift of about 500Hz, and this effect can spread the energy of the carrier out over 1kHz or more; heavy rainstorms producing a sound rather similar to an auroral signal. This effect will also scale with frequency and so will be far less noticeable at vhf. These storms can also increase the signal levels by around 10–20dB, as the raindrops scatter the signal more effectively. Amplitude modulation results from variations in the scattering efficiency or interference effects between signals arriving by different paths.

Several enhancements of 10–15dB on 10GHz have occurred at the same time as big lifts on the vhf bands, eg on 10 November 1978 and 3 October 1980, when the note was T9 and very good quality ssb was obtained, showing that the clean signal that was enhanced by the ducting had swamped the normal, rough troposcatter one.

Conclusion

This method of calculating troposcatter path losses has given predictions of signal levels that have been shown to be accurate to within a few decibels over a number of paths on 144MHz and 10GHz from 100 to 500km long, when used in conjunction with the calculations of the path loss capability of the equipment.

(Continued on page 717)

Safe tune-up with the FT7

by LES MAY, G4HHS*

WHEN the author's HW100 was replaced by an FT7 no particular antenna matching problem was envisaged as the half-size G5RV could be matched on 3·5 to 21MHz with the E-Zee Match in use. However, conversations with other operators indicated that the longevity of the transistors in modern solid-state power amplifiers was a matter of some concern; whether they were used operating valve power amplifiers in a poorly matched condition was not clear. What was well known was that the FT7 and TS120V transceivers must be operated with an output vswr of less than 1·5:1.

Provided a suitably tuned matching device is used, this does not present any problem. The procedure normally adopted with the FT7 is to tune-up into a dummy load, and then to replace the dummy load with the E-Zee Match pretuned to the positions previously determined and logged when the HW100 was in use. By pretuning the matching unit the instantaneous vswr is always low enough for safety, and the possibility of a serious mismatch (which can occur during tune-up) is avoided. The requirement to pretune the antenna or atu is stressed in the manual and repeated in the review of the FT7 by G3KLF (*Rad Com* June 1979, p521). A major attraction of a compact lightweight rig is the opportunity it affords for /M or /P operation, yet the pretuning requirements may act as something of a deterrent.

When a demonstration station was set up using a newly-made G5RV antenna at the author's school, it was not possible to pretune the matching unit, and it was quickly realized that the instantaneous vswr during the tune-up process was unacceptably high. Adjusting for maximum noise on receive was simply not good enough. What was required was a device which allowed the FT7 always to "see" 50Ω while the antenna or atu was being adjusted, however serious the instantaneous mismatch. A little reading and some thought produced the device shown in Fig 1, which was suggested by [1].

The mode of operation may be understood by dividing the diagram at the dotted line. To the left R1 is a dummy load able to dissipate the output power of the transceiver. It is shunted by everything to the right, made up of R2 and the effective resistance of R3, R4 and R5 together with the unmatched reactance of the antenna or atu. It will be seen that whatever the condition at the output the shunting resistance will always exceed 1,000Ω. A parallel combination of 50Ω and 1,000Ω results in the load "seen" by the transceiver being about 48Ω, which is near enough to 50Ω to be of no consequence.

The matching process itself is monitored by the rf bridge formed by R3, R4, R5 and the output to the atu. Because the three resistors are all 51Ω the bridge is balanced when the atu presents a pure resistance of 51Ω. D1, C1, and the meter form an rf detector to sense the balance point; when the meter reads zero the bridge is balanced. Loading by the meter is reduced by R6, and rf is bypassed by C2 and C3. A sensitivity control was fitted but found to be unnecessary with the FT7, as explained later. Some rough calculations suggested that R2 might need to be reduced to 500Ω and that a diode with low turn-on voltage would be required. Because only a null reading, not a measurement, is desired, the meter does not have to be very special; a meter of the type to be found in portable cassette recorders will do provided it is no less sensitive than 100μA.

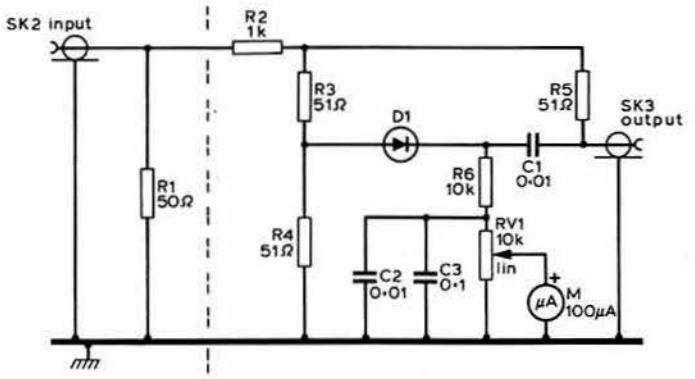

Fig 1. Circuit diagram. The dummy load R1 is fitted to SK1

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Components list

R1	50Ω dummy load	C1,2	0·01μF ceramic
R2	1,000Ω (see text)	C3	0·1μF ceramic
R3,4,5	51Ω 0·5W 2%	D1	Hot carrier diode
R6	10kΩ	M	100μA (see text)
RV1	10kΩ linear (see text)	SK1,2,3	SO239

The layout of the bridge should be as symmetrical as possible, and a pcb layout is given (Fig 2). Because the board is symmetrical the input and output sides can be interchanged to suit the particular operator's convenience. Part of the board must be connected to the case by a thick wire, and a short length of desoldering braid is convenient. The "works" fit comfortably into a 15 by 8 by 5cm diecast box obtained from Birketts. This is heavy enough to ensure the unit sits still on the bench, leaving both hands free for tuning up. The board is self-supporting on the input and output wires to the bridge. After wiring up and checking for shorts the unit can be tested.

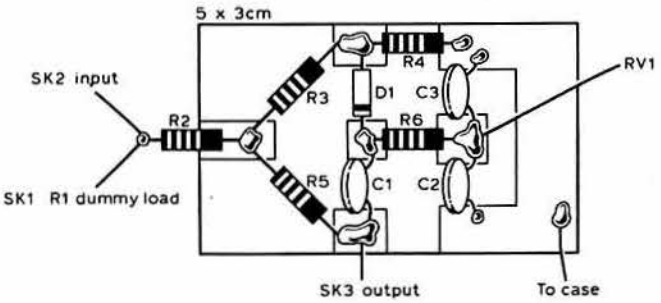

Fig 2. PCB and component layout

With a dummy load fitted to SK1, the input to SK2, SK3 not connected (to ensure maximum mismatch), and RV1 at minimum, power can be applied to the unit via an in-line vswr bridge. If all is well in-line reflected power will be zero. The sensitivity control should be rotated until the meter reads full scale. If fsd cannot be obtained R2 can be reduced but should not be less than 500Ω. In practice it does not matter if the meter reads a little less than full scale, and RV1 can be preset or left out entirely in this case. When the atu is connected the meter reading should fall a little. By adjustment the match can be improved until the reading is zero, and no movement should be perceptible when the transmitter is keyed on and off. Some care is needed to ensure that the reading obtained is zero, as this indicates that the antenna is very well matched. When the antenna or atu is connected to the output of the in-line bridge, the match will be found to be very close to the best obtainable with the atu and antenna in use.

The unit described can be built for about £4. It eliminates the possibility of an unintentional bad mismatch during antenna adjustment and, as a bonus, reduces the annoyance to other band users caused by continuous carrier being radiated during adjustment of the atu. Very little rf reaches the antenna.

Reference

[1] *Solid-state design for the radio amateur*, W. Hayward and D. DeMaw. Published by ARRL. Obtainable from RSGB Publications (Sales).

A modern Q5er

A way of helping a receiver to sort out the crowded bands

by JOHN L. CRAWLEY, G3LBX*

OLD hands will remember "Q5ers" well! The name stood for the cunning idea of putting an extra receiver on to the back-end of an existing receiver to improve its selectivity. People used the excellent little command receivers that the government had finished with, which tuned round 450kHz, and used an i.f. between 50 and 100kHz and LC filters which gave a greatly improved selectivity. The author began to wish he had not pulled that command receiver to bits nearly 30 years ago!

His old FT500, with its crystal filter working at an i.f. of 3,180kHz, puts out a very pleasing signal, but suffers from poor selectivity. Over the years he has got used to listening to three-and-a-half conversations at the same time, but it is not ideal! People say, "Why not fit one of the new high-grade crystal filters with a very narrow bandpass and a good shape factor?". There are three reasons why he did not do this: (1) they are very expensive; (2) even if fitted they could do nothing to improve the rest of the receiver; and worse, (3) the narrower passband would actually degrade the transmitting signal.

An "outboard" receiver was the answer, but using the front-end of the original as far as the 3180 filter, which would act as a preliminary filter, as in many high-cost professional receivers. The outboard receiver would sit on top of the FT500, and would be housed in a separate box which would also accommodate the frequency counter and an external vfo using a pll synthesizer. Two—not just one—cheap mechanical filters at 455kHz would be used in tandem; one might as well get really excellent ultimate rejection! Fig 1 shows the final arrangement.

*The Rectory, Cockermouth, Cumbria CA13 9DU.

Construction

The input to the Q5er is taken via a 5pF capacitor which is soldered directly on to the output terminal of the 3180 filter in the FT500. A short length of miniature coaxial cable and a socket on the back of the chassis are all that need be added inside the FT500.

The KB4412 and KB4413 are cheap and effective. The author did not use the a.m. facilities provided by the KB4413 (detector, noise limiter, squelch, and meter circuits) but they are there for those who may find an a.m. signal to listen to! They seem to work happily in conjunction with the SL1612 and SL1621. The author prefers a really big S-meter, and the circuit shown will drive this.

The two mechanical filters are MFL4550IL, and are available from Ambit International, who also supply the KB4412/13. Obviously two of these in tandem give a very high degree of ultimate rejection of unwanted signals, but only if used so that there is no leakage path. They are supplied with small input and output transformers and a small circuit board. The author soldered the circuit board edge on to the copper-clad glass fibre board screens in the diecast box which houses the device. The KB4412 is mounted above the first filter with pins 1, 15, 16 and 9 gently bent back to keep them for direct connections within the compartment. Pins 14 and 5 are soldered directly to the copper ground plane, and all other pins go through drilled holes to be connected in the compartment holding the second filter. The agc trimpots are also mounted on this screen. The other screen holds the second filter and the SL1612. The only pin to go through this board is pin 3 (output). The agc line and +6V lines are passed via feedthrough capacitors. The KB4413 is mounted on a board with the SL1621 and the rest of the agc and audio output circuits. The crystal oscillators are in separate diecast boxes bolted to the sides of the larger box.

Adjustment is straightforward. Peak the signal with the four transformer cores, then put a valve voltmeter on pin 10 of the KB4412. With an S9 signal from the FT500, increase the voltage on pin 10 until the agc is operating to the best advantage. The trimpot on pin 2 should be adjusted under the same conditions. The author's results were best with the agc on the FT500 in the "fast" position. The rf gains of the FT500 are used to prevent overload on very strong signals.

Conclusions

The shape factor and ultimate rejection are extremely satisfactory and the bandwidth wide enough to allow very acceptable "communications quality". This is at the expense of some extra noise from the additional mixer. Under most circumstances this is not noticeable in use, and the author finds himself using the outboard receiver most of the time. When the band is quiet and more "quality" is desired, the outboard receiver is turned down and the audio gain on the FT500 is turned up. The crystal oscillators in the Q5er are "pulled" exactly on to the frequency which brings the signal precisely into the passband.

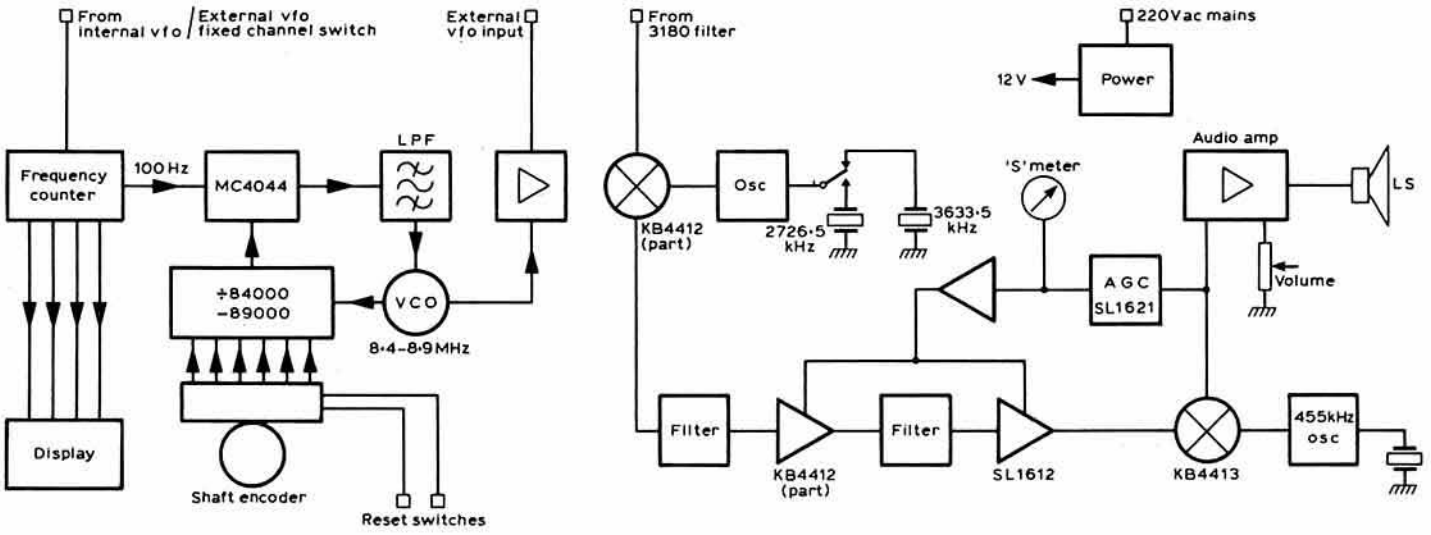

Fig 1. Block diagram of the Q5er. In the author's station it is boxed together with a pll vfq and frequency counter, as shown

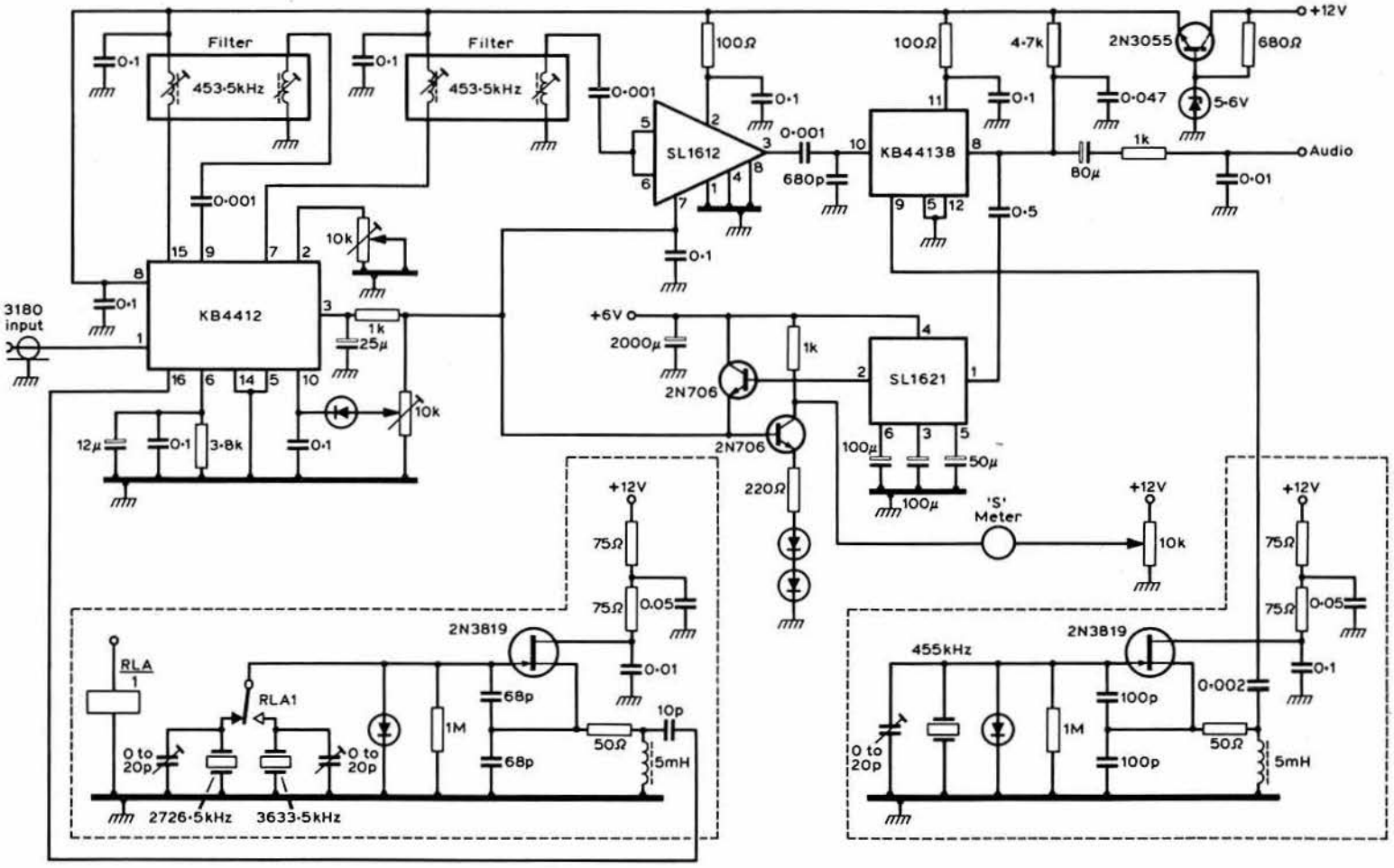

Fig 2. Circuit diagram of the Q5er

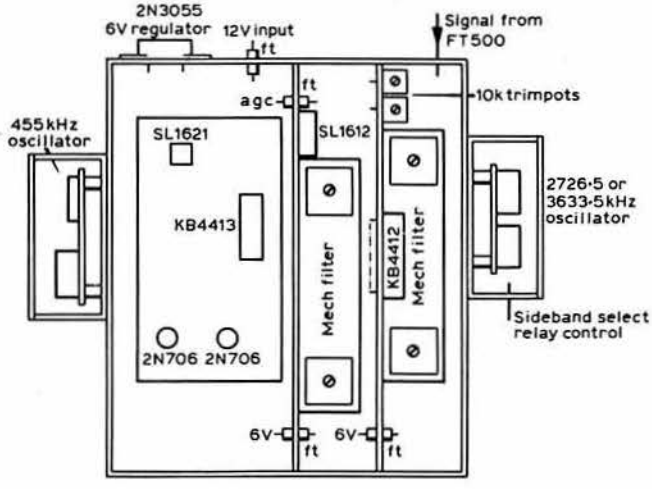

Fig 3. Plan of layout arrangement. The screens are cut from copper-clad glass-fibre board. The filters are soldered on to the copper foil of the screen

The power supply and audio amplifier are straightforward and not shown in the circuit diagram.

There is no reason why this receiver should not be used with any transceiver having a 3,180kHz i.f., or indeed with a 9MHz i.f. and different crystals in the first oscillator. To find the correct frequency for the oscillators add the *centre frequency* of the mechanical filter to the centre frequency of the receiver's filter for one crystal; and subtract the frequency of the mechanical filter from the frequency of the receiver's filter for the other crystal. Note that the centre frequency of the MFL455 is 453·5. □

Tropospheric scatter propagation

(Continued from page 714)

It enables the merits of various sites to be compared more scientifically, and an estimate to be given of the distances that should be workable under flat conditions. It has also demonstrated the potential of narrowband modes on 10GHz and revealed several interesting propagation effects that can be investigated. The papers in the references will provide more background information on the subject, and are quite light reading.

Acknowledgements

The author would like to thank G3JVL, G3RPE and G3WDG for their advice during the production of this article.

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[4] "Results of propagation tests at 505 and 4,090MHz on beyond the horizon paths", Bullingdon, Inkster and Durkee. Proc IRE, Oct 1955, p1306.
[5] "Microwaves", *Radio Communication* March 1978.
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[7] "On theoretical signal to noise ratios in fm receivers", D. Middleton. *J Appl Phys* April 1949, Vol 20, pp334-51). □

EQUIPMENT REVIEW

Microwave Modules MMC435/600 atv converter

by A. F. WOOD, TEng(CEI),MITE, G3RDC, and JOHN L. WOOD, G3YQC, editor *CQ-TV**

Introduction

The amateur tv converter model MMC435/600 is a fairly recent addition to the Microwave Modules range, and enables amateur 432MHz television transmissions to be received on a domestic uhf 625-line television set without modification.

Almost all amateur television stations today are equipped to use the commercial 625-line negative-going modulation standard known as System I. Many also transmit PAL colour pictures, so it seems logical to make use of readily obtainable television sets.

Description

The converter is housed in a small black durable diecast box. It requires a 12·5V nominal power supply and has 50Ω bnc connectors for the antenna input and i.f. output sockets. The converter uses two bipolar rf amplifier transistors and a dual-gate mosfet mixer. The local oscillator is free running and is applied to Gate 2 of the mixer.

Stripline techniques are used for the tuned circuits and a high-Q i.f. output filter is incorporated. All circuitry is constructed on a single high-quality glass-fibre printed circuit board.

Evaluation and measurements

Tests were carried out on two converters to ensure that the results obtained were typical. The units tested were standard and not specifically supplied for this review. Two types of tests were carried out: (a) measurement of the receiver's performance using instruments. (b) Objective tests to determine on-the-air performance in amateur service.

The converter parameters measured were bandwidth, overall gain, noise figure, gain compression and dynamic range. The tests were carried out using two Hewlett Packard 8640B signal generators, a hybrid combiner, a Hewlett Packard 8554L spectrum analyser, a Wiltron 640RF analyser and a Rhode & Schwarz noise generator type SKTU.

Bandwidth and overall gain

The rf analyser was adjusted to sweep across the band using an input signal level well within the handling capability of the converter. Bandwidth at the 3dB points was 20MHz (420 to 440MHz), the units were found to peak at approximately 434MHz, where the overall gain was typically 20dB. The passband characteristic was slightly eccentric and exhibited a more gentle roll-off on the lower frequency side of the passband. Investigation showed that this was due to the fact that the high-Q i.f. filter did not quite tune correctly and one of the trimmer capacitors was observed to be fully open on both units.

Noise figure

A low-noise amplifier was connected to the i.f. output of the converter and fed to the spectrum analyser to obtain a measure of the converter's noise output when terminated at the antenna socket with a 50Ω resistive load. The noise generator was then used to measure a noise figure of typically 2·2dB. This was felt to be sufficiently close to the manufacturers' claim of 1·9dB and the error was due to the noise contributed by the i.f. amplifier used during the test.

Technical details

Input frequency	430-440MHz	RF connectors	50Ω bnc
Output frequency	Tuned to Channel 35 but can be retuned over Band 4	DC power requirements	11·13·8V 12·5V nominal
		Current consumption	75mA maximum
Typical gain	25dB	Size	110 by 60 by 31mm
Overall noise figure	Better than 1·9dB	Weight	260g

Dynamic range

Dynamic range is one of the most important parameters in a modern amateur weak-signal receiving system. The presence of very strong interfering signals throughout the spectrum can, and often does, produce many in-band spurious signals. These are primarily caused by intermodulation distortion, cross-modulation, gain compression (desensing) and reciprocal mixing. Fortunately the cure for any one of these effects will generally cure them all (except where reciprocal mixing takes place due to the local oscillator noise sidebands).

There are many ways of assessing dynamic range, and receiver manufacturers each have their own ideas or simply ignore this part of the specification. Recent literature has shown a great interest in the "third-order intercept point" method. Perhaps the most significant contribution to in-band spurious is due to the third-order intermodulation distortion products; ie, when two strong in-band signals f1 and f2 are present then third-order intermodulation products (2f2-f1) and (2f1-f2) will be produced—as the strength of the interfering signal increases, the distortion products will also increase but more rapidly. Thus it can be seen that a point will be reached when the distortion products reach the same amplitude as the incoming signal; this is known as the intercept point.

Fig 1 shows a graph of input signal to output signal and input signal to inter-modulation products. The intercept point and gain compression point is also shown. The third-order intercept point for the converters was measured by feeding two 432MHz signals, spaced 100kHz apart and of equal amplitude, to the antenna input, and monitoring the i.f. output on the spectrum analyser. The level of both signals was increased in 10dB steps, and the third-order products were measured and plotted on the graph. Obviously one cannot increase the signal levels indefinitely, so care was taken to remain within the gain compression figure. The graphs, being straight lines, can be projected upwards beyond gain compression until they intercept. Although this point can never be reached in practice, it nevertheless gives a meaningful figure by which dynamic range can be judged.

The intercept point on these converters was of the order of +4dBm. But what does this mean in practice? Assuming that an S0 signal is 1μV and that one S-unit is 6dB, then an interfering signal of S9 would be necessary to produce third-order intermodulation products just above the noise level. The value chosen for S0 is the noise level of a receiver with a 3dB noise figure in a 6MHz bandwidth.

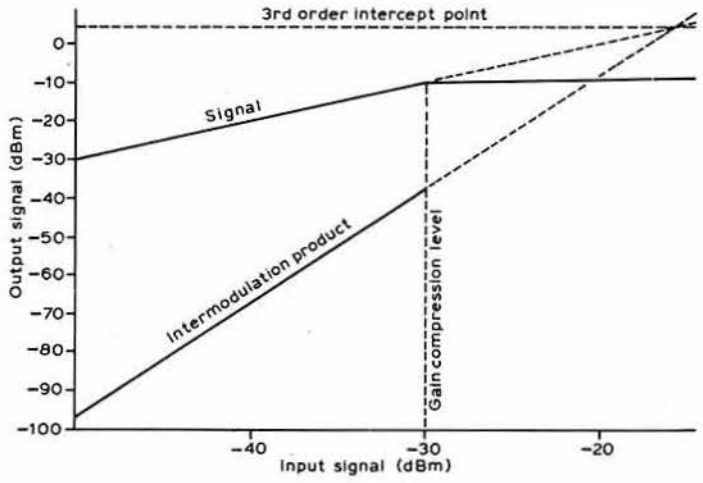

Fig 1. Graph of input signal to output signal and input signal to intermodulation products

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This article was originally published in *CQ-TV*, the journal of the British Amateur Television Club

Gain compression was measured using the test set-up described above and increasing the output of one signal generator until the output level due to the other signal dropped by 1dB. The 1dB gain compression point was measured at −30dBm or, to put it another way, desensing will not take place until the interfering signal is greater than S9+20dB.

The final check using instruments was to connect the spectrum analyser to the antenna input socket, and it was found that the local oscillator radiation (about 150MHz) was −42dBm in both cases.

Measurement errors

Due to the limited time available with the highly sophisticated test equipment used, it was not possible to determine the measurement errors accurately, but it was felt that the results obtained were sufficiently accurate to enable a proper assessment of the receiver's capabilities to be made.

Objective tests

At the station of G3YQC the converters were checked on the air and directly compared with the main station receiver, which consisted of a retuned ELC1043/05 tuner preceded by a commercial stripline low-noise preamplifier using a TP491 transistor, and aligned using typical amateur setting-up procedures (tuned for maximum smoke!). This receiver was generally regarded to be pretty "hot" and was good for dx. The Microwave Modules converters showed a noticeable improvement when receiving television signals from regular but distant stations; fine detail could be seen more easily due to the reduction of background noise, and one station which was often not seen at all could actually be locked and identified. Both converters were unconditionally stable under all operating conditions.

Notes and conclusions

The converters as supplied are adjusted to operate around Ch35 in the uhf tv band, but this can easily be shifted to avoid interfering broadcast stations. Small changes in oscillator frequency will not necessitate readjustment of the high-Q i.f. output filter. As an experiment a realignment of one of the converters was carried out using the test equipment, but no significant improvement in any parameter could be made.

The Microwave Modules amateur tv converter type MMC 435/600 was found to be an excellent unit for its intended purpose. It was built to the usual high standards expected from this company and had clearly been well designed. Dynamic range was very good, noise figure was excellent, and on-air performance showed that the converter represents a unit of outstanding quality for the amateur market.

This converter will enable anyone who possesses a modern broadcast television set and a 432MHz antenna system to obtain at low cost an excellent receiver for amateur television purposes, and it is hoped that it will encourage many amateurs to explore this fascinating and absorbing aspect of amateur radio.

The converters are available from stock priced £27·90p plus 80p postage. □

OSCAR NEWS

Statement by AMSAT-UK on frequencies for Phase 3B-C

AMSAT-UK has received a large number of letters and counter proposals regarding the choice of transponder frequencies for the new Phase 3 series of satellites—published in *Radio Communication* April 1981, p336—and replies as follows:

(a) AMSAT-UK has no control over the exact choice of frequencies, only by recommendation to AMSAT-USA and AMSAT-DL, the satellite builders. However, the problems had already been suggested to AMSAT-DL on 1 April 1981.
(b) It should be noted that the published frequencies are not as yet finalized, but when they are they will be published in *Radio Communication*.
(c) The suggested frequencies already lie within the internationally allocated frequency band of 435–438MHz, designated for use of the amateur satellite service (WARC 1979 report). This allocation has been agreed by the 154 member nations of ITU.
(d) It should be realized that at the present time 432MHz satellite operators, atv operators and other specific groups do co-exist with apparently no mutual interference.
(e) Communications between atv stations invariably employ a rotary beam array with little pick-up in the undesired directions. The pick-up of a Yagi array from a satellite of the Phase 3 series is expected to be very low. The received field strength from these satellites, particularly at apogee, should cause few problems. Also, atv arrays are predominantly horizontal, while a Phase 3 satellite array in all probability will have to be accurately aligned in elevation.
(f) At the recent IARU Region 1 Conference the view was expressed that with availability of higher frequency bands, both satellites and atv operators would naturally progress to the higher frequencies to the mutual benefit of both interests.

AMSAT-UK is fully aware of potential problems and will continue to be involved in liaison with AMSAT-USA and AMSAT-DL representing the viewpoints of all users of this part of the spectrum in the UK. Existing co-operation has been strengthened by the formation of an International Satellite Co-ordinating Group within IARU Region 1, of which AMSAT-UK is a proposer and founder member.

G3AAJ

BOOK REVIEWS

Oscilloscopes—How to use them, how they work by Ian Hickman, BSc, CEng, MIEE, MIEEE. First edition, 1981. Published by Newnes Technical Books, 122 + vi pages (215 by 135mm). £3.45 (limp covers).

This new book has a clear aim and purpose: to help all potential users of oscilloscopes to understand their basic principles, the circuitry, the accessories, and how to use them most effectively in practice. The text ranges from general-purpose instruments to the special purpose units such as storage scopes and spectrum analysers. A number of the diagrams are in two colours and provide easily assimilated information. In view of the speed at which models change, the inclusion of a considerable number of photographs of current instruments, including high-cost professional scopes, may not be quite so useful. But for once the publisher's blurb seems fully justified: "the book will appeal to everyone who needs to know about oscilloscopes, from the school student to the graduate, from the hobbyist to the technician."

Contents: Introduction; The basic oscilloscope; Advanced real-time oscilloscopes; Accessories; Using oscilloscopes; Oscilloscopes for special purposes; How oscilloscopes work (1) the crt; How oscilloscopes work (2) circuitry; Appendix 1 crt phosphor data; Appendix 2 oscilloscope manufacturers; Two-page index.

Electronics Pocket Book edited by E. A. Parr, BSc, CEng, MIEE. Fourth edition, 1981. Published by Newnes Technical Books. 350 + viii pages (186 by 126mm). £5.60 (limp covers).

Perhaps I am not the right person to review this book, since in 1963 John Reddihough (now editor of *Television*) and I produced the first edition. It was, I recall, John's idea and he did most of the work. Specifically, with the aid of some specialist contributors, we attempted to provide a book for what was then the relatively new breed of technicians who install and maintain industrial electronic control systems and the like. We felt there was a need for a compact reference book at a down-to-earth non-mathematical level that would provide information different from that then found in most of the established books which were mostly concerned with radio, television and telecommunications. Since then, of course, "electronics" and the whole data-processing industry has changed almost out of recognition; since then, also, several editions—and several editors—of the book have come and gone. The current editor, or the publisher, has opted for a rather wider, broadbrush treatment aimed at "the professional engineer and the home hobbyist" and has included a long 53-page chapter on "communications" that tries (not very successfully) to cover everything from vhf communications to colour television and teletext.

It is only fair to state that the book has also been very extensively revised, with much now outdated information removed, to permit the inclusion of recent developments and to make room for the "hobbyist" material. The result—at least to a parent seeing a child grow up—is that the book now falls between two or more stools. While the electronics technician would still find it a useful source of information (though there are some important omissions) the "professional engineer" is unlikely to be enthralled; nor I suspect will be many radio amateurs, even though it does cover, if only in outline, an enormously wide range of components, circuits and systems. I am still trying to puzzle out why, throughout, the abbreviation "icp" is used for integrated circuits.

Contents: Electron physics; Electronic components; Integrated circuits; AC amplifiers; DC amplifiers; Oscillators; Digital circuits; Digital computers; Optoelectronics; Communications; Servosystems and control; Transducers; Electromagnetic devices; Electronic instruments; Power supplies; Maintenance, Fault-finding and safety; Reference data; 10-page index.

G3VA

The "JULIE" modification for reception of fast-scan tv

by RICHARD M. LANGNER, G8JLE* [1]

THE purpose of this article is to describe a simple yet effective modification that can be made to virtually any domestic television receiver so that the amateur 432–440MHz tv band can be received. The modification can only be used on the mechanical type tuner, modification details for the electronic type tuner having already been published by several authors [2]. Previously published modifications to mechanical tuners usually consist of adding either extra fixed capacitance or extra fixed inductance to the lecher lines. The disadvantage of these methods is that the high frequency end of the normal broadcast tv band is not tunable. All the tuners modified by the author, as described here, will tune all the broadcast band in addition to the amateur band, with little or no loss in sensitivity to the former.

The modification consists of adding extra specially-shaped vanes to the tuning capacitors in each tuning section. These extra vanes provide all the extra capacitance required when the tuning capacitors are almost fully closed. However, when the tuning capacitors are between three quarters of the way open and fully open (about tv channel 45–68) there is no overlapping of the new vanes, and it is this feature that enables the tv to tune these frequencies normally.

Modification details

Using tinsnips, cut out the extra vanes from thin tinplate. The author finds the tinplate from the sides of an old varactor tuner to be ideal for this job. Fashion these new vanes to the same dimensions as the existing static vanes, but leave a long tail as shown in Fig 1(a), then cut away the section marked (A) in Figs 1(a) and (b). Make four or five of these vanes and bend them as shown. Having removed the tuner lid, solder one vane to the end of each lecher line, making sure that the moving vanes have clearance throughout their travel. Most tuners require two extra vanes in the oscillator section, one on each side of the rotating vanes (See Fig 2).

Setting-up procedure

The method of alignment is simple. Tune in a uhf repeater or, preferably, an amateur tv transmission. (If neither is available, the third harmonic of a 144MHz transmission located close to the tv frequency should suffice for initial tests.) It is preferable that a weak signal be used so that the agc of the receiver does not operate. Adjust the tuner so that the vanes are almost fully closed.

Starting with the oscillator section, bend the new vanes towards or away from the original vanes until a signal is received. Check that it is the required signal by disconnecting the antenna or keying the transmitter on and off. Next, bend the other vanes in the other sections in a similar manner to achieve a picture with as little "snow" as possible. This is best done using an old knitting needle of the plastic variety, so that hand capacitance is minimized. Some tuners have brass slugs inside each capacitor support

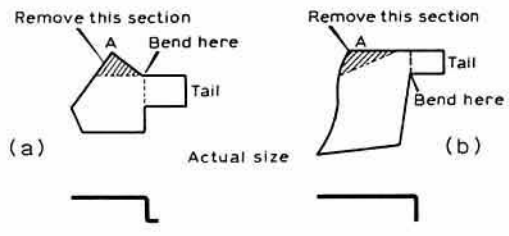


Fig 1. (a) The shape of the extra vane to fit one common tuner. (b) The shape of the extra vane to fit the tuner of the VL100 and other receivers

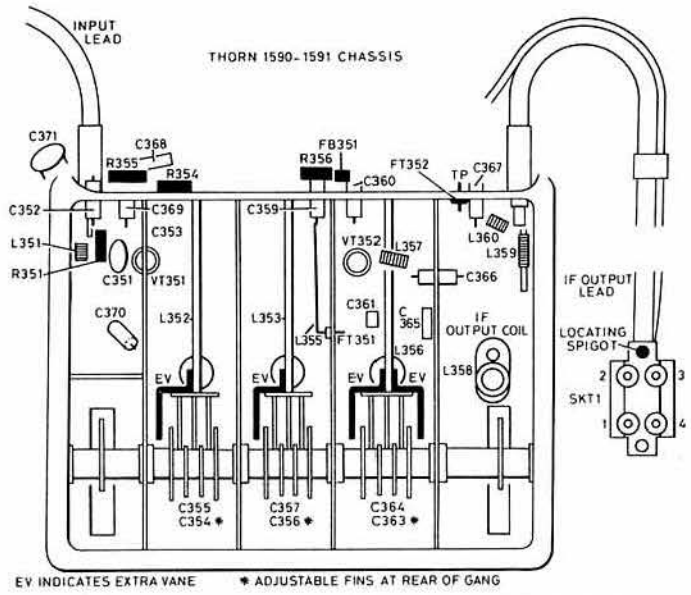


Fig 2. The extra vanes shown fitted to a Thorn 1590–1591 chassis

pillar; these can be left alone until no further improvement can be made with the procedure described above. However, the i.f. output coil should be adjusted for the best response. Replace the tuner lid.

Performance

The modification was carried out on G8IHP's 24in Ecko single-standard monochrome tv receiver, which is fitted with a tuner of Philips manufacture as standard. Results were quite good, and contacts between G8IHP and the author followed regularly. A contact between G8GQS and G8IHP resulted in a received picture quality of readability R1 over a path length of approximately 35 miles. R2 signals were obtained with the use of a preamplifier. Sets modified by the author include the Thorn 12in portable monochrome tv range known as the Ferguson Courier, Ultra Bermuda, Alba portable etc, all being first-time successes.

The latest addition to the author's tv receiving equipment is a Rigonda 6in portable (battery/mains) model VL100. These receivers became very popular a few years ago after being advertised on the back of cornflakes packets! There are still quite a few of these particular models around, and they are available quite cheaply on the second-hand market. Fig 1(b) shows the shape of the extra vanes for the VL100 and is drawn to actual size. The tuner used in this model is of British manufacture and requires only **one** extra vane in the oscillator section.

Other television receivers use the same model of tuner unit as the VL100, notably the full range of GEC (valve and hybrid) monochrome and colour chassis. Again the actual size drawing in Fig 1(b) can be used as a template, only one extra vane being required in the oscillator section.

Sound channel

Normal broadcast tv sound is 6MHz higher than the vision carrier frequency and is not used by amateurs, as this would cause part of the transmission to be out of band. Narrowband frequency modulation of the vision carrier can be used. This is sometimes convenient for the transmitting station, as some uhf transmitters are primarily driven by a 144MHz fm transceiver. However, the author finds that a talkback on the 144MHz band is quite common. Although there is no particular talkback/tv sound frequency, there is a calling channel using fm on 144·750MHz and using usb on 144·180MHz.

References

[1] The title of this article is based on both the author's callsign, G8JLE, and the name of his very patient yl Julie, to whom this article is dedicated.
[2] The *Amateur Television Handbook* published by the British Amateur Television Club contains a good detailed description of modifications to the Mullard ELC1043/05 electronic tuner.

Further information

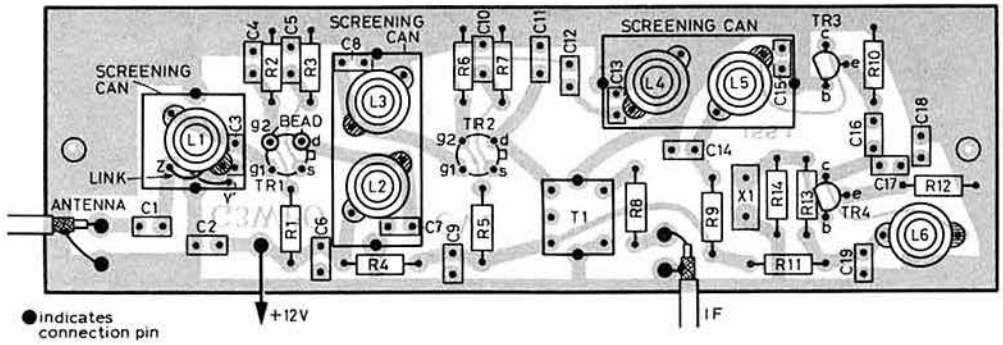
Anyone requiring further information about this modification, or who would like to have an application form for membership of the British Amateur Television Club, should forward an sae to the author. □

*84 Nettleham Road, Woodseats, Sheffield S8 8SX.

The RX80 Mk2

(Part 6)—*erratum*

Fig 45 on page 625 of the July issue was incorrectly composed. A correct version is shown here.



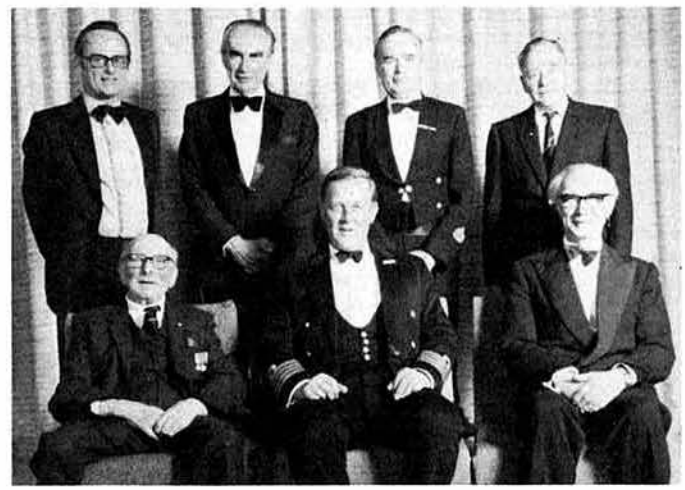
RNARS 21st birthday dinner

Len Newnham, G6NZ, receiving a plaque to commemorate his attendance as guest of honour from Commander I. Anderson-Mochrie

To celebrate the founding of the Royal Naval ARS on 25 June 1960, a dinner was held in the Royal Naval Signal School, Petersfield, Hants, on 16 May 1981. Twenty-seven RN and ex-RN radio amateurs attended the inaugural meeting at HMS *Mercury*, and of these, seven were among the 120 guests who attended the dinner.

Guest of honour was Len Newnham, G6NZ—a former President of the RSGB and long-serving member of Council—who is well known in the Portsmouth area, accompanied by Margaret, G4HSV. He was welcomed by Capt G. A. Plumer, RN, President of the RNARS, accompanied by Mrs Plumer, and Commander I. Anderson-Mochrie, RN, G3VCM, chairman of the RNARS.

In an address to the guests, G6NZ spoke of the early days of radio and of the work done by naval staff and scientists at the old Signal School. Among those, he particularly mentioned Capt Jackson, RN, who became President of the RSGB and a Fellow of the Royal Society. □



Capt G. A. Plumer with six of those present at the inaugural meeting. L to r, standing, G3LIK, G3DOT, G3JFF, and G8WC; seated, G8IX, Capt Plumer and G3ENI (G3JAF missing)

RAE courses 1981–2

Bath. Courses commencing September. Weekly evening classes, 7–9pm. Details from course tutor Peter Bubb, G3UWJ, QTHR, tel Bath (0225) 27467.

Belfast. College of Technology, College Square East, Belfast BT1 6DJ. Theory and practice: Tuesdays, 5.30–8.30pm. Morse code instruction and practice: Thursdays, 6–8pm. First class 15 September. Enrolment early September. Details from J. E. Wilson, c/o the college.

Birkenhead. North Wirral College of Technology, Borough Road, Birkenhead, Wirral. Enrolment 7–9 September. First class week beginning 14 September. Details from D. E. Owen, Department of Electrical Engineering at the college, tel 051-653 5555, ext 230.

Borehamwood. De Havilland College, Elstree Way, Borehamwood, Herts. Enrolment 2–8pm, 14–15 September. Classes Mondays, 7–9pm, commencing 28 September. Tutor G. L. Benbow, G3HB, c/o the college, tel 953 6024.

Bradford. School of Technology & Design, Bradford College, Great Horton Road, Bradford, W Yorks BD7 1AY. Classes normally Monday evenings, but Tuesday evenings also available if there is enough demand for two classes. Morse reading practice is included in the course.

Students over 14 are eligible, but head's permission needed if still at school. Details from P. Nurse, G8ZXF, tel 0274 34844, ext 340.

Cheshunt. East Herts College, Turnford, Wormley, nr Cheshunt. Course night Monday. It may also be possible to accept some external candidates for both the December and May 1982 examinations if sufficient notice is given. Details from Mr J. France, c/o the college, tel Hoddesdon 66451, or from G3OJI, QTHR.

Chingford. Friday Hill House, Simmons Lane, Chingford, London E4. Commencing 17 September. Enrolment first night at 7.15pm. Class 7.15–9.45pm. Enquiries to Alan Foss, G8EAY, tel 01-529 3380.

Durham. The New College, Durham. Classes Friday evenings, 6.30–9.30pm commencing September 1981. Details from G3ZJY, QTHR, tel 0385-66773.

Farnborough. Oak Farm Community Centre, Chaucer Road, Farnborough, Hants. Commencing September, Thursdays at 7.30pm. Tutor John Hardy, G3KND. Details from G. V. Phillips, c/o the centre, tel 515045.

Leamington Spa. Mid-Warwickshire College of Further Education, Department of Engineering, Warwick New Road, Leamington Spa CV32 5JE. Enrolment 3–4 September, 9.30–12am, 2–4pm and 6–8pm. Classes Thursday evenings, commencing 17 September. Details from C. A. Smith, c/o the college.

Rawtenstall. Accrington & Rossendale College, Haslingden Road, Rawtenstall BB4 6RA. Probably commencing 8 September, 7–9pm. Enrolment 2–3 September, 2–4pm and 6–8.30pm. Course tutor David Haworth, G4IFT, tel Rossendale 213558.

Slough. Langley College of Further Education, Station Road, Langley, Slough SL3 8BY. Classes Thursdays 5.30–7pm, operating techniques, including on the air operation; Thursdays 7–8.30pm, morse; and Wednesdays, 7–9pm, theory. The college has a fully equipped station, G3XPL. Enrolment 8–9 September, 12.30–8pm. Details from E. C. Palmer, G3FVC, at the college, tel Slough (0753) 49222.

Stourbridge. Stourbridge College of Technology. Details from Dave Wilson, G6ADU, tel Stourbridge 73855.

Swinton. Pendlebury High School, Cromwell Road, Swinton, Manchester. Classes Thursdays, 7.30pm, commencing 1 October. Enrolment week beginning 14 September. Details from course tutor P. Whatmough, G4HYE, tel 061-794 3706.

Welwyn Garden City. De Havilland College, Applecroft Centre, Applecroft Road, Welwyn Garden City, Herts. Enrolment 2–8pm, 14–15 September. Classes Thursdays, 7–9pm, commencing 1 October. Details from G. L. Benbow, G3HB, c/o the college, tel Welwyn Garden City 26318/31344.

Weybridge. Brooklands Technical College, Department of Technology, Heath Road, Weybridge, Surrey. Classes Wednesdays, 6.45–8.15pm. Enrolment 7–9 September, 6–8pm. Course tutor Chris Roberts, G4EVA. Details from Mike Tooley, G8CKT, at the college, tel Weybridge 53300, ext 215/246.

TECHNICAL TOPICS

Pat Hawker, G3VA

THE columnist can never win! Last month, my tongue in my cheek, I described the impact on amateur radio of the 1984 Triaesu speech-synthesizer units, with chips gradually usurping human operators. Little did I know. According to *The New Scientist*, even before the warning came through your letter boxes, the firm of Toshiba had demonstrated a "socially-aware" (but bossy) "speaking television set".

Automatically it switches itself on to breakfast-tv as the still-sleepy humans face the cornflakes, booming as it does an unnaturally cheerful "Good morning". Not until last thing at night does the picture switch itself off with a rather patronizing: "Have a good night's sleep". An ultrasonic sensor keeps a watchful eye on what you are up to—dare try and slip quietly away from the one-eyed monster and it petulantly whines that if it's going to be left alone "I'll fade out".

And should you wish to make a closer examination of the charms of those Hot Gossip dancers you will receive a stern "Mary Whitehouse" rebuke: "Watch from a distance for your eyes' sake". While if you turn up the volume, the synthesized nanny will softly intone: "Remember the neighbours; lower the volume".

Socially-aware tv set my foot! Before they bring that model into full production they had better first make it a crime to crack a nagging chip smartly over its plastic head!

Home-building receivers with ic sub-systems

For almost a decade the idea of solid-state hf and vhf receivers based on a relatively small number of discrete components, by making use of one or more "sub-system" ics, has been invoked by those wishing to see a real revival in home construction. I suspect, however, that it would be misleading to suggest that very many such receivers have actually been built.

In *QST* (April 1981, pp13–5) Peter Chadwick, G3RZP, of Plessey, and Doug DeMaw, W1FB, of ARRL, combine forces to outline a 3·5MHz receiver with high dynamic range based on four ic devices, including the SL6440 ic mixer (see *TT* June/July 1980, pp643–4) and the SL6700 sub-system ic (whose availability in the UK is reasonable) as the "heart" of the design, including two i.f. amplifiers, agc generator, noise blanker, a.m. detector etc. The design uses a 741 op-amp as af preamplifier, and discrete transistors for the hf oscillator, bfo and a dc amplifier for i.f. gain control. As a single conversion model with an i.f. of 455kHz, a 2kHz ceramic i.f. filter is used (but with the suggestion that a higher performance mechanical filter could be readily substituted). Fig 1 shows the complete front-end up to the sub-system ic, with tuning by means of a three-gang 300pF Jackson Bros variable capacitor. Although the noise figure is put at 20dB, this would generally be adequate on 3·5MHz; pre-mixer amplification would reduce the strong-signal performance.

It will be noted that a twin-tuned signal-frequency filter is used between antenna and mixer, and this would clearly be necessary to minimize "image" response with a 455kHz i.f., but it is also in line with the growing belief that the time has not yet arrived when we can afford to forget about premixer selectivity. In the April *TT* (p321) attention was drawn to the value of effective preselection filtering, even ahead of high-performance professional receivers. In this connection, Ron Glaisher, G6LX, writes:

"For many years, I have been using such devices which I call *passive preselectors*. They produce really excellent results on the lower frequency bands, particularly when used with the modern solid-state transceiver. I referred briefly to their use on 3·5MHz in *Amateur Radio Operating Manual* (p56) and can recommend them in place of the more commonly used front-end attenuators which reduce both the wanted and unwanted signals."

Unfortunately, of course, good rf selectivity is difficult to achieve on the higher frequency bands, while on 7MHz the problem arises from the really strong in-band broadcast signals, so that there is little alternative to using attenuators, or having really good signal-handling performance in the front-end.

Point-to-point wiring and a 500MHz prescaler

Virtually every home-construction project published these days seems to be based on the use of printed wiring. Much advice has been presented in the literature on how to roll your own simple pcb, while more complex

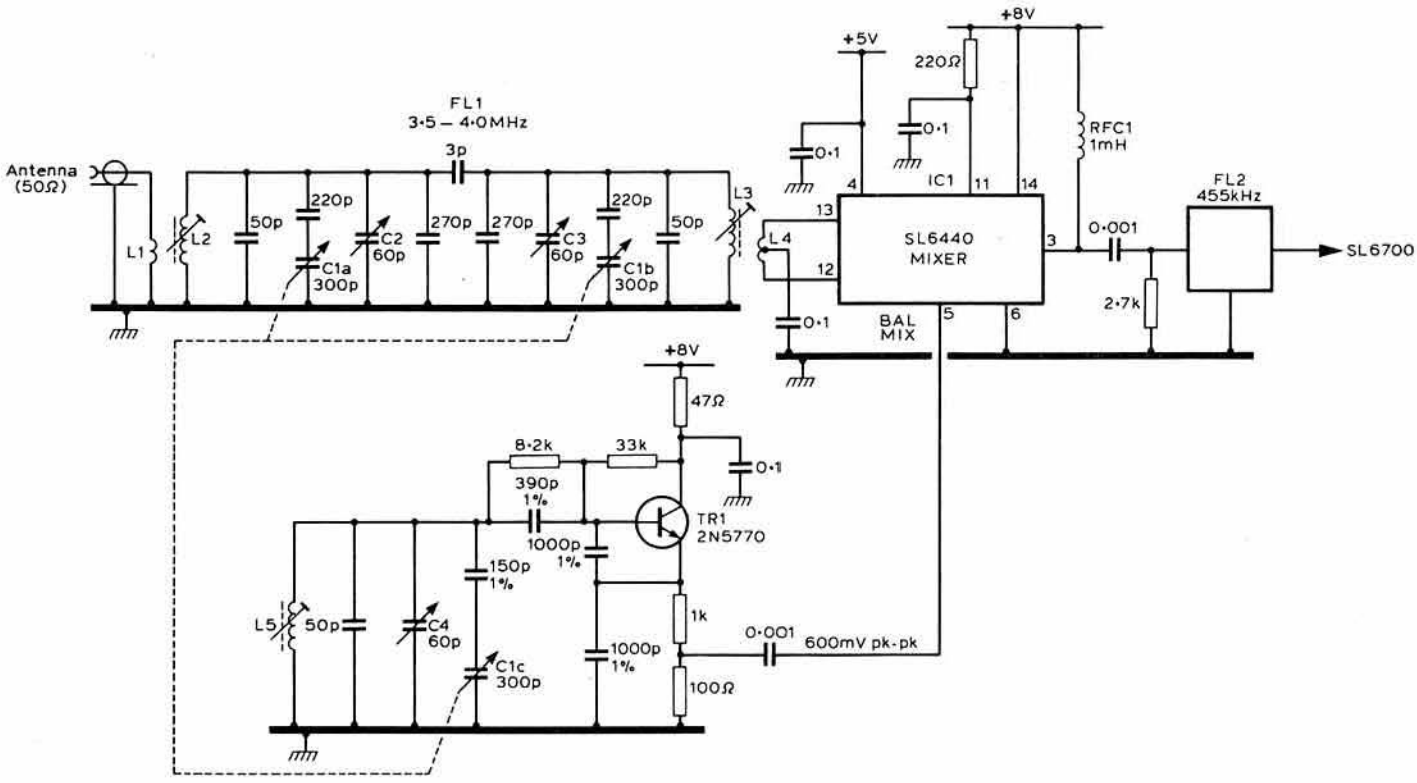


Fig 1. Front-end of the G3RZP 3·5MHz receiver, based on four ic and three bipolar transistor devices yet providing high dynamic range. L1,L2 magnetic-core transformer, L2 4·3μH, impedance ratio 15:1. L3,L4 magnetic-core transformer, L3 4·3μH, L3/L4 impedance ratio 10:1 + 1 (centre-tapped L4 winding). L5 variable inductor, 4·3μH

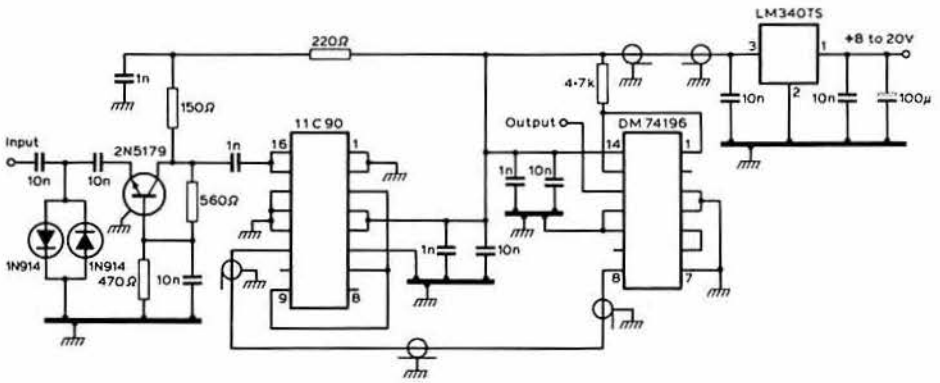


Fig 2. ZL1TXB's divide-by-100 prescaler (10–500MHz) but used also to indicate the continued value of point-to-point wiring for one-off projects

designs now usually indicate some source from which the boards can be obtained. This form of construction does permit the assembly of designs with every expectation that they will achieve similar performance to the prototype.

Yet I have a suspicion that the pcb is one reason for the decline in home construction, and this viewpoint seems to be shared by Ken Fredericksen, ZL1TXB, (*Break-in* June 1980, p230). In presenting details of a "divide-by-100 prescaler" for use in counters between 10 and 500MHz (Fig 2). He writes:

"Many amateurs are put off projects by the necessity of making a printed circuit board, particularly for a prototype or one-off project. The method I use is essentially point-to-point wiring using integrated circuit and transistor pins as tag points, with all components mounted upside down on the copper side of an unetched pc laminate board. The method works well at vhf, and with high-speed digital ic devices—plastic dual-in-line packages and metal can T05 devices as well as assorted transistors have been used in both digital and linear circuits, usually at vhf, with excellent results. Coil formers can simply be glued into holes in the board if it is necessary to isolate dc bias supplies from rf circuitry." The prescaler which he uses to illustrate his ideas is based on a Fairchild 11C90 650MHz ecl device and a National DM74196 50MHz ttl device.

One wonders whether constructors have yet learned to make full use of the wide range of improved adhesives that have become available in recent years: it should no longer be a term of rebuke to say of equipment that it looks "just stuck together".

Electret microphones

A short item in the April *TT* drew attention to a simple diode/ptt-supply technique used by DJ1XK to obtain the low dc voltage required for a low-cost electret microphone. From Ron Glaisher, G6LX, has come a timely note on my too loose use of the term "polarizing voltage". He writes:

"You mention that diodes can provide the 'low polarizing voltage' from a ptt line. This is not strictly true, as an electret microphone is self-polarized. The voltage is required to power the fet impedance converter/amplifier which is normally built into the electret capsule. The use of diodes in this way can often cause noise problems, and this is a point that needs to be watched.

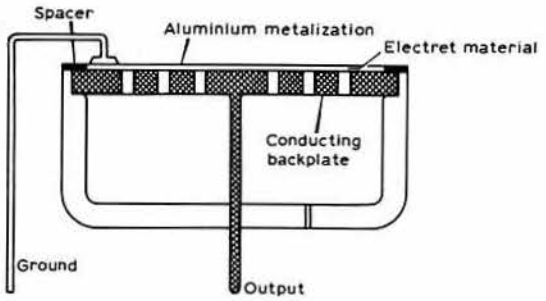


Fig 3. Form of electret microphone being tested by British Telecom. It uses a metalized film diaphragm and acts much like a polarized capacitor microphone

"If background noise is observed when the microphone is 'live' this is likely to be due to the diodes acting up. Zener diodes can be even worse!"

This letter is also a reminder that not many of the standard reference books have yet got around to including the electret microphone, so that a little background information seems called for—particularly since electret microphones are one of three types of better quality microphones currently under evaluation as possible replacements for the ubiquitous carbon-granule microphones throughout the telephone system (the others are piezoelectric film as mentioned in *TT* January 1981, p46, and moving coil); all such units would incorporate amplifiers and be developed as simple replacement units for the present inserts.

The term "electrets" dates back to Oliver Heaviside and is used to describe materials that permanently retain an electric charge (ie permanently "polarized"). These can now be made using extremely thin polymer films (eg fluorinated ethylene polymer Teflon aluminized on one surface only about 13µm thick). A charge of up to about 100V is imparted during manufacture, and it is then possible to use the material to form a capacitor-type of linear microphone without the requirement for a continuous high-voltage polarizing supply (Fig 3).

The output is low, and this requires the use of a built-in amplifier having a very high impedance input which can be based on a fet or a Darlington configuration of bipolar devices. In practice, electret microphones now range from very low cost units to the small lapel-type clip-on microphones widely used in broadcasting.

Faster than light?

As every schoolboy knows, nothing—not even radio signals—travels faster than light. Or does it? A new term "superluminal" has been creeping into the vocabulary of radio astronomers. It is being used to describe a number of radio sources (quasars) that appear to be expanding at velocities greater than *c*, the velocity of electromagnetic radiation. These sources were first observed some 10 years ago but everybody concerned seems to have been a little reluctant to make fools of themselves by suggesting that a superluminal source could really exist. However, recent observations at the American National Radio Astronomy Observatory, Charlottesville, Virginia (*Nature*, Vol 290, 2 April 1981, pp365-8 and also p363) on the quasar 2C273, using a four-antenna very-long-base-line-interferometer, working at 10·65 and 5·0GHz, appear to lead to the inescapable conclusion that, throughout the period mid-1977 to at least mid-1980, 3C273 has been expanding with an apparent velocity *10 times* the speed of light! Don't ask me to explain how or why—although some theories are suggested in *Nature*. But there appears to be no foundation to the rumour that a few amateurs, heard working all the dx stations, are doing so by getting their signals there before those of the rest of us have even left the antenna!

Bal, unbal or balun?

The age-old debate about the feeding of balanced antenna elements from unbalanced feeders still rumbles on. Not everyone, for instance, agrees. with G6XN's forthright view in *TT* May 1980 that a balun is essential for any beam antenna fed from coaxial feeder. An editorial note in *Ham Radio* May 1981 puts it thus: "Much controversy exists in amateur circles concerning the usefulness of the balun. Some amateurs swear by it. Others swear at it, claiming that the balun is an unnecessary nuisance and expense. Be that as it may, good engineering practice says that a transition between an unbalanced transmission line and a balanced load is, indeed, necessary."

The controversy carries over into the field of television receiving antennas, even though in this case there is considerable evidence that the absence of a balun on an array *does* lead to distortion of the radiation pattern and reduction of cross-polarization discrimination due to common-mode currents on the outer braid.

In *QST* April 1981 Jacob Z. Schanker, W2STM, entered the controversy by drawing attention to an SRI investigation that came to the conclusion that the radiation pattern of *dipoles used near resonance* is in no way improved by the use of a balun. Perhaps the point that should be noted is

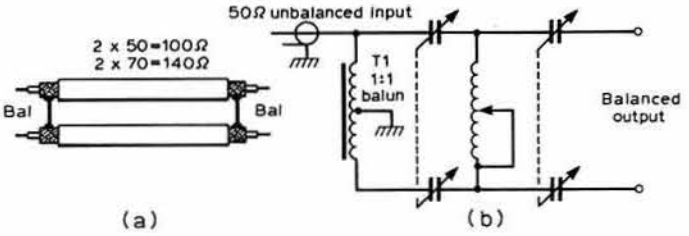


Fig 4. (a) Showing how two coaxial cable lengths can be used as a balanced transmission line, unaffected by nearby metallic objects. (b) Flexible atu providing balanced output from 50Ω unbalanced input in such a manner that losses in the 1:1 ferrite balun tend to be minimized

that the pro-balun enthusiasts are concerned with beam *arrays*, the antis or indifferents with dipoles etc. There is, of course, also the question of power losses at some frequencies, particularly in ferrite-cored baluns.

W2STM also refers to the more general problem of attempting to assess in any detail the performance of hf antennas by using small-scale models. He notes, for instance, that a 1·6GHz "model" dipole fed with RG8/U coaxial cable would, when scaled up for use on 3·5MHz, require—at least theoretically—a coaxial cable with a diameter of 14ft!

Also in *QST* (May 1981) John S. Belrose, VE2CV, draws attention to the use of twin lengths of 50Ω or 70Ω coaxial cable to form a *balanced* transmission of 100 or 140Ω impedance: Fig 4(a). This form of balanced line has the advantage that it is not influenced by near-by metallic objects, such as guttering, a problem that exists with normal forms of balanced line. He also notes a flexible matching unit to provide balanced output from a 50Ω line: Fig 4(b).

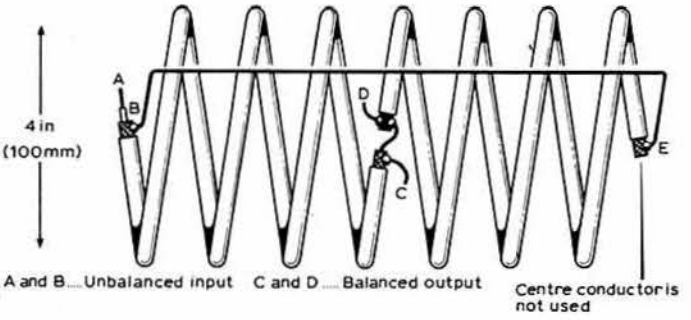


Fig 5. A 1:1 broadband coaxial balun. For 14/21/28MHz actual transformer consists of seven turns closewound (3·5 turns either side of output) of RG-8X cable approximately 4in (100mm) diameter. Centre conductor in upper winding is not used

In *Ham Radio* (May 1981, pp62-3) Roy N. Lehner, WA2SON, provides constructional details of a 1:1 broadband balun based on the type introduced by W6TC in *Ham Radio* March 1980, pp18-29, but using one of the newer lower-cost cables (the lower power rating may make it advisable to watch the swr). For 14/21/28MHz he uses seven turns of closewound RG-8X cable with a diameter of about 4in (10cm) using two equal lengths (42-48in) formed into a single-layer coil (Fig 5) housed in a non-metallic container; this could be made from about 2·5in of a length of 4in pvc pipe coupling or a short length of acrylic tubing etc. Some of the plastic kitchen containers for salt etc could probably be used successfully provided that the housing is made watertight and the top and bottom covers have no gaps once cemented in place.

Mains and p/e generators

For one small part of my mis-spent youth I was officially "in charge of a w/t station in the field". In less grandiloquent terms what this meant was my being transported to some pleasant spot and dumped there with an HRO receiver, a Special Communications Mark 3 transmitter (6V6-807 copa), a handful of crystals, some antenna wire, an earth stake and a 350W, 110V Onan petrol/electric generator. Then I would be left to get on with my w/t while my companions undertook the congenial task of subverting the local secretaries, the ladies of the town, and what have you, into providing "secret" information. Just how "secret" came to light when in answer to London's excited and "most urgent" request for more details on one of our reports, our "source" shamefacedly admitted that it had all been copied out of an ancient encyclopedia!

In retrospect, those carefree months gave me more insight into the fantasy world of covert intelligence than they taught me about the practical aspects of hf radio communications. But I did learn one lesson that has remained with me: the supreme importance (field days excepted) to any radioman, professional or amateur, of having a reliable, 24h, 240V (or 220V or 110V) mains supply instantly available at the touch of a switch. Faraday's dynamo still remains one of the most important inventions in electronics.

But in that era mains supplies were far from reliable and dc mains were still common; hence the American-built Onans. These p/e generators had to be started by pulling a cord wrapped around the shaft, but otherwise were considered excellent machines: yet they took a dislike to me. If the spark plug was allowed to become even a little dirty or damp, you could pull on the cord until you were purple in the face with only an occasional tantalizing "burp" from the engine; all the time the seconds to the next "sked" would be ticking away furiously.

Earlier, in "front-line" Nijmegan in 1944, there had been a rather unfortunate experience. The local mains supply was switched on for only about two hours per day, but I soon discovered that by removing the fuse on the mains input panel, and then connecting the output from the Onan into one of the room sockets, we could all—including the delightful, many-childrened Dutch family who were our hosts—have our own supply of electricity all day long. All went well until the time I forgot to disconnect the Onan before replacing the mains fuse for our daily official ration. Back at base they never understood why mine was the only Onan ever to be returned "u/s" with its windings burnt out; I felt it wiser not to enlighten them. But a little later I did discover that it is perfectly possible, with only a dial-light to act as an ac voltmeter, to run a 110V HRO from 220V mains supplies by means of an electric fire!

Energy sources

As soon as an amateur station is moved away from mains supplies, the provision of electrical power becomes the dominant factor. In the case of mobile operation the advent of all-solid-state equipment requiring only a 12V supply removed most of the problems for all but the highest powers. For hand-held vhf transceivers, nicad batteries or even primary cells are usually entirely adequate. It is for expeditions, field days, repeaters sited at remote locations, beacons at remote locations, and just occasionally for the exceptionally remote QTH without mains electricity, that alternative power sources are of most concern; most of us have forgotten, if we ever knew it, that it was not until the end of the 'forties that the problem of dc mains supplies was virtually eliminated.

About 20 years ago hopes were high in regard to the development of a number of rather exotic energy-conversion processes intended to provide more effective batteries than, for example, the common lead-acid vehicle battery. There were the so-called "fuel cells" which differ from a conventional battery, either primary or secondary, in that the substances which react chemically at the electrodes in the cell are stored partially or wholly outside the reaction cell; in other words a battery in which additional "fuel" can be added when the "tank" is exhausted. This was clearly a potentially attractive idea based on a lot of early work on the Bacon fuel cell. Unfortunately practical development has been limited, mainly because most forms of fuel cell involve either high temperatures or high pressures or both. There is little evidence that we shall see an early development of fuel cells suitable for amateur radio operation.

For large-scale power generation, one also heard a lot about mhd (magnetohydro-dynamic) systems; here, basically, the principle is similar to that of the classic Faraday generator where mechanical energy is converted into electricity by the motion of a conductor across a magnetic field; in the case of mhd the conductor is a gas which is forced through the magnetic field by a pressure difference. Again, no immediate prospects.

The most usable (though still costly) of the "new technologies" appears to be the solar generators based on silicon photovoltaic diodes in arrays. They also offer scope for further significant improvement in conversion efficiency (the theoretical limit of conversion efficiency of a silicon cell is about 25 per cent, or about double what is normally achieved) and also in cost reduction. In terrestrial applications it is usually necessary, for obvious reasons, to use these in conjunction with storage batteries. No batteries will be used with the large solar generators of up to about 7·5kW capacity that will be needed for direct broadcast satellites, which is why the satellites will need to be positioned well to the west of the target area so that the solar eclipses that occur around the equinoxes will not happen until after midnight local time. On the ground, solar cells are also more attractive in sunny climates than, for example, in the UK.

There are many other ways of generating electricity: the trick and challenge for amateurs is to do this at a supportable cost, though this is unlikely to approach that of power purchased from the Electricity Boards. In the following notes we give some recent estimates of costs for *professional* installations, as guidance, but as with the French d-i-y p/e generator

Table 1—Cost comparisons for electricity generating systems capable of powering a 400W continuous load (USA professional equipment)

Capital costs	Wind	Thermoelectric	Gas/propane turbine	Solar	Diesel
Generation equipment	$7,900	$15,920	$18,854	$55,000	$5,560
Site equipment (fuel tanks, towers, housings etc)	4,000	8,000	8,000	8,000	8,000
Storage battery	8,000	3,000	3,000	25,000	3,000
Installed cost	$19,900	$26,920	$29,854	$88,000	$16,560
Operating costs					
Annual maintenance	$500	$750	$1,000	$500	$2,000
Fuel at $1/gallon	—	4,380	2,732	—	2,015
Ten year total running cost	5,000	51,300	37,320	5,000	40,150
Ten year life cycle cost	24,900	80,720	67,174	93,000	56,710
Ten year kilowatthour production	35,054	35,040	35,040	35,040	35,040
Cost per kilowatthour	$0.71	$2.30	$1.92	$2.65	$1.62

Notes: Source North Wind Power Co Inc, so that one may assume that the 400W figure has been selected to the advantage of wind generation. Balance would change for much lower or intermittent loads. Diesel fuel at $1/gallon does *not* apply to UK.

mentioned in *TT* last month, there should often be ways of putting together makeshift systems at dramatically lower cost. Prime sources of power include fossil fuels (diesel and petrol generators), wind, water (including water wheels and tidal systems), steam, propane/methane gas for either thermoelectric or other generating systems, and the solar systems mentioned above. Although most of these are of ancient lineage, a number of them are being looked at again in the interests of energy conservation, either singly or in combination: the combination of wind and solar systems is particularly attractive, based on the premise that over any extended period of time the weather is likely to be either sunny or stormy.

Cost comparisons

Two recent articles provide some insight into the cost-effectiveness of different systems that are capable of powering continuous loads of between 25 and 500W. For smaller, intermittent or low duty-cycle loads, attention is drawn to the South African work on powering vhf repeaters from large disposable Leclanche air cells (2,000Ah) used to trickle charge nicads (*TT* December 1977, pp943-4).

In "Wind electric systems for remote power requirements", *Telecommunications* July 1980, Philip E. Tonks of the North Wind Power Company, puts a manufacturer's case for wind power based on a 400W continuous load. He comes up with a "cost per kilowatthour" of $0·71 compared with $2·65 for solar power and $1·62 diesel, taking into account installed cost, annual operating and maintenance costs: see Table 1. The firm has a wind system based on a three-bladed rotor and a generator that can provide a continuous 1kW output with average wind speeds of 6·3m/sec or more.

The second article "The use of new energy sources to power television rebroadcast transmitters" by S. Polgar, of the French broadcast-transmitter organization TDF (*EBU Review*—Technical, No 186, April 1981, pp58-65) reports very fully on the operational use for one year of a combination of solar and wind generators near Montpellier in the south of France, at a site where the cost of installing mains power cables would have been prohibitive. Here the wind-and-solar system provides electric power for three very low-power rebroadcast transmitters and ancillary equipment, representing a 30W load during transmission periods and about 1·26kWh per day. This experimental installation cost, in 1979, some 227,000 French francs (about £20,000) and was designed to provide about 600W peak output from the solar generator and about 120W peak output from the wind generator. However, it is estimated that a system suitable for supplying (in the south of France) 100W for 13h/day would now cost about £12,000, with the solar modules (660W peak) accounting for about 45 per cent of the total; wind generator (120W peak) about 22 per cent; battery (880Ah) about 18 per cent; transport, civil engineering etc about 15 per cent.

During the trial period two major incidents occurred. In January 1980 thick fog covered the region for several weeks and there was neither wind nor sun: the battery was given a 250Ah charge from a mobile generator, and later the battery capacity was increased from 817 to 1,090Ah. During November 1980 the wind generator fell to the ground as a result of metal fatigue caused by the flexing of the self-supporting mast (the South African notes in 1977 underlined the high wind gusts likely to be experienced at high, exposed sites); stays were subsequently fitted to the mast.

Over the year the wind generator produced 19 per cent less electricity than had been predicted; the solar generator came very close to the predicted figure.

The use of solar generators to power community village tv receivers, particularly in Africa, has led to the development of tv sets (black-and-white only) that consume only 20W; the French believe that direct-broadcast satellites could create a large demand for low-consumption receivers working off solar generators. Clearly, for all such applications the major step is to reduce both total and peak consumption to the lowest possible figures, remembering that for an amateur transmitter what really matters is the watts output, and that the consumption of receivers can be quite low (although for highest performance oscillators/mixers should not be starved of current).

The French are studying the use of a 50kW solar-power system to provide energy saving for high power transmitters; these would operate without storage batteries, and power would still be taken as required from mains supplies. It is interesting to note that a recent Marconi estimate of the energy cost of running a 250kW broadcast transmitter is put at over £100,000/year so that "topping up" solar systems could probably be justified on economic as well as energy conservation grounds.

Experimental use of wind/solar generators is also being made in the UK, where solar generators alone are less effective than in more sunny climes.

Lead-acid battery sulphation

Tom Walshaw (one-time G2PI and contributor to *The Model Engineer*) writes: "ZL2BHD's suggestions about the restoration of lead-acid cells suffering from the shedding of lead paste (*TT* May 1981) reminded me of a means of dealing with that other enemy—sulphation. For many years my Lake District QTH was self-sufficient in electric power: a paraffin engine drove an ancient 230V dc generator for my workshop; an ex-aircraft 25V machine charged batteries for lighting, and an ex-Admiralty motor generator provided 230V single-phase ac for the "wireless", the gramophone and, of course, the shack.

The batteries were ex-War Department 'Canadian' 120Ah three-cell units in wooden cases, dry charged, and at least seven years old when bought 'new'. They suffered further when I was away, since the family would quite happily run the lights down to a glimmer before starting the charging engine (sometimes even when it was a question of switching on the lights to see to light the paraffin lamp!). Sulphation was inevitable.

"This was dealt with as follows. The cell was carefully emptied and washed out with water (my own water supply provides almost 'pure' water from the tap; others less fortunate should use distilled water). Care is needed to avoid lodging debris over the plates. The cells are then filled with a solution of Glauber's salt (sodium sulphate), one part salt to five of water by weight. Charge at normal rate for twice the calculated 'full charge' time. Empty, wash out, and refill with acid of 1·2 specific gravity. Discharge through a resistor (I used lamps) at about one tenth of the 10h rate for 24h. Recharge normally, and finally correct the specific gravity. This last operation usually required some acid to be removed, and it might be better to start with a lower gravity at the first charge.

"This was quite successful, and I have since used it on a number of occasions even though the 'mains' arrived some 20 years ago. It is not effective if the plates themselves have started to disintegrate, but it is certainly worth a try.

"A few months ago, discussing this procedure with a battery-bound friend (though he has a windmill!) he told me that he simply adds a small quantity of Glauber's salt to the battery when in service and this was effective, not interfering with the operation. Apparently the sodium sulphate in solution broke down the crystalline sulphate on the plates into powdery form, but not having tried it I offer that idea only for what it is worth!"

Referring again to the original problem of the shedding of lead paste, even on quite new lead-acid batteries, due to heavy gassing, a pertinent observation comes from Charles Marshall, G8ZQK. Recently his car battery suddenly failed, would not take a charge and had to be replaced. He recovered the original battery from the garage and carried it home in the hatchback. On arrival he found that during the journey it had turned right over, although fortunately very little acid had leaked out. After turning it the right way up again, he discovered that the battery appeared to be working and would take a charge, and this has proved to be the case. It would seem that, as with ZL2BHD's unit, shedding of lead paste had led to a short-circuit, but in this case simply the bumping around and turning over had been sufficient to clear the fault, without the messy cleaning process recommended by ZL2BHD. So, as a first step, it seems worth giving a recalcitrant battery a thorough shaking, if that fails then try hosing out in the ZL2BHD manner.

IEE wiring regulations

The standard work of reference (though not an easy one to grasp) over the whole field of electrical installations in the UK has, for many years, been the IEE publication *Regulations for the equipment of buildings*, of which

the 14th edition was issued about 1966. Recently a new 15th edition, under the new name *Regulations for electrical installations* has been published (£10, but there is also an associated guide to the regulations at £2.95). This new edition has been drastically revised, both to take account of the changing technology and in an effort to "harmonize" the regulations with those in other European Common Market countries.

Some of the changes, including several important changes in terminology, are of concern to amateur radio installations. For example, after having become used to referring to the "L" lead as "line" rather than "live" it now looks as though this key lead should be called "phase" instead of "line", and sockets etc marked as "P" instead of "L". At least we can think of it almost in dc terms as positive and negative instead of line and neutral! Strictly speaking the "neutral" conductor should now be considered a "live part" since it can become "live" should the return connection to the socket be broken.

Another change is that the current operated earth leakage circuit breaker (elcb) mentioned several times recently in *TT* is considered the preferred form of protection against earth-leakage currents, but has emerged under the new name of "residual current circuit breaker".

Llyr D. Gruffydd, GW4CFC, is not convinced of the value of the elcb in the shack. This is limited, he feels, by the fact that it offers no protection against shocks obtained from the secondary side of any mains transformer, detecting only current imbalances in the line and neutral conductors caused by leakage to earth. His main worry is that introducing an elcb into a shack can lead to a false feeling of immunity to shock, and is thus psychologically bad when most of the severe shocks experienced by amateurs originate from the secondary side of the transformers. GW4CFC speaks from experience of this feeling in a laboratory containing dozens of taps of running sea water and much electricity! He found that installing elcbs, rather than adding to staff safety, induced a state of euphoric carelessness among at least some of the occupants.

He also questions the suggestion that particularly hazardous areas deserve more sensitive units; while he agrees the chances of suffering a severe shock may be greater, a shock is a shock is a shock whether you are standing on a dry rubber mat or in a pool of sea water: the heart will stand just so much current. His view is that if 30mA sensitivity is inadequate for the greenhouse, it must be equally inadequate for the living room!

Expanded scale voltmeter

TT June 1981 included a tip from G3NXM on a very simple form of expanded scale voltmeter achieved by using a zener diode. R. K. Quigg, GI4CRQ, comments: "For several years I have used the arrangement shown in Fig 6 to give a linear 10V to 15V expanded scale voltmeter, readable and stable to about ±0·02V (or even 0·01V if a really big meter is used). Even a small 'cheapie' meter will read to about 0·05V. This rather more complex arrangement minimizes the problem of the change in zener voltage when the supply voltage drops close to V_{zener} and hence the current through the diode approaches zero. If care is taken in selecting the diodes, or if the 200Ω resistors are adjusted experimentally and a dvm used for setting up, I have found it possible to achieve, and maintain, an accuracy of around ±0.02V reading."

A simple power supply unit for which such a meter would be useful is shown in Fig 7 from a design by D. Kooijstra, PA0DKO in *Electron*. Nothing particularly unusual about this 4A unit, but it does include a voltage-overload crowbar trip circuit.

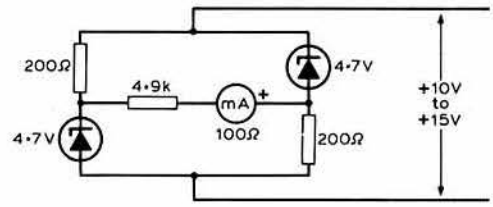


Fig 6. Linear and stable form of expanded-scale voltmeter recommended by GI4CRQ

Morse code tutor modification

John A. Young, GM4DQD, has made two small modifications to Malcom Irving's morse code tutor (*Radio Communication* January 1978, p24, and March 1979, p226) which add to the usefulness of this unit. With G3ZHY's original circuit there was a tendency for the tutor to persist in delivering in a cyclic manner small sequences of characters. GM4DQD believes this is due to the relationship of the frequencies of the address and character generators remaining constant over considerable periods of time. The solution to the problem is to make one of the oscillators slightly less stable. He did this by transferring the 1kΩ capacitor charging resistor of the NE555 oscillator of the address generator from the stabilized +5V line to the unstabilized input side of the psu voltage regulator; no further problems were then found from character recycling. It helps if the unregulated voltage is sufficiently high to allow a small value resistor to be inserted between the rectifier and the regulator.

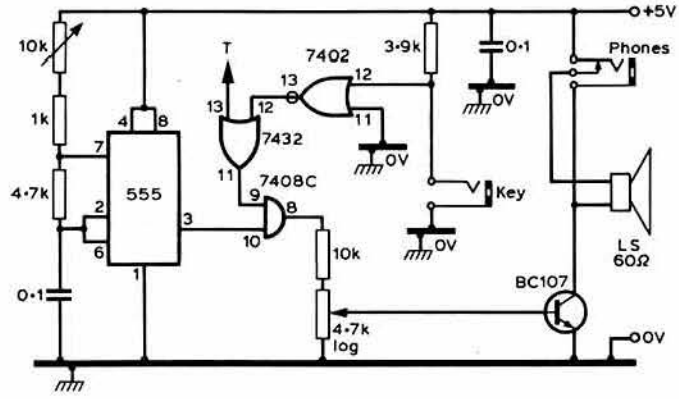


Fig 8. GM4DQD's modifications to the keying facility on the G3ZHY morse tutor to eliminate "spacer" tone

The keying facility (Fig 1, March 1979, p226) was found to be a very worthwhile modification, but GM4DQD noted that the small capacitance formed by key leads allowed the tone to persist at a low, though not always negligible, level. The alternative keying arrangement shown in Fig 8 provides a "golden silence" key-up effect; the only extra component is the 39kΩ resistor since there are unused gates in the 7432 and 7402 devices in the unit. □

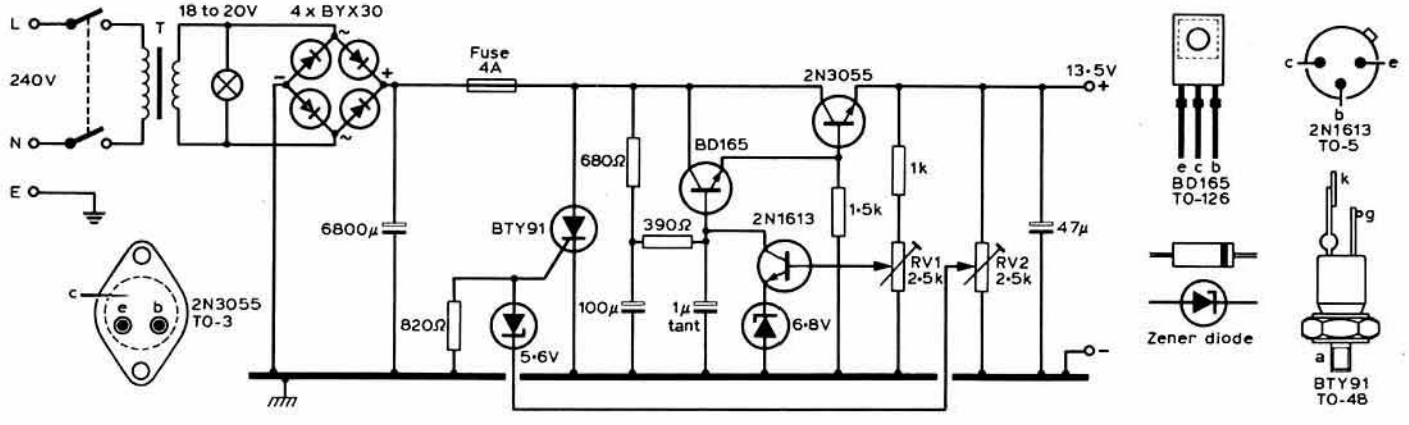


Fig 7. 13·5V, 4A power supply unit described in *Electron* by PA0DKO with crowbar over-voltage protection. RV1 adjusts output voltage, RV2 adjusts trip voltage

SWL NEWS

Bob Treacher, BRS32525*

144MHz dx

Sporadic-E. The exceptional conditions between 7 and 11 June took many by surprise but several keen vhf listeners managed to add several new countries and QTH locator squares to their lists. The 144MHz band on 7 June sounded more like 14MHz. Your scribe logged RB5EHT (RI square) and SP9BPQ (JK square) on ssb, while stations from LZ, UC2 and YO were audible on cw. Unfortunately the Es conditions on 8, 9, 10 and 11 June occurred when many listeners, including your scribe, were at work, but those lucky enough to be near a receiver might have heard the first G-4X4 QSO at 1600 on the 11th, while others might have heard stations from UB5, UO5 and YU. It also seems that stations in Italy worked into Jordan. All pretty spectacular stuff and hopefully there may be more before the summer ends.

Tropospheric. On 13 and 14 June there was a spectacular tropo opening to central and southern France, Spain and Switzerland. Stations as far south as VD and XD in Spain, along with stations in the south of France in BD and CD squares, were heard in south east England. Several HB9s were 59, while fleeting signals from stations in Italy were heard. The best of the conditions seem to have favoured stations in the South of France who were working in an arc from YN to FK squares (QTH locator maps are available from RSGB HQ). The most potent signals into your scribe's QTH came from F6CJG/P, BF21j; F6FHP/P, AE21g; F6GDX, AF17d; F6EOQ/P, YI34j; F6GLJ/P, BD43c; HB9AMH/P, DH66c; and EA1XH, YD41b. The Belgian field day helped to swell the activity, with ON5FF/P the loudest of signals from that direction, but 4U1ITU and several OE stations unfortunately evaded the log book at this end. The lift faded out around lunch-time on the 14th.

RAE help

On a recent trip to VK, G2DYM was able to obtain a sample of Australian amateur radio examination papers with answers. The standard of the papers is similar to that used in the UK. Anyone interested in copies should write to G2DYM at "Cobhamden", Beerdown, Uplowman, Tiverton, Devon EX16 7PH, enclosing £1 to cover cost and postage.

DX swl

John West, VS6-001 and ORS44958, is now licensed as VS6JW. He took the RAE in December 1980 and passed the morse test shortly afterwards. He is keen to receive swl reports on his signals. John mainly uses cw, but does monitor the ssb portions of the hf bands. He can normally be heard on the Royal Signals Net around 1230 on 21,170kHz, but has no set operating schedule as conditions vary so much. John can be reached via PO Box 541, Hong Kong.

1·8MHz

Philip Aliband, ARS42876, has commented on the lack of ssb activity on this band. He rightly points out that during the major contests 1·8MHz is a hive of Continental activity, with stations audible from UA, SP, OH etc, and even dx audible from W, VE, EA9 and KP4. Outside of contest activity it is rather more pedestrian, with stations from G, GW and perhaps DL being heard. The harsh truth is that it needs some major event like a contest or a dxpedition to encourage operators to use the band. The main times of activity of Continental stations outside these events is around 2200, and then usually only on Fridays and Saturdays. Perhaps there is a need for a dx net on 1·8MHz simply aimed at making the band more popular. With the increasing number of countries allowed to use the band, the prospects for successful dx working are encouraging. Has anyone another slant on the lack of activity, or another idea for promoting some regular dx activity on the band. There are many listeners who would be willing to send reports to stations willing to get involved.

1981 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS14585	183	179	177	113	116	14	782	ssb/cw
RS42604	160	175	158	136	116	29	774	ssb
A8841	142	164	204	102	87	5	704	ssb/cw
BRS48909	163	193	198	72	56	18	700	ssb
A8808	166	148	140	105	95	34	688	ssb/cw
BRS1066	128	146	150	81	64	36	605	ssb/cw
BRS44703	121	101	107	89	79	0	497	ssb
ARS42503	92	125	145	28	32	0	422	ssb
BRS40705	95	85	92	31	24	1	327	ssb
BRS18529	48	45	84	60	66	20	323	ssb
BRS44266	113	50	105	27	9	10	314	ssb
BRS41992	48	44	101	55	47	15	310	ssb
BRS35509	57	75	101	38	31	1	303	ssb
ARS41349	44	73	51	25	34	2	229	ssb
RS44218	75	42	58	21	16	0	212	ssb/cw
A9191	56	33	60	26	29	3	207	ssb/cw

Newcomers

Two to welcome this time. Mark Rogers, RS46276, uses a KW202 with a long wire, and has copied JA and KL7 on 14MHz. Graham Powell, RS46228, has logged nearly 1,400 QSOs since he joined the Society in January. His favourite band is 7MHz, and he mentions the good conditions in the winter months already reported in the column. His dx on the band during May included CE3PK, CX3TU, TI2CC, LU5FGG and VP8QG, all logged around 2200, while early morning listening resulted in CO2HQ, KG4WM, FM7WS, TG9AL and ZL3AB being logged between 0400 and 0500. He has also heard 18 of the 27 Brazilian states on 7MHz this year.

DX news

Graeme Caselton, RS44984, usually reports vhf happenings, but this time he admits to listening on an AR88D with a 37ft vertical to become a "temporary hf swl". During his two-hour spell he logged A4, HH, SU, VP8, 9M2 and 4U1UN, which has certainly whetted his appetite for the longer haul dx. He asks what is rare? This really depends on how long you have been listening. If, like Graeme, you listen on the hf bands for the first time, even an Italian or a German can be rare. As you progress, W becomes your best dx, then VK or ZL, then KH6 and eventually you are left with a dozen "rare" countries—CE0X, ZM7, Heard Is, China, 7O, Kermadec Is etc.

Michel Delvaux, ARS42503, has received his first QSL card from JA. He also received the "Heard All Continents" Award issued by JARL.

Bernard Hughes, BRS25901, has received the "Arabian Knights Award" and the "JY Silver Award", both from JY1.

John Sutton, BRS35509, spends most of his listening time on 14MHz around 0430, at which time he has heard stations from the Pacific and the Caribbean. He has also added rtty to his receiving set up, and has received good signals from CP6EL.

The main dx during the period under review was the expedition by VK9NS *et al* to Tokelau Is. Most reported hearing them on 14MHz and 21MHz. Other trips noted have been OH0XX/OJ0, 6O1T1, DA1WA/HB0, KP2A/D; that of XZ5A took many by surprise. At the time of writing it seems that this station is still active, as the Japanese operators who activated this rare country left the equipment to enable others to use it. Check around 14,270kHz.

Robert Small, BRS8841, also commented on 3D2CS, K6XT/NH9 and UK1PGO on 21MHz for new countries. On QSL returns he mentions C21AM, JA1JWP/JD1, W4PRO/CE0A and YI4SC.

Brad Bradbury, BRS1066, was off to SV for a holiday when he wrote, and mentioned receiving a certificate from W3USS, the station at the US Senate in Washington. He also passed on some worthwhile information from S79RD who said, "SAE es ircs very much appreciated. Please pass word along to the other swls".

In addition to the dx trips mentioned earlier, Paul Crankshaw, BRS48909, also noted ST0AS on 21MHz and T32AB and AH8A on 14MHz.

Mark Mullins, RS42604, who was awaiting the May RAE results, is going to F and C31. He enclosed his usual list of good dx heard during early June, and commented on four new countries confirmed—LX, VK9N, ZD7 and 6W8.

Finale—copy next time to reach your scribe by **25 August.** □

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4 - 2 - 70

John Morris, G4ANB*

Cyprus worked on 70MHz

Sporadic-E is usually rather disappointing on 70MHz due to the lack of dx to be worked, but the event of 7 June, whose effects on 144MHz are reported elsewhere, was a definite exception to this rule for two stations. The opening fortuitously coincided with the RSGB 70MHz contest, and at about 1335gmt Gordon Pheasant, G4BPY, in Walsall, worked 5B4AZ (QU26) in Cyprus by double-hop sporadic-E. A few minutes later David Butler, G4ASR, who was operating in the contest as GW4ASR/P (YM55f), also worked 5B4AZ. The double-hop propagation faded soon afterwards. These contacts were G-5B4 and GW-5B4 "firsts", and also look likely to be contest winners, as the distance from GW4ASR/P to 5B4AZ was approximately 3,475km, which is a new dx record for 70MHz. Both contacts were made on cw.

5B4AZ was running just 10W to a dipole for the contacts, using the beacon transmitter supplied by G4BPY. GW4ASR/P was using 50W dc input and a six-element long Yagi at 760m asl in Radnor Forest. A few days after the contest G4ASR telephoned 5B4AZ who confirmed both contacts as complete. Congratulations to all involved on these excellent results.

The first 70MHz UK-Gibraltar contacts of 1981 took place on 25 May. G3UUT in Cambridge received a telephone call warning him of Spanish tv on Ch E2, and a check of the bands showed both the 50 and 70MHz ZB2VHF beacons at good strength. G3UUT then telephoned ZB2BL, and an initial contact on 28·885MHz was followed by an ssb QSO on 70MHz at 1620gmt. ZB2BL went on to work several other UK stations before conditions faded at 1655gmt. A further Es event on 31 May gave many other operators their first ZB2 contact on 70MHz. ZB2BL is now equipped with a vfo-controlled ssb rig supplied by GM3WOJ, but is having some problems with tvi.

Several letters to *4-2-70* have commented on the increasing level of activity on 70MHz. For G4FRO in Bristol, recent high spots were EI9Q (WM65d) on 19 May and ZB2BL on 25 May. During the 7 June contest G5KW on the Isles of Scilly provided WJ square for a lucky few. G4FRO has pointed out that he does not have a particularly good site or antenna. The QTH is at sea level with a three-element beam at only 9m agl, and most of his contacts were made with just 10W of rf.

Several more Continental stations are equipping themselves with 70MHz receiving equipment in order to make crossband contacts. F6FHP (AE21g) has a converter and four-element Yagi, and he heard one of the UK beacons on 25 May at 1620gmt. Following a call on 28·885MHz both G3JXN and G3UUT attempted to make crossband contacts with F6FHP, but with no success. In some countries special permission has to be obtained to listen on 70MHz, and GW3MHW has reported that DZ9QV is trying to obtain this.

In an attempt to make crossband contacts, GW3MHW recently set up his keyer to send his callsign with an indication that he would be listening on 14·345MHz. SM6PU copied the 70MHz transmission at good strength for over an hour but unfortunately had no 14MHz transmitter. However, something did come out the test, as SM6PU called on 28·885MHz and completed 28-70MHz crossband contacts with G3FDW and G4BPY.

Israel worked on 144MHz

The first G-4X4 contact on 144MHz took place at 1600gmt on 11 June when Mike Lee, G3VYF (AL33j), worked 4X4IX (RS65f) on ssb. The distance between the two stations is about 3,540km. 4X4IX also made partial or complete contacts with several stations in Belgium and the Federal Republic of Germany at about the same time.

G3VYF has very kindly provided a tape recording of his contact with 4X4IX, and the strength of the Israeli station's signal was impressive. Equally notable is the speed with which the contact was made; just 30s from the initial call to completion of the contact.

It is thought that the propagation mode was not double-hop sporadic-E, but tropo assisted extended Es. In particular, G3VYF believes that about 800km of the UK end of the path was covered by tropo, and similar conditions could well have prevailed at the Israeli end. It is known that Italian and Yugoslavian stations were working into Jordan and Israel by Es at the time.

Congratulations to both operators on this excellent contact.

144MHz sporadic-E

The sporadic-E event on 7 June which brought the UK-Cyprus contacts on 70MHz also extended up to 144MHz. Many UK operators made contacts with USSR stations, notably with UC2 and UB5 prefixes. Some of the contacts approached the limit for single-hop Es of approximately 2,500km.

The earliest reported contact was made by G3IPV (AM18a) who worked LZ1QH/P (MB26g) at 1355gmt on cw. UB5SBI (MI28e) was also worked at 1912gmt.

G3COJ (ZL37a) first noticed the Es on 144MHz at 1650gmt when YO7CJH (LE59c) was heard. The next station heard was UB5PAZ at 1650gmt, but the propagation faded before the contact could be completed. Between 1732 and 1845gmt contacts were made with UC2AAB (NN18c), UC2ABN (NN18a) and UB5BAE (MJ38a), all of these on cw.

For GM4IHJ the first indication was at 1030gmt when satellite observations showed intense plasma disturbance west of Finisterre, NW Spain. Icelandic tv was copyable on 63MHz, and Nordic fm audible up to 100MHz, but there was no reply to a "CQ" call on 144MHz. At 1810gmt Polish fm was audible at 70MHz, followed by Russian tv sound on 100MHz. YO6AFP (MG square) was heard on 144MHz at 1844gmt and worked at 1851gmt.

GM8JYU, in Gretna, came across this, his first Es opening, while tuning down the band just before closing down for the night. He was surprised to come across a strong signal while doing this and astonished when it turned out to be SP8AOV (LL53d) calling "CQ". After working this station at 1734gmt GM8JYU went on to work several Polish and Czechoslovakian stations in JJ and JK locator squares, as well as UT5DL (LI23g), UC2ABT (NN18a) and UB5DAA (LI22f). The gear at GM8JYU is an IC202S with 3SK88 preamp and 100W linear feeding a pair of nine-element F9FT Yagis stacked vertically with the feedpoint 9m agl. GM8JYU commented that the opening certainly caused his adrenalin to flow, and hopes that his "plaintive screams into the microphone were not too noticeable".

G8LFB (ZL30f) noticed a short opening on 6 June, when EA7EZH (YX12f) was audible from 1930 to 1935gmt. During the 7 June event G8LFB was handicapped by having his pa out of action, and his 3W failed to penetrate the massive pile-up attracted by the excellent signals from RB5EHT (RI33j) at 1650gmt. Other stations heard between then and 1845gmt included UC2ABT, SP5EPT (KM65j) and SP8AOV. On 9 June the pa was running again and a short opening brought contacts with YU2RGT (HF20c) at 1425gmt and YU4VYL (JE34j) at 1432gmt.

Aurora

GM3TAL, in Fife, has reported an auroral opening on 70MHz on 16 May. Between 1400 and 1600gmt several GM and G stations were worked using 30W to a four-element beam pointing northeast. The Gdansk fm broadcast station was audible during most of the day, and tone "A" signals from GB3SU could be heard during the afternoon. GM3TAL is interested in running cw and ssb skeds on 70MHz. Anyone interested should write to GM3TAL, QTHR, offering times and frequencies.

GM4IHJ stayed on 144MHz on 16 May to make auroral contacts with stations in GM, GI, G, SM and EI between 1315 and 2110gmt. The DL0PR beacon was audible by aurora on 15, 16, 18 and 25 May.

Repeater news

The Home Office has issued a licence for 433MHz repeater GB3HZ (RB4, Hazlemere, near High Wycombe, Bucks). This completes the licensing of uhf Phase 5, all 16 units having been approved.

Two new uhf repeaters, GB3IW (RB4, Isle of Wight) and GB3GY (RB11, Grimsby) are now operational. GB3YL (RB14, Lowestoft) and GB3ED (RB14, Edinburgh) are both back on the air. GB3HE (RB14, Hastings) has been fitted with a new antenna system.

Two vhf repeaters are back on the air from new sites; GB3SC (R1, Wimborne, Dorset) and GB3EL (R0, east London). As GB3WL (R1, west London) also came back on the air recently, the full four-unit London vhf repeater system is now fully operational for the first time in several months.

GB3FC (RB2, Fylde Coast, Lancs) was taken out of service in January when the local firm which provided the site became bankrupt and site clearance was withdrawn by the office of the Official Receiver. A new site has been found in the Norbreck Hydro Hotel on the Blackpool seafront, where a spare room with mains power is available. It is planned to mount

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IARU REGION 1 METEOR SCATTER QSO PROCEDURE

The aim of this procedure is to enable contacts to be made by meteor scatter reflection (ms) as quickly and easily as possible. As the reflections are of very short duration the normal QSO procedure is not readily applicable, and special measures must be taken to ensure that a maximum of correct and unmistakable information is received. The best meteor showers are mostly strong enough to make some of these measures unnecessary, but to encourage use of all generally listed showers there is no reason why the suggested procedure should not always be used.

Definition

Two types of ms contact, arranged in different ways, may be distinguished.

1. A scheduled contact, where two interested stations agree in advance on the mode (cw, ssb), frequency, timing and period of the contact. This may be done by exchanging letters, or via the vhf net, which is active from 1100 to 1400ut on each Saturday and Sunday around 14·345 or 28·345MHz.
2. A non-scheduled contact, where a station calls "CQ" or responds to a "CQ" call. Such contacts are often termed "random".

Timing

Traditionally most stations use 5min periods on ssb and 1min on cw and this practice gives quite satisfactory results. However, growing technical standards make it possible to use much shorter periods and amateurs are encouraged to arrange 1min schedules for cw and 15s periods for ssb, especially during showers.

1. All ms operators living in the same area should, as far as possible, agree to transmit simultaneously in order to avoid mutual interference.
2. If possible, northbound and westbound transmissions should be made in periods 1, 3, 5 etc, counting from the full hour. Southbound and eastbound transmissions should be made in periods 2, 4, 6 etc.
3. When arranging schedules, which are normally 2h long, use even hours, such as 0000-0200 or 0200-0400, and not odd hours such as 0100-0300. This makes the best use of everyone's operating time, and in random operation indicates how much time a station may have before the next scheduled contact.

Schedule duration

Every uninterrupted scheduled period must be considered as a separate trial. This means that it is not possible to break off and then continue a contact. Scheduled periods are usually in the range 1–2h.

Choice of frequency

Scheduled contacts should be arranged to avoid popular frequencies.

For non-scheduled operation the last letter of the callsign gives the frequency on which a station should call "CQ":

"A" means 1kHz above the reference frequency;
"B" means 2kHz above the reference frequency;
"C" means 3kHz above the reference frequency;

and so on up to "Z", which is 26kHz above the reference frequency. If the last letter of the callsign denotes some geographical or other special factor, then, and only then, the middle or first letter may be used.

The reference frequency for cw is 144·100MHz, and the ssb reference frequency is 144·400MHz. Thus SP5JC, whose callsign ends with "C", would call "CQ" 3kHz above the appropriate reference frequency, and thus on cw would call on 144·103MHz. Similarly, LA2PT would call "CQ" on ssb on 144·420MHz, as "T" is the 20th letter of the alphabet. A reply to a "CQ" call should always be made on the same frequency as that on which the "CQ" call is received.

This system will result in activity spreading over 26kHz in a random manner, avoiding the risk of concentrated activity—which has occurred when the frequency has been left to human choice. In addition, by knowing a callsign, the frequency on which that station should be calling will also be known. Minimum local QRM will occur because many stations may be operating in an area but their frequencies will be spread. The use of split transmit-receive frequencies is also avoided.

CW speeds

Speeds from 200 to 2,000 letters/min are now in use, but in non-scheduled ms work speeds of more than 400 letters/min are not recommended. In scheduled work the speed should always be agreed before the QSO, especially if one station does not have a multispeed tape recorder. Some operators cannot reach the higher speeds now in use. Note that in some countries, including the UK, the licensing authorities require the callsigns to be sent at a lower speed at the start and finish of each transmission.

Check that the message is correct and readable before and during the transmission.

QSO procedure

1. **Calling**
   The contact starts with one station calling the other, eg *"SM3BIU DL7QY SM3BIU DL7QY . . . "* The letters "DE" are *not* used.
2. **Reporting system**
   The report consists of two numbers:

First number (burst duration)	Second number (signal strength)
2: up to 5s	6: up to S3
3: 5–20s	7: S4–5
4: 20–120s	8: S6–7
5: longer than 120s	9: S8 and stronger

3. **Reporting procedure**
   A report is sent when the operator has positive evidence of having received the correspondent's or his own callsign or parts of them.
   The report is given as follows: *"UA1WW I1BEP 26 26 UA1WW I1BEP 26 26 . . . "*. The report should be sent only twice per set of callsigns and must not be changed during a contact, even though signal strengths might well justify it.
4. **Confirmation procedure**
   (a) As soon as either operator copies both callsigns and a report he may start sending a confirmation. ***This means that all letters and numbers have been correctly received.*** Confirmation is given by inserting an R before the report: *"SM7FJE G3SEK R26R26 . . . . "* A station with an R at the end of the callsign could send: *"GW3ZTH I4BER RR27 RR27 . . . "*.
   (b) When either operator receives a confirmation message, such as *"R27"*, and all other required information is complete, he must confirm with a string of Rs, inserting his own callsign after every eighth R: *"RRRRRRRR HG5AIR RRRR . . . . "*. When the other operator has received Rs the contact is complete, and he may respond in the same manner, usually for three periods.
5. **Requirements for a complete QSO**
   Both operators ***must*** have copied ***both callsigns,*** the ***report,*** and also an ***"R"*** to confirm that the other operator has done the same.

Missing information (cw only)

If a confirmation report is received at an early stage in the contact, the other operator has all the information he needs. The following strings may then be used to ask for missing information:

BBB . . . both callsigns missing
MMM . . . my callsign missing
YYY . . . your callsign missing
SSS . . . duration and signal strength report missing
OOO . . . all information incomplete

The other operator should respond by transmitting the required information only. This approach must be used with great caution to prevent confusion.

Meteor scatter work on ssb

Contacts are conducted in the same way as on cw. Letters are generally given in the ICAO alphabet (Alpha, Bravo, Charlie etc), but may be given without phonetics during a schedule. The letter "R" in confirmation reports is pronounced "Roger".

the antennas on the hotel roof, at about 58m asl. As GB3FC was sponsored by the now bankrupt local firm, the Fylde Coast Repeater Group has been formed to be responsible for the operation, maintenance and financing of the repeater. It is hoped that GB3FC will be back on the air from the new site by the autumn. Details of the new group may be obtained from the treasurer, G4EWS, or the secretary, G4EZM (both QTHR).

One problem arising from the loss of the GB3FC site was that there was considerable difficulty in proving ownership of the equipment. This highlights the importance for repeater groups (and, no doubt, others) of conducting their affairs in a professional manner, keeping as many records, minutes and receipts as possible, and ensuring all agreements are in writing.

Propagation warning systems

John Branegan, GM4IHJ, has been following the recent items in *4-2-70* which discussed the possibility of putting propagation information on beacons, and has made the following comments:

"I believe the proposal to provide a propagation warning service is an excellent one, but I strongly oppose the use of the existing, highly important propagation beacons for this.

"Since the extremely valuable beacons service was introduced it has been the target of many compulsive improvers. Not all improvements have been useful, at least from the point of view of this regular observer of propagation. Certainly a beacon should send its callsign at regular intervals, but between callsigns the radiation should comprise the most appropriate signal for propagation studies. Contrary to modern practice this should not be a hotch-potch of QRAs and wx data, but a simple constant carrier. More data can be obtained from detailed study of a carrier than from an irregularly-keyed, constantly-shifting signal. From a carrier one can extract accurate measurements of frequency and doppler shift. Amplitude and phase effects caused by multipath, diffraction and scintillation can be studied, as can polarization changes such as rotation, splitting and depolarization. All these features are highly diagnostic for propagation studies, and if we are to get useful data from distant beacons we should leave their signals as uncluttered as possible.

"This certainly does not mean that I am opposed to providing warning of propagation events. I believe an aid of this kind would be an enormous boon, but it must be kept separate from the beacons. What we need is a 'radio notice board' to dispense propagation and other information far and wide. There are many possibilities, but one would be to have a chain

of 30 or so suitably sited units from John O'Groats to Land's End, sending real-time and stored local and remotely received data on a suitable frequency."

GM4IHJ has made a valid point in his letter, and careful thought must be given to the danger of reducing the utility of beacons for propagation studies by using them to send warnings. A single letter, indicating an auroral event, sent after the beacon callsign would make little difference. Even two or three characters, such as the proposed system for GB3MLY described in last month's *4-2-70*, would probably be acceptable. However, GM4IHJ suspects that a meaningful and useful guide to a propagation event will require something much more loquacious.

The alternative proposed by GM4IHJ of a "radio notice board" is certainly attractive, but would require a massive investment of time and effort, both to set up and to keep running. This could be viewed as a possibility for the future, to which some of the simpler, beacon-based systems currently being planned may eventually lead.

Do any other readers have comments or ideas on this subject?

50MHz

G3COJ heard the ZS6PW beacon on 50·030MHz between 1713 and 1745gmt on 25 May. No other 50MHz signals were audible at the time, except ZB2BL who was working crossband to 28MHz. G3COJ has suggested that the signals from ZS6PW were being propagated by F-layer with Es assistance.

GW3MHW heard ZS3E and ZS6PW on 29 April and 25 May, and completed a crossband contact with ZS3AK on 28 May. The ZB2VHF beacon is audible on most days, often from before 0800 until well after 1400gmt. GW3MHW has been investigating the different responses of his three 50MHz antennas; a three-element horizontal, a three-element vertical and a six-element horizontal. Surprisingly, depending on the conditions at the time, each of these can produce better signals from ZB2VHF than the others. GW3MHW has concluded that on 50MHz the antenna used is not very important, although for the more distant ZS stations the six-element is usually best.

G3WBQ has reported that the Mauritania 7·246MHz broadcast station is back on the air complete with harmonics, the seventh of which was audible on 50·7227MHz on 28 May at 1900gmt. On this occasion the fourth harmonic on 28·984MHz did not appear and the ZS beacons on 28MHz were weaker than usual. G3WBQ commented that the same thing happened during 1980: 50MHz open to South Africa while the 28MHz beacons' strengths are down; so this could be a useful indicator.

Beacon news

John Worsnop, G4BAO, has reported that the GB3SX beacon (70·685MHz, AL71d) has been completely upgraded. The old 10W valve transmitter was taken out of service on 18 May and replaced by a new solid-state unit supplied and built by G4BAO. The prom-based keyer was built by G3UUT, using the same design as for GB3SIX. The halo antenna has also been replaced by a pair of crossed dipoles at the top of the 12m lattice tower. The transmitter runs 17W output, with 14W available at the end of the coaxial cable run, using a Mullard BGY32 power module and the drive circuits from a Pye T30FM.

G4BAO has thanked G3UUT for spending most of the afternoon at the top of the tower, installing antennas; G3DME for providing hospitality during the beacon installation; and Pye Telecommunications for the loan of test gear. Reception reports for GB3SX would be welcome. They should be sent to John Worsnop, Pye Telecommunications Ltd, Lab 1, St Andrew's Road, Cambridge.

G3UUT has supplied information on the present state of the ZB2VHF beacons on 50·035 and 70·260MHz. The 50MHz unit runs continuously, but on 70MHz the old valve transmitter is still in use and the beacon keeper, ZB2BL, is concerned about the fire risk in his cramped shack. However, the beacon is always on when ZB2BL is in the shack, and at other times it operates on a time switch from 1200 to 1300 and from 1830 to 2100gmt. Anyone hearing either beacon should call ZB2BL on 28·885MHz.

Belgian vhf convention

The second Ghent vhf-uhf convention, which took place on 30 May, attracted well over 200 participants from several countries, including a sizeable contingent from the UK. The convention was unusual from the British point of view in that it was devoted almost exclusively to lectures and discussions, with a small exhibition of amateur-built equipment and an outdoor antenna display, but no trade stands at all.

The single lecture stream lasted all day and covered a wide variety of topics. One of the most memorable presentations was given by F3YX, who illustrated his talk on amateur tv with a colour videotape recording showing his shack, equipment and antennas. For one particular sequence F3YX had mounted a camera on his chest, with a small transmitter relaying pictures back to the recorder in the shack. With the camera and recorder running he had then climbed the ladder running up the outside of his 50m-tall antenna tower. The recording showed the spectacular view from the platform at the top of tower and details of the antenna installations. Then came the long descent. The effect of rung after rung of the ladder passing slowly from the bottom of the screen to the top with the French countryside clearly visible in the background was quite mesmerizing, and there was hardly a member of the audience who did not let out a small sigh of envy when the scene finally reached ground level.

Other lectures included an introduction to the theory and construction of gasfet preamplifiers, by G3WDG; and a demonstration of amateur designed and built microprocessor systems programmed to calculate distances and to give moon and sun antenna-aiming data, by ON7HP, ON7AZ and ON6UG. At the end of the lectures the programme promised a "surprise pour les participants", which turned out to be a pcb and constructional details for a crystal checker, given free to each participant.

During the evening the notorious "Shack Gent", a very well equipped house in the city centre rented by the local radio club, was thrown open to visitors, and there was a chance to see a film of the expedition to the Republic of Ireland mounted by ON5FF, ON6UG and others during August 1980.

The British visitors to the convention have expressed their gratitude for the excellent hospitality shown by members of the Oost Vlaamse Radio Club, in particular Freddy de Guchteniere, ON6UG, who organized hotel bookings and was unstinting in providing transport to and from hotels and stations.

Perseids plans

Several groups are planning special activities for the Perseids meteor shower, which reaches a peak on 12 August each year and usually produces excellent reflections for several days before and after this date.

ON5FF/CT1 will be using sites in WA, VA, WZ and VZ locator squares from 5 to 12 August. Operations will be confined to ms using cw at about 800 letters/min on 144·011MHz. Note that 2·5min periods will be used by the expedition for random calling and working, and ON5FF/CT1 will in all cases transmit during the first, third, fifth and so on periods of each hour. The antenna system will be a vertically stacked pair of the new DL6WU seven-element Yagis.

PA2HKR, PA2REH and PA3ABA plan to be operational from locator DR06h, on the southern tip of Norway, during the first two weeks of August. They will be active on the vhf net on 14·345MHz, and skeds may be arranged there; 144·012 and 144·212MHz will be used for ms working. The equipment will consist of an IC260e and linear amplifier, with four nine-element Yagis for tropo working and a single nine-element for local and ms operation. Details of the callsigns to be used have not been provided, but amateurs visiting Norway for less than a year normally use "own call"/LA.

Amateurs from various parts of the UK will be congregating in north Devon on 8 August to prepare for an attempt to make transatlantic ms contacts on 144MHz. During similar trials in 1979 and 1980, signals were heard in both directions but no complete contact was made. With the experience of the previous attempts to draw on, it is to be hoped that it will be a case of third time lucky.

VHF activity at 4U1ITU

Geoff Grayer, G3NAQ/F0ZY, has written from Geneva with some information on the present state of vhf at 4U1ITU, the amateur radio station located in the International Telecommunications Union building.

G3NAQ describes the shack as being conveniently located on the top floor of the building, next to the bar. The antennas are mounted on the roof above, but the feeders are taken via ducts, which means a rather long cable run. The site is not particularly good for vhf, although HB9MMC, located a short distance away at an apparently worse location, has obtained good results on 144MHz, including many contacts into the UK.

144 and 432MHz equipment is available at 4U1ITU, but has been used mainly for satellite working. G3NAQ operated the station on 144MHz during the contests on 7-8 March and 2-3 May using a TS700S, Electronic Developments preamp/pa and Tempo 6N2 amplifier into a nine-element Yagi. The results were very disappointing, only 45 and 35 stations respectively being worked. Similarly skeds with UK stations have produced no results.

Investigation of the antenna system showed some 5 or 6dB loss in the feeder, while the Yagi was almost touching a 28MHz loop. G3NAQ is

working on improving the station. Permission has been obtained to take the vhf feeder direct, and it should be possible to mount the antenna higher and in the clear directly above the shack. The aim is to set up a separate 144MHz dx position in the station, but for this an intermediate amplifier to boost from 10W to 60W to feed the 6N2 is needed. In addition a low-noise preamp plus suitable switching relays local to the antenna would be useful.

The International Amateur Radio Club, which runs 4U1ITU, is unfortunately in financial difficulties, largely because of the open-door policy it has adopted towards visiting amateurs in the past. Income from the small number of club members has been insufficient to cover repair and maintenance costs. This policy is now to be changed and an operating charge will be introduced, although even this is unlikely to be enough to finance new equipment.

Most of the gear at 4U1ITU has been donated by manufacturers, which must be good advertising, as the station receives a constant flow of visitors from all over the world. During the frequent conferences at ITU, of which there are many besides WARC, the station is a show case for amateur radio.

G3NAQ intends to activate 4U1ITU on 144MHz during openings, and to this end has arranged to be alerted by local stations in the event of good conditions, as well as his own monitoring of the band. He will be especially looking for UK stations. Any offers of equipment to help improve the 4U1ITU vhf set-up would be very welcome, especially as the aim is to give vhf enthusiasts the chance to work a new country.

CW on vhf/uhf

Two comments which are often heard on 144MHz, especially from newly-licensed G6+3 operators, are:"I'm busy practising cw so that I can go hf" and: "I'm not bothering with the morse because I'm only interested in vhf." Both of these statements imply the morse test is some sort of barrier against access to the hf bands, to be overcome once and then forgotten, along with vhf.

Nothing could be further from the truth.

Heretical though it may seem, and without going into the virtues of cw versus phone at hf, cw is probably even more useful above 30MHz than it is below, Most successful vhf dx operators can use phone and cw with equal facility.

Arguments about which is the "best" transmission mode on vhf/uhf are meaningless. The wise operator chooses his mode to suit the conditions. For mobile and local working fm has much to commend it. The low background noise—at least when signals are moderately strong—and tolerance to slight frequency errors make for easy listening.

When signal strengths begin to drop ssb comes into its own. The narrower bandwidth and concentration of power into information, rather than carrier, make ssb the most effective mode for phone dx operation.

In extremely adverse conditions cw is unbeatable. It is no coincidence that during weak auroral events the cw portion of 144MHz is usually full, while the rest of the band may be nearly empty, nor that most ms and eme work is done on cw. On tropo many a "lost" contact has been resurrected by one of the operators switching to morse. It is also significant that only one holder of a class B licence has managed, so far, to take the Four Metres and Down Supreme Award.

The moral is that the ability to use cw, when necessary, is one of the most useful assets a vhf/uhf operator can possess. To those who are "not bothering with the morse"—think again! A good way to improve skill at receiving morse is to listen around 144·05MHz during the Monday evening activity periods from 2000gmt.

Foxhunt

While tuning over the 144MHz band one recent Sunday, G4ANB was perturbed to discover a strong fm transmission modulated with music. Tuning further down the band revealed a rapidly-growing net on S18 of concerned amateurs who had also heard the offending signal and were anxious to trace its source so that the person responsible could be asked to close down.

Operators over a 30km radius co-operated in providing beam headings and the transmitter position was soon established to within a few kilometres. Several small portable beams were then loaded rapidly into the backs of cars and the foxhunt began in earnest. Predictably, as soon as the mobile stations were in position the transmission halted. For a while it seemed that the whole exercise had been in vain, until the carrier came back, this time without music, but with the sound of a clock ticking faintly in the background.

For the next two hours the carrier came and went irregularly, but by patience and co-ordination on 144MHz between the searchers, and finally by removing the antennas from the rigs and roughly plotting field strengths, the actual house from which the transmission was coming was located. This caused some consternation, as the house in question was the home of a well-known and respected local amateur. Knocking on the door produced no response.

A close neighbour, also an amateur, noticing the crowd outside the house holding small black boxes, came up and asked what the problem was. On having the situation explained he volunteered to invade the shack and investigate. All doubts about the source of the transmission were removed for the assembled foxhunters when they heard, over the air, a knock on the shack door and subsequent conversation. The transmission ceased, the very red-faced resident emerged, and what had happened became clear.

The person responsible had recently finished building a replacement transmitter for the local vhf repeater, and was in the habit of leaving the unit on "soak test", sending into a dummy load, when not in the shack. On this occasion confusion had arisen between the cable leading to the dummy load and that going to the outdoor colinear antenna, and the wrong one had been connected, so that a carrier was being radiated. This by itself would have been fairly harmless, had not the audio gain control been connected to give increasing gain when turned anti-clockwise, so that what was thought to be the minimum setting actually left a live microphone in the shack. Finally, the domestic hi-fi system was being used to play music, and the extension speaker in the shack had inadvertently been left on. Thus three simple errors conspired to produce the completely accidental transmission of music on 144MHz.

Once this chain of events had been deduced, everybody was invited in to look at the transmitter for which they had been diligently searching. The builder received several compliments on the quality of his constructional work, and was clearly pleased by the range over which the signal had been heard during this accidental coverage test. Thus the affair ended amicably, and it was agreed that the impromptu hunt had provided an enjoyable afternoon's outing and had contributed in no small degree to the "self-training" of those involved.

There are several morals to this tale. The first is a reminder that the licence conditions specify that the callsign should be sent at the beginning and end of each period of sending, and every 15min for longer transmissions. Note that this also applies to test and tuning transmissions, not just to actual contacts. Second, when testing or adjusting a transmitter it is useful to be able to monitor the outgoing signal. Third, when making such tests it is wise to listen on the frequency at regular intervals, as more distant stations may often be able to hear and comment on characteristics of the signal which are not noticeable locally.

Finally, it is of note that none of those involved in the hunt had any special training, and had to set up equipment and organize co-ordination at short notice to track down what seemed at first to be an intruder in the band. The speed with which this was done is gratifying, and speaks well of the ability and responsibility of amateurs.

New Zealand repeater system

Ian Maslen, G4BYR/ZL4DQ, read with interest the item "Antipodean channels" in June's *4-2-70,* as he recently moved from New Zealand to the UK. He has supplied further information on the repeater system in that country, which is currently undergoing a major revision.

At the last NZART national conference it was decided that in view of the outcome of the WARC decisions for Region 3, the New Zealand repeater allocations would be changed to occupy the segment 146-148MHz. The implementation of this plan is currently in progress. The new layout is very similar to the Australian arrangement: there are eight frequencies for repeater outputs spaced 50kHz apart from 146·65 to 147·00MHz, with inputs 600kHz lower, and another seven with outputs from 147·05 to 147·35MHz and inputs 600kHz higher. The old 700kHz split is being abolished. Simplex frequencies lie between the repeater inputs and outputs.

Each repeater will be identified by its name and output frequency, for example "Wellington 710". It is hoped that the changeover will be completed by the end of February 1982, at which time all unconverted repeaters should be closed down.

Scatter

F5DE (AF22f) is very keen to work UK stations on 144MHz to obtain the Four Metres and Down award. He is often active on cw on 144·050MHz from 2000 to 2200gmt, especially during the months June to October. The equipment runs 3kW erp from a 110m asl site with good take-off to the UK. Stations interested in running skeds should write to M Bernard Delage, F5DE, Loitissement Beauregard, Touvre, 16600 Ruelle, France.

It is rumoured that GJ3YHU may be operational on 70MHz from

(Continued on page 733)

MICROWAVES

Charles Suckling, G3WDG*

A horizontally-polarized omnidirectional Alford slot antenna for 1·3GHz

An omnidirectional horizontally-polarized antenna for 1·3GHz with useful gain has been developed by G3JVL, to serve as a beacon or repeater antenna. This type of antenna has been in use for a number of years at the GB3IOW 1·3GHz beacon, and several versions have been extensively tested under mobile conditions with excellent results.

The antenna consists of a length of slotted tubing as shown in Fig 1. The feedpoint can be made either in the centre (Fig 1(a)), or at the end (Fig 1(b)) by suitable design. The width and length of the slot, the wall thickness and the diameter of the tubing are all related, and much experimental work was done by G3JVL to evolve working designs, details of which are given below.

Antenna type	Tube dimensions	Slot width	Slot length
Centre fed	38·10mm od 16swg wall	11mm	509mm
End fed	38·10mm od 16swg wall	11mm	254mm
End fed	31·75mm od 20swg wall	4mm	254mm
Centre fed	31·75mm od 20swg wall	4mm	509mm

The feed impedance of these antennas is approximately 200Ω, and this can be matched to an unbalanced 50Ω line by a 4:1 balun, as shown in Fig 1(c). This is constructed from 3·6mm (0·141in) semi-rigid cable, the slots in the outer conductor being made with a broken junior hacksaw blade. Small solder tags are attached to the end of the cable at the points indicated so that small screws can be used to attach the cable balun assembly to the sides of the slot.

In use the antenna should be mounted vertically as accurately as possible since the vertical beamwidth is quite narrow. The length of the tube below the slot is uncritical, so the same tube can be used for both mast and antenna!

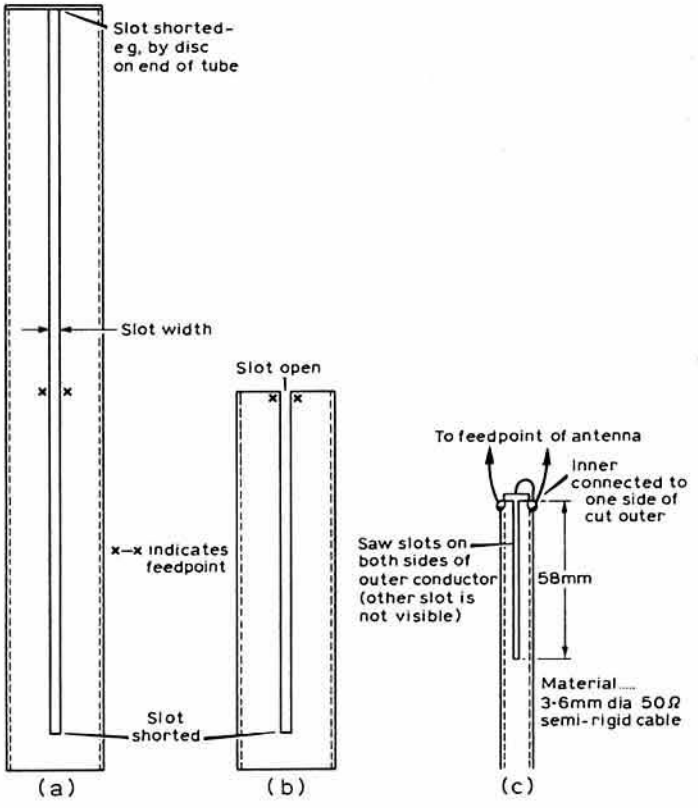

Fig 1. Details of the 1·3GHz Alford slot antenna and balun

An N-WG14 transition for 5·7GHz

An N-WG14 coaxial to waveguide transition for 5·7GHz is shown in Fig 2. This was originally developed so that prototype waveguide filters could be measured using laboratory test equipment. One practical application would be to enable coaxial feeeder cables to be used between waveguide dish feeds and waveguide equipment. Losses in short lengths of cables such as heliax are acceptable at 5·7GHz, and since large quantities of waveguide 14 do not appear to be plentiful on the surplus market, the best solution when antennas and equipment have to be physically separated is to use a coaxial feeder cable.

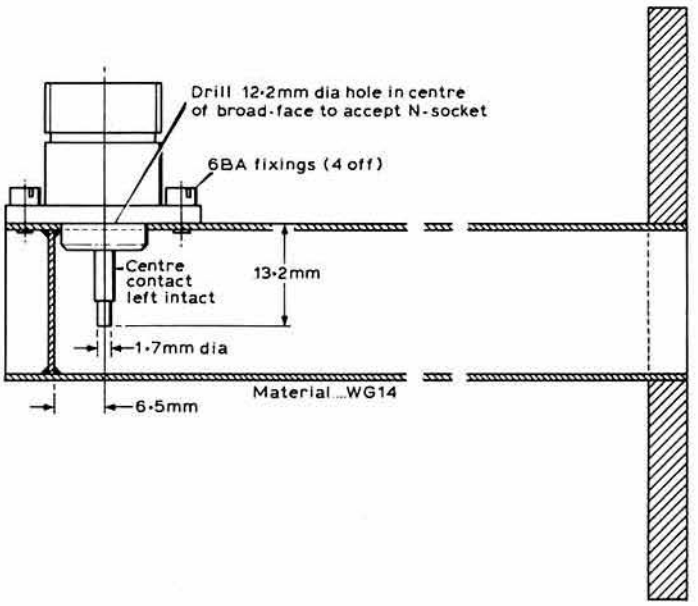

Fig 2. Constructional details of a coaxial to waveguide transition for 5·7GHz

Construction of the transition should be apparent from Fig 2. The N-connector is a standard four-hole fixing type with a small extension piece of copper wire soldered into its centre connection. In the prototypes the short-circuit plate was made by sawing opposite slots across the broad faces of the waveguide using a junior hacksaw, and inserting a 34·8 by 19 by 0·6mm piece of brass sheet across the waveguide, which was then soldered into position (see *Rad Com*, April 1980, p372).

The prototype transition has a vswr of better than 1·2 across the 5,650 to 5,850MHz band, with a total loss of less than 0·1dB.

Combating tuning drift in 2C39 power amplifiers

Most users of power amplifiers using the 2C39 or one of its variants will have experienced the problem of tuning drift, either as a change in power output during a transmission or as much reduced power after a receiving period. Both situations can of course be overcome by simply retuning (usually only the anode cavity needs adjustment). But this can become very annoying, especially in contests. The problem can be lessened by running the amplifier as efficiently as possible, as outlined recently in *Microwaves* (June 1981).

After discussion with various stations, and recent experiences with a 2C39 amplifier, it became clear that the cooling arrangements can have a large part to play in determining the degree of tuning drift. It appears that if the amplifier is not cooled adequately it drifts more during a transmission as it heats up, but the overall drift during a receive period is less. A well-cooled amplifier has less of a drift problem while transmitting, but appears to change more during a receive period.

Thus one solution which has been employed successfully in practice is to use an efficient blower, but to switch it off during receive periods. Then the amplifier cools down less during the receive period, and full power is regained after only a few seconds transmitting.

*46 Windsor Close, Towcester, Northants.

Recent awards

G8GXE (near Slough) recently gained 1·3GHz Standard Certificate No 27, which enabled him to obtain his Supreme Award. One month earlier he had been awarded 1·3GHz Distance Award No 28 for a QSO with OK1KIR/P.

Claims on the 10GHz front have been rather low this year so far, but are expected to increase somewhat with the cumulative contest season. Only one 10GHz microwave distance award has been issued this year, the recipient being G8SHF/P for a QSO with GW3PPF/P.

Newcomers are reminded that the microwave distance awards are issued by G5UM for a station's first contact beyond a specific distance on each of the microwave bands. These are as follows (with the number of awards issued to date):

1·3GHz	600km	28 issued	5·7GHz	300km	none issued
2·3GHz	500km	3 issued	10GHz	150km	52 issued
3·4GHz	400km	none issued	24GHz	150km	2 issued

1·3GHz fm repeater operational

The first repeater to become operational on 1·3GHz using the RSGB proposed specifications is OZ5REE located in GP22j. The repeater is on RM0 (1,291·0MHz input, 1,297·0MHz output) using horizontal polarization from two big-wheel antennas, one on transmit, one on receive. The transmitter runs 5W output from a tripler, and radiates on continuous carrier when not accessed so that stations intending to use the repeater can determine whether they have a usable path to the repeater, a very useful facility when operating mobile. Identification is by phase modulation every 2min.

2,276MHz moon "beacon"

Several 2·3GHz eme operators have recently been using a signal source left on the moon during the last Apollo mission to gauge system performance, compare antenna gains, preamplifiers etc.

After hearing a signal from this source on the 20ft eme dish at Oxford, G4KGC and G3WDG carried out some tests using a 4ft dish (and 1·5dB nf GAT 6 gasfet preamp). Signals were found very easily, and were approximately 5dB s+n/n in 500Hz bandwidth. These results suggest that this "beacon" would be a useful signal source for anyone interested in developing efficient equipment for 2·3GHz.

The "beacon", which is used for transmitting scientific data, is on 2,276·0MHz and transmits on right-hand circular polarization. The signal is fm with 1·06kb/s data, and is audible on an ssb receiver as two modulated sidebands plus a central carrier.

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various reefs around Jersey during August to activate squares not normally available on that band.

GM8ZNZ has a superb vhf site 250m asl on the north side of the Forth-Clyde valley. GM4IHJ recently helped fit a 16-element F9FT and masthead preamp, giving very encouraging results, with many distant beacons audible. GM8ZNZ is a member of RAIBC, and is keen to work other members and friends. He hopes to be active on 144MHz from 1000 to 1100gmt on most days.

A net for those interested in 50 and 70MHz meets on 3,718kHz at about 8.30pm each day, particularly at weekends. The regulars include many of the well-known exponents of the lower vhf bands, and anyone is welcome to join in.

Repeater callsigns can be confusing. G3UBX has noted that fm operators around Worcester often have QSOs on "ms", while many Class B licence holders in Welshpool are worked on "cw", and there are surprisingly many (legitimate) "cb" users in Birmingham!

G4BAO noticed an unusual signal on exactly 50·5MHz at 1155gmt on 11 June. It consisted of an nbfm transmission of a "speaking clock", giving times 2h ahead of gmt, which puts it east of Greece. The propagation was probably sporadic-E, as the ZB2VHF beacon on 50·035MHz was very strong at the same time. Can any reader throw light on this signal?

Please do not forget to mention your QTH locator when sending band reports to *4-2-70*. All items for October to reach G4ANB by 21 August (late news by 2 September) and for November by 18 September (late news by 28 September) please. □

RAYNET

G. Cluer, G4AVV*

THERE is to be a Raynet symposium on Sunday 4 October at Harpenden Village Hall. Members of BARTG will know this venue well, as for the last few years this has been the place used for the annual teleprinter convention. This is the first Raynet symposium to be planned by the Raynet Committee and it is hoped to keep up the high standard set by those groups that have run them so successfully in the past.

At the time of writing, the programme has still to be confirmed, but the aim is to have a series of talks from interesting and knowledgeable speakers for all Raynet members—from seasoned controllers to the newest (or prospective) member. An emergency planning officer from Humberside and one from Greater London have been approached to talk about problems associated with tidal flooding along the coast and in rivers such as the Thames, and another talk will be for controllers and other local group officers and will give hints on how to form and run a group. As always at these events, there will be plenty of time for questions and contributions from the floor.

The doors will open at 10.30am for a start at 11am, and there will be talk-in on the inter-group frequency (145·800MHz). Sandwiches and coffee will be on sale for those who do not bring their own lunch, and there are good local pubs in the village. Tickets will be available on the door or in advance from G4AVV. The price will not be excessive.

More and more groups seem to be making use of the talkthrough permission that Raynet has been granted by the Home Office; latest reports on its use have come in from West Kent and Havering. It seems that we have been wanting this facility for so long that when permission came a number of groups soon sorted out the technical problems and operating procedure and quickly put their ideas into practice. Perhaps we should aim to see the day when every Raynet member can switch his mobile equipment to this mode.

Other reports received are of coverage at the request of a user service at a charity walk or similar. These events are useful to the community but are also good publicity and training for Raynet. Gloucestershire Raynet, for example, helped the St John Ambulance at the Lions Club Raft Race and earned themselves the comment "Never thought 'amateurs' could be so professional".

Other trends being detected in reports are a move to 432 from 144MHz in urban areas for Raynet work, and the more general use of hand-portable equipment.

The writer would also be keen to know what contacts local Raynet groups have made with prospective React groups. React is an organization with similar (though not necessarily identical) aims to Raynet which will use the cb bands once they have been licensed. Although such groups are unlikely to have the right to use as powerful equipment or as many different frequency bands as Raynet—nor will they, in general, be able to rely on such a high level of technical knowledge among their members—they will undoubtedly have a much larger membership and, possibly, a much less restrictive licence. Some Raynet groups have plans to use cb, and others are talking to local prospective cb groups in order to plan how they might work alongside each other, and G4AVV would be pleased to hear from Raynet groups which have had contact with React groups.

Mark Lees, controller of the new Manchester group, says that people in that area do not seem to like writing letters to him, and prospective members may like to telephone him on 061-223 4200. Victor Kusin, GM4HCO, would like to hear from interested amateurs on the west coast of Scotland, as he is now controlling the Strathclyde group.

Finally, may I add my name to the list of hundreds from all over the country who have expressed shock and sorrow at the death of Peter Balestrini. It will be a long time before Raynet can fill the gap that he has left. Jane Balestrini will continue, for the time being, to act as supplies officer; when writing to her please help by making the writing clear and large. Other matters that Peter was dealing with, including granting permission for talkthrough, participation at country shows, walks etc, is being dealt with by G3IIR, QTHR. □

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THE MONTH ON THE AIR

John Allaway, G3FKM*

IT just had to happen! The current tendency for all major expeditions to transmit about 25kHz above lower band edges has been threatening to cause confusion when more than one was active at the same time. On one recent evening, stations calling ZM7JS on 21MHz actually received signal reports from KP2A—and abuse from those calling the latter! The two pile-ups were inextricably mixed, and as the present-day snappy operator only repeats the call of the station he is calling relatively infrequently, chaos became inevitable. Perhaps the time has now come for "the usual expedition frequencies" to be varied a little?

G4DRW reports the arrival of QSL cards for ZD8RH—in fact these should go via G4DBW.

Graham Powell, RS46228, reports hearing G4KLM claiming to be called Len on 7MHz ssb. Other details of this case of piracy were mentioned in June *MOTA*.

G4KCT is being pirated by "Robert" claiming to be in Castle Bromwich. This has taken place on several hf bands, including 7MHz ssb. The genuine operator is called Baz and lives in York.

Use of ssb transceivers in the cw bands

Ian Buffham, G3TMA, writes: "No one can deny that ssb transceivers have revolutionized phone operation—frequency netting is now very accurate compared with the "good old days" of a.m. However, the virtual universal ownership of transceivers means that a great many are being used on the cw bands. All in all they have not brought any advantages to cw operation, their big limitation being that the operator cannot be completely sure of his transmit frequency. This is especially the case if irt controls are misused. The result is that replies to "CQ"s can be anywhere within ±1kHz of one's own frequency. In today's crowded bands such calls can either cause interference to others or be inaudible due to adjacent commercial QRM. Such errors would be quite intolerable on ssb, so why should we tolerate them on cw? As I see it, there are two answers to the problem:

(a) Make transceiver owners aware of the problem and encourage them to check their netting habits from time to time with a second receiver; and

(b) in these days of sophisticated equipment it should not be too difficult to incorporate a netting aid. A push-button to impose a tone on the receiver audio corresponding to the transmit frequency would be useful."

Peter Taylor, H44PT, president of the Solomon Is RS

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Some of this year's officers of the Malayan ARJS. L to r: 9M2AV, secretary, 9M2CM, president; 9M2FK, treasurer; and 9M2AU, committee member. In the front row is the junior op of 9M2FK

Expeditions

Ed Richmond, W4MGN, commenced an extensive African tour in late June, and hoped to operate from a number of stations in the countries he was scheduled to visit. These were expected to include 6W8JI, TR8MX, TL8CN, 9U5JM, 9X5MH, 5Z4RL, EL2AV and C5AAP. Ed has the calls C5ACC and EL2AG, and expected to have a TL0 call but would otherwise use his host's call. All QSLs should be sent via WA4VDE.

St Peter and Paul Rocks have been mentioned again in connection with PY1RO's call. A visit during early September is said to be a possibility.

A group of KH6 amateurs will be visiting Kalawao County on the island of Molaki from 7 to 9 August, and will use the callsign KH6FV. Kalawao County is possibly the rarest county in the USA.

An expedition to the Sisargas Is will take place on 15 and 16 August. The callsign will be ED1ISI, and there will be continuous operation throughout the 48h. Frequencies to be used are 3,535, 7,035, 14,035, 21,135 and 28,435kHz (cw) and 3,635, 7,065, 14,135, 21,235 and 28,535kHz (ssb). A special QSL will be sent to all who make contact and should be applied for via the address in "QTH Corner" The Sisargas Is are off the NW coast of Spain and are surrounded by rough seas—should the journey promise to be difficult on the first weekend, the group will try again on 22–23 August.

WB1GDQ/CE0X is expected to be on the air from San Felix Is for 5 to 10 days early in September. The operators will be SV0BV, SV1IW and SV1JG.

Pierre, J28AZ, is rumoured to be likely to be in the People's Republic of Yemen between 28 August and 3 September, and to be taking his IC720A with a linear and antenna. He hopes to be on the air as 7O1AA.

DX news

Although not valid for DXCC credit, A6XJA appears to have moved to a new location and to be fairly active near 28,458kHz between 0900 and 1600, on 14,103kHz at 1800, and on either 21,180 or 21,330kHz between 1900 and 2000. A51PN is fairly frequently to be found around 21,005kHz at about 1400 working into Europe.

JA9IAX/JD1 is the relief operator at the weather station on Minami Torishima and will be there until 20 August. He is active on all bands 3·5 to 28MHz cw and ssb looking especially for Europe.

According to *QRZ DX* a Chinese-Canadian amateur has been told by the Chinese authorities that he will be the first to operate when amateur radio commences in that country. Information received from IARU Region 3 sources is that close contact with the Association of Radio Sport of the PR of China is being maintained both by that body and by JARL. Chinese officials have visited Japan and have been seeing amateur stations. Mr Cheng Ping, secretary-general of ARSPRC, has said that basic studies are now being made for the resumption of activities—which he hopes will be as soon as possible.

Activity from another eastern country which has not been heard on the air for many years took place during May when XZ5A appeared on 14 and 21MHz, from Kawthule in south-central Burma. The operators were said to be JA8BMK and JA8BKM. The full details of the expedition were not available at the time of writing but should prove to be very interesting.

VK9CCT now has a new callsign—VK9YA—for use when visiting the Cocos Keeling Is.

HS4ANK is a recent arrival in Thailand, and keeps daily schedules at

G3ZAY (l) with TG4NX and XE1FX (r) at this year's Dayton convention. He also took the other photographs on this page at the convention.

1200 on 14,220kHz, and at 1600 on either 21,300-21,350kHz or 28,500Hz. VS5TX has been active on rtty and hoping to visit 9M6 for rtty enthusiasts. He was using equipment lent to him from Japan but hopes to have his own soon.

It seems that stations in Somalia have now changed their 6O prefix to T5, and T5TI has been worked from the UK on both 14 and 21MHz ssb. 7Q7LW has also been worked recently and it is hoped that this heralds the return of regular amateur radio activity from Malawi.

TL8GE is often on 14,140kHz on Tuesdays and Thursdays at 1630 when he works a list of stations prepared by DF2OU. TL8WH is near 14,210 or 14,225kHz on most days after 2330, and will be in TL8 until the end of 1981. Also from the Central African Republic is TL8CN, who is on cw daily at the low end of 7MHz from 0400, and between 21,020 and 21,025kHz after 1300. He also appears on ssb around 28,520kHz from 1900. TL8RC is to be found on the low ends of 3·5 and 7MHz mostly after midnight.

TYA11 will be using a five-element "sloper" system on 7MHz and a delta loop on 3·5MHz when operator Bull returns from the USA at the end of this month. He will then be in Benin until July 1982.

FK8DJ is active on most mornings using his TS130, TL922 and triband beam. He hopes to visit Wallis Is (FW) this month. ZL3AFH/A has been reported on 21,300kHz between 0300 and 0530, and those who are fortunate enough to make contact should apply to ZL2HE for confirmation. ZL2HE also edits the dx column in *Break-In*, the official journal of NZART, and other stations for whom he acts as QSL manager include ZL1BIQ/K, ZL2BCF/A, ZL2CF and ZL5MC (1978–9).

G3SVK reports that the DX Information Net, under the supervision of F6FMX, meets daily during the week at 1000 on 14,220kHz. On Saturdays and Sundays the net meets on the same frequency at 1700.

Karl, K4YT, and W4QZS

Overseas news

Norman Wilkinson, previously G4HVT and ZS1SS, and now A9XE, has written from Bahrain. He has been there for about 18 months and operates entirely on cw. He says that his cw is not too fast and that he looks "for equally slow senders calling CQ"—this enables him to avoid pile-ups, as when the QSO is finished he has to QSY. He prefers 21MHz but also uses 14 and 28MHz, and is often on between 0245 and 0330 as well as in the afternoon. On Thursdays and Fridays he may be found at any time—the weekend holiday in the Gulf area being on those two days and not Saturday and Sunday. QSLs are 100 per cent via RSGB, and Norman is still looking for GI, GJ, GU and GW.

Liberian maritime mobile stations

H. Walcott Benjamin, EL2BA, President of LRAA, has asked for publicity to be given to the fact that the Liberian QSL bureau is unable to forward QSLs to all but two of these stations because they are not known. The two who are known are EL0AI (who had EL9A as QSL manager) and EL0AV, who provides envelopes and is an LRAA member. Ben points out that most are illegal operators, and a request is made by the Liberian Bureau of Maritime Affairs for all who work EL0/MM stations to make note of the name of the ship and send the information to LRAA, PO Box 1477, Monrovia, Liberia.

IARU monitoring service—Intruder Watch

More information has been received from G5XB, and it reads as follows: "From around mid-April this year a wide area of the Thames valley suffered severe interference to 28MHz operation from an unstable, rough, 50Hz fm carrier centred on 29,150kHz. Assisted by local amateurs, Intruder Watch undertook a preliminary investigation and eventually located the general source of the interference. The matter was then referred to the Home Office monitoring station, and due to their good offices and excellent work by the local radio interference inspectors the radiation was traced to faulty electronic equipment in Reading and finally suppressed."

WN4FVU and WB4ZNH who operated from Uganda earlier this year

World QRP Federation

Angus, G8PG, secretary of the WQF, has kindly submitted this report: "Since the last report the Benelux QRP Club, the EA8 DX QRP Club and the JARL QRP Club have joined the federation, so there are now member organizations in all six continents. An internationally-agreed maximum power figure for QRP ssb is to be announced shortly. Thom Davis, K8IF, has been appointed first chairman of the federation.

"From July 1982 the summer DL-AGCW CQ QRP Contest will become a WQF-sponsored contest with amended rules and a new section for portable stations, the rules will be announced later.

"The federation were concerned to read the remarks by VP2MIX (June *MOTA*) about long calls by QRP operators. There is reason to believe that the operators concerned are new to QRP and do not belong to a QRP club. All evidence shows that successful operation under pile-up conditions requires short calls and high personal discipline, whether the operator is using 1W or 1,000W, and all experienced QRP operators apply these principles."

DL7FT, WB8ZJW and DJ0UJ discussing problems concerning operation from Albania

G4JVG/SM0, Steve, Stockholm. **Photo: G4JWT/SM0KJD**

10 Metre News and Views

This is a new news-sheet which is being produced by G3LWM, G3YPZ and G3ZEV, and it will be supplied free of charge to anyone sending an sae to G3LWM, The Oaks, Cricketfield Lane, Bishops Stortford, Herts. Issue No 1, dated June 1981, begins by saying: "With the advent of 27MHz cb band widespread use and congested channels, the amateur radio movement faces a new and worrying threat. Already there are many intruders in the bottom end of 28MHz using rigs widely available that go up to 30MHz. The cb operators find 28MHz a godsend, due to the apparent lack of use by amateurs at times when there is no dx present. It is the aim of this group to bring to the notice of all amateurs the benefits of 28MHz operation as a viable alternative to 144MHz for local and not-so-local working."

28MHz vhf?

Continuing from the item above, the question of the correct use of 28MHz is raised: "Historically 28MHz is lumped into the hf spectrum and is looked upon as one of our best dx bands giving excellent long-skip contacts during sunspot peaks but very little during the remaining years. This fact has been well documented in amateur text books. Co-existing with its hf characteristics are its vhf tendencies—direct line-of-sight, refractive, trophospheric and sporadic-E types of propagation are very much in evidence, with range capabilities in excess of other vhf bands. If this is so, then it may be asked why the band is not in constant use for what we will, for convenience, call groundwave contacts. The reason is that the band is usually approached with hf techniques instead of vhf. Whoever heard of anyone using a trap vertical, long wire or trap dipole for 70, 144 or 432MHz? Good receiver sensitivity is also needed, yet on 28MHz 'deaf receivers' and makeshift antennas seem to be standard, so when tried the band produces disappointing results!

"There has yet to be produced an hf rig with comparable sensitivity to the normal 144MHz fm 'box'. How many times has it been said 'You are not moving my S meter, my receiver is not much good on 28MHz'. What should be said is 'My receiver is deaf on 28MHz'. A cross-section of receivers used by G3s LWM, YPZ and ZEV over the years included KW2000, FT101, TS510, TS520, TS120V and SB101, yet all of these have been insensitive on 28MHz."

BYLARA

A reminder from Diana, G4EZI, that members make a point of being on the air around 14,280, 21,380 and 28,680kHz on the sixth day of each month (YL Activity Day) on the hour every hour. This is an opportunity for anyone to make contacts for the BYLARA Award. There is also a net on Mondays at 7.15 pm (local) on 3,690kHz, and this may be joined by anyone after 7.45—contacts made at this time are also valid for the award if made on the sixth day of the month.

The association is open to all—licensed or not, and of either sex. The secretary is Mrs Diana Hughes, G4EZI, 3 Primley Park Crescent, Leeds LS17 7HY. Membership this year costs £2 or US$5, and a quarterly newsletter is produced. Informal meetings are held in tea rooms (at 2pm) by members attending most rallies!

Welcome

Due to staff shortages at RSGB HQ this feature has been omitted for a number of months, and those who have joined the Society from other countries during this time have not been listed. Sincere apologies—this does not mean that they are any the less welcome! Some of those who have joined this year (up to early June) are: A22AA, A22BF, AB8L, C6ACA, CT1FB, CT4ER, CT4RA, DA4AP, DK8BH, DL8RAH, DL9TJ, EA1TE, EA1UA, EA2EM, EA5PS, EA5SP, EA6DW, EA7BLO, EI1DK, EI2AFB, EI5DR, EI6AV, EI6DY, EI7DR, EI7EB, EI0DA, EP2ZA, F1AIA, F1DPU, F1GCA, F6BGI, F6DLA, H44SH, HA5BT, HB9BXW, HB9CAW, HB9RAH, HI8FCN, I1LEP, IX1BGJ, JA1EPY, JA1KRU, KA1ESH, KB7MM, LA6VA, LA9CY, LA0CK, LB6TA, LX2RF, N4BNK, N4LE, N6RA, N9ALK, ON1KXX, ON1RL, ON6RD, ON7WB, OZ7AQ, PA0JDZ, PY3CJS, SM4DHF, SM6PU, SK7JC, SM0MAN, TF3YH, VE3BJJ, VE3BLB, VE3EAU, VE3RC, VK2ALU, VK2DSY, VK4IO, VK4ZRQ, VK6HK, VK6RO, VK9NL, VP8QE, VP9EP, W1YL, W1RU, W2HD, WA2ROJ, W4GUF, WA4MRR, WB5FOT, ZB2GU, ZC4DY, ZL2APK, ZL3ST, ZS2WV, ZS6AES, ZS6ARG, ZS6BTB, ZS6M, ZR6ABX, 4X6AS, 5B4AN, 5B4RW, 5N6RED, 5Z4GM, 5Z4PR, 8P7F, 8P6NO and 9G1YS.

New listener members were A. Thorne, E. Barrett and R. Ambler. (A4), J. Taylor (A9), A. Ayling (DL), I. Kluiters, A. Barnard-Birt, F. Prompion and T. Cleghorn (EA), M. Burrell (EA8), J. Clarke, W. Dundon, D. Hill, J. O'Hara, W. McCauley, J. Ivory and G. Sheehan (EI), G. Delor, Lafosse and M. Solomon (F), T. Doyle and A. McLean (HZ), A. Yonel (JA), O. Brynhi and A. Gaard (LA), J. Charles and R. Stearn (ON), B. Johansson (SM), G. Gopah, N. Kathju and M. Porter (VU), A. Ward and W. Guzman (W), R. Brindle (YJ), A. Hellier (ZB2), J. Bramford (ZE), R. Wearie and J. Van der Walt (ZS), J. Lord and S. Porter (7Q), S. Kapang'a (9J), and J. Johnson (9V).

Top band

News has been received from ARRL that the FCC has decided to lift most of the restrictions currently affecting USA amateurs on 1·8MHz. Some restriction will remain in the 1,900 to 2,000kHz section in order to protect Loran stations in eastern Canada, but the rest of the band will receive full power and other normal facilities in the near future.

Claims for top band "firsts" continue to come in and they will be sorted and published in due course—in the meantime readers are invited to send in details of any contact which they may have made which they believe to be the first between the UK and any other country.

Awards

The **CHC Western States County Award** programme issues a number of certificates to licensed amateurs and listeners who submit a list of the requisite contacts certified by two licensed amateurs. They will all be endorsed for bands or modes as requested. The original awards cost US $3 each, and later endorsements US $1. Applications go to: Awards Manager, Scott R. Douglas Jr, KB7SB, PO Box 46032, Los Angeles, Cal, 90046, USA. The individual awards (with minimum number of counties worked requirement) are:

Washington State (10)	Wyoming State (7)
Oregon State (10)	Idaho State (15)
California State (20)	Montana State (15)
Arizona State (variable)	Alaska State (2)
Utah State (7)	Hawaii State (2)

Tony Siese, VP9HK

QTH CORNER

A9XE	N. Wilkinson, Post Box 25017, Awali, Bahrain, Arabian Gulf.
DL7RT/EA6	DL7RT, W. Rothert, Harnackstr 4, D-1000 Berlin 33, FR of Germany.
ED1ISI	EA1ANC, PO Box 1, Malpica, Coruna, Galicia, Spain.
FC0FRV	DJ2AA, P. Huber, Post-Planegg, Clarastr. 8, D8033 Krailling, FR of Germany.
FC0FRZ	DK9CG, M. Moises, Streiffachstr. 10, D 8034 Germering, FR of Germany.
FK8CR	now via F6EWK, J. Bueno, 3 Av Quesnay, 93190 Livry-Gargan, France.
JT0WA	OK1DWA, J. Sanda, Strojinica 10, 17000 Praha 7, Czechoslovakia.
JW5NM	M. Bjerrang, Svalbard Airport, N-9170 Longyarcity, Svalbard, Norway.
OH0AM	OH2BH, M. Laine, Pyorrekuja 4 C 43, SF-01600 Vantaa 60, Finland.
TI9FAG / TI9VVR	TI2EY, E. V. Moreno, San Pedro, El Retiro, Costa Rica.
VK4ANS/LH	ZL1AMO, R. W. Wright, 28 Charles Av, Massey, Henderson, Auckland 8, New Zealand.
XZ5A	JA8BMK, Jin T. Fukuta, Box 150, Ashigawa, Hokkaido 070-91, Japan.
ZM7ZR	via VK2BJL, D. Mead, Box 85, Round Corner, 2158, NSW, Australia.
ZM7JS	via VK9NS, J. B. Smith, PO Box 103, Norfolk Is 2899, Australia.
ZM7KD	via VK2BKD, S. Chambers, 15/4 Allison Rd, Cronulla 2330, NSW, Australia.
7Q7LW	L. W. Sampson, PO Box 24, Mtakata, Malawi.

Balaton Diploma
For QSOs after 1 January 1967 with members of the Balaton club (HA3s KGJ, KHL, GI, GJ, GQ, HE, HL, HQ, HZ, IG, IK, IQ, IS, NG, 4XW, 6NP and 8UA), each of which counts five points. Contacts with HA1s KXX, XA, XX, ZY, HA2s RQ, KRQ, KSC, YRC, SH, Y, HA3s KHB, KHO, GG, HK, HO and HU count three points; and with HA1s KZ, KX, Z, X, YZ, YX, HA2s KR, KS, KT, R, S, T, YR, YS, YT, HA3s KG, KH, KI, G, H, I, YG, YH and YI count one point. European stations need 30 points and must have worked two club members, others 15 points with one member. Fee is 10 ircs, and applications go to Turjanyi Jozsef, HA3GJ, SIOFOK, PO Box 78, H-8601, Hungary.

The WXBAS Award
This is awarded to those who have contacted at least 10 stations in the Brugge area (Brugge, Oostende, Knokke, Zeebrugge and Blankenberge). There is no time limit and applicants should send certified log and QSL data, plus seven ircs, to the award manager: Patrick Piesen, ON1APE, Dwarsstraat 3, B-8390 Knokke-Heist, Belgium.

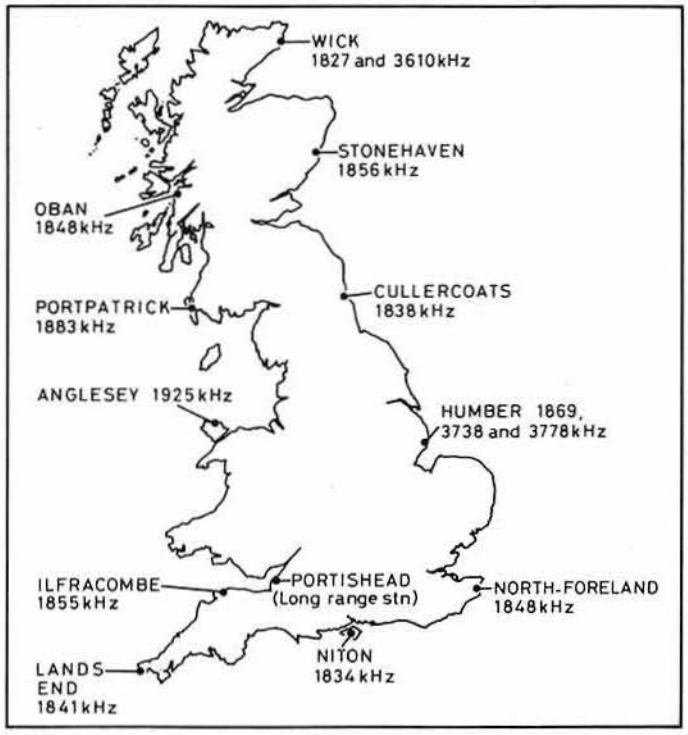
Royal Wedding Day Award (GB4RWD)
Issued to any licensed amateur or listener who submits details of a contact with, or reception of, GB4RWD between 28 July and 2 August 1981. A special endorsement will be added if this took place on 29 July. Send details plus £1, US$2, or 10 ircs to G4KIU, 10 Julien Place, Willesborough, Ashford, Kent TN24 0UH. Cheques should be made payable to "HRTW" and proceeds will be donated to charity.

BYLARA Award
Available to licensed amateurs and listeners who have worked/heard 15 lady members of BYLARA, at least 10 of whom were in Britain. Applicants outside Europe need 10 and 6 respectively. The starting date is 29 April 1979. Send log data, signed by applicant, with £1.50, US $4 or 12 ircs to Mrs D. Hughes, 3 Primley Park Crescent, Leeds LS17 7HY.

Varazdin 800 Award
Requires five QSOs with Varazdin (YU) during 1981. To aid in identification, Varazdin stations will use the YZ9 prefix and may be worked on more than one band for credit. Send log details to Radio-Club Varazdin, PO Box 3, 42 000 Varazdin, Yugoslavia. There is no charge, but return postage would no doubt be appreciated.

The Dip Med Award
Awarded to licensed amateurs and listeners who have worked/heard 15 of the 26 Mediterranean countries—one of which must have been Malta. (VHF applicants need only five.) The list of eligible countries is as follows: 9H, EA, EA6, EA9, F, FC, C, 7X, 3V, 3A, I, IS, IT, SV, 5B, SV5, SV9, ZB2, YU, ZA, 4X, OD, SU, TA, YK and 5A.

Helen and Tom Logan, VP9JD and VP9V



This map shows the locations of coast stations using frequencies in bands shared by the amateur service. At all times steps must be taken to avoid any possibility of interference by amateur stations

The 9H Diploma
Available to those who have worked/heard stations in Malta. Europeans need 10 points and others five. Each 9H contact counts one point, but QSOs with Goza (9H4) and the MARL club station 9H1MRL count two points. For both the Dip Med and this award send a list certified by two other licensed amateurs plus 12 ircs or US$2 (15 ircs or US$3 if outside Europe) to MARL, PO Box 575, Valletta, Malta. Both certificates are free to blind or handicapped applicants.

The Budapest Award
Issued for QSOs after 1 January 1959 with HA5/HG5 stations. Europeans need 75 and others 25. Fee 10 ircs. Apply to Remix RC, Budapest, PO Box 64, h-1475, Hungary.

Contests

Results of the **1980 CQ WW WPX Contest (CW section)** appeared in April *CQ*. In the single-operator category, UK scores were as follows:

G3KDB	(All band)	1,340,696 points	**G4CNY**	(28MHz)	84,132 points
G3MXJ	(All band)	1,077,616 points	**G3MZV**	(21MHz)	300,642 points
G3XTT	(All band)	415,758 points	**G4GOY**	(14MHz)	44,408 points
G2AJB	(All band)	77,028 points	**G4FAM**	(7MHz)	541,856 points
G6NK	(All band)	10,512 points			

Certificate winners are listed in bold type. G4FAM was world third on 7MHz. In the multi-operator single-transmitter category **G4DSE** achieved world 7th placing with 1,321,008 points. No British calls appear in the QRP section.

Howdy Days
1800 9 September to 1800 11 September
For lady operators only. Photocopy of rules available from G3FKM (sae please).

The Elettra Marconi Contest
1300 to 2200 26 September and 0400 to 2100 27 September. Photocopies of the rules of this contest may be obtained on request from G3FKM. Please include sae.

The All Asian DX Contest
0000 22 August to 2400 23 August (CW).
Rules of this contest appeared in June *MOTA*.

The European DX Contest
0000 8 August to 2400 9 August (CW).
Rules in July *MOTA*.

New Jersey QSO Party
2000 15 August to 0700 16 August and 1300 16 August to 0200 17 August. Useful for those looking for NJ counties. Activity will be around 3,535, 7,035, 14,035, 14,280, 21,100, 21,355, 28,100 and 28,610kHz.

Rhode Island QSO Party
1700 15 August to 0500 16 August and 1300 16 August to 0100 17 August. Look around 3,550, 3,710, 7,050, 14,050, 14,300, 21,050, 21,110, 21,360, 28,050, 28,110 and 28,600kHz.

Ohio QSO Party
0000 to 22 August to 2400 23 August.
Frequencies: 5kHz up from the low end of each USA General Class band.

Around the bands

The very early deadline and the holiday season have meant that G8KG's summary of propagation is missing this month. No doubt the details will appear at a later date but, in a short note to your scribe, Smithy said "there was a sharp fall in solar activity in the first three weeks of June".

This month's list of contributors is also somewhat reduced in size, but thanks are due to the following for information: G3HB, G5JL, G3s AAE, GHY, GIQ, GVV, IMW, KSH, GM3LYY, G3s NWG, YRM, G4s EHQ, EOW, GW4KGR, G4s LDS and LRS, and RS1066.

Stations using cw are listed in italics.

3·5MHz. 0000 PY7AFZ, W5JMM/SU, SV0AW/9 (SV stations may now use up to 3·73MHz on phone), 8P6JQ. **0100** OE8AJK/YK. **0300** KP2A/D, *OAPV* PYs, ZS5BK. **0400** VP2ET. **2000** ZE1EV. **2100** 5Z4YV. **2200** DA1WA/HB0, UK9CAE, 4X6DI. **2300** CE6COR, ZD8RH, 9Y4LL.

7MHz. 0700 *TF, YL1P.* **0100** *C6A, CP, CX, HF0POL, J8, OA, OX, UI8, VP5CM, YV, 9Y.* **0300** *HC, HH, HT, VP2A.* **0400** *HK0,* KP2A/D. **0500** *XE, ZL.* **2200** DA1WA/HB0, PY1ZAE. **2300** FM7WS, TL8CN, UI8FFF, ZD8RH.

14MHz. 0700 G3MUV/CE0, KH3AB, W6, ZM7JS. **0800** HK0FBF, VK9NL, VR6TC, ZM7KD, 4U1UN. **0900** C31GA, *K6XT/NH9,* UK1PGO, ZM7JS. **1100** *FO8GL.* **1400** 9M2CH. **1700** VU2AU. **1900** EK1P (F.J.L.), SJ9WL, UK1PGO, VK9YA, YL1P, 9V1UQ (QSL to K5BLV). **2000** XZ5A, 4S7OM, 6O0DX. **2100** JX2BZ (QSL to LA7JO), KP2A/D. **2200** J73RM, TA1CT (PO Box 902, Istanbul). **2400** *UA0YAD.*

21MHz. 0700 JA, NL7K. **0800** FO8CW, AH6CH/KH3, *KH6IJ,* ST0AS, VK, ZL, 5W1AU. **0900** FO8s DH, *HA,* JA (all day), UK1PGO, 3D2FL, 5W1DI. **1000** HL0ABY, W5VTH/KH8, ZK1CG/KH8, ZM7JS. **1100** AH8AA, *ZB2CN* (QSL to JH8SCA). **1300** *FY7YG, JT60UB,* VP2EK (QSL to VE1ASL), YB0BOS. **1400** H44SH, HS1AMB/P, KX6ZZ (QSL to DF7NM), 9M6MB. **1500** JT0WA, SV1JG/5, W6, VE6. **1600** AH2AK, CE0AE, HZ1TB (Box 3636, Riyadh). **1700** A7XG. AP2AC, D68AM, KP2A/D, VS5PP, 7Q7LW, 9X5OW. **1800** D4CBC, *J28CI, DL2VK/ST3,* T5TI, TY9ER, *9V1OK.* **1900** DA2CK/HB0 (QSL to KA2JFY), SU1AL. **2000** C31UN, S79RD, T5TI, VP2MX (QSL to VE1ASJ). **2200** J28CH, VK2AIE, W6RO. **2300** W6-W7, 4U1UN.

28MHz. SU1AA, 3B8DB, 5Z4GX (QSL to DF7GX), 8Q7BF. **0900** 9M8PW. **1000** LA1RR/ST2, VU2BBJ. **1100** DA2CK/HB0, 3B8CF, 5Z4YW. **1200** *KP2A/D,* VP2MBN. **1300** ZD8TC/M. **1400** A4XIU, LU, PY, ZP, 8Q7BF. **1500** HZ1HZ. **1600** A9XCX, 5N0WNL, 9V1UH. **1700** C5ADS, EP2TY (QSL to JR3WRG), JT0WA, TYA111, 5N9GM, 7Q7LW. **1800** HC1BP, VP8QG, *VU2LO,* 9G1RT. **1900** HH2RL, KP2A/D, LU, PY, YV, ZP. **2200** J88AM.

Thank you to all correspondents—and to the editors of the following for information extracted: *Long Skip* **(VE3BMV)**, *QRZ DX* **(K5FUV)**, *DX'press* **(PA0TO)**, *CQ Magazine* **(W1WY)**, *DX NL* **(DL3RK)**, *Lynx DX Bulletin* **(EA1QF/EA2JG)**, the *DX Bulletin* **(K1TN)**, the *Long Island DX Bulletin* **(W4UL/W21YX)**, and *DX News Sheet* **(Geoff Watts).**

Please send everything for **October** issue **to reach G3FKM** no later than **4 September** and for **November** by **2 October.** □

HF propagation study

Band predictions for August 1981

UTC	28MHz 000001111122 / 024680246802	21MHz 000001111122 / 024680246802	14MHz 000001111122 / 024680246802	7MHz 000001111122 / 024680246802	3·5MHz 000001111122 / 024680246802
EUROPE					
Moscow	.....	...11111232.	213655556885	763111111368	43.....4+
Malta	.....	...12222242.	523766667897	996311112478	+ + 3.....24+
Gibraltar	.....	.....21.	31 .465555885	997532112478	+ + 52.....25+
Iceland	.....	.....	12222552	766422222356	5542.....23
ASIA					
Osaka	.....	...12212211.	....31.13574	.....14.	.....
Hong Kong	.....1..	233234531	2....1.13786	153	.....2.
Bangkok	...1111112.	...1234335751	4....1.13788	1.....156	22
Singapore	...1111112.	...1234345752	5.....13788	1.....156	23
New Delhi	...111112..	...2334346531	63.....13788	3.....157	24
Teheran	...22221231.	113433446863	8641....13799	62.....157	3.....24
Colombo	...22222221.	1.2334446763	73.....13799	4.....157	2.....24
Bahrain	...22332331.	314434457875	974.....3799	73.....157	4.....24
Cyprus	...11111121.	1.2555656763	877544456899	863.....368	+ 3.....35
Aden	...33344442 1	534534457877	985.....13799	74.....157	5.....24
OCEANIA					
Suva (s)	.....	...11111132.	..1531.1364.	...1....1..	.....
Suva (l)	21.1.....52	33363.....84	.463....45.	...1....1..	.....
Wellington (s)	.....	...11111..2.	..3531.11262	...1....11.	.....
Wellington (l)	11.1.....22	54352.....76	23563....363	...1....11.	.....
Sydney (s)	.....	1.1443231..1	1.1421.13444	.....14.	.....
Sydney (l)	1	32134.....45	111531....185	.....13.	.....
Perth	...22221....	1.2454431...	52..2..1354.	1.....155	22
Honolulu	.....	.....1..121.	..2421.123.	...11.....	.....
AFRICA					
Seychelles	...33444432 1	534434557877	984.....13799	73.....157	5.....24
Mauritius	...33455552 2	514535557887	9751....3799	74.....157	5.....24
Nairobi	1...33455663 2	745634457988	9972....3799	762.....157	44.....24
Salisbury	2...33466674 3	854744557998	9984....3699	873.....157	55.....24
Capetown	...24456774 2	2...765557998	86162....2699	7841.....157	452.....24
Lagos	21.24356775 3	864764347998	99862....2699	7851.....157	452.....24
Ascension Is	21...4334565 1	752175446897	99853....1689	7751.....157	442.....24
Dakar	1...1334556 51	753574334897	99863....589	8751.....47	552.....4
Las Palmas	....1111112 1.	21.255565763	986765545799	88631....158	+ + 3.....25
S AMERICA					
South Shetland	.....4656 4.	2456884	621.11..2678	6751.....125	452.....2
Falkland Is	1....1454641	6521.4456886	998621..2468	8851.....15	552.....2
Rio de Janeiro	1....3354541	652115444687	998631...269	7751.....17	542.....4
Buenos Aires	1....2343541	6424.5454686	998621...158	7751.....4	552.....
Lima	121221	42.232343355	997641....16	6851.....1	352.....
Bogota	1111121	31.124332345	886641....6	5851.....	252.....
N AMERICA					
Barbados	1121221	42.234332366	997641....27	7851.....2	452.....
Jamaica	.....11. 1.	31...13221235	885531....5	4751.....	.42.....
Bermuda	.....11. 1.	31...13221255	875531....26	5751.....1	242.....
New York	.....1 2.	2....1121244	763321....15	3751.....	.42.....
Mexico	.....1. 2.	2....121223	56332.....1	551.....	.22.....
Montreal	.....	1....1111234	763321....25	3651.....	.32.....
Denver	.....	1.....12	4423.....1..1	341.....	..2.....
Los Angeles	.....	1111	23231....2...	141.....	.....
Vancouver	.....	.....	22231....1...	131.....	.....
Fairbanks	.....	.....	112431.12211	...11.....	.....

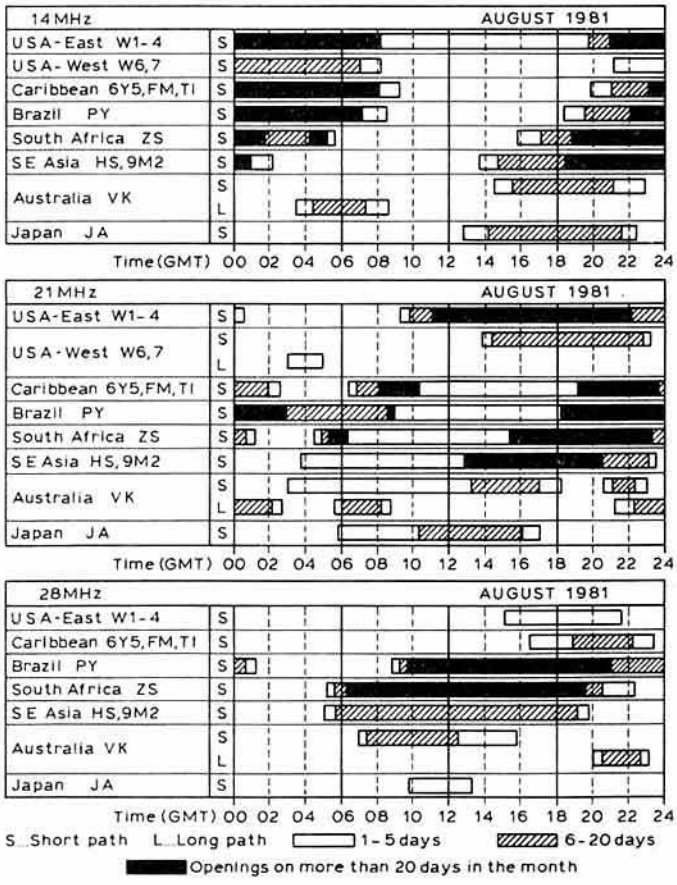
Propagation predictions

During August the F2 mufs remain at their low summertime value. Beginning in September they will slowly rise to reach their maximum towards the end of October/beginning of November.

Traffic with North America on **28MHz** will be very rare. More certain on this band is traffic with Africa and South America. Because of seasonal changes from winter to summer conditions in the southern hemisphere, **28** and **21MHz** will remain open a little longer for traffic with Australia and South Africa. Apart from this there will be little change in conditions on **21MHz** compared with last month. As compensation for poor summertime conditions, there remains the possibility of short-skip dx. This will occur at random and facilitate traffic with the rest of Europe on **28** and **21MHz** caused by reflection of high frequencies by sporadic-E. **14MHz** will remain the night-time dx band. Traffic, which will sometimes be possible during the afternoon on **14MHz** with Australia and Asia, will be mostly interrupted by European QRM.

There will be no noticeable change on **7** and **3·5MHz** compared with last month. During the second half of the night, local traffic on **3·5MHz** will only be interrupted by the dead zone through interference.

The provisional sunspot number for May 1981 from the Sunspot Index Data Centre (Brussels) was 126. Solar activity was higher during the first 18 days of the month. Using the Waldmeier formula the maximum monthly smoothed sunspot number of Cycle 21 occurred in December 1979. The predicted smoothed sunspot numbers for September, October and November are 125, 123 and 121 respectively.



OBITUARIES

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

Mr V. A. G. Bunn, G8RUW
Victor Bunn died on 2 June, aged 53. Although he had only taken out an amateur radio licence in recent years, he had a long-time interest in radio, not only as a hobby, but also professionally. He was a member of Norfolk Raynet and deputy controller for the Breckland group, and was always enthusiastic and willing to help.

Mr B. Dean, G3KDK
Bert Dean died on 3 April. He had a long career in the Navy in radio, and retired a chief radio technician. He also joined the British North Greenland Expedition. Later he worked with the Home Office Communications branch. He was a keen member of RNARS and kept many skeds, both on cw and phone.

Dr M. Gibbs, G3FGQ
Dr Michael Gibbs, who died on 25 March, was a keen radio amateur, although he confined his activities to listening. He built much of his own equipment.

Mr W. J. Green, G3FBA
Bill Green died on 29 May. He was an RSGB Council member for many years, and had also been a regional representative. Up to the time of his illness he had been active on the vhf bands and was just returning to hf. He was a member of RNARS.

Mr J. Hall, G3RAK
Jim Hall, who died on 25 April, was a keen amateur who helped many with the morse test.

Mr S. E. Janes, G2FWA
Edgar Janes died on 1 May, aged 59. An enthusiastic and active member of the Society for many years, and a founder member of the Government Communications ARC, he was especially proud of his involvement in the Voluntary Interceptors' organization during the war. His main interests lay in technical and constructional aspects of the hobby, and he was always willing to help others less able than he. He was active on the air until a few days before his death.

Mr R. J. Lock, G3PHK
Dick Lock died on 25 April. He attended rallies all over the UK, and enjoyed the hf bands, and latterly 144MHz. He was also a member of the RSARS.

Mr J. B. McRae-Smith, G3HEK
Joe McRae-Smith died on 16 May. He was a keen cw operator and in recent years concentrated on top band and 14MHz. He was a member of the Salop ARS and was involved in the club nets.

Mr N. E. Reed, G6US
Eddie Reed died on 22 January, aged 77. He was first licensed in the mid-'twenties and was active until his death. He served with the RSS. He operated mainly on the hf bands, but operated a sked with G5BG on 144MHz for many years.

Rev Father S. J. Smith, STL, PhL, GM4DNM
Stan Smith, who died on 26 May, aged 67, was first licensed in 1973 as GM8IEH and gained his "A" licence in 1974. His main activity was on the hf bands on ssb, and he was also well known on local 3·5 and 144MHz nets. He was a member of RSGB and had served as regional representative for Region 13 from 1975 to 1977. He was an active member of Glenrothes & DARC and was a former chairman of the club.

Mr R. Warne, G8AW
Ronnie Warne died on 6 May, aged 76. He was a long-serving member of the Cornish Radio Amateur Club, and a founder member of the West Cornwall RC before the second world war. He was a keen dx operator, working the places he had visited during his time with the Royal Navy.

Mr N. Wilshire, G3CEU
Norman Wilshire, who died on 2 June, was active on 1·8MHz for many years. He was a keen member of Stevenage & DARS. When he moved to Helsdon, although not so active he occasionally worked 7MHz ssb, and became a member of the Cornish Radio Club.

Also:
Mr C. D. Craythorne, G3PBC;
Mr F. T. Howard, RS44797, on 2 March;
Mr C. N. Lawrence, BRS42189;
Dr S. A. Maclean, RS34931, on 21 May;
Mr J. Nisbet, GM3QK, on 10 April;
Mr J. J. B. Paine, G3CQV, on 27 December 1980;
Mr S. M. Thompson, G4JLE, on 7 December 1980;
Mr W. B. Urquhart, RS32908, on 24 May.

YOUR OPINION

EQUIPMENT COSTS

The Editor
Radio Communication

Sir—I read with great interest the letter from Arthur Milne in the May issue of *Rad Com*. The subject is, to my mind, one of the greatest importance to radio amateurs, and one about which there has been little or no discussion. Interestingly enough, in mid-May I returned from the USA with the very rig that he cites as an example.

To be fair it must be remembered that import duty is payable on equipment brought into the country from overseas, and this does not appear in Mr Milne's calculations. My understanding is that this duty is 7 per cent on transmitters, 11 per cent on transceivers and 14 per cent on receivers....don't ask me why! This duty is payable on the total of cost, insurance and freight charges. Finally, on top of everything, there is of course VAT at 15 per cent. The prices quoted are fairly typical of those paid in the USA, with the exception of the list price—I doubt if anyone pays that. It is worth noting that most states impose a sales tax, but this can be avoided by having the rig shipped across the state line. All things considered the price of a Kenwood TS830S shipped by UPS may be taken as $850. If one is prepared to shop around I do not doubt that it will be possible to reduce this figure by $25 or even more. If one brings the radio back on the aircraft from the USA, the total cost on the basis of $2·40 to the pound, is around £455.

A rig purchased in this way will of course have the Kenwood name rather than Trio on the front, but that is about the only difference. While it may arrive set up for use on 120V, the manual details conversion to 220V or 240V. Although it is by no means clear from either the operating manual or the service manual, the digital remote vfo model VFO-230 will convert in a similar fashion. For those interested in purchasing vhf equipment it should be pointed out that the fm channels are not at 25kHz spacing as in the UK. I do not think that there are many Japanese manufacturers who would produce a "cpu" or synthesizer chip solely for the UK market. It is usually fairly easy to convert equipment bought in the USA to European standards. It may be necessary to install a toneburst, as North American practice seldom requires this feature.

Shipping the equipment back to the UK can be expensive as a *one off*, because of the fees charged by shipping agents. However, even allowing for this cost it may well remain an attractive proposition for someone who does not visit the USA. For those who, like myself, have already a need to be over there, nothing could be easier. The rig and its carton were shipped by the dealer in yet another carton and was thus very well protected. Transatlantic carriers allow one to send free of charge, two bags, the dimensions of which do not exceed 106in. There is a weight restriction, but this is seldom relevant. Baggage insurance is a cheap but necessary precaution.

If the rig to be imported covers the 28MHz band, then at least a month prior to departure, it is necessary to write to the Home Office, Waterloo Bridge House (attention Mrs Dixon) to obtain an authority to import the rig, as it will be one that is specified in the Radio Telephonic Transmitters (Control of Manufacture and Importation) Order, 1968. Section 7 of the Wireless Telegraphy Act, 1967 therefore prohibits the importation of the apparatus save with this authority. The permits are issued free of charge, but the make and model of rig must be specified at the time of application.

I do not doubt that our friends in the trade will counter by saying that the dollar is now much stronger against the pound (at the time of writing $2.12) but one should not forget that in turn the dollar is stronger against the yen, and thus importation costs into the USA will be correspondingly lower. Equally they will say that "You're on your own when it comes to service". For the last 10 or more years I have serviced a well-known brand of American equipment by corresponding directly with the manufacturer. The price that I paid in the USA covers the dealer's profit *and* warranty servicing in that country.

Is it worth all the trouble? There is very little trouble—and by purchasing a TS830S and a VFO-230 while on a visit, I saved a great deal of money; indeed rather more than the cost of my fare. There is no doubt in my mind that the prices charged for amateur equipment in the UK are:
(a) fixed, which as I understand it is contrary to the law; and (b) excessively high as a result of dealer profits which are far in excess of what they should be. The remedy lies in the hands of UK radio amateurs.

C. Pedder, G3VBL

Sir—Radio amateurs do *not* pay £639 for their TS130S. They pay £438 plus air-mail, VAT and duty paid. The UK retail trade is aimed solely at the amateur radio telephone and telegraph operator's market, which is a separate hobby from amateur radio, although we share the same bands. The prices charged in the UK, assuming one needs to buy from a professional retailing organization offering "off the shelf" sales, hire purchase, trade-in facilities, after-sales service and showrooms with a full-time staff are quite fair considering the small number of amateur licences in this country. You cannot expect a businessman to invest his money in "ham" radios unless the return on the investment is considerably more than what he could get simply by lending the money to a building society—at far less risk!

Be this as it may, it is up to *genuine* radio amateurs to make it quite clear to the retail trade that we will *not* pay for after-sales service that we do not want. Neither will we pay the high profit margin asked simply (but economically rightly) because the UK does not contain many amateurs! At the prices being charged at present, debatably the retailers might not need us but *we certainly don't* need *them*.

My suggestion to all *real* radio amateurs intending to buy gear is this. Find a dozen others, either via RSGB or the air, who are also contemplating buying a new rig. Work out the cost of self-importing the **lot** from abroad direct. Deduct 10 per cent and offer **that** as a price to the UK retailer on the basis of cash-as-seen working for all 12 rigs! If you want HP, negotiate it yourself direct with a finance company—that is all the retailer will do anyway. If the UK dealer will not meet your price, and he'll think long and hard if you're talking in 12 offs, then give him the old goodbye and import direct. I buy my commercial rigs direct now, when I want them. I always give the UK trader the option of selling to me at the same price as I can import. If he won't do it, he doesn't get the business. You do likewise.

Stephen Dyke, G3ROZ

Sir—I have read with interest the letters from G2MI, GW6WM, G3SKI (May 1981 *Rad Com*) and GW3BGP (November 1979 *Rad Com*) about the costs of equipment, and have heard many comments over the air, and feel very much the same way.

I would like to suggest that some form of price fixing is in operation by the importers. Why are prices the same to the nearest penny from all retailers? Are all their overheads, profit margins etc the same?

Could a price fixing ring be carried out like this?
(i) If a retailer is going to sell equipment at a price less than the importer dictates then they are "fobbed off" with the tale that they have no spare units in stock.
(ii) If a cut-price retailer wants to sell and advertise his wares in a magazine, then the major importers/retailers threaten to withdraw all their advertisements indefinitely from that magazine—ie cutting off a large part of the magazine's revenue.
(iii) The importers impose a stranglehold on the supply of spare parts.
(iv) Dealerships are quickly terminated.

All of these would try and put the cut-price retailer out of business unless he had substantial financial backing to weather and "smash" the ring.

(Continued on page 750)

CONTEST NEWS

Low Power Contest 1981 results

The contest attracted fewer entries than last year's record number, but activity was about the same, judging by the number of contacts made. There were 84 British low power stations shown in the logs, some only in one or two unfortunately; could they be persuaded to stay a little longer and send in an entry next year? Further analysis showed 24 low power overseas stations active, and two Finnish stations who, although they did not manage to work into the UK, still sent in their logs.

Conditions on 7MHz were not helpful to inter-G contacts, while on 3·5MHz overseas entrants had trouble raising the few UK stations they could hear, except during the first and last hours of the contest. Other contest activity on 7MHz (D.I.G., SM, UA) added to the spice during the morning.

Section A winner George Burt, GM3OXX, used an impressive 300ft long wire antenna 150ft high. He also had the second highest score overall. Runner-up D. F. Beattie, G3OZF, had a BFY50 transistor pa driven by a TS520, to dipoles at 75ft. Third placed J. J. Hunter, G3AZ, used his home-made valve transmitter with a 6AK5 pa (a popular low noise front-end valve for receivers in the 'sixties).

The leader in Section B, Chris Page, G4BUE, had the highest overall score, and operated a TenTec Argonaut at 5W input with inverted V antennas 50ft high Second placed Iain Robertson, GM4HBG, was keying an HW8 and listening on an FT101B, with dipoles at 40ft. Edwin Hodson, G3XTJ, fought receiver troubles and local noise to take third place with a horizontal end-fed wire (halfwave on 3·5MHz) and a quarterwave vertical on 7MHz, driven by a TenTec Argonaut and receiving with an R4C.

First placed in the overseas section, Joop Stakenburg, PA3ABA, used an HW8 and inverted-V antennas. DJ6FO, last year's winner, used similar antennas, but keyed an FT401DX coupled to a 6DQ6A valve pa. Frans Koop, PA0FKP, with a home-made valve transmitter (EL90 pa) at 5W input, feeding a 22m end-fed wire, took third place.

Comments from the logs: "Prefer 8h rather than 11", *G3DNF;* "Present scoring system much better but why two sections?", *G4BUE;* "Conditions for inter-G working on 7MHz could hardly have been worse", *G3AZ;* "Preferred last year's scoring system", *G4DVW;* "Lots of QRP stations couldn't hear me from my quiet portable location, what about a distance multiplier?", *G3VIP;* "3·5MHz not useful, last half-hour signals came out of noise, end of contest should be later. Suggest 1000gmt to 2000gmt", *PA3ABA;* "Hard work for Continental stations", *HB9ASJ;* "Some operators call QRP test but don't listen hard enough", *PA0FKT.*

Subject to Council approval, Chris Page, G4BUE, will be awarded the 1930 Committee Cup.

G3KKQ

SECTION A: BRITISH ISLES STATIONS USING 1W OR LESS

Posn	Callsign	3·5MHz QSOs	3·5MHz Points	7MHz QSOs	7MHz Points	Total
1	*GM3OXX/A	35	500	33	445	945
2	*G3OZF	49	630	22	280	920
3	*G3AZ	30	390	29	330	720
4	G3DNF	23	330	15	225	555
5	G3SYC	38	530	–	–	530

SECTION B: BRITISH ISLES STATIONS USING 5W OR LESS

Posn	Callsign	3·5MHz QSOs	3·5MHz Points	7MHz QSOs	7MHz Points	Total
1	*G4BUE	57	730	41	515	1,245
2	*GM4HBG	26	360	46	570	930
3	*G3XTJ	47	610	18	210	820
4	G3VIP/P	34	465	25	345	810
5	G4ERT	49	670	8	105	775
6	G3UYM	37	535	15	225	760
7	G3YNA	32	435	20	290	725
8	G8IB	26	375	12	165	540
9	G3AWR	15	215	18	270	485
10	G4BCY	22	255	16	205	460
11	G3BPM	23	290	14	100	390
12	G4DVW	27	335	5	45	380
13	G3IFF	31	355	2	10	365
14	G4HMD/A	14	200	13	160	360
15	G4BUO	17	245	8	110	355
16	G4AYS	26	325	–	–	325
17	G4EBO	–	–	12	165	165

SECTION C: OVERSEAS STATIONS USING 5W OR LESS

Posn	Callsign	3·5MHz QSOs	3·5MHz Points	7MHz QSOs	7MHz Points	Total
1	*PA3ABA	4	45	32	445	490
2	*DJ6FO	–	–	24	335	335
3	*PA0FKP	–	–	16	230	230
4	PA3ASC	2	25	8	115	140
5	HB9ASJ	–	–	6	75	75
	†OH2BBL	(8)	100	–	–	–
	†OH5JK	(2)	30	–	–	–

* Certificate winners
† Claimed points only, no valid contacts made.

Check logs acknowledged with thanks from G3MCK, G4KLQ, PA0PN, PA0WTK and PA0WX.

7MHz Contest 1981 results

Once again we have to report a disappointing entry from British Isles stations, with numbers slightly down on last year. Entries in the rest of the sections are well up on previous years and it would appear that the HF Contests Committee is running this particular contest for the benefit of overseas stations! It is the committee's aim to run contests for the RSGB membership.

In the SSB Section almost 200 G stations were active, and in the CW Section over 100, and yet we only get a very small percentage of the active stations submitting a log. Next year SSB Section British Isles stations will be able to work USA stations and it is hoped that this will encourage more people to send in their logs.

The standard of logkeeping was generally good, but a few entrants were very confused by the callsigns of the GDR stations, and some entrants failed to send in the required summary sheet.

G3FXB will be awarded the G6QB Trophy, and winners and runners-up in the other sections will be awarded certificates.

Finally the committee would like to thank especially those stations who submitted logs for both SSB *and* CW Sections.

Equipment used by leading entrants
G3RRS: TS180S, SB220, RA1772, 2-el Yagi, dipole, inv-V, beverage.
G3OZF: TS520, L4B, λ/4 vertical, delta loop.
G3FXB: T4XC, R4C, 3-el wire Yagis to NW and NE, 2-el to SW.
G3SJJ: TR7, 40m delta loop, 80m delta loop.

DX worked and breakdown of leading entrants' scores
G3RRS: CO, CX, EA8, FM, FY, HI, HK, JA, PY, PZ, SU, TG, UA9, UL, VE1,2,3,6,7, VP1, VP2M, VP8, XE, YB, YN, YS, YV, ZD7, ZL4, ZS, 4X, 5N. (454 QSOs, 63 mults, 2,977 points.)
G3OZF: EA8, EP, FM, FY, H4, HI, JA, PY, PZ, ST, UA9, UL7, VE1,3,6, VP2M, VP8, YV, ZD7, ZL4, ZS, 5N. (397 QSOs, 54 mults, 2,498 points.)
G3FXB: EA9, JA, PJ, PY, T1, UA9, UD, UJ, UL, VE1,2,3,4,7, V0, VK3,5, VP2A, VP2M, W1 through 0, YV, ZD8, ZL1. (622 QSOs, 62 mults, 6,620 points.)
G3SJJ: CO, EA9, JA, PJ, PY, T1, UA9, UD, UF, UJ, UL, VE1,2,3,4,7, VO, VK3, VP2M, W1 through 0, YV, ZD8, ZL1. (507 QSOs, 61 mults, 4,709 points.)

G3KDB

BRITISH ISLES SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3RRS	187,551	11	G3UDY	15,384
2	G3OZF	134,892	12	GW3HBK	14,256
3	G3TSL	129,387	13	GM4EHB	11,155
4	G2QT	61,524	14	G4ARI	10,120
5	G3BBD	40,410	15	G8VF	7,800
6	G4EQI	38,522	16	G3SOX	3,855
7	G4KPE	36,828	17	G4FVK	2,873
8	GU3YIZ	30,688	18	G3ZGA	2,516
9	G3VLX	21,138	19	G4KAL	1,199
10	G4BYY	20,930			

REST OF WORLD SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	EA8XS	3,987	4	UW9FD	60
2	UA9FGJ	1,530	5	PZ1BK	45
3	JA6XMM	540			

EUROPE SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	OZ5KG	13,090	38	YU1AST	760
2	DA1BJ	9,900	39	OZ4HW	708
3	ON6RL	8,190	40	EA7BNK	700
4	EI7CC	7,520	41	Y22TD	696
5	UP2OU	7,320	42	SM4BTF	675
6	DK7VW	6,045	43	OK2TBC	600
7	F8WE	5,720		OZ6YJ	600
8	EA2QU	5,343	45	OZ1DAF	598
9	G4JVG/SM0	4,615	46	YO2BEH	595
10	OH2VB	4,356	47	YO6OO	560
11	DL3FAK	4,344	48	DK5GX	525
12	SP9KAD	3,887	49	EA4AHA	486
13	OK1FAR	3,393	50	SP5GTC	450
14	SP6CZ	3,237	51	YO8BDA	420
15	OK3TOA	2,926	52	OK1MSP	415
16	UB5MGY	2,925	53	OH1TD	400
17	LA8WI	2,820		YU7SF	400
18	UP2GF	1,969	55	Y22RK	376
19	Y23TD	1,830	56	PA0CF	360
20	Y44XF	1,790	57	OH2DN	350
21	PA0EHF	1,755	58	DJ6QO	320
22	Y54ZI	1,584	59	Y43VL	300
	PA0CLC	1,584		YU3DRM	300
24	HB9DX	1,575	61	Y47XF	290
25	OK2PDL	1,450	62	YU7ORQ	275
26	Y46XL	1,377	63	Y25BL	260
27	LA4HH	1,320	64	OK1KJP	225
28	Y39QA	1,248	65	OK3FON	212
29	OK2BQL	1,100	66	OH6DH	180
30	PA2HJH	1,050	67	OH7NW	165
31	Y36XH	1,024	68	HA5KFL	150
32	LZ2RF	990		Y26IH	150
33	OK3YK	944	70	Y34SE	144
34	UP2BCD	910	71	DA1BB	120
35	PA3ASK	870	72	SP7KTE	110
36	PA0PHK	810	73	LA4YW	100
37	PA0FEI	805	74	OK2BWH	50

Check logs received from: LZ2KKZ, PA3BIA, PA0VSS, SM5BDV, SP1GHW, SP5BHY, Y27VH, Y34YF, YU2QU.

BRITISH ISLES SSB RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS32525	49,058	3	BRS45019	15,260
2	BRS28198	25,668	4	BRS15822	12,285

REST OF WORLD SSB RECEIVING

Posn	Station	Points
1	UD6-001-220	3,990

EUROPE SSB RECEIVING

Posn	Stations	Points	Posn	Station	Points
1	SP-3003-LG	4,980	12	Y2-EA-10576/O	1,720
2	OK1-21568	4,740	13	Y2-9460/F	1,624
3	UP2-038-1580	3,630	14	UB5-073-1610	1,480
4	Y2-6992/F	2,585	15	Y2-4406/G	1,400
5	Y2-17509/C	2,350	16	Y2-8213/L	1,200
6	Y2-EA-14129H	2,295	17	Y2-EA-11030/F	840
7	SM3-5384	2,280		ONL383	840
8	UA1-169-438	2,080		NL5288	840
9	OK1-21873	1,950	20	Y2-8580/A	805
10	Y2-10103/F	1,925	21	UB5-060-1690	450
11	SP-0125-WA	1,760	22	SM5-6559	200

BRITISH ISLES CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3FXB	410,440	16	G3IMK	71,595
2	G3SJJ	287,249	17	GM3PIP	69,044
3	G4CP	256,896	18	G4KPE	67,252
4	G3IGW	254,324	19	G3KSH	33,618
5	G3PDL	246,089	20	G3APN	29,865
6	G3OZF	230,214	21	G3ZDW	23,793
7	G4CNY	226,655	22	G2FNK	21,519
8	G3UFY	198,234	23	G3WTM	16,327
9	G3XTT	175,336	24	G3HRY	14,066
10	G5MY	155,116	25	G4BUO	13,365
11	GM3OXC	113,092	26	G3AWR	9,152
12	G3DCZ	109,956	27	G3SWX	6,080
13	G3JKS	104,622	28	G4EBK	5,712
14	G2QT	104,572	29	G3TXF	3,485
15	G3SXW	83,214			

Check logs received from: G2AJB, G3RDQ, G3FXA, G4FAM.

REST OF WORLD CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	UJ8JAS	7,920	12	N0TT	2,010
2	UA9CAL	7,035	13	K5MM/7	1,770
3	W1CCN	6,195	14	UL7PBY	1,650
4	UA9FCI	6,160	15	K1WJ	1,500
5	K2SX	4,725	16	AK3Z	1,275
6	UA9FGO	3,660	17	W4KO	1,060
7	UA9GFV	3,600	18	W2ND	1,000
8	UA9AFO	3,450	19	W1END	660
9	UA9UCK	3,200	20	W0CH	620
10	VO1AW	2,870	21	KA1CC	210
11	UD6DKW	2,300	22	UA0CBW	15

Check logs received from: EA9GT, K6FM, YV5HL.

EUROPE CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	EI5DI	4,650	62	UB5VK	1,090
2	UC2WAZ	4,268	63	SP2BME	1,050
3	UQ2GFM	4,230	64	OH3XS	1,038
4	EI7CC	3,762	65	YU7SF	1,030
5	UB5FJ	3,672	66	LZ1IF	1,026
6	OK1FCA	3,591	67	HB9DX	1,020
7	SM5DAC	3,519	68	PA0DIN	987
8	DL5JQ	3,032	69	HA3HE	978
9	OZ4HW	3,015	70	UA6LFR	950
10	OK3TOA	3,000	71	UW3UO	948
11	Y22UB	2,952	72	Y24GE	930
12	DF4KV	2,880	73	OK1PH	900
13	LA8XM	2,862	74	Y4IYN	890
14	HA7RF	2,793	75	OH5OZ	888
15	OK3CFP	2,790	76	OK1AWH	861
16	DK9XT	2,655	77	SM6DUA	840
17	OK1RR	2,640	78	SP6BYF	835
18	UP2BEX	2,608	79	UO5OFV	825
19	UT5EH	2,565	80	Y27IL	798
20	HA4YG	2,527	81	HA5JK	780
21	UB5FAA	2,511	82	UB5UGO	778
22	EI0CS	2,439	83	UC2SE	774
23	OK1ATZ	2,400	84	UA4PAB	768
24	UB5ITU	2,345	85	Y3IWI	765
25	UO5OWC	2,280	86	OK1MZO	750
26	HA5KHG	2,275	87	LA2MA	745
27	Y27VH	2,184	88	OH2DN	732
28	YU3TKN	2,112	89	Y33WA	726
29	PA0WKI	2,080	90	YO7AWQ	725
30	SP5LGT	2,016	91	Y47ZL	705
31	OH6RC, Y39YD	1,984	92	PA0CF	692
			93	OH7NW	690
33	Y26FL	1,888	94	UA1GJM	660
34	LA7XB	1,864		LA2KD	660
35	UB5SBG, UQ2GAA, YU2QU	1,792	96	YO6ADW	620
			97	OZ6YJ	588
			98	PA3AMA	575
38	UQ2GEC	1,760	99	YO2IY	500
39	DL9OT	1,750		YO2BEH	500
40	UB5WCJ	1,743	101	SP5ES	495
41	YO8CDQ	1,715	102	Y43VL	475
42	LZ1KDP	1,680		Y5IYJ	475
43	UA1FV	1,650	104	OK1MSB	440
44	Y31ZE	1,600		OK2BQP	440
45	Y23CM	1,590	106	HA5KFL	412
46	Y2IGH	1,568	107	UP2PBM	400
47	OK1DRY	1,560	108	Y23HN	390
48	UA3AFQ	1,536	109	OE1JJB	380
49	UA1AUA	1,518		OK3CFK	380
50	HA1SN, YO2CGZ	1,491		Y23XB/A	372
		1,491	111	YO3BYF	372
52	OK1AGN	1,470		UY5TE	372
53	OK1DAV	1,456	114	UA3QAH	365
54	UA2FBO	1,421	115	OK1AEH	325
55	HA7UG	1,400	116	LZ2KBS	280
56	YU3WO	1,368	117	SM7LSU	252
57	SM2BDB	1,326	118	UO5OGU	232
58	OH3AA	1,197	119	Y62XG	189
59	UQ2GKM	1,125	120	SP6FER	138
60	HA8KAZ	1,115	121	YU4VWQ	80
61	PA0ATG	1,110			

Check logs received from: F9UO, OZ1CBW, PA3AAV, PA3ASC, PA0GN, SM5BDV, SP9DTH, UA1ZAB, UA4HFK, UB5EEP, UB5FAP, YU7AEC, Y2IQD, Y47LN, ZB2EO.

BRITISH ISLES CW RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS1066	76,120	3	BRS44395	24,850
2	BRS15822	51,170			

EUROPE CW RECEIVING

Posn	Station	Points	Posn	Station	Points
1	UP2-038-1580	4,350	8	Y2-8580/A	1,920
2	OK2-20282	3,115	9	UC2-008-119	1,820
3	UA3-155-28	3,100	10	UP2-038-1024	1,510
4	OK1-11861	2,800	11	UB5-060-643	1,505
5	UA4-148-362	2,765	12	ONL383	930
6	LZ2-F166	2,480	13	YO7-15815/OT	810
7	UC2-005-177	2,430	14	Y2-9812/H	400

144MHz Contest May 1981 results

This event confirmed once again the popularity of single-band contests on this band. The four sections seem to have been well received, although the single-operator portable section was not as well supported as had been indicated by comments on the cover sheets for previous events. A few stations said that they preferred last year's rules, but these were fairly evenly balanced by comments expressing the opposite view. The exchange of QTH locator only caused a similar split of opinion but here it was noticeable that the stations who consistently make high contest scores were generally those who preferred not to exchange full QTH details, whereas others thought it removed the character from the contest.

Conditions during the contest were generally described as being about average as far as propagation was concerned, but several groups found that the weather gave them trouble, with some finding that the route to their site was blocked by snow. Very few complaints were received about the quality of the signals and the few that were received were not clearly defined or supported by other reports concerning the same station.

The leading stations in the four sections are to be congratulated and will receive certificates, as will the runner-up in the Single Operator Fixed Section and the Multi-Operator Portable and Alternative Address Section.

The swl contest was not very well supported, which is perhaps an indication that this aspect of our hobby is not attracting as much attention as in previous years. The winner, BRS32525, is to be congratulated on winning by a clear margin, and will receive a certificate.

Check logs are gratefully acknowledged from G8UDV, G8SKW, G6BYP, G8YCI and G4BXY.

G3LCH

SECTION S—SINGLE-OPERATOR FIXED STATION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GJ4ICD	4,181	333	YO70	DG6UL/P	722
2	G8MDZ	3,474	366	AL76	DL0EP/P	655
3	DK3UZ	3,174	334	EN20	OK2KAU	726
4	GM8YJU	2,659	248	YO05	FLFLN/P	725
5	G8MAG	2,071	331	YL16	DL0BD/P	650
6	G8NEY	1,596	225	YL63	PE1AGZ	562
7	G3JKY	1,255	211	ZL69	DF9VM	543
8	G4AHN	1,253	212	ZL56	GI4BDL/P	530
9	G8RBY	1,109	200	ZM16	GM8MBP	507
10	GI8TBQ	960	83	XO33	F6KHX/P	670
11	GW3NYY	953	129	XL40	F6KBX/P	587
12	G4JZF	889	203	YM30	F1FLN/P	485
13	G8UAG	728	156	YM50	F1EPO	425
14	G8XUF	601	149	YM67	ON6XN	500
15	G3JFY	591	99	ZL73	GM3PXK/P	515
16	G4KGC	500	110	ZM65	GI4BDL/P	426
17	G8LHT	492	103	ZN34	DB7XO	560
18	G4DFI	485	101	AL41	DK0KU/P	505
19	G8OMI	457	103	ZM41	F1FLN/P	440
20	G8GGG	439	99	ZL24	GM8YJU/P	382
21	G8WRD	394	93	ZL46	GM3PEK/P	480
22	G8XYM	392	63	ZN13	ON4AVV	500
23	G8UYZ	385	56	ZN12	ON7CC/A	531
24	G8JAM	359	65	ZM25	ON7ZX/A	800
25	G8XBH	354	110	ZL50	G3ZQM/P	395
26	G4KDR	310	74	ZL79	G8LEF	308
27	G8MFJ	280	48	ZL41	—	—
28	G3ORX	267	57	YL49	GM3PXK/P	465
29	G6AYY	247	33	XK38	F1FHI	420
30	G8LXY	204	79	ZL09	ON7ZX/P	293
31	G8XTJ	203	53	ZL27	G3WRS/P	302
32	G4KVI	190	94	ZL37	F1FLN/P	300
33	G8IFF	165	37	ZM80	GM3PXK/P	451
34	G8VJU	158	35	AI53	GW4LIP/P	310
35	G4AGQ	147	60	ZL66	ON7ZX/A	302
36	G8XLH	134	37	AL53	PA0LGJ	316
37	G3UAZ	29	11	ZL45	GJ4JWA	250

SECTION P—MULTI-OPERATOR PORTABLE AND ALTERNATIVE ADDRESS

Posn	Group	Callsign	Points	QSOs	QRA	Best dx	Km
1	Wulfrun	G8BHH/P	7,295	769	YM48	DL0GY/P	773
2	Parallel Lines	GW4LIP/P	7,138	746	YN75	DJ7CL	764
3	Mudhoppers	G4DEZ/A	6,603	617	AL34	—	—
4	Socom	G4BWG/P	6,055	546	AL45	YS3ZN/P	830
5	Hastings Electronics RC	G6HH/P	5,793	603	AK03	F1ENZ/P	740
6	Albright & Wilson ARS	GW3OXD/P	4,610	579	YM54	DA1AS	770
7	Vale of White Horse ARS	G4ANB	4,118	552	ZL24	DL3ZAL/P	552
8	Harwell ARS	G3PIA/P	4,049	579	ZL33	DL1LE/P	767
9	Bedford Contest Group	G4FEV/P	3,633	420	ZM68	DL0UL	815
10	Southgate RC	G3SFG/P	3,442	510	ZL76	DD0PX	620
11	Harrow RC	G3EFX/P	3,365	529	ZL06	GM8SVB/P	647
12	Mid Landark ARS	GM3PXK/P	3,272	299	YP25	—	—
13	Wakefield & DRS	G3WRS/P	3,171	359	ZO46	F1KNO	809
14	Liverpool University	GW8JUL/P	2,877	447	YN75	DK0ME/P	708
15	Hull & DRC	G8GBY	2,739	332	ZN18	F1KNO	751
16	Tyneside AR	G3ZQM/P	2,189	259	YO20	F1KLQ	740
17	Worthing & DARC	G8GCP/P	2,156	373	ZK09	GI4KKK/P	575
18	South Dorset RS	G8SDS/P	2,012	268	YK28	DK0LF	661
19	Sperry Sports	G4HIR/P	1,922	365	ZL66	DF9VM	590
20	South Manchester	G3FVA/P	1,747	382	ZN61a	F6KBK/P	601
21	Malvern Hills RAC	G4BVY/P	1,710	371	YM79	PE1CHC	560
22	Dudley ARC	G4DAR/P	1,623	363	YM40	DJ3GG/P	614
23	Basildon Marconi ARS	G8VYK/P	1,574	324	AL33	GI4BDL	540
24	Wilde Goose	GI4BDL/P	1,548	123	XO61	F1FLN/P	780
25	G8TNI Group	G8TNI/P	1,323	254	ZM73	F1FKO	545
26	Bury St Edmunds RS	G6BSE/P	1,248	178	AM64	F1KNO	542
27	Rutland Weekend	GW4CZZ/P	1,234	215	YN64	ON7CC/A	575
28	Leicester RS	G3LRS/A	1,184	242	ZM25	DB6DC	600
29	East Antrim ARC	GI4KKK/P	1,173	122	XO11	GJ4JWA	688
30	Fareham & DRS	G8KGI/P	912	218	ZK05	DK0LF	550
31	G8VAL Group	G8VAL/P	742	73	XJ05	G3WRS/P	568
32	EMI (Wells) RC	G3ORA/P	613	123	YL68	PE0MAR/P	467
33	Luton VHF	G4LBH/P	517	133	ZL18	F1GCX/P	512

SECTION A—SINGLE-OPERATOR PORTABLE OR ALTERNATIVE ADDRESS

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G8GRB/P	817	181	AL53	DL0KU/P	491
2	G4HYG/P	218	44	YN38	G6HH/P	357

SECTION M—MULTI-OPERATOR FIXED SECTION

Posn	Group	Callsign	Points	QSOs	QRA	Best dx	Km
1	Five Bells	G8ZHP	3,358	372	ZM29	F6EKG/P	709
2	South Bucks	G8VWA	2,380	447	ZL48	DK0HE/P	548
3	G8YLH Group	G8YLH	2,086	326	ZL56	DB6DC	570
4	RAF ARS	G3RAF	907	158	YL56	GM5CSY	580
5	Manchester Student	G3CXX	855	208	YN49	F0JL/A	432
6	G4DDL Group	G4DDL	408	120	ZL47	ON1RN/A	391

144MHz SHORT WAVE LISTENER SECTION

Posn	Station	Points	QSOs heard	Best dx	Km
1	BRS32525	586	142	F1KNO/P	475
2	BRS26003	445	51	G8MDZ	491
3	BRS28198	311	47	DF9VM	465

May 432/1,296/2,304MHz Contest results

Average conditions, coupled with a lack of activity, perhaps caused by the 144MHz event during the same period, produced a poorly-supported contest. Only a few groups took advantage of the fact that, with the two events arranged in this way, all operators could be occupied for most of the 24h. This requirement is often quoted as a reason why groups prefer multi-callsigns in multiband contests, but the single station, single band events still seem to attract a greater number of entries, despite the obvious advantage in this modern age of multiband (switched?) capability at the home vhf/uhf station.

Again, entrants often seem not to have read the rules prior to the start of the contest. It is worth noting that Rule 12 is concerned with the whole of the contest exchange, including the use of consecutive serial numbers for each callsign independent of changes of band. Also, in multiband events, both individual cover sheets and a multiband summary sheet (Form 4422) are required if results are to be tabulated with full and meaningful information.

The multi-operator section was won by the Hadrabs Contest Group with band-leading scores on both 432MHz and 1,296MHz giving them the advantage over the three-band entry of the Dau a Deugain Group in second place. The winner of the single-operator section, G8DIU, is to be particularly congratulated on using completely home-made equipment on both the bands used for his entry.

Check logs are gratefully acknowledged from G8BQX, and one listener log was received from BRS32525 with a score of 29 points from 17 contacts heard.

G3LCH

432MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km	Antenna
1	G8PUB/P	1,629	161	AL47	400	DK2GR	—	2 × 2ley
2	G3JOC	1,172	112	AM27	400	DJ3ST	632	27eql
3	G3VCP/P	856	113	AL45	200	—	—	—
4	G4BRK	455	83	ZM68	400	DD8PA/A	623	19ey
5	G8TFI/P	416	106	ZL26	200	DJ9DL	548	88emb
6	G4LOO/P	286	70	ZL18	150	ON5PXA	405	2 × 46emb
7	G4JNT/P	243	65	YM50	25	—	—	68emb
8	G3UHF/P	191	51	ZN61	15	G8AGU	279	—
9	G4GFX/P	169	37	YM79	10	G8XJK/P	202	2ley
	G8JMR/P	169	58	ZL26	40	GD2HDZ	362	18epb
11	G8XJK/P	102	27	AM64	10	G8AGU	335	2 × 48emb
12	GW3YZD/P	59	19	YN64	10	G8TFI/P	226	8/8

432MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km	Antenna
1	G5UM	70	22	ZM35	10	GW3UEY/P	141	14ey
2	G8DIU	45	17	ZL60	22	G3JOC	202	5ey
3	G8LXY	23	17	ZL09	10	—	—	8ey

1,296MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km	Antenna
1	G4JUG/P	3,306	24	AL47	60	PA0WRC/P	287	30eql
2	G8GXE/P	2,760	39	ZL26	4	G4IRB/P	186	24eql
3	G4LOO/P	2,727	35	ZL18	5	GW3NZS/P	188	15/15
4	G4ANT	2,053	16	AM27	300	PA0EZ	260	—
5	G4IRB/P	2,132	21	ZN61	25	G8GXE/P	186	6ft d
6	G4BRT/A	2,035	26	ZM68	50	G8JUL	190	26eql
7	G3OHM/P	1,977	22	YM50	25	G4BYV	205	—
8	G3FZL/P	1,704	12	AL45	10	PA0EZ	307	23ey
9	G3ZUD/P	1,632	25	ZM26	—	G8JHL	138	—
10	G4CDQ/P	1,451	16	YM79	1	G8JHL	156	4 × 23ey
11	G8JMR/P	1,286	23	ZL26	1	G4CDQ/P	110	15/15
12	G8SDK/P	643	10	AM64	5	G4JUG/P	101	4 × 25eql

1,296MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km	Antenna
1	G8DIU	1,038	22	ZL60	20	G4ERP/P	160	23ey

2,304MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km	Antenna
1	G4BRT/A	190	3	ZM68	25	G3RQZ	106	2 × 42eql

OVERALL RESULTS—MULTI-OPERATOR SECTION

Posn	Group	Band position 432	1,296	2,304	Points
1	Hadrabs	1	1	—	2,000
2	Dau a Deugain	4	6	1	1,895
3	Norfolk VHF/UHF	2	4	—	1,339
4	South Bucks	5	2	—	1,090
5	Crystal Palace & Socom	3	8	—	1,041
6	Luton VHF	6	3	—	991
7	South Manchester RC	8	5	—	762
8	South Birmingham RS	7	7	—	747
9	Malvern Hills AC	9	10	—	542
10	G3ZUD group	—	9	—	494
11	Harrow RS	10	11	—	492
12	Bury St Edmunds RS	11	12	—	258
13	RWCG (UHF)	12	—	—	36

OVERALL RESULTS—SINGLE-OPERATOR SECTION

Posn	Callsign	Band position 432	1,296	2,304	Points
1	G8DIU	2	1	—	1,642
2	G5UM	1	—	—	1,000
3	G8LXY	3	—	—	329

Region Round-up Contest 1981 results

Once again the level of activity was less than in the previous year, although G4IQM felt that this was a "good, snappy contest—how about two a year?", and G4CNY is looking forward to the next one "maybe this year?". G2HLU noticed the fall in activity and expressed the hope that the contest is not going downhill. GM3OXC put in a plea for an earlier start to help Scottish stations on 3·5MHz, and GW3HCL bemoaned the fact that the only RSGB region he didn't work was Region 11—his own! G3OZF found the contest just right, he worked all 20 regions on each band. Like all other entrants he started on 3·5MHz and then moved to 7MHz when there was nothing else around to work. Don's equipment consisted of TS820 transceiver and delta loop antenna for 7MHz with a dipole for 7MHz.

The leading entrant in section B, G4BUE's equipment was a TenTec 509 Argonaut with Yaesu FR101 receiver, and he used inverted-Vs with apices at 35ft.

The standard of logs was mostly very good—but it would help those checking entries if the standard forms HFC1 and HFC2 were used—small supplies are free on application to HQ.

The HF Contest Committee is grateful for the many comments received and will take them into consideration when the rules for the 1982 event are formulated.

Certificates will be awarded to the first three stations in each section.

G3FKM

SECTION A

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G3OZF	118	14,120	15	GM3OXC	84	9,072
2	G4DRS	118	13,767	16	G4IQM	70	8,640
3	G3NOM	111	12,987	17	G2HLU	85	8,415
4	G3HVX	111	12,616	18	G4IP	74	7,326
5	G4CNY	109	12,388	19	G3ZDW	73	7,008
6	GW3MPB	108	12,312	20	GI2FHN	47	6,400
7	G4BUO	107	11,877	21	GM3YOR	66	6,240
8	G6UQ/A	104	11,544	22	G3ZNH	57	4,930
9	G4FAD	102	11,285	23	G4HZF	60	4,872
10	G3FKH	97	10,730	24	G4GLC	73	3,386
11	G3SJE	95	10,471	25	G4JIL	40	2,520
12	G5MY	94	9,588	26	G3NKS	40	2,400
13	GW3HCL	85	9,435	27	G3MCK	42	1,890
14	G4IDC	86	9,252				

SECTION B

Posn	Callsign	QSOs	Points	Tx	Pwr input	Antenna
1	G4BUE	81	7,533	Argonaut	5W	Inv-Vs
2	G3PTO	75	6,435	Modified TS120V	8W	67ft end-fed Zepp
3	GW3SB	28	1,328	HW8	3W	Dipoles

LISTENER SECTION

Posn	Station	Points	Receiver	Antenna
1	RS11445	11,445	FRDX400 + PR30	60ft Windom
2	RS1066	10,212	FR101S	84ft wire
3	RS44395	7,548	DX300	Joystick

Check log from G3XTJ/A gratefully acknowledged.

DF Qualifying Event Chelmsford/Colchester results

After 1in of rainfall the night before, the sun finally broke through the clouds on to the 21 teams assembled on Fordham Heath. The start had several muddy patches, one of which enabled Doreen Pawley to show off her skill at rallycross.

From the start approximately half the competitors headed for the A station, G3KPJ/P, which was hidden in thick gorse bushes on Tiptree Heath. The lack of cover was compensated by the erection of several dummy antennas in neighbouring trees which coupled signals from the main antenna and proved very misleading to some teams.

The B station, G4HKC/P, was concealed in a small wood on the NW bank of the Roman river at Rowhedge. This site also being close to the River Colne, several competitors found themselves on the wrong side of a river, much to their inconvenience. The transmitter was hidden in a densely overgrown ditch and fed an antenna some 250yd long.

The tea was once again provided by the Prince of Wales Public House, Great Totham, where Mike Hawkins was presented with the Mid-Essex Trophy.

Posn	Name	Club	Time of arrival Station A	Station B
1	R. Parsons	Burton-on-Trent	1519	1444
2	M. Hawkins	Chelmsford	1520	1445
3	A. Simmons	Mid-Thames	1521	1442
4	G. Whenham	Coventry	1430	1528
5	E. Mollart	Mid-Thames	1533	1443
6	D. Newman	Slade	1533½	1444½
7	B. Bristow	Mid-Thames	1453	1537
8	C. Oliver	Dartford Heath	1442	1538½
9	P. Lisle	Mid-Thames	1422	1543
10	R. Newman	Colchester	1601	1521
11	T. Gage	Mid-Thames	1609	1538
12	D. Pawley	Mid-Thames	1610	1510
13	J. Herbert	Colchester	1616	1522
14	A. Mead	Chelmsford	1454	—
15	M. Easterbrook	Dartford Heath	1528	—
16	G. Hubble	Colchester	1554	—
17	R. Goodearl	Mid-Thames	1556	—
18	P. Clark	Chelmsford	—	1557
19	S. Carey	Dartford Heath	1609½	—
20	F. Pearson	Colchester	—	—
	R. Dewberry	Mid-Thames	—	—

A. Simmons and G. Whenham qualify for the final.

7MHz Contests 1982 rules

Licensed radio amateurs and listeners throughout the world are invited to take part in these RSGB 7MHz contests.

Log and cover sheets may be obtained from RSGB HQ, 35 Doughty Street, London WC1N 2AE, in exchange for a large sae—those who need a large quantity are advised to purchase one of the new combined log and summary sheet pads advertised elsewhere in *Radio Communication*.

IARU Region 1 HF Phone

Field Day 1980

Summary of results – top 10 in each class.

OPEN CLASS

Posn	Callsign	QSOs	Multipliers	Points	Posn	Callsign	QSOs	Multipliers	Points
1	DL0KG/P	1,034	143	525,239	6	DL0CS/P	912	112	377,440
2	GU3HFN/P	1,560	107	521,411	7	DL0JR/P	816	119	354,144
3	DL0KL/A	1,075	120	438,840	8	G4GI/P	1,270	81	333,072
4	DL0MZ/P	1,056	111	429,681	9	GW3EOP/P	1,086	92	330,740
5	G3GRS/P	1,356	86	388,548	10	G4AAX/P	1,165	86	330,240

RESTRICTED CLASS

Posn	Callsign	QSOs	Multipliers	Points	Posn	Callsign	QSOs	Multiplier	Points
1	DL0EH/A	508	127	256,540	6	DK0OI/A	409	65	108,420
2	DF9KH/P	441	104	178,568	7	DF8FJ/P	494	54	102,492
3	DJ5DW/P	474	78	158,184	8	DL8BAB/P	387	62	99,076
4	DL0AZ/P	484	79	151,127	9	G3FJE/P	498	52	98,332
5	DK5JM/P		73	144,759	10	DK0LF/P	392	55	95,095

Certificates of merit are being sent to the three leading stations in each class.

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, to be published in the January 1982 issue of *Radio Communication,* will apply. Please note however that unmarked duplicate contacts will be penalized at 10 times the number of points claimed, and that logs containing in excess of five unmarked duplicate contacts will be automatically disqualified. Duplicate contacts should be included in logs, marked as such, and without any claim for points.
2. Eligible entrants. British Isles: RSGB members only.
Rest of world: all licensed amateurs.
3. Periods. Phone: 1200gmt 6 February to 0900gmt 7 February 1982.
CW: 1200gmt 27 February to 0900gmt 28 February 1982.
4. Sections: Single-operator only.
5. Bands: Phone: 7·04 to 7·10MHz. **(NB – Resolution 10-1 of the Administrative Radio Conference, Geneva 1959, will no longer be applicable after 31 December 1981** and therefore inter-regional contacts (eg with the USA) will be permitted in this contest).
CW: 7·00 to 7·04MHz.
6. Exchange. RS(T) plus serial number starting at 001.
7. Scoring. (a) British Isles stations with:
European stations: 5 points per QSO;
Non-European stations: 15 points per QSO;
British Isles stations may not work each other.
(b) European stations with:
British Isles stations: 5 points per QSO.
(c) Non-European stations with:
British Isles: 15 points per QSO.
8. Multiplier. (a) British Isles stations: one for each different country worked (ARRL DXCC list applies). In addition VE, VK, W, ZL, and ZS call areas will each count as a country for this purpose.
(b) Others: One for each different British Isles prefix worked, ie G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6, and GW8 (a maximum of 42). Note that the prefix GB will not count.
9. Final score. QSO points multiplied by the number of different multipliers contacted.
10. Logs. Log sheets should be headed: date, time (gmt), callsign of station worked, RS(T) and number sent, RS(T) and number received, if multiplier, and QSO points claimed. A summary sheet is required showing the countries or prefixes worked.
11. Declaration. Each log must be accompanied by the following declaration – "I declare that my station was operated in accordance with the rules of the contest, and in accordance with the terms of my licence". The declaration must signed and dated.
12. Address for entries: Entries must be sent to: RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs WS13 6UJ, England. Misdirected entries may be disqualified.
13. Closing date for receipt of logs. Phone contest: 3 April 1982. CW contest: 24 April 1982.
14. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw contest. Certificates will be sent to the entrants placed first, second, and third in the British Isles, European, and non-European sections of each contest.
15. Dispute. In the case of any dispute the ruling of the Council of the RSGB shall be final.

RSGB UHF Contest rules

1600-1600gmt, 3-4 October 1981
Bands: 432MHz to 24GHz
This contest is timed to coincide with the IARU Region 1 Contest.
Each band will be tabulated individually and no multipliers will be used. Contestants wishing to have their logs forwarded to IARU should clearly state this on Form 4422.
The following general rules, published in the January issue of *Radio Communication,* will apply: 1, 2, 3, 4d, 5a, 6a, 7b, 9, 10a, 11b, 12a, 13-24.
All entries and check logs to: VHF Contests Committee, c/o Mrs P. Suckling, G4KGC, 46 Windsor Close, Towcester, Northants NN12 7JB.

432MHz Cumulative Contest rules

1900-2100gmt, 9, 17 October 1981
2000-2200gmt, 25 October, 2, 10, 18, 26 November 1981
The following general rules, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 9, 10a, 11b, 12a, 13-24.
All entries and check logs to: VHF Contests Committee, c/o Mr M. Pharoah, G3LCH, 49 Streathbourne Road, London SW17.

1,296MHz Cumulative Contest rules

2100-2300gmt, 9, 17 October 1981
2200-2400gmt, 25 October, 2, 10, 18, 26 November 1981
All contacts must be made directly on the 1,296MHz band.
The following general rules, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4a, 5a, 6a, 7b, 9, 10a, 11b, 12a, 13-24.
All entries and check logs to: VHF Contests Committee, c/o Mr M. Pharoah, G3LCH, 49 Streathbourne Road, London SW17.

70MHz Fixed Contest rules

0900-1300gmt, 25 October 1981
The following general rules, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4a and b, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-24.
All entries and check logs to: VHF Contests Committee, c/o Mr R. Taylor, G4BEL, 12 The Rampart, Haddenham, Cambs CB6 3ST.

144MHz CW Contest rules

There will be two sections in this event:
Section 1 – 24h, 1600-1600gmt, 7-8 November 1981.
Section 2 – 6h, 1000-1600gmt, 8 November 1981.
These contests are timed to coincide with the IARU Marconi CW Contest.
The following general rules, published in the January 1981 issue of *Radio Communication,* will apply: 1, 2, 3, 4d, 5a, 6b, 7a, 9, 10a, 11a, 12a, 13-24.
All entries and check logs to: VHF Contests Committee, c/o Mr G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

ROPOCO 2 1981 rules

1. The general rules for RSGB hf contests, published in the January 1981 issue of *Radio Communication,* will apply.
2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.
3. When. 0800 to 1000gmt, Sunday 30 August 1981.
4. Contacts. CW in the 3-5MHz band only. Entrants are requested to confine their operations to 3,510-3,590kHz. Send RST plus – for the first contact, entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact.
5. Scoring. 10 points per contact.
6. Entries. Logs must be sent to D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, East Sussex TN22 1UB, postmarked not later than Tuesday 15 September 1981.
7. Awards. Certificates will be awarded to the first, second and third placed entrants.

BARTG 2nd Spring VHF/UHF Contest results

A happy Easter weekend was spent by some intrepid explorers perched on wet Welsh hills etc, all in the cause of vhf rtty activity. Some slightly less adventurous individuals enjoyed home comforts, but all in the spirit of the event, even a /M rtty (G8UVE/M).
Good activity was noted and a reasonable number of entries received, although more would have been expected from the more active stations. Total of 61 UK stations on 144MHz, 21 on 432MHz and 26 and two Continentals respectively. DX distances were down a little, but conditions were a bit flat.
The organizer wishes to thank all those who took part and sent in reasonably accurate logs, best of luck for September.

Comments from logs
"Pity FM telephony is still on 144·600", *G8DVR/P;* "Rest period a good idea but could be 2h longer, say 6h" *G3UUP/P;* "Thoroughly enjoyed by all, why can't we have another contest in addition?" (Organizer comments "fine but please find extra organizer, I'm single-handed at moment"), *G4FOX;* "ON1GL didn't make it on 70cm but with 2W he did try hard", *G4FOX;* "Again many southern stations heard but could not be worked", *G4EEV;* "Usual humble effort", *G8CDW hf organizer.*

MULTI-OPERATOR SECTION

Posn	Callsign	Points	144MHz Best dx	144MHz Distance	144MHz Band %	432MHz Points	432MHz Best dx	432MHz Distance	432MHz Band %	Overall % pts
1	G4FOX	226	ONIGL	393	100	69	GW8NDD/P	168	79·3	179·3
2	G3NNG	179	ONIGL	418	79·2	87	PE1AKN	356	100	179·2
3	G8DVR/P	189	G3EMU/A	311	83·6	80	G8BIS	252	92·0	175·6
4	G3UUP/P	151	ONIGL	373	66·8	28	G8DVR/P	178	32·2	99·0
5	GW8NDD/P	113	G3EMU/A	370	50·0	23	G3NNG	205	26·4	76·4

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	144MHz Best dx	Dist-ance	Band %	144MHz Points	432MHz Best dx	Dist-ance	Band %	432MHz Overall % pts
1	G8SFM	130	G4KKF	368	58·3	43	G8BIS	186	100	158·3
2	G8LWY	100	G3TEU*	254	44·8	36	G8DVR/P	221	83·7	128·5
3	G3EMU/A	223	DG3KAD*	333	100	—	—	—	—	100
4	G8APB	64	G8AWZ	231	28·7	28	G8DVR/P	221	65·1	93·8
5	DC1ZN/P	127	G4JMP	590	57·0	—	—	—	—	57·0
6	G8MWU	124	G8VJO	326	55·6	—	—	—	—	55·6
7	ON1GL	117	G3NNG	418	52·5	—	—	—	—	52·5
8	G4EEV	46	G8LWY	315	20·6	—	—	—	—	20·6
9	G8CDW	43	G8SFM	146	19·3	—	—	—	—	19·3
10	G8MAF	23	G4FOX	130	10·3	0	—	—	0	10·3

*Better dx disallowed due to inaccuracies

Special thanks for check logs from G4HTC and G4LTC

BARTG 1981 Contest results

Good conditions prevailed throughout the contest this year, with five out of six continents being copied in the UK. The following G stations were listed among the 110 entrants in the single-operator section: 6, G3HJC; 9, GM3ZXL; 18, GI4AHP; 29, G3LDI; 33, G4FLM; 46, G4HYD; 52, GW3EHN; 56, G4EEV; 57, G2PB; 59, G4KHX; 60, G4IPZ; 68, G4EJA; 77, G3RDG; and 83, G3GGL. There were no British entries in the multi-operator or listener sections.

During the contest rtty activity took place in Antigua, Alaska, Australia, Austria, Balearic Is, Belgium, Brazil, Bulgaria, Canada, Canal Zone, Cayman Is, Channel Is, Chile, Czechoslovakia, Denmark, England, Finland, France, Gabon Republic, German Federal Republic, German Democratic Republic, Ghana, Gibraltar, Guadeloupe, Guam Is, Hungary, Indonesia, Ireland, Israel, Japan, Kuwait, Luxembourg, Malaysia, Monaco, Morocco, Netherlands Antilles, New Caledonia, Newfoundland, New Hebrides, New Zealand, Nigeria, Northern Ireland, Norway, Okinawa, Pakistan, Panama, Phillipines, Poland, Portugal, Puerto Rico, Rhodesia, Romania, St Pierre & Miquelon Is, Sardinia, Scotland, Sicily, SW Africa, Lithuania, Spain, Sweden, Switzerland, USA and Yugoslavia.

G8CDW

Mobile rallies calendar

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

2 August—RSGB National Mobile Rally, Woburn Abbey.

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.

23 August—SDARC Radio & Electronics Rally, at Park School Further Education Centre, Marlowe Avenue, Swindon, Wilts. Open 10am. Several national groups, including BARTG, BATC and AMSAT-UK will be present. Bring and buy and refreshments will be available. Details from K. Saunders, G8SFM, QTHR.

30 August—Torbay ARS Mobile Rally, at the ITT Social Centre, Old Brixham Road, Paignton. Talk-in on S22 from G8NJA, and R2 from GB3TR. Ample free parking, trade stands, used equipment stand, draws, hot meals in dining room, bar facilities. One mile from beaches. RSGB book stall. Further details from G4DZH or G2CWR, 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—Pembroke RSGB Group GW2OP Bucket and Spade Party at The Regency Hall, Saundersfoot, Dyfed. Talk-in on RB4, RB6, S22 and R7. Starts 1100bst. Details from GW3XJQ.

13 September—East Anglia Radio Amateurs' Picnic, East Anglia Transport Museum, Carlton Coleville, nr Lowestoft, Suffolk. Details from G3TWQ.

13 September—Telford Mobile Rally, Telford New Town Centre Malls, Shropshire (Exit 12 off M6 onto A5; A442 from N or S. Follow signs to "town centre"). Open 11am, but 10.45 for disabled, with special parking arrangements. Talk-in via GB4TRG on S22 fm and SU8/SU20. Attractions include free coach service to Ironbridge Gorge Museum nearby, TA display, Home Office, steam train rides, etc. Full catering and licensed premises on site, unlimited parking. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416. All QTHR.

20 September—Ballymena ARC Mobile Rally in the Castle Grounds, Antrim. Open from noon. Talk-in station S22. Attractions include trade stands, bring and buy, raffle, refreshments, etc. Further details from GI4HCN, QTHR.

20 September—Bromsgrove Mobile Picnic, organized by Bromsgrove & DARS, at Avoncroft College, Bromsgrove, just off the A38. Talk-in on 144MHz ssb, S22 and 432MHz fm. A true picnic, no trade stands. There will be a flea market, raffles etc plus low-price admission to the Avoncroft Open Air Museum of Buildings. Refreshments available. Details from E. Cotton, G8XAB, tel 0905 773181.

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—Harlow Mobile Rally. The new venue is Harlow Sports Centre; details to follow. Further information from Phil Dunbar, G8FRG, QTHR, tel 0279 39851, ext 251, office, 32486, home.

13 December—Leeds & DARS Christmas Rally, at Pudsey Civil Hall. Details from G4LXJ.

Contests calendar

2 August	144MHz QRP & SWL *(Rules in May issue)*
8-9 August	European DX (CW) *(Rules in July issue)*
9 August	DF Qualifying Event Oxford *(Rules in July issue)*
11-12 August	Meteor Scatter
15-17 August	New Jersey QSO Party *(Rules in August issue)*
15-17 August	Rhode Island QSO Party *(Rules in August issue)*
16 August	70MHz Trophy & SWL *(Rules in June issue)*
22-23 August	All Asian DX (CW) *(Rules in June issue)*
22-23 August	Ohio QSO Party *(Rules in August issue)*
23 August	DF Qualifying Event Slade *(Rules in July issue)*
30 August	Ropoco 2 *(Rules in August issue)*
5-6 September	SSB FD *(Rules in May issue)*
***5-6 September**	144MHz Trophy & SWL *(Rules in July issue)*
	IARU VHF (144MHz) *(Rules in July issue)*
9-11 September	Howdy Days *(Rules in August issue)*
12-13 September	International ATV *(Rules in July issue)*
12-13 September	European DX (Phone) *(Rules in July issue)*
20 September	DF National Final Mid-Thames
26 September	AGCW—DL uhf/vhf/cw (144MHz) *(Rules in June issue)*
26-27 September	Elettra Marconi *(Rules in August issue)*
***3-4 October**	RSGB UHF/SHF *(Rules in August issue)*
	IARU UHF/SHF *(Rules in July issue)*
October/ November	432MHz Cumulatives *(Rules in August issue)*
	1,296MHz Cumulatives *(Rules in August issue)*
11 October	21/28MHz (Phone) *(Rules in May issue)*
18 October	21MHz (CW) *(Rules in May issue)*
25 October	70MHz Fixed *(Rules in August issue)*
***8 November**	144MHz (CW) *(Rules in August issue)*
14-15 November	Second 1·8MHz
15-16 November	European DX (RTTY) *(Rules in July issue)*
November-December	BATC Cumulative *(Rules in July issue)*
6 December	144MHz Fixed
6-7 February 1982	7MHz (Phone) *(Rules in August issue)*
27-28 February 1982	7MHz (CW) *(Rules in August issue)*
20 March 1982	AGCW—DF uhf/vhf cw (432MHz) *(Rules in June issue)*

* IARU co-ordinated date

Special event stations

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

GB4LFO, 1-3 August
Cardiff Centre for Disabled People will operate this station, which will use an FT101ZD with G5RV and HF5 antennas. Details from C. H. Parsons, GW8NP.

GB4TCF, 28-31 August
The station will operate on all hf bands and 144MHz in all modes. It is to be at the National Town & Country Festival at the National Agricultural Centre, Stoneleigh, Warks. There will be displays of home construction, amateur tv, home computing, Raynet and RSGB. Visitors welcome. Details from G3ZFR, QTHR.

GB4CBE, 29-31 August
The station will be operating at Crofton Beam Engines, nr Great Bedwyn, Wiltshire, on 144MHz fm and 3·5MHz. It will celebrate the restoration of the locks on the Kennet & Avon Canal as far as Crofton. There will be boat trips, folk singing, steam engines, bar etc. Details from Andy Brooker, G8JDH, tel 01-650 5465.

GB2FI and GB6BRC, early September
Barry College of Further Education ARS are planning an expedition to Flat Holm Island in the Bristol Channel to commemorate tests carried out by Marconi on the island. They will operate on all hf bands and low power 144MHz fm, depending on conditions. It is also hoped to use wideband fm on 10GHz. Details from Simon Lloyd Hughes, GW8NVN.

GB2NG, 6 September
The station will operate at the National Giro Open Day at the National Giro Centre, Bootle, Liverpool. Sefton ARC will be operating it on 3·5, 7, 14, 21, 28 and 144MHz on ssb, cw, fm and rtty. Visitors are welcome. Details from Les Gurney, G4LBJ (QTHR as G8VJN).

Looking ahead

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

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.

23-25 October—Amateur Radio Exhibition, Granby Halls, Leicester. Not to be confused with the ARRA exhibition to be held at Castle Donington on 29-31 October. Details will be given in special advertisements in September and October.

29-31 October—Amateur Radio Retailers Association Tenth National Amateur Radio Exhibition, Donington Park, Castle Donington, Derbyshire. **Please note change of venue.**

6-8 November—WACRAL annual conference weekend, Cliff College, Calver, nr Sheffield. Details from sec G3AGX, QTHR. Non-members welcome.

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 January 1982 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **October** issue should reach them by **20 August** and for the **November** issue by **17 September.**

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. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR.

Ainsdale (AARC)—4, 18 August. Ainsdale Scout HQ. Details from sec Norman Horrocks, G2CUZ, tel 0704 77604.

Bury (BRS)—11 August (Club fox hunt), 4, 18, 25 August (Informal meetings for morse tuition, construction projects, club station operation, etc), 7.30pm. Mosses Community Centre, Cecil Street, Bury. Publicity sec Peter Butterworth. 6 Wilton Avenue, Prestwich, M25 8HB, tel 061-798 0970.

Manchester (South Manchester RC)—7 August ("150MHz digital frequency meter", by Chris Ward, G4HON), 14 August (Club quiz), 21 August ("Computerized process control", by Les Seddon, G3VIW), 28 August (Mini df contest), 4 September (Lecture to be arranged), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays, 8pm. Sec David Holland, G3WFT, tel 061-973 1837.

Stockport (SRS)—12 August (Natter night), 26 August ("CABCALBONT" illustrated talk by Roland Parkinson, G3FNM), 9 September (Surplus equipment sale), 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec Ray Phillips, G3FYE, tel 061-456 7239.

Wirral (WARS)—5 August (Club quiz organized by Alan Woodland, G4KVP), 19 August (SSTV demonstration and talk by Clive Redfern, G4CZR), 2 September (Sale of surplus equipment), 7.45pm. Sports & Recreational Centre, Grange Road West, Claughton, Birkenhead. Sec Garry O'Keefe-Wilson, G8VPF, tel 051 6771531.

Wirral (W&DRC)—12 August (DF Winners Revenge df hunt), 9 September (Surplus equipment sale), 8pm. Sports Concourse, West Kirby, Wirral. Publicity sec J. Mills, G8NOY.

Your new RR1 sends greetings to all members in the region. I would like to take this opportunity to express thanks on behalf of all those in Region 1 to Bill, G3SMM, for all his excellent efforts during the past four-and-a-half years. During my term of office I hope to meet as many of you as possible, however in the immediate future I would like particularly to hear from clubs whose programmes are absent from the above. *73s G3FNM.*

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

Barnsley (UK FM Group Northern) Next meeting 2 August, 6 September, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G8PLJ.

Harrogate Repeater Group (HRG)—Negotiations with the site owners are continuing to look good for a site for a vhf repeater for N Yorks. Information from G4ATZ.

Otley (OR&ES)—Tuesdays, 8pm. 11 August (Channel and frequency checking, using a Racal 9905 counter timer—bring your rigs), 8 September ("Amateur tv", by G8CJS), 10 September (Visit to Drax Power Station). Back of Court House Street, Otley. Sec Jack Annakin, contact G8DFZ for details.

Pontefract (P&DARS)—6 August (Junk sale), 20 August (Discussion evening), 3 September (Tape slide lecture). Club have started a "spares box" for members' use. Details from G4ISU.

Scarborough (SARS)—Mondays, 7.30pm. 10 August ("Place names", by G4JAQ). Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ, tel Scarborough 862638.

Wakefield (W&DARS)—11 August (On the air), 25 August (Club project), 8 September (Visit to Emley Moor transmitter), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT is globetrotting at present but G3WWF can supply any information.

York (YARS)—Fridays except third in each month, 7.30pm. United Services Club, Micklegate, York. The club annual dinner is provisionally booked for 16 October. Quite a few members went to Ally Pally. Sec Keith Cass, G3WVO.

Probably due to the arrival of summer and the usual downturn in club activities, there is not very much this month. Ask your sec whether he has told me about your club picnic—*RR2.*

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

Atherstone (AARC)—13 August ("DX on the broadcast bands", by John Arrowsmith, G4IWA), 20 August (Informal evening), 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G8SYE, tel Atherstone (08277) 5995.

Birmingham (Midland ARS)—18 August ("Interference suppression when mobile", by Barry Orme, G8OFE), 8pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 5 August (Natter night), 2 September (Talk-to be finalized), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104.

Birmingham (UoB ARS)—The new committee includes Jonathon Perkins, G4IVV, chairman, and Chris Driver, RS42041, treasurer. Thanks and good wishes go to last year's committee since most of them left the university this summer. Meetings are held on Fridays during term, 7.30pm. Tuesdays (RAE classes), 7.30pm. Club room, second floor Students' Union (above shop). Sec Dave Thomas, G4HHJ.

Bromsgrove (B&DARC)—14 August ("Amateur radio on a shoe-string", by Rev G. Dobbs, G3RJV), 8pm. Avoncroft Art Centre, Bromsgrove, 25 August (Informal gathering at the Parkgate Inn), 4 September (Antennas will be erected at Stoke Prior for SSB Field Day on 5 and 6 September). Club net Wednesdays, 144·850MHz, 8pm. Sec G4HFP, tel Stourport (02993) 3818.

Kidderminster (K&DARC)—18 August (Plans for SSB Field Day to be held on 5 and 6 September will be discussed), 1 September (Informal evening), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Solihull (SARS)—18 August (Surplus sale), 7.30pm. The Manor House, High Street, Solihull. Club nets (G3GEI), Fridays, 9.30pm on 1,960kHz and (G8ZLJ), Sundays, 9pm on S19 or next lowest vacant channel. Morse classes available. Sec G4JDL, tel 021-745 3098.

Stourbridge (StARS)—Third Monday in each month, 7.45pm. There will not be a meeting in August due to the absence of members on holiday. Library, Longlands School, Brook Street, Stourbridge. Sec G8JTL, tel Lye (038482) 4019.

Walsall (WARC)—5 August (Final preparation for Walsall Show), 19 August (No meeting), 31 August (Demonstration station at Walsall Arboretum), 2 September (Lecture on aerials—see sec for details), 8pm. Forest Comprehensive School, Bloxwich. Club net Fridays, 3·70MHz ssb, 9pm. Sec G4GKC, tel Walsall (0922) 39457.

Worcester (W&DARC)—3 August (Film show—"World of amateur radio", ARRL, and "Something big in microcircuits" Keith Ballinger, VE2AQU, ex-G8BBP will talk about amateur radio in Canada), 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.

Derby (D&DARS)—5 August (Rally preparation), 9 August (Rally at Lower Bemrose School), 12 August (Film show), 19 August (Night on the air), 26 August (Talk by G5RV on antennas), 2 September (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Simon Cook receiving the G5YY Trophy from Bill Mead, G5YY, ex-chairman of Derby & DARS, for winning the junior section of the society's construction contest. Simon has passed the morse test, and is awaiting the RAE result

Derby (Nunsfield House ARG)—7 August (Make do and mend, by Jim Wilson), 14 August (Aerial and mast maintenance), 21 August (Surplus sale), 28 August (Technical film show), 7.45pm, Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby 71875 or 799452.

Grimsby (GARS)—13 August (GDO project), 20 August (Treasure hunt), 27 August (How to get off desert islands), 7.30pm. New Alexandra Social Club, Cleethorpes, Sec Trevor Matthews, G3RGC, tel Grimsby 884060.

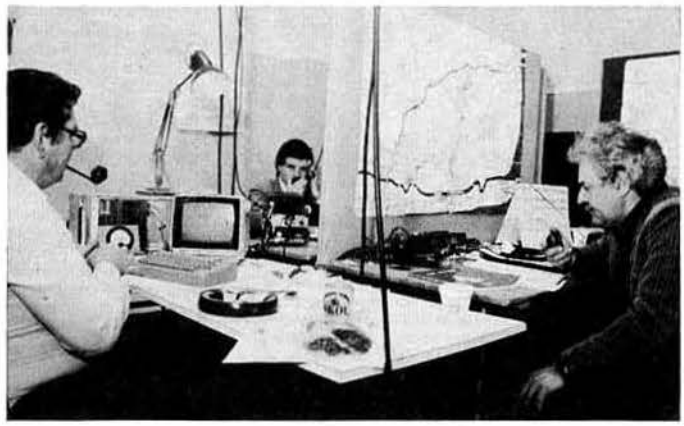
Ibstock (IARS)—4 August (DF Hunt), 18 August (Pre-war radio, G3AAQ), 7.30pm. Hastings Arms, Ibstock, Sec Steve Haywood G8UZQ, tel Ibstock 62158.

Louth (L&DARS)—25 August (Visit to Royal

Four members of the Nunsfield House ARG which organized the Elvaston Castle Mobile Rally on 14 June. L ro r: Ian Cage, G4CTZ, secretary; Les Jackson, G3OZ, president; Ken Clamp, G3ZOW, chairman; and Margaret, wife of G3ZOW

Observer Corps), Eastgate Union Church, Eastgate, Louth. Sec Ron Padbury, G4GAB.

RR4 will be manning an RSGB stand at the Derby Mobile Rally on 9 August and hopes to meet RSGB members from the east Midlands there.



The Grafton RS and Southgate RC talk-in station at the RSGB Alexandra Palace Exhibition

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRS)—11 August (Natter night and sale of gear of late G3REK), 8 September (Talk on Raynet by G8MHZ), 8pm. Elmurst Youth Centre, Fairfax Crescent. For details contact sec G8BGH, tel 0296-64 783.
High Wycombe (Chiltern ARC)—26 August (Talk on "Home-made test gear", by G3VCT). For details contact sec P. B. Shears, G4LMM, tel High Wycombe 24095.
Maidenhead (M&DARS)—6 August (Visits to members' shacks), 18 August (Talk, "Noise", by R. Hemmings, G3VCT). Sec John Patrick, G3TWG, tel Bourne End (06285) 25275.
Reading (RARC)—4 August ("SWR facts and fallacies", by Peter Chadwick), 18 August (SSB FD and 2m Trophy discussion), 15 September (Quiz vs Maidenhead Club). Sec G4CCC.

REGION 7—*RR to be appointed*

Thames Valley (TVARTS)—1 September ("Territorial Army radio operating procedure", talk and demonstration by Mike O'Beirne, G8MOB), 8pm. Dittons Library Meeting Room, Watts Road, Thames Ditton, Surrey. Details from sec Malcolm C. Bell, G8RLB, tel 01-977 6122, daytime only.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7HB.

Burgess Hill (Mid-Sussex ARS)—17 September (Junk sale). Further details from J. Brooker, G3JMB.
Crawley (CARC)—12 August (Informal, G8ECR), 26 August (VHF pub hunt). Further details from D. L. Hill, G4IQM, tel 0293 882641.
Dartford (DHDFC)—9 August (RSGB QE Oxford), 23 August (RSGB QE Slade). The club holds at least one df hunt a month. Further details from sec G4BWV.
Medway (MARTS)—7 August (Junk sale), 28 August (Film evening). Further programme information from sec G4EVY.
Sussex Repeater Group—The group is responsible for GB3SR and GB3BP on vhf, GB3BR, GB3HO and GB3NX on uhf, and the proposed 1·3GHz WX, CP and HM. Further details from M. Senior, G4EFO.

REGION 10—*RR to be appointed*

Barry (BCOERS)—Thursdays, 7.30pm. Barry College of Further Education, Annexe, Weycock Cross, Barry. Further details from Colin Beynon, GW3WSU.
Swansea (SARS)—Thursdays, fortnightly, 8pm. New location on the campus will be Lecture Room "N", Applied Sciences Block, Swansea University College. Club net each Sunday, 1000gmt, 28·530MHz. Net controller Cen, GW4BIQ. Further details from Roger Williams, GW4HSH, tel Swansea 404422.

REGION 11—RR B. H. Green, GW8AAA, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Bangor (UCNWARS)—2 August (2m QRP), 16 August (4m Trophy, meet at Cryn-y-Brain, 0700gmt), 10 August (Meteor scatter, meet in Rockets, 0800gmt, for operation from Holyhead Mountain, 11 and 12 August). There will be a minibus going to Telford and the Welsh Convention in September. Further details from GW4ELI. Prospective members and UCCA candidates—alternative prospectus free, also free pint when you visit!
Colwyn Bay (Conway Valley ARC) (GW6TM)—First, second and third Thursdays in each month starting 3 September. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, 11 Bryn Derwin, Abergele, tel 0745 823674.
Dolgellau (Meirion ARS)—First Thursday in each month. Ship Hotel, Dolgellau. Sec Mrs Jean Jones, GW4KYK, 25 Ffordd, Tywyn, tel 0654 710402.
Rhyl (R&DARC) (GW4ARC)—Fourth Thursday in each month. Ambulance Station, Coast Road, Rhyl. Sec R. Stubbs, GW8XLL, Rosaire, 81 Dyserth Road, Rhyl, tel 0745 53493.

REGION 16—*RR to be appointed*

Braintree (B&DARS)—First Monday (Informal), 8pm, and third Monday (Formal), 7.45pm, in each month. Braintree Community Centre, Victoria Street. 15 August (Visit to Whipsnade Zoo), 17 August (Junk sale). The club also holds short lectures on radio and associated topics for swl and junior members, given by Danny Begg, G3YXJ, at 7.30pm on informal meeting evenings. Details from Alan Heritage, G4EOG, tel Braintree 25109.
Chelmsford (CARS)—4 August ("10GHz", by M. Donnithorne, G8MKX), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094. The club is also holding a df hunt on 14 August, starting at 7.30pm at Tiptree Heath, ngr 884 148. OS map 168 will be required. Details from Dick Brocks, G3WHR, tel Maldon 55707.
Colchester (CRA)—Details of regular club meetings from Frank Howe, G3FIJ, tel Colchester 70189. The club will be holding another of its regular df hunts on 4 September, starting at 1pm at Fordham Heath, ngr 945 264. OS map 168 will be required. Details from Ian Butson, G4HKC, tel Colchester 860724.
Ipswich (IRC)—5 August (Planning of special event station at Ipswich Carnival on 8 August), 12 August ("Some modern amateur radio equipment", by Peter Clark of Arrow Electronics), 26 August ("Microwaves", by B. L. Crooknose, G4GBA), 2 September (Final planning for SSB Field Day), 8pm. Club Room, Rose and Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.
Norwich (Norfolk ARC)—Wednesdays, informal and morse tuition alternating with formal meetings. 5 August (Equipment demonstration by G4CTT), 19 August (Visit to Jaguar Flight Simulator at RAF Coltishall—Limited places, so first come, first served), 7.45pm Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 610247.
Southend (S&DRS)—There will be no club meetings in August, but meetings will restart in September. Details from A. Adams, G3YOA.
Vange (VARS)—Thursdays, with the first meeting of the month as regular junk sale. 13 August (Details of Vange Rally), 20 August (Talk by G8VFI), 27 August ("Slow scan tv", by G3LUI), 8pm. Barstable Tennants Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 12 August ("An insight into rtty", by G3RRA), 26 August (Talk on AMSAT-UK by G3AAJ), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane. The dinner and dance will be held late in September. Details from sec Ivor Ireland, G4BJQ, tel Farnborough (0252) 43036.
Horndean (H&DARC)—Second Thursday in each month, 13 August (Talk by Raynet), 10 September (Junk sale), 8 October (AGM), 7.30pm. Merchiston Hall, Horndean. Sec Sid Jenkins, G4CHO, tel Horndean (0705) 597188.
Jersey (JAEC)—Second Wednesday in each month, 7.30pm. The Communicare Centre, St Brides, Jersey. 9 August (Fox hunt), 12 August (No meeting because venue closed). Sec Mary Smith, Tel Jersey (0534) 23249.
Poole (PARS)—There will be no meeting at the Poole Technical College during August, an outside event is being held in lieu. Sec Barry Purse, G8ZCG, tel Broadstone (0202) 693986 for details.
South Dorset (SDRS)—First and third Thursday in each month, 4 August ("Amateur fast scan television" by G3YWG), 18 August (Informal meeting), 7.30pm. 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. Tel 01-989 6741.

Cheshunt (CDRC)—5 August (144MHz portable on Broxbourne Common), 12 August (Natter night and cw practice), 19 August (HF rig operating from club room), 26 August (Natter night and cw practice), 8pm. The Church Room, Church Lane, Wormsley, Herts. Enquiries to Jim Sleight, G3OJI, tel Ware 4316.
Chiswick (ABCARC)—18 August (G3CCD as F0UT in France). The Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Edgware (E&DRS)—13 August (No meeting), 27 August (SSB Field Day briefing). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec G4HMD, tel 01-952 6462. Club net on 1·875MHz, Mondays, 2200 local time.
Harrow Weald (RSH)—Fridays, 8pm. All August meetings informal for practical work. Harrow Arts Centre, High Road, Harrow Weald. Sec G4AUF, tel 01-868 5002.
St Albans (Verulam ARC)—25 August (Bring and buy), 7.45 for 8pm. Formal meetings in Charles Morris Hall, Tyttenhanger Green, Nr St Albans. Informal meetings second Tuesday in each month, RAFA HQ, Victoria Street, St Albans. Details from Hilary, G4JKS, publicity sec.
Southgate (SRC)—13 August (New QTH housewarming party, St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Guest of honour Ron Broadbent, G3AAJ, RR19), 7.45pm. Sec Val Austin, G8PZY, not QTHR, tel 01-360 5832.
Stevenage (S&DARS)—20 August (Beginners' night with vhf/uhf and hf stations on the air and questions and answers on amateur radio), 8pm. Staff canteen, BA Plant B, Gunnels Wood Road, Stevenage, Sec G8LXY.
Wanstead (ELRSGBG)—No meeting in August. Details from Rod Holmes, G3PKQ, tel 01-558 2928, or G3AMF, tel 01-969 9224.
Watford (WRC)—This new club has applied for affiliation to the RSGB. Wednesdays, 12 August (Ron Broadbent, G3AAJ, RR19, talking about the RSGB and Oscar), 8.15pm to 11pm. Watford Radio Club, Small Hall, Christ Church, St Albans Road, Watford.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.

Bristol (BRSGBG)—30 August (Ashton Court Picnic, see details later of new site), 24 August (General meeting), 7.15pm. Queens Building, Bristol University. Sec G8GLQ.
Cheltenham (CARA)—6 August ("EME" tests by Richard, G4ERP, and Tim, G8PZD), 21 August (Natter night). Old Bakery, Chester Walk, Clarence Street, Cheltenham. Sec G4ILI.
Gloucester (GARS)—20 August (Preparation for AGM (10 September)), Thursdays, 7.31pm. The Chequers Bridge Centre, Painswick Road, Gloucester. Sec G3MA.
Weston-super-Mare (WsMARS)—10 August (VHF df hunt), 7pm. WSM Rugby Social Clubhouse, Drove Road, Weston-super-Mare. Call G8WSM. Please note change of officers 1981/2: chairman, G4EYC, sec G3BLO, or information from G3PQE, tel Weston-super-Mare (0934) 22712.
Yeovil (Y&DARC)—6 August (Briefing for the club's 144MHz cross country race, G3MYM), 13 August ("The mechanism of ionospheric reflection", by G3MYM), 20 August ("Skin effect", by G3MYM), 27 August (Natter night and committee meeting), 7.30pm. Building 101, Houndstone Camp, Yeovil. Sec D. L. McLean, 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 **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

TS700G, £290. IC245 multimode mobile, £220. Multibeam, £10. Liner 2, modified, works ok, £60. 144/432 MMT, £120. 28/144 MMT, £70. 7/8 whip, £7. *Wanted:* fm midband Westminster, accept rough one cheap. Tel N London 01-360 0210, after 6pm.

Trio 2200GX, fitted R0, R3, R7, S20-S22, helical rubber whip, new nicads, usual accessories, good cond, in orig packing, £75. G8ONA. Tel NW London 01-428 3266.

KW2000B, £200. KW204, £100. GW3ZFS, c/o "Aircomm", 22 Brecon Road, Abergavenny, Gwent. Tel 0873 2566.

Trio R1000, orig packing, dc kit fitted, as new, £220 ono. SP100 separate spkr, £17 ono. SEM Z-Match, £40 ono. D. Mathews. Tel 01-876 7868.

LG300, virtually new cond, hb power supplies, spare 813, first-class 150W cw rig, 10-80m, £20. AR22 rotator with control unit, 20yd cable, £12.50. Variac model 80CS58 3·4A, £7.50. Buyers collect. G3MI, 2 King Street, Chesham, Bucks. Tel 0494 783990.

Heathkit SB300 rx, exc cond, spare valves, £75 ono. Honda EC1500E 1kVA, 220V, used little, £160 ono. DB oscilloscope D53, Telequipment, JD amps, 25MHz on both channels, almost unused, £240 ono. O'Brien, G3LP, 38 Hatherley Road. Tel Cheltenham 512481.

Standard C8800 2m fm mobile, fully synthesized, 5kHz or 25kHz shift selector, full repeater facilities, four memories, 1MHz shift, repeater shifts, full microprocessor type programming, 1W+10W output, Loc or-dx selector switch, auto-calling channel, two months old, £195. Tel 01-803 6678, anytime.

FT101E, mint cond, all accessories, orig packing, £395. TR7200G mobile tx/rx, mint, five repeaters, £130. G4HGN, QTHR. Tel 0298 871249 or 78252.

Nascom 1, NAS-SYS 3 monitor, psu, cased, built-in cassette recorder, all info, some programs on tape, £125. Ex-language laboratory tape recorder chassis with psu etc, £10. 9MHz 2m xtals, £1.20 each. Dawe ac vvm, £10. G3WUN. Tel Rochdale 57353.

KW Vespa KW201, £120 the pair. Buyer collects. G4BDQ, 10 Westridge Road, Portswood, Southampton SO2 1HQ.

FR50B, FL50B, £135. IC240, £135. Both in vgc. *Wanted:* Myford ML8 wood-turning lathe. G3BJC, QTHR. Tel Trowbridge (Wilts) (02214) 2516.

Trio TS520S with cw filter, spkr, £375. Icom 255E 2m fm tx/rx, £190. GM4JEM, QTHR. Tel 031-661 4429.

NEMS Clarke vhf fm rx type 1672, frequency range 55-255MHz, tunable with signal strength meter, tuning meter, in comp wkg order, £30. Tel Wolverhampton 782404.

Icom 255E, exc cond, orig packing, MMA 144V rf switched preamp, £195. G8TQT. Tel Bournemouth 420666.

Atlas 210X with ac power supply, mobile mounting bracket, Atlas matching transformer, G-whip, tribander, helical, 80 and 40 loading coils, all in good cond, £325. G3KLF. Tel Fareham 236906, weekends or evenings please.

Silent key sale: Drake R4B, T4XC, homebrew 230V ac power unit, mint cond, £350. TenTec XC1 harmonic gen, seven ranges, 1kHz-1MHz, £8. Buyer collects both. G3JKF, QTHR. Tel 0293 28080.

VHF experimenter offers sundry tx chassis for 4-2-70, each with spare set of valves, one or two with psu. Numerous xtals. Send sae for list to G5UM, QTHR.

Trio 7010 2m ssb, cw xtal, orig packing, £130. MM 28/144 transverter, £80. Both ono, and good cond. C. N. Bauers, G4JUV, 17 King George Avenue, Leeds LS7 4LH. Tel 0532 628317, evenings.

KW202 rx, 160/10m Q-mult, notch filter, matching spkr, exc cond, buyer to collect, £110. Tel Bristol (0272) 826753.

Olympic T100 am/cw tx with instruction leaflet, £20 ono. Pye equipment, Vanguard AM25B high band single channel, control box, manual, £17. Ditto low band without front panel or control box (for spares), £5. PTC2701 base station sub-units, 25W a.m. tx, single channel, manual, £12. RX, early model, less mains transformer, £5. RX, later model, £8. Old rf strips, three, 50p each. F27 base station, rx, sub-unit, single channel, without squelchboard, £12. Collect or pay carriage. GM4LBN, GM8JMN, QTHR. Tel 031-445 1343.

FT101E, mint cond, all leads, accessories, orig packing, £400. FT221R, used little, comp with leads, accessories, orig packing, £300. Will deliver reasonable distance. G4GNP, QTHR. Tel Goole 2736, after 6pm.

Liner 2, preamp, etc, only one xtal to change if they tinker with the bandplan again! £80. TC7 Mk2 tunable i.f., bandsearcher, 2m converter, £40. Both ono, exchange for 70cm fm. G8ADD, QTHR. Tel 021-748 5268.

LM13 usn wavemeter, similar to BC221, but has voltage stabilization, exc cond, charts, spare valves, comp £17, incl postage. GU5ZC, QTHR. Tel 0481 54833.

HF 160 10m a.m./cw tx, 60W, modulator fault, £15. Pair Celestion Ditton 66 monitor spkrs, ideal quality disco, cabinets marked, hence £150. Quad 303 power amp, £75. G3WMT, QTHR. Tel 01-303 1721.

Ferrograph Series Two model YDA tape recorder, £15. Sony TC200 stereo tape recorder, £20. Pair of Wharfedale spkrs, crossover, tweeters in cabinets, £25. Class D wavemeter, works off mains, £8. Tel Thomas, Chipping Sodbury 319662.

Yaesu FLDX400, FRDX400 mic, spare valves, fb cond, £260, exc 2m trns or hf vert antenna small beam. Advance OS15 scope, handbooks, £25. G3KPW, QTHR. Tel 0474 62051, evenings.

IC202S, nicads, charger, £140. IC245E, RM3, £250. Heathkit HM2102, pwr/swr, £20. Heathkit MM1U multimeter, £25. G8ESK, QTHR. Tel Bradford 45611.

Icom IC215, as new, 12 channels fitted, nicads, charger, helical whip, £100. G8TPE, QTHR. Tel 01-727 7109.

Sony TC510 semi-pro portable three-head tape recorder, £350. Bell & Howell 1237 sound cine camera, £230. G3YIS, QTHR. Tel 01-697 2136.

Icom IC2E, all as advertised, HM9 spkr, mic, DC1, adaptor, CP1 lead, instructions, all as new, £130 plus carriage. HF5R antenna, with radials, in good cond, instructions, £40. G3MLP, QTHR. Tel 0733 63851.

TR2300, nicads, reverse repeater, spare lead, nine months, vgc, Mizuho LA2X 1W/10W linear, third size of TR2300, hence mounted on rig by Velcro strips for neat layout, six months, vgc, 13·5V 1A psu/charger, £170. Going multimode. Chan, G5MUR. Tel 01-942 5717, evenings.

RTTY MM2000, seven months old, £145. G4EDD, 11 Broxtowe Avenue, Kimberley, Notts. Tel Nottingham 384508, anytime.

RNARS 21st Anniversary commemorative postal covers with special cancellation, 25/6/81, price 60p plus sae 9½ by 6½in for cancelled but unaddressed items. John Hughes, G4KGT, 74 Fairacres, Prestwood, Great Missenden, Bucks HP16 0LF. Tel 01-920 7961, or Great Missenden 4380.

FT202R handheld, six channel, five channels fitted, nicads, charger, £65. FT227R no mods, £165. G8CZH, QTHR. Tel 01-859 1852.

Icom IC215 2m fm, exc cond, all repeaters, four simplex, 900mA nicads, built-in charger, helical whip, £99 ono. Matching power supply, incl spkr, also available. G8PJQ, Q1HR. Tel 01-432 1730, day, or 05827 68783, home.

Bell & Howell 622 16mm sound projector with films etc, £150 ono. G3TOF, QTHR. Tel Harlow 23517, evenings.

FT7B 100W p.e.p. tx/rx, 80-10m, £290 or exchange for good KW2000 etc, cash adjustment. Kokusai mechanical filter, MF455I0CK, three xtals, £12. G4GXU, 6 Spinney Bank, Kings Sutton, Banbury, Oxon OX17 3RL.

Trio TR7500, £130. CCTV camera HV62, £110. MMT432/28S, £120. Tonna 21-el atv, £15. Mustang 3-el hf Yagi, £70 ono. Modular Electronics PM70/10 70cm 10W amp, £10. All items in good cond. G4GUO, QTHR. Tel Charles, Worthing 45400, anytime.

CQ tv amateurs—Revere 16mm cine camera, cassette load, three-lens turret, holdall bag, lens, wide angle, 17mm f2·5, standard 25mm f1·9, telephoto 76mm f2·8, telephoto 152mm f3·5, all C mount, offers. For right offer will add rewind editing unit, spare cassettes. G3EFK, QTHR. Tel Downland 51212.

Pair 2m portable tx/rx Ultra Cub, nicads, chargers, helical antennas, etc, £30 each. Yaesu FT227R, 5/25kHz steps, scanner, reverse repeater, spare plugs, vgc, £160. Trio 9R59DE rx, 160m transistor tx, Pye Ranger batt, tape deck, offers. G3YZW, QTHR. Tel 01-478 3643.

Exchange over 200 valves, some rare unf types for w.h.y.. 17 vols *Radio Communication,* comp 1962-78, sstv monitor, see *Radio Communication* Feb 1971, wkg, comp but not cased, £50. G3CGQ, QTHR. Tel 0582 25519.

Icom IC211E with ICRM2 remote controller, vgc, boxed, £400. PET4008 computer with Tensai cassette deck, incl counter, sound facility, mint cond, boxed, few programs, £400. G8TFZ, QTHR. Tel Saltash (075 55) 5311.

Versatower, 60ft, wall-mounted, comp all winches, ropes, head unit etc, dismantled, requires repainting only, £170. Delivery at cost. G3PJK, QTHR. Tel 061-643 2631.

Palm 2 2m fm handheld, six channels S20, S22, R0, R2, R4, R6, toneburst fitted, comp with rubber duck, nicads, charger, leather case, £90 ono. G8OUD. Tel Southampton 434059, after 6pm.

Bearcat 220FB, scanning rx, 30-88, 118-174, 430-512MHz, a.m. and fm all bands, as advertised, comp in packing, accessories, £210. G4GAV, QTHR. Tel Maidstone (0622) 36697.

FT480R, exc cond, under guarantee £299. 5λ/8 mobile whip, boot mount, spare whip, £12. SWR25 power/swr meter, £8. 13-8V 3A power supply, £12. G4DXG. Tel 01-679 3215, after 7pm, anytime weekend.

IC245, £260 ono. FT207R incl NC2 charger, YM24 spkr mic, £160 ono. Both orig packing. MMT432/144R, £130. TR2300, £130 ZVC ssb board, £45. Pye Europa fm rx, £50. G8OQN, QTHR. Tel John, Portsmouth (0705) 750600.

Yaesu FR50B and FL50B, 80-10m tx, 50W p.e.p., rx modified 160m, £150. FT202R handheld, 1W, six channels, xtalled S20-23, R4, 144·850, λ/4 antenna, nicads, £80. G4GNK, QTHR.

Trio JR310 amateur bands rx, top band, WWV, wkg order, £70. *Shortwave Magazine,* 1973-81, bound volumes, £25. Jaybeam crossed dipoles for 145MHz, free. Telford Communications TC7 tuning 28-30MHz, wkg, offers, Tel Kim, Morden, 01-648 0028, after 6.30pm.

IC215, just over 1·5yr old, good cond, fitted R0-9, S17-20, S22, helical, £95 ono. Prefer buyer collects. G8UBW, QTHR. Tel Bath (0225) 333965.

Sony CRF330K "World Zone" 33 band synthesizer rx, with combined cassette recorder, digital readout, wide, narrow, a.m., usb, lsb, cw, as new cond, with packing, at less than half new price, £525 ono. G8NYB, QTHR. Tel Chertsey 66712, evenings.

Swan 350 pa stage, uprated to 500 specification, ie 6LQ6s instead 6H5s, new spare pair, some other valves, £130. AM10D tunable rx, £22. Eddystone 898, £7. Datong rfc module, unused, £19. Carriage extra. Edwards, G3KGN, QTHR. Tel Southend 77779.

Trio/Kenwood TS180S hf tx/rx i.f. shift, four memories, effective separate vfo, fast and slow scan, rf speech processor, 200W dc, £525. G4GPL. Tel 01-953 6921.

3cm portable tx, fm, 1MHz dev with M1 wavemeter, £35. 3cm rx, £10. 4ft glass fibre dish, £15. Heavy tripod, suit above, £20. 2ft glass fibre dish with feed, £10, or £75 the lot. GM3VBB, QTHR. Tel 031-449 3842.

FT101E, with 350Hz cw filter, immac, still has plastic cover on front panel, comp with mic, fan, all accessories (unopened), orig packing, £410 ono. PW Helford tx/rx, wkg, fb on 80/20m, cased, mic, £120 ono. G4GZS. Tel Rugby 815506.

Eddystone 730/4, exc cond, £135 ono. LM14 frequency meter, US Navy version of BC221 with modulation, as new cond, charts, psu, manual, £30 ono. KW107 Supermatch, vgc, £75. Buyer collects. G3NJP, QTHR. Tel Cranbrook (0580) 714482.

SWL bargains: HF5 vertical, 80-10m, £29. AT1000 High-Q atu, £19. Datong AD370 active antenna, £43. FDK TM56B 2m rx, 12 channels, plus four scanning, £39. Tel Wombourne (Staffs) 896625.

Trio 9R59DS, exc cond, cover, headphones, £65. 2m converter, all connectors, 2m dipole, £15. Phil Davies. Tel Birmingham (021) 445-4564.

Heath HR1680 fb cw/ssb rx, as new, £160. HW101 cw/ssb tx/rx cw filter, rit fitted, good cond, HP23 psu, £190. Demonstrate at QTHR or deliver reasonable distance. G4GZQ. For full info tel John, Thatcham (0635) 65997.

Drake R4C, £250. R4C filters, 500Hz, 1·5kHz, 6kHz, £25 each. Atlas 215X base consul psu, £295. Standard 8800, £155. 2200GX, £100. Telequipment scope D52, £110. Keighley dvm, £60. Eddystone 940, £175. G3RCQ. Tel Hornchurch 55733, after 6pm.

Icom IC255E, up/down mic, full rev/rpt, auto toneburst, mobile mount, orig packing, £175. ZX80, 8k Basic rom (as ZX81), psu, 3k memory board (less chips) three books, improved tape interface, £50. G8EPQ NOT QTHR. Tel Milton Keynes 640249, evenings.

Yaesu FT501/FP501, digital readout, 10-80m, 500W, manual, Trio MC50 mic, Datong RFC/M rf speech processor, £389. G3DNQ, QTHR. Tel 0279 51776.

Trio TS120S, hardly used, £330. G-whip mobile ant for 80-20-15-10 with base, £20. Creed 7B teleprinter, with cover, wkg order, plus second machine for spares, £20. G4JZL, QTHR. Tel 0225 834127, evenings.

FT101E, remote vfo, cw filter, fan, £400. Hygain TH3 Mk3 tribander, £80. G3NKR. Tel Winchester (0962) 51448.

Trio 7200G 2m fm tx/rx, fitted 13 channels, manual, no mods, unmarked perfect cond, £100. MMT144/28 transverter, as new, £70. Command rx BC454 and psu, £9.50. Buyer collects or carriage extra. G3KZU, QTHR. Tel Oxford (0865) 63000.

Drake 2NT cw tx with TenTec solid-state vfo, £85. HAL2550 iambic keyer, exc cond, £25. Icom IC720 with ICSP3 spkr, Heathkit mains supply, virtually new, in perfect cond, best offer. G5DDC. Tel 01-486 4137.

AR88D, needs good home, exc cond, incl set of spare valves, manual, £50. Buyer to inspect and collect. Tel Ruislip 33650, anytime.

FRG7, 0-30MHz, rx cw Perspex cover, £135. Datong morse tutor, £36. Icom IC22A, 10W mobile tx/rx, five simplex, seven repeater channels, auto toneburst, perfect cond, £100. G8KND, QTHR. Tel Taunton 72782.

Muirhead decade oscillator, 1Hz 111,100Hz, vgc, £60. Coil formers, ceramic, 2in diameter, heavy duty ceramic insulators, ideal for guy wires, offers. G3VWE, QTHR. Tel 0272 656783.

Yaesu FT501/FP501, immac, spare pas, manual, digital rit, noise blanker, vox, AGC 100kHz marker, 200W output, 100W, 15 and 10m, ZL/VK using ground plane ant, fan built-in, orig mic, £335. G4KJP. Tel Bridgwater (0278) 57259.

432MHz 18-el Parabeam, as new, £15. SSM Europa B 144MHz transverter, £65. *RSGB Bulletin* and *Radio Communication* 1960-80, comp set, most in Easibinders, offers? Old valves: Baird VB11; De Forrest type H; offers? G3OHC, QTHR. Tel 021-308 2512.

FT200/FP200, late model, full 10m cover, recent overhaul, manual, £220. HF5V/HF5R, five band vertical, with radials, £50. Prefer buyer inspect/collect. G3VZM, QTHR. Tel 051-339 5317.

Valves: new, unused, two 6080, £2 each; two QQV04/7, £2 each; one 829B, £3; one 362 (collectors' piece), £3; one 35T (ditto), £2. Valves: used but good, two QQV06/40, £3 each; two KT88, £2 each; German RV12P2000, £1 each. Add some postage. Two Weston tc meters, 0-3A, £5 pair. RAF morse key, back contacts Type 1969, £3.50. Henley elcb, unused, see *Technical Topics* May 1981, £6. Two Eddystone gear drives, (EX358), £3 each. One brand new five gang 48PFD, air trimmers, gear drive, fully screened, all brass, beautiful, £8. Two brass coaxial tubes, adjustable shorting pieces, ex-German radar, suitable GHz Z-Match? SAE details. Add 75p postage all items. G5LH, QTHR. Tel 0632 662490.

Museum item, Admiralty pattern wavemeter G61, 1-25MHz, offers. *Wanted:* 10A Variac. FT241 xtals, channels, 44/324/325 or any type on 451kHz. G3RWH. Tel Cowes (I-o-W) 0983 293323.

TR2400, as new, £160. TS700, £250. Atlas 210X, as new, £275. G3LBG, QTHR. Tel 0702 521561.

Yaesu FT101Z, mint cond, solid-state, 2×6146B, pa, rf speech processor, variable i.f. width, noise blanker, Yaesu YD184 dual-Z desk mic, Heathkit HM102 rms power swr meter, offers complete lot or separate. *Wanted:* TS700S. G4FNI. Tel Kevin, Bournemouth (0202) 24848.

Datong morse tutor D70 accessories, cartonned, £35. Katsumi code oscillator, £5. Yaesu YH55 headphones, £6. Timac plug-in 13A timeswitch, £10. Ameco two-cassette code course, manual, £4. Telex CB88 powered boom mic headset, £25. All as new. G4IOF. Tel 01-486 8286.

SR56 programmable calculator, manuals, contest score programme, £15. Lunar 144MHz preamp, £6. Trio MC30 desk mic, £12. Xtals: HC18/U 6MHz tx, 44MHz rx, pairs for R3 and S21, £2 pair. B7G 100kHz and 7MHz, £1. Moss, G4ILO. Tel 01-316 0054.

FRG7700M, unwanted gift, three months old, £280. FRG101DD, spkr, £350. AT1000. atu, £18. All in mint cond, post free. Tel Stroud 3081, evenings.

Trio 9R59DS rx, good cond, £50. YW3 swr meter, £7.50. Audio oscillator, resistance tuned, model LO63C, offers invited. Trio TR7600 tx/rx with RM76 microprocessor, covers 144-148MHz, exc, £180. All prices ono. G8XHL. Tel Colchester (0206) 48102, evenings/weekends.

NEC CQ110E tx/rx, 160-10, ssb, a.m., fsk, sstv, exc cond, £400 ono. Homebrew 80-10 1kW linear, 3kV psu, £60 ono. 6LQ6s, new, boxed, £2.50. GW3KZW. Tel Martletwy (083485) 602, evenings.

KW107 atu, perfect cond, £70. G3WWO, QTHR. Tel Smallburgh 745, evenings after 7pm.

TR2300, charger, case, nicads, helical, handbook, £150 ono. VB2300 amplifier, 10W, £45 ono. Mobile mount, TR2300 or TR3200, £10. PS1200 psu and charger, operates TR2300, TR3200, TR2200GX, Icom portables, £25. Collect, carriage extra. G8SBU, QTHR. Tel Fareham 232799.

Drake R4C with MS4 spkr, in exc cond, £200. G3VLX, QTHR. Tel 0689 26584.

FT200, FP200, KW dummy load, mic, £180. 18AVT vertical antenna, £20. G4TJP, QTHR. Tel Swindon (0793) 21086.

Icom IC255E, cost £255, mint cond, orig packing, £165. 113 copies *Radio Communication*, etc, £10. 30 variable airspaced capacitors, unused, £10. Approx 100 multiway connectors, various types, £10. G3HSC morse course, three discs, £3. G3SEV. Tel Southend (0702) 585548.

Frequency counter, 100MHz, £50. Field strength meter, 10-160m, £10. Valve voltmeter, £10. SWR meter, £10. Two-tone oscillator with pulse facility, £10. Speech compressor, £8. *WW* fm tuner, £7. Car radio, £5. Coaxial, low loss, 75Ω, 50yd by 0·3in, £7. Ex-Army 30ft sectional antenna with whip top section, guy-ropes, new, in carrying bag, suit /P etc, £15. QQVO620, new, £4. *ARRL Antenna Handbook*, £1.50. Chrome handles, £0.50/1.50 per pair. Diodes, 800V 6A, 15p each. 6CW4, £1.50. 6BW6, £2. MC1310P (stereo decoder), £1. Post/carriage by arrangement. G3ZIJ, QTHR. Tel Birtley (0632) 403706.

Pye Westminster W15FM dash mount, xtalled S18-23, R0, R3, R5-6, comp with service manual, mount, ext spkr, good cond, modulation, £80. G4DOV, QTHR. Tel Barry, 0922 414927.

Atlas 210X hf tx/rx, 100W output, ac power supply, mobile mounting bracket, Atlas mobile antenna, matching transformer, G-whip tribander, helical, 80 and 40m coils, whips, £325. Crowther. G3KLF. Tel Fareham 236906 weekends or evenings only please.

Trio TS510 and PS510, spare pa valves, handbook, workshop manual, one owner, £200. Buyer inspects and collects, G3NXM, QTHR. Tel Bradford (0274) 581373.

FT75, 80-10m ssb base/mobile tx/rx, ac and dc psus, mobile mount, mic, £125 ono. Tel Southampton 760178.

Heath SB102 and HP23A psu, £200. *Wanted:* 2m multimode, w.h.y? G3NXQ, QTHR. Tel 0905 20264.

TS700 2m multimode, mains or 12V operation, £250. TR2300 with helical ant and mobile mount, £130. G3ONP, QTHR. Tel 03843 5130.

IC215 2m fm tx/rx, channels R1-9, S20, S22, mint cond, orig packing, £110. G4KOU. Tel Steyning (0903) 814089.

Drake SPR4 rx, superb cond, used little, additional xtals costing over £90, technical manual, £200. Buyer please inspect and collect. Frank Tennant, 38 Roundways, Ruislip, Middx. Tel Ruislip 33650, anytime.

SX200 scanning monitor keyboard, selection frequencies, purchased 1981, £185 ono. FDK TM56B vhf marine monitor, 12 fixed channels, four scan, £60 ono. Both items used little, exc cond. Tel Looe (Cornwall) 4171.

FT101E, with cw filter, spare valves, service manual, £375. FR101DD rx, 160-2m, bc bands, a.m., fm, usb, lsb, cw, digital/analogue, £375. FRG7 gen cov rx, ssb filter, fm adaptor, £125. G8BJG, QTHR. Tel 01-462 3553.

FDK Multi 2000, tx/rx, synthesized 2m, 12V/mains, fm/ssb, comp mic, handbook, can be seen, £180 ono, or swop for MM2000 rtty converter, w.h.y? G4AMZ, QTHR. Tel Wilmslow 533857, evenings.

TS700A 2m multimode, 144-148MHz, Janel preamp, rf switched, full service manuals, mint, £200. G8VR, QTHR. Tel 04747 3552.

Trio gen cov rx model 9R59DS, 550kHz-30MHz, comp with loudspkr, good cond, offers around £95. Tel 041-779 1458.

Santec handheld 2m fm tx/rx, synthesized, 10 memories, scanning, 1W or 4W output, repeater shift, toneburst, nicads, charger incl, brand new in Feb, £145 ono. G6ARA. Tel Worcester (0905) 423723, evenings or weekends.

Pye Cambridge boot mount, comp with cable, mic, spkr, cradle, plugs, etc, six channel, incl S20-23, R3, R5, £50. G4KQE, QTHR. Tel Silver End 83094.

FRG7 external digital readout (kHz only), no other mods, MMC144/28LO 2m converter, Heliscan dipole, £195. Buyer collects or carriage at cost. G6BMY. Tel Ron, 061-998 8061.

Eddystone 888 rx, ext spkr, Q-mult, preselect, all circuits, £75. KW Vanguard a.m./cw tx, £25. Partridge Joystick with Joymatch 3 atu, £10. Codar PR30 preselect, power from rx, £5. G4KJI. Tel Alan, Stanford-le-Hope (Essex) (03756) 5057.

Liner 2 with 3N204 built-in preamp, £100. Quarter-wave 2m whip, spring clip gutter mounting, £12. Carriage extra, both. G3CBU, QTHR. Tel 0256 58921.

FT101, exc cond, 80-10m, fan, mic, spare driver and pa, manual, cables, orig packing, £225. GM3NIG, QTHR. Tel 041-639 7700.

Swan 350 ac psu, manual, spare valves, £180. Buyer collects. G4BVI, QTHR. Tel Ipswich (0473) 53270.

Trio 180S, extra filters fitted, YK88C cw and YK88S sideband filter, comp with PS30 power supply, AT180 atu, matching MC50 desk mic, LF30A low pass filter, as new, £600. HF5 radials, new, £15. Tel Bill Hayward, Great Leighs 509.

Telequipment D61A scope, all leads, manual, X10 probe, dc, to 10MHz, £110. G4IYA, QTHR. Tel Shorne (Kent) 3172.

TS520S xtal filter, DS1A dc unit, mint cond, £400 ono. G3XHK, 9 Wensleydale Gardens, Hampton, Middx TW12 2LU. Tel 01-979 8779.

FT101E, still in box, used very little, fan, cw filter, all leads, mic, spare set, Toshiba's manual, etc, priced right at £400. Buyer collects. G4ICN, QTHR. Tel 0522 37119.

FT221R, 2m multimode, £290. Datong asp, £55. MM 500MHz frequency counter, £42. MM 6dB attenuator, £4. G8BWR, QTHR. Tel 0926 498388.

Trio DG5 digital display unit for TS520S/SE, £60. G3ZZR, QTHR. Tel Witney (0993) 3792.

FRG7 fine tune, Mizuho KX2 atu, both in exc cond, £135 ono. A real bargain! 21 Cotswold Street, Cottesmore, Nr Oakham, Leics. Tel Oakham (0572) 812808, after 6pm.

FT200/FP200, fan, spare pa valves, £230. Palm 2, new, incl six channels, helical, nicads, charger, £85. Liner 2, preamp, 4-el quad, £87. Datong FL1, £40. Hammerlund keyer, incl paddle, £15. Deliver free S London/Surrey. G4IFB, QTHR. Tel Gary, 01-642 1465, after 6pm.

FT101Z analogue, six bands, fitted 600Hz cw filter, fan mic, immac, no mods, inspect, collect, £400. G6FB, 11 Morningside Avenue, Portchester, Hants. Tel Cosham (0705) 370087, anytime.

Trio TR7200 mobile rig, fitted R0-7, S20-23, matching VFO30G, 144-146 coverage, repeater shift, etc, £125. 2m transverter, MMT144/28, as new, £65. G4DEV, QTHR. Tel 01-850 3304.

FRG7, exc cond, box, manual, £120, no offer. Buyer collects. Tel Borehamwood (01-953) 7778.

FT200, FP200, vgc, manual, packing, several valves incl pa, Shure 444 mic, prefer buyer collects but would deliver 50 miles, £220 ono or part exchange 2m tx/rx. G3EJF, QTHR.

Eddystone EA12 rx, plinth spkr, manual, spare valves, fb cond, delivered GB, £140. G3JMO, QTHR. Tel Middlesbrough (0642) 828851.

4CX250B linear, DK1OF design psu, comp automatic

reset, timer, crossover relays, linear 99 per cent comp, needs facia legends, painting, debugging, spare new 4CX250B, £150, or exchange for MM 70cm transverter, 2m i.f. in good cond. Inspect and collect. G8RCF, QTHR.

60ft lattice telescopic tiltover mast, motorized and crank lift, comp with rotator antennas and feeders, late G8AJ, £400. Buyer collects. Tel Lymington (Hants) 682464.

Trio JR599CS rx, 160-10m plus 2m, a.m. ssb//fm/cw filters, provision for five extra 500kHz bands, good clean cond, no mods, £145 cash, prefer buyer to inspect and collect. J. F. Wright, Flat 4, 2 Harrington Road, Brighton BN1 6RE, East Sussex.

Telemax hetrodyne frequency meter type 74, 20-280MHz, cw charts, mains psu, £25. Telequipment 542 scope, £15. Four J.J. Lloyd decade boxes, four dial, 1Ω steps, £5 each. Advance 10MHz timer/counter type TC6, £15. Ferrograph 3CFN/L recorder, £25. G4ALC, QTHR. Tel 01-578 9621.

Universal Avometer model 9A Mk2, £17. National RQ150 portable tape recorder, reel-to-reel, £17. SEI clip-on ac ammeter in case, 0/50/100/200/400/800A, £30. TCC field strength meter, C3041, £7. Portable 4in oscilloscope, built-in tb/v&h amps/sync etc, 110V, type OS8BU, £25. G8PF, QTHR. Tel 0425 617576.

Datong speech processor, £25. Europa 2m transverter, £45. Coaxial slide switch, 50Ω, five-way, £6. Burns FMD1 discriminator board, unused, £10. All items carriage extra. GW4HAT, QTHR. Tel Swansea (0792) 290770, evenings.

Trio TR7010 ssb/cw tx/rx, 12V base or mobile station, currently in use, exc performance, covers 144·1 144·35, 10W, rugged construction, dx a cinch, £130. G4AVT, Parbold, Lancs. Tel 02576 2412.

IC2E 2m portable tx/rx with mic, leather case, nicads, charger, dc converter, £130 ono. G8WPM, QTHR. Tel 0962 883328.

Bird Thruline element, 100/250MHz, 50W, £14. Pye Bantam, marine band fm, unmodified, case, £18. Kokusai mechanical filter, 455-15CK usb, lsb, xtals, £12. G4JEX, QTHR. Tel 01-764 0220.

Wood & Douglas 2m tx kit, 1·5W fm and toneburst kit, both untouched, still in orig packing, £16. Tel 0902 332295.

Trio JR500S rx, very clean and selective, manual, ideal rig for swl beginner, £85. Antwis. Tel Frodsham 32516.

FT101, fan, mic, cw filter, handbook, used little, orig packing, delivery negotiable, £220. VHF radar oscillator type 201M, QRO disc seal triodes, collectors' item, store soiled, restorable, offers. G5XB, QTHR. Tel 073 525 2195.

High speed telegraphing course, Candler USA, £7.50. *Wanted:* Bird Thruline elements. KW low pass filter. Mobile linear 10m. Automatic rotator. Bencher keying lever. Microscope slides. Compact two- or three-speed tape recorder. MSF clock. FT901 accessories. A.M. filter. G3AZI, QTHR. Tel Preston (0772) 37815.

FDK Quartz 16, 2m fm tx/rx, 10W, S20-23, S15-16, R3-7, R0, RR7, RR0, mobile mount, exc cond, £99. IC202 with Microwave Modules 25W linear amp, nicads, handbook, £155. Bush BP90, mw/lw battery rx, £10. G8RZA, QTHR. Tel 01-500 1495.

FT707, comp station with FC707, FV7070M, FP707, YM35, as new, £780 ono. Prefer not to split. FC301, £60. Datong morse tutor, £40. T3170L swr/power meter, £7.50. G4HNJ, QTHR. Tel 0202 825307.

Clearout, everything must go: Swan 100MX 80-10m tx/rx, £300 ono; Yamaha B35 electronic organ, £600; Wood & Douglas 70cm, £30; Pye Europa 70cm tx, 2m rx, £25; Jaybeam 6-el quad, £12; VHF pa, three-off 4X150A, £18; Car cassette, spkrs, £14. Caravanette, Suntor Marina, 1976, three berth, 5/8 whip, ideal dx-peditions/contests, £2,100. New World teak gas fire, £45. Pedal steel guitar, requires finishing, £20. Olivetti portable typewriter, £20. Primatic copper cylinder, ideal earth, £8. Dipping halogen lamps, £12 pair. G4JQP, QTHR. Tel 0761 34216.

Complete station, 160-10m and 2m, FT277E (FT101E), £375. FTV250, £90. FV101B, £40. SP101, £10. TR2200G plus 10W pa, £85. Eight-el Yagi, £8. G4GMS, NOT QTHR. Tel Edenbridge 865242.

Yaesu FT227R 2m fm tx/rx, fully synthesized 5kHz steps, memory, 10W output, as new, three months old, comp with mic mounting bracket, orig packing, £169. G4GGN, QTHR South Birmingham. Tel 021-705 0759.

Complete fixed/mobile 2m station: IC240 with mic, leads, mobile mount bracket, handbook, ZL Super Slim Jim 2m ant, PX402 mains psu, 13·8V dc, 3-4A regulated output, all new Jan '81, mint, £190 ono. *Wanted:* 14AVQ/WB in perfect cond. Tel Bath area (0373) 64694.

FT7B, not used mobile, new cond, with atu, swr bridge, tuning load, Hustler mobile ant, coils, 80-10 h/d battery, comp 100W station, ready to run, £450. G2DTS, QTHR. Tel 0285 72489.

Liner 2 preamp, extended range, manual, mobile bracket, Pye mic, reasonable offer secures. G3ZTZ, QTHR. Tel Camberley (0276) 25430.

MML 144/40 linear, as new, nine months old, £60 ono. Carriage at cost. G8DVQ, QTHR. Tel 0272 564740.

FT200, FP200, manual, £225. Heathkit HW8 QRP cw tx/rx, vgc, £80. G4ERO, QTHR. Tel Bournemouth 518012.

Heavy duty mains transformer, primary 240V 50Hz, secondary 830-0-830, 400mA, £10. G3MXT, QTHR. Tel Manchester (061-790) 0952.

Eddystone 730/U hf communications rx, immac cond, has xtal phasing, variable selectivity, i.f. output, xtal calibrator, etc, an excellent rx, £85. Buyer inspects and collects or carriage extra. G4HSB, QTHR. Tel Peter, 0642 816608, evenings after 7pm.

Microwave Modules transverters: 1,296/144, £125. 432/28S, £90. 432/144R, £80. John Lemay, G8KAX, QTHR. Tel Hornchurch 57782, early evening.

Trio 7800, nine months old, £225. KDK 2025E, 14 months old, £165. FKD Palm 2, six channels xtalled, £75. GW8WFS, QTHR North Wales. Tel 0492 82770.

TS700S,as new cond, boxed, mic, vox, six xtal channels, extra spkr SP700, £300. G3JZN, QTHR. Tel 061-723 2529.

FT227RB with mic, stepper, unmodified, perfect cond, 5/8 whip, boot lip mounting, £190 ono. G3RLG, QTHR. Tel Parkstone (Poole) (0202) 746861.

TR2200GX, boxed, unmodified, nicads, charger, soft case, R0, R3-7, S11, S17, S20-23, £110 ono. G3GQR, QTHR.

KW2000A, 2X6146Bs, spare, other spare valves, extra xtals 21/28, ac and mobile psus, cw Europa B 144MHz transverter (100W), Shure mic, well used but serviceable, £210. Deliver 30 miles Dorking. G3KZR. Tel 01-890 9502, day, or 0306 730270, evenings.

Creed 444 printer, £50. Complete 123 set, cw, tx/rx 20W o/p, perfect, £50. 6S6M tape reader, £10. Pye Bantam h/band fm, nicads, case, £25. 2m linear, 4CX250B, 200W, £80. 14in Hewlett Packard video monitor, £20. Sanwa multimeter, 33kΩ/V, £16. Electronic keyer, £10. Electronic keyer with memory, £40. Marconi sig gens, 995A/2, £30; TF144G/4, £15. Two Hudson AM108 low band mobiles, £15. Heathkit HM15 swr bridge, £6. All ono. G4GXE, QTHR. Tel 053-871 305, after 5pm.

FT101 Mk2, 160m, fan, 350Hz cw filter, £275. Tel 01-428 4972.

Liner 2, £80. Europa 2m transverter, £35. G4CUF. Tel Wigan (0942) 728443.

FRSDX400, 160-2m rx, comp with SP600 spkr, spare valves, £150. Five-way antenna switch, £7. 5/8 ground plane, £7. 500Ω dynamic mic, £4. Teletext decoder boards, completely built, incl psu, needs case etc, £60. HV15 cctv camera, comp with two lens, £50. 10m preamp, £11. IRCs, 12 for £2. *Radio Communication* (1974-79), £8. Joystick, £5. Key, £8. Large variety of 741 cmos ics SAE list. G4CVZ, QTHR. Tel 051-220 5470, after 6pm.

WANTED

Oscilloscope up to £50, in good wkg order, 4-5in screen. 75 Station Road South, Belton, Great Yarmouth, Norfolk. Tel 0493 781035.

Good NAB reel-to-reel deck, full track or stereo, with or without works, will exchange Akai 4000DS in first-class nick or choice of good scopes, part exchange or buy. Tel Stan, 0327 842373.

Battery charger, single or multi, for Pye PF70. Batteries and carrying case for Pye a.m. Bantam. Any boards, wkg or not for Pye vhf Olympic or Westminster. Cook, 129 School Lane, Addlestone, Surrey. Tel Weybridge 52128.

RME69 or similar communications rx, octal valve version preferred. Anything pre-1950 considered. *For sale:* various pre-war radios, vintage components incl early Eddystone equipment. G4HHZ, QTHR. Tel Chandlers Ford (04215) 68705, evenings, Winchester (0962) 822401, days.

TKS Syd Fenwick looking for TM11 low power tx, lf, df, loop, lf df, rx, Gonio FM12 or similar. 19in rack with antenna insulator, hf, df, rx, FH4 or similar too. GM4HXW, QTHR. Tel Beith 2715.

Antenna rotator suitable at least for light hf work. HF frequency carrier, digital. Digital multimeter. SAE for reply. G3GZQ NOT QTHR. Tel Buckfastleigh (036 44) 3608, weekends of pm only.

EC10 or other gc rx. Neil Ackerley, G3RIR, QTHR. Tel 021-455 8911, daytime, Lutterworth (04555) 4522, evenings, weekends.

R4C serial 2100 or more. Prefer cw filter and 1·8 and 28MHz xtals, must be reliable and in good cond (for Antarctic expedition). Good price. Newstead, G3CWI. Tel 0692 404260.

LC80Q 80m loading coil for Hygain 14AVQ vertical antenna. G3CPG, QTHR. Tel 06845 2279.

Manual for HRO Senior of 1940 to buy or on loan. G3HCO, QTHR.

Charging set 60W, 15V, pedal driven, as used with WS, 62 etc. G8BZW NOT QTHR. Tel Southport 76439.

Manual and/or circuit diagram for Marconi TF1417 frequency meter/counter. Spare divider. Boards for same. Price etc to W. H. Facey, 40 Newton Road, Bideford, Devon EX39 2LL.

TR9000, accessories, BO9 base unit, SP120 spkr. *For sale:* SB2M Mizuho, ssb, 2m, xtalled 144·20, 144·40, handbook, mint, £80. 2m linear amplifier LA2X for SB2M, new, never used, £40. Collect, carriage extra. G8SBV, QTHR. Tel Fareham 232799.

Ex-Air Ministry, ex-RAF straight hand morse key, enclosed brown Bakelite cover, with sloping front. Must be near mint cond. GW4JKR, QTHR. Tel Llanfairpwll 714618.

RAE Part Two, May 1981 (failed). Budding GI6 looking for a correspondence course, must be complete with all study notes. Datong morse tutor D70. R. Scandrett, 25 The Crescent, Carryduff, Belfast BT8 8DW. Tel Carryduff 813118.

Sinclair ZX80 computer, complete, and Sinclair built. Tel 01-458 3937.

Wilcox-Gay master oscillator unit, roller coaster of 48 turns, 2·5in dia, 7in long, wide-spaced tx type condenser, 300pF cermie ends. Split stator, variable 250pF each section. GW4JKR, QTHR. Tel 714618.

B2 tx/rx or interesting items. Need wireless sets Nos 38 (not AFV), 18, 48, 58, and 68. Any headset/mic, valve kits (spares), manuals/schematics for RF24, 25, 26, 27, units. Units will be shipped to a given address in Birmingham, small parts to the USA. I can supply usual/unusual items for collectors civil/military. Trades considered. Tony Grogan, WA4MRR, 5 Rollingwood Drive, Taylors, S. Carolina, 29687, USA.

Exchange/part exchange/cash adjustment: VDU and keyboard or teletype printer RS232/20mA interface. I offer 100W 2m tx, six channel, 25W mobile, comp with handbook, 2m converter, 4-6MHz i.f. and shack clearout. G8EDN, QTHR. Tel 01-204 3777.

All types ssb filters, tuning capacitors, xtals, Toko components, books, hand morse key. Valve bases and blower motor for 4X150A valves. J. P. Scott, 91 School Road, Peterhead, Aberdeen, Aberdeenshire. Tel 0779 76062.

YOUR OPINION

(continued from page 739)

One policy for those especially capable of servicing the units themselves is to import directly and to build more equipment. I agree with Ron Bravery, G3SKI, that perhaps evidence can be collected and submitted to the Monopolies Commission. With the advent of legal cb let us buy accessories from those sources, as there will certainly be competition there.

Perhaps there is someone who works for HM Customs who will provide for all, through this channel, all the necessary information for the importation of amateur radio gear. If we all buy from alternative sources then perhaps it will force prices down to reasonable levels.

Clive Smith, GM4FZH

* Radio Communication *would never allow itself to be influenced by any threat from a retailer to withdraw his advertising because of a vendetta against another legitimate advertiser—Ed.*

Sir—As a rather irate reader of *Rad Com*, I feel I must write to you about one particular subject that must be close to the hearts of most purchasers of amateur radio equipment—its price!

Review the pages of this magazine, and pick out, as an example, the IC2E or TR2300 144MHz portables-I have not singled them out as bad examples but only at random. Look at the price of these products from any supplier, whether a franchised dealer or not. It is not odd that they all sell the products at exactly the same price? For most products you would expect variations in price, eg a dealer in London is going to sell much more than, say, one in North Wales, hence differences in price.

The present situation we have in the UK is that a few main agents import the equipment, add their margin, and control the price by allowing the retailers a small margin, probably 20-25 per cent, which if so is not much to pay overheads etc.

I work for a USA semiconductor manufacturer. I have compared prices in the UK with the USA for imported Japanese equipment and it certainly looks like we are paying over the odds. Okay, so in the USA there is a bigger market, but they are importing gear from the same source as the UK, so the $fob price ex-Japan cannot be all that different. On importing semiconductor and microcomputer products (including bulky items like radio gear) there is import duty of 17½ per cent and freight costs of 2½ per cent. These costs refer to the $fob ex-Japan price.

In conclusion, I reckon we have what amounts to retail price maintenance on amateur gear. For my own use I am currently looking at purchasing hf gear from Japan. What if a group of amateurs got together and imported gear and passed the benefits on to the buyers?

If semiconductor companies get too greedy on price, customers directly import the goods, missing out the distributors. Why can't amateurs do the same? Perhaps the dealers would like to comment?

P.S. Gebbie, GM8YQN

Sir—The letter written by Arthur Milne, G2MI, in the May *Rad Com* on comparative prices between the UK and USA has been on the tip of my pen for months. No doubt our friendly dealers will manage to justify themselves and protest poverty, but it is difficult not to believe that someone somewhere is doing "very nicely thank you" out of the UK market.

I note in April *QST* an advertisement for the Trio 830S at $929 including $100 worth of extras which at the then exchange rate of $2.10 to the pound translates to £442. I would be very interested to know what this would cost in duty to bring into the country and what, if any, could be the variation in charge between a happy and an unhappy customs officer.

If the RSGB has members in the Customs & Excise perhaps they would, for the benefit of readers, give some idea of likely charges. Many RSGB members must visit the USA, and it could prove very useful information as to whether or not it is worth taking advantage of the philanthropic dealers of the USA.

Mike Faulkner, G3IZJ

MOBILE LOG BOOKS

The Editor
Radio Communication

Sir—Does any reader know if anyone still sells the old-fashioned mobile log book which had space for frequency and callsign and comments?

I have read the new licence regulations as carefully as I can, and I do not see any words which *forbid* me to keep my mobile and portable log books in exactly the same form that I have kept my station log book since I was first licensed.

Alan Gordon, G3XOI

AFTER KINGMAN REEF AND PALMYRA—EUROPEAN DX—QUO VADIS?

The Editor
Radio Communication

Sir—I used to think dxing was a great hobby and a source of pleasure. However, I am not so sure any more. Something new and alien has entered the European picture. Working a much-wanted dx station evidently has become a matter of life and death, and you stop at nothing to reach your goal. Tempers are at the peak and discipline is an unknown quality. Some "sharpers" even start calling before they have ascertained the identity and the QTH of the dx station. Better to be on the safe side in case you have not worked the country before. The result of course is a frequency inferno aided by a score of self-appointed "policemen" shouting their heads off in unison; again aided by the "super guardians" attempting in turn to shout down the "policemen". When these gentlemen must pause for breath, the frequency is taken over swiftly by the witty bystanders, feeling an urgent need to share their observations with the rest of the world. Up against such behaviour even split frequency operation is of course doomed to fail.

It goes without saying that what I have described above does not apply to the vast majority of European dxers. However, little strokes fell great oaks and I am afraid that an unfavourable impression is in the process of being created in relation to European dxers in general. If this is so, we may before long be left entirely in the dark by the rest of the dxing world as they will limit their European QSOs to the minimum.

What happened to the "ham" spirit and to the operational standards of days evidently gone by? Does amateur radio today reflect the general decline of virtues like good conduct, consideration and fair play? Personally I know of no cure for the sickness, but perhaps we should think about it seriously?

Hans Smith-Gunvaldsen, LA1ND

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KEYBOARD MORSE SENDER
Historically the electronic key superseded the straight key for the simple reason that it reduces sending fatigue by reducing hand movements.
But progress continues. There are now at least four good reasons why the Datong Keyboard beats an electronic key. First, it reduces hand movements even further. Second, it cuts the need for mental concentration so you can save the effort for receiving (a task for which the brain is uniquely suited). Third, learning to use it is very easy **and** it's a useful skill anyway (unlike "paddling" or "pumping"). Fourth, even a beginner can reliably send error free morse, and remember that good morse means better copy.
Now check the summary below to see why the Datong Keyboard beats other keyboards.
- CONVENIENCE: no need for a power cable, four internal pen cells last for 300 hours **and** give continuous memory back up.
- EXCLUSIVE COLOUR CODED KEYBOARD DESIGN: Separate key switches beneath a tough polycarbonate membrane combine excellent "feel" with a splash proof wipe-clean surface.
- LAVISH MEMORY: four 64-character memories with auto-repeat and programmable "pause" function, for all the routine sending.
- BUFFER MEMORY: ensures perfect sending despite less than perfect typing.
- COMPREHENSIVE CHARACTER SET: includes punctuation, procedure signals, accented letters. Plus a "merge" key for making any non-standard character.
- BEAUTY AND STYLE: only one inch thin and with four-colour panel Model MK looks every bit the thoroughbred it is.

Model MK is supplied with output leads and spare connectors but without batteries (four HP7 pen cells).

Model MK

G8's – ARE YOU MISSING OUT?
Unless you can monitor the other bands you are missing a lot. If you have a 2 metre all-mode receiving set up, just add Model PC1 in series with its antenna and you have a superb general coverage receiver. What better way to listen in to all the non-VHF amateur bands, not to mention everything else from 60 kHz to 30 MHz? For sheer value for money there is no better way to get high performance general coverage reception. After all what a waste it is if your expensive 2 metre all-mode rig covers one band only?

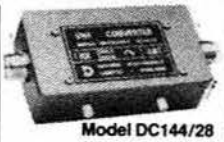
Model PC1

ATTENTION VHF SCANNER OWNERS!
Did you know that Model PC1 will extend the coverage of your SX 200 type scanner to include all the long, medium and short wave bands as well? This is an excellent way to listen to your favourite short wave broadcast stations without the extra expense of a complete new receiver.

MINIATURE RECEIVING ANTENNAS
If you don't have enough space to put up traditional receiving antennas, our active antennas are the answer. They need no tuning yet have constant sensitivity from 200 kHz to well over 30 MHz. Results are quite comparable to full size conventional antennas but the space saving is enormous. The indoor version (AD270) is 3 metres long and the outdoor version (AD370) is 2 metres long.
A TV-type feeder cable of any reasonable length can be used yet because the antennas are balanced dipoles any interference picked up by the feeder is rejected. Because of their wide frequency coverage Datong Active Antennas are ideal accessories for modern general coverage communications receivers.

Model AD270

Model AD370



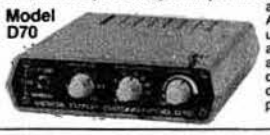
Model DC144/28

YET ANOTHER 2 METRE CONVERTER?
Yes but not **just** another. Model DC144/28 is designed to overcome the overload and spurious signal problems experienced by conventional converters. It uses a Schottky diode balanced mixer with about 7dbm of local oscillator drive. This, coupled with a 3SK88 r.f. amplifier, gives an excellent combination of low noise figure and strong signal handling capability. Its input and output gain controls also help you get the best out of your main receiver without flattening it with excessive gain.
Model DC144/28 is available either as a complete cased unit (die cast box, S0239 connectors) or as a ready built and tested PCB module.

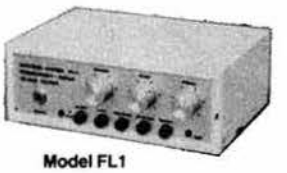
MODEL ASP – THE "INTELLIGENT" RF CLIPPER
Model ASP modifies your speech signal direct from the microphone and makes it more effective at modulating your transmitter. The effect is as if the transmitter peak power were to increase by between two and three times. "Intelligent" means that unlike other speech processors Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true r.f. clipping selected (in decibels) by the panel push-buttons. Special circuitry does this without the undesirable side effects of simple a.g.c. devices.
Adding a Datong r.f. clipper to a normal SSB transmitter has a similar effect to adding a linear amplifier but without the high cost and risk of TVI.

Model FL2
Model PC1
Model ASP

MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER
For building up your morse code reception speed there is no better method than the Datong "Morse Tutor".
You learn the code with the characters at normal speed but with an extra delay between each one. As you improve you reduce the "DELAY" control until, with it fully reduced, you find you are reading code at the chosen speed and with correct spacing.
An important feature is that the unit is completely portable. This allows you to practise wherever and whenever you find it most convenient. The all-CMOS design gives about 60 hours of practice from a lowcost PP3.



Model D70



Model FL1

IMPROVE YOUR SELECTIVITY
Model FL2 transforms the selectivity of your receiver yet simply connects in series with the loudspeaker. It contains three high performance audio filters (lowpass, highpass and notch) which can be used separately or together to give optimum results for any mode and any conditions.
Since, with most receivers, the built-in selectivity is a compromise, adding Model FL2 can greatly improve your ability to reject interference from overlapping SSB or CW stations.
Model FL1 works in a similar way but has the unique feature of being able to notch out interference whistles automatically.
The cost of a Datong audio filter is little more than the cost of a single accessory crystal filter, yet in terms of versatility and performance the audio filter is far superior.

Model FL2

Products not shown in this advertisement

Model Datest 1 Transistor Tester
Model Datest 2 Transistor Tester
R.F. Speech Processor Model D75
Model RFC/M R.F. Speech Processor PCB Module
Model MPU, Mains Power Unit
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The C58 is the ultimate 2 metre transportable offering a superb performance on FM/USB/LSB & CW unequalled in any transceiver to date.
The C58's small size makes it truly a portable and when used with the CM8 mounting cradle it has all the features, and more, of a mobile multi-mode transceiver.

UNIQUE L.C.D.
The lcd display has been purpose-made for Standard and it not only displays the frequency down to 100Hz but also supplies scanning and memory details. The main advantage with the lcd display is the low power consumption which is a must for portable equipment. For night use the display can be illuminated.

MEMORY/SCANNER
The C58 has five memories that can be user-programmed from the front panel controls; these memories not only retain the frequency but also the mode at the time of programming. When the memories are scanned the scanner will look only at those channels that have been entered in the correct mode; ie: if out of five channels three have been entered in the FM mode and two in the SSB mode, then on scan with the mode switch in the FM position the three FM channels will be scanned (this is displayed on the lcd). When the mode switch is in the SSB position only the two SSB channels will be scanned. This type of intelligent scanning can be found only in the Standard range at the present time.

RELIABILITY
As with all Standard equipment the reliability is assured by their excellent quality control and years of experience in the professional communications market. We can endorse this by the lack of Standard equipment we find in our service laboratory.

ACCESSORIES
The accessories for the C58 are the same as those for the C78 (with the exception of the power booster), which allows interchangeability between the units.

FEATURES

- ★ Liquid Crystal Display
- ★ 100Hz/1kHz/5kHz & 25/12·5kHz
- ★ Five programmable memories
- ★ Rit Control
- ★ Repeater & rev. repeater off set
- ★ Effective noise blanker
- ★ Full scanning facilities
- ★ Automatic/manual tone-burst
- ★ One Watt RF power
- ★ Up/down scan on microphone
- ★ Battery saver

C78 £209 inc VAT

THE DYNAMIC DUO

ACCESSORIES FOR BOTH

CL8	carry case with straps	**£6.95** inc VAT
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C230	12 240v charger	**£7.95** inc VAT
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CPB78	10 Watt amplifier for C78	**£65.00** inc VAT
CPB78	10/25 Watt amplifier for C58	**TBA**

C58 £235 inc VAT

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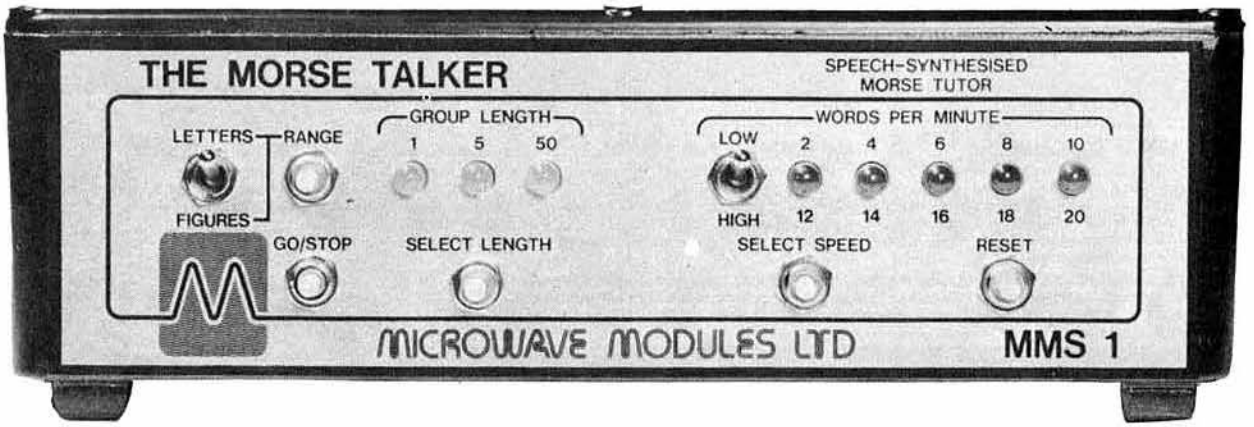

FEATURES

- ★ **Complete self-contained Speaking Morse Tutor**
- ★ **Latest state of the art microprocessor speech synthesis system**
- ★ **Suitable for beginners and proficient operators alike**
- ★ **Wide speed range: 2–20 wpm**
- ★ **High speed option: 12–48 wpm**
- ★ **Variable group length and single character facility**

PRICE £99.00 inc VAT (P&P £2.00)

DESCRIPTION

This unique product is a self-contained SPEAKING MORSE TUTOR and as well as a random morse generator, the MMS1 incorporates a microprocessor speech synthesis system which provides talk back of the morse after transmission, giving the pupil the opportunity of checking his proficiency. This unit represents a truly cost-effective means of obtaining a full class A amateur licence, without having to rely on a third party for instruction.

The unit requires only a DC power supply, 9 to 13·8 volts, to enable operation and this should be connected to the power socket located on the rear panel via the supplied plug.

To give this product appeal not only to the beginner but also to the proficient operator we have incorporated six 'learning levels'. In this way it is a simple matter to become more and more proficient, even after passing the Morse Test.

The six ranges are:

LETTERS ONLY:	A–F, A–M, A–U, A–Z.
NUMBERS ONLY:	0–9.
LETTERS & NUMBERS:	0–Z.

Also for each of the above ranges the user can select:

1) One letter
2) Five letters (One word)
3) Fifty letters (Ten words)

BEFORE TALKBACK

In addition a useful facility is provided in that continuous morse can be sent. (No talkback facility in this mode).

Morse can be sent in the range 2–20 words per minute (w.p.m.) in 2 w.p.m. increments. Speed selection is made by depressing the front panel mounted switch marked 'SPEED SELECT'. However, at speeds of 12 w.p.m. or less, characters are sent at 12 w.p.m. but the spacing is adjusted for the selected speed. In this way morse rhythm will be instilled, since this is the essence of good morse rather than the 'dots and dashes' approach. The incorporation of a crystal-controlled reference ensures totally accurate character and space, lengths and intervals thereby producing a perfect rhythm.

The MMS1 contains an internal loudspeaker which may be supplemented by either headphones or an external loudspeaker, by connection to the socket marked 'EXTERNAL SPEAKER' located on the rear panel. The available audio output level at this socket is 250mW. In addition a tape recorder socket is also located on the rear panel, so that recordings may be made at any time, without disabling the internal loudspeaker.

It is also possible to use the internal sidetone oscillator for sending practice and this may be achieved by connecting a suitable morse key to the socket marked 'KEY'. (N.B. – This facility does not provide talkback).

The MMSI utilises 2 microprocessors, 2 memory I.C.'s and various other integrated circuits and semiconductors. All circuitry is constructed on high quality glass-fibre printed circuit board, and the unit is housed in a highly durable black diecast enclosure.

PRICE: **£99.00** inc VAT. (P&P £2.00)

HIGH SPEED OPTION. As an optional extra an alternative higher speed EPROM memory I.C. can be purchased providing a 12–48 w.p.m. speed range in 4 w.p.m. increments. Also supplied with this EPROM is an easily attachable label to amend the indicated speed range on the front panel.

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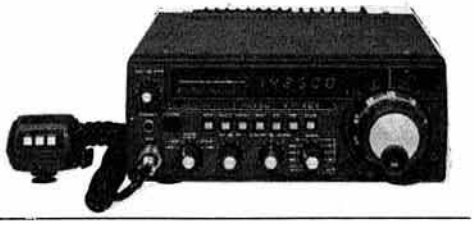

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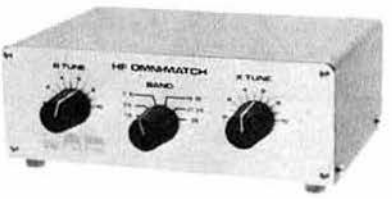

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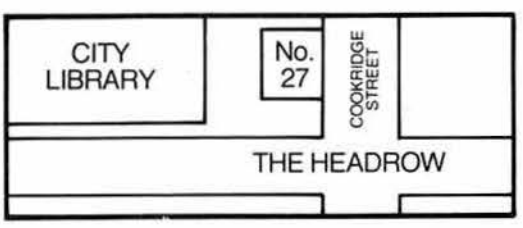

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144·4 (433·2)	b	e	b	e	e	b	e	e	e	e	e
144·480	e	e	e	e	e	e	e	e	e	e	e
144·800	c	e	e	e	e	c	c	c	c	c	e
144·850	e	e	e	e	e	e	e	e	e	e	e
145·000/ROT	a	c	a	c	c	b	b	b	a	a	c
145·025/R1T	a	c	a	e	e	b	e	b	e	e	e
145·055/R2T	a	c	a	e	e	b	e	b	e	e	e
145·975 R3T	a	c	a	e	e	b	e	b	e	e	e
145·100/R4T	a	c	a	e	e	b	e	b	e	e	e
145·125R5T	a	c	a	e	e	b	e	b	e	e	e
145·150/R6T	a	c	a	e	e	b	e	b	e	e	e
145·175/R7T	a	c	a	e	e	b	e	b	e	e	e
145·200/R8T	e	c	a	e	e	b	b	b	a	a	c
145·300/S12	e	e	e	e	e	e	e	e	e	e	e
145·350/S14	e	e	e	e	e	e	e	e	e	e	e
145·400/S16	e	e	e	e	e	e	e	e	e	e	e
145·425/S17	e	e	e	e	e	e	e	e	e	e	e
145·450/S18	a	e	a	e	e	b	b	b	a	a	e
145·475/S19	a	e	a	e	e	b	b	b	a	a	e
145·500/S20	a	c	a	c	c	b	b	b	a	a	c
145·525/S21	a	c	a	c	c	b	b	b	a	a	c
145·550/S22	a	c	a	c	c	b	b	b	a	a	c
145·575/S23	a	c	a	c	c	b	b	b	a	a	c
145·600/R0R	a	c	a	c	c	b	b	b	a	a	c
145·625/R1R	e	e	e	e	e	e	b	e	a	a	c
145·650/R2R	e	e	e	c	e	e	b	e	a	a	c
145·675/R3R	e	e	e	c	c	e	b	e	a	a	c
145·700/R4R	e	e	e	c	c	e	b	e	a	a	c
145·725/R5R	e	e	e	c	c	e	b	e	a	a	c
145·750/R6R	e	e	e	c	c	e	b	e	a	a	c
145·775/R7R	e	e	e	c	c	e	b	e	a	a	c
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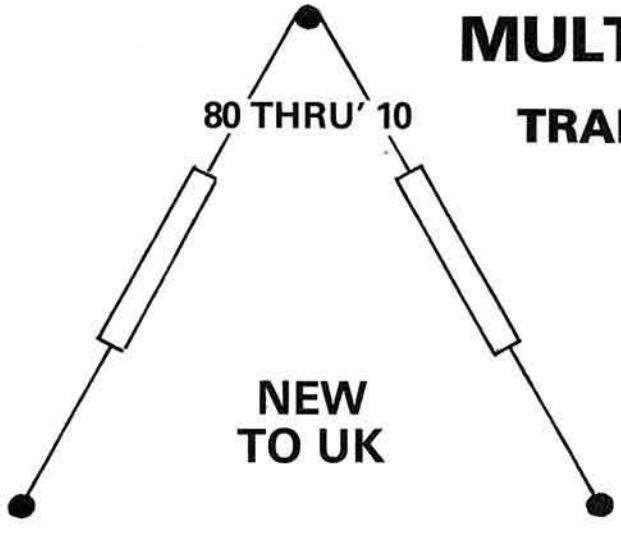

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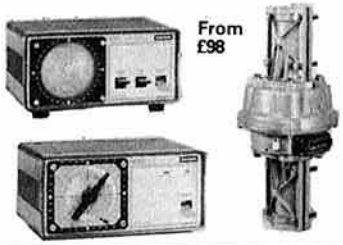

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A no nonsense sythesised rig, free of gimmicks yet offering high power and good sensitivity. Covers 144-148 HMz with channels in 5 KHz spacing selected by decade switches. Slide switches control simplex or repeater and high or low power operation. Low power level is adjustable by internal preset. Maximum power (5 watts nominal) may exceed 7.5 watts from internal NiCd battery pack. Antenna has BNC connector.

PRICES: Z5800 £175.00 inc VAT
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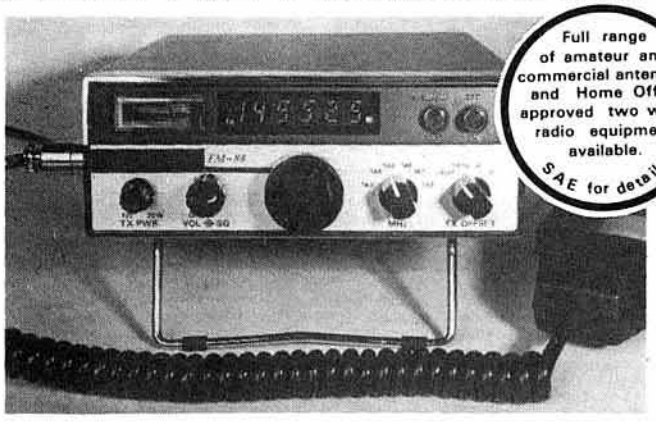
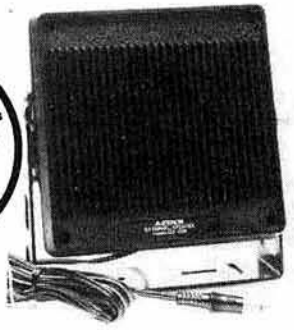
FM88 2M TRANSCEIVER



We are convinced that the FM88 is one of the most reliable 2 metre rigs being offered today. The construction has to be seen to be believed, and all the frills which normally lower reliability have been omitted.

If you are considering buying a new 2 metre transceiver, you owe it to yourself to consider a unit which has proven itself with thousands of hours of reliable "on the Air" operation in the USA. 25 Watts output. 143-149 mHz in 5KHz steps.

INTRODUCTORY PRICE £178.00 inc VAT



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Please address all Amateur Equipment correspondence for the attention of Lou Glover (G4GKJ)

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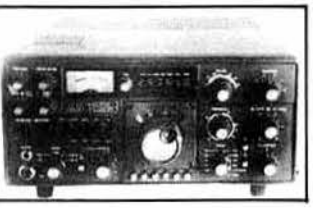

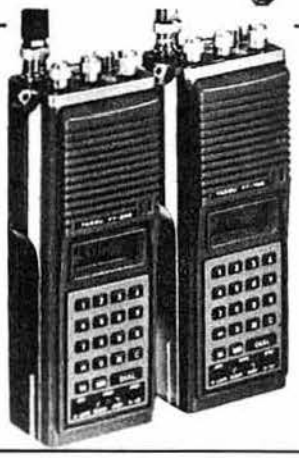

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Yaesu's marvellous new hand-held for either 2m or 70cm operation. Its LCD display (with night-lamp feature) is coupled to a 4-bit microprocessor giving 10 memories, up/down scanning in 25 or 50kc steps (manual or auto) plus memory scan and scanning between two desired frequencies, priority channel with search-back, keyboard entry allowing split frequency for non-standard repeaters... and lots more.

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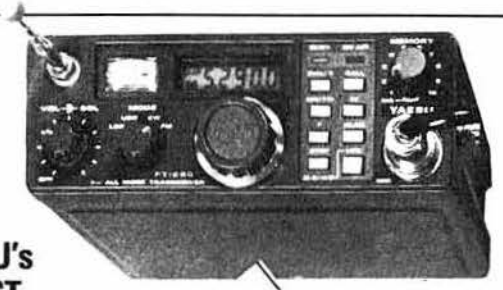

YAESU's LATEST . . . the new all-mode 2m portable FT-290R

So many features ★ 10 memories ★ Memory scan ★ 2 VFOs ★ Band scan ★ Clarifier ★ FM/LSB/USB/CW ★ LCD readout ★ Real S-meter ★ Priority channel ★ 2·5w out

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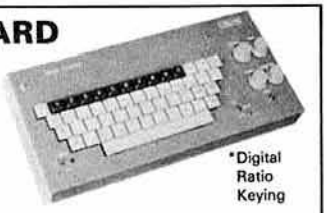

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YAESU MUSEN

FT707
SOLID-STATE HF TRANSCEIVER "WAYFARER"

The FT707 "The Wayfarer" is an ultra-compact solid-state transceiver ideally suited for the home station or as a travelling companion, providing performance previously proffered only by the "Top liners".

For further details of this exciting new system, please contact any authorised sales outlet for a free colour brochure. Better still: *see it for yourself—try one out today!!!*

The FT707 is THE radio of the eighties: 80, 40, 30, 20, 17, 15, 12, 10 metres—100W output (10W 'S' model) 50% developed in 3:1 VSWR—Digital, bright orange LEDs in mode sensitive counter plus analogue readout—Transceiver status at a glance from string LED and 5 single displays—16 poles of crystal filtering provides continuously adjustable IF bandwidth 2·4kHz to 300Hz (N.B. This is true "variable bandwidth" that minimises much of the adjacent channel interference not "IF shift")—Noise blanker of most advanced design using local AGC loop—Schottky diode ring module, power transistor buffers, ultra clean and low noise local oscillator are all combined to produce, size and price notwithstanding a most remarkable receiver.

The illustration to the left shows part of the FT707 System here neatly mounted in the MR7 rack unit along with a YM35 fist microphone with scanning controls. Alternatively there are two other 600 ohm fist mics, the noise cancelling YM36 or the larger YM37 and two 50K/600 ohm swan neck desk mics the standard YM34 or the scanning YM38.

The FC707 ATU can match loads from 10 to 250 ohms into 50 ohms. An accurate illuminated power meter (15 and 150W FSD) and SWR bridge (to 5:1) plus an inbuilt 150W dummy load complete this attractive package.

The FP707 20 amp supply with inbuilt loudspeaker permits operation from 100-117/200-234V 50/60Hz of the FT707 (illustrated under).

The FV707DM is an external digital VFO that uses an advanced twin loop PLL to provide 10Hz tuning steps with excellent spectral purity. The addition of this 1" high package, with its 12 channels of memory with Receiver independent tune and internal/external (mic), up/down, fast/slow scanning, perfects the FT707 for mobile or contest use.

The FTV707R transvertor (not shown) is the latest addition to the 707 system. This main frame takes any one of the standard transvertors for 6, 4, 2 or 70cms.

FT707 Star Features

- ★ 80-10 metres (including 10, 18 and 24 MHz bands)
- ★ USB—LSB—CWW—CWN—AM (Tx and Rx operation)
- ★ All solid state—including "advanced" final amplifier
- ★ 100W PEP. 50% power output at 3:1 VSWR
- ★ Full "broad band" no tune output stage
- ★ Excellent Rx. dynamic range, power transistor buffers
- ★ Rx Schottky diode ring mixer module
- ★ Local oscillator with ultra-low noise floor
- ★ Variable IF bandwidth—16 crystal poles
- ★ Bandwidths 6kHz* 2·4kHz-300Hz (600-350)Hz*-300Hz
- ★ AGC; slow-fast switchable from the front panel
- ★ VOX built-in and adjustable from the front panel
- ★ Semi-break in with side tone for excellent CW
- ★ Digital (100Hz) plus analogue frequency display
- ★ LED Level meter reads: S, PO and ALC
- ★ Convenient concentric AF/RF gain controls
- ★ Indicators for: calibrator, fix, int/ext VFO
- ★ Receiver offset tuning (RIT-clarifier) control
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Peter Waters

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Here's a really super action packed FM mobile transceiver. Particularly ideal for the operator with very little room to accommodate the standard size of transceiver. The detachable head unit may be mounted remote from the main transceiver (optional cable kit necessary) so it can be tucked away in the smallest of spaces. Apart from this novel practical feature, there is a host of technical features. A microcomputer control panel takes care of frequency control, 8 memories, band and segment scanning, all selected by touchpad controls with back illumination. Full coverage of 144 to 146MHz is available on 25kHz or 12½kHz steps, a bar LED signal and RF meter gives positive readout as does the large LED frequency display. Other features include high/low power switching, repeater shift, tone burst, tone entry indicator, ni-cad memory back-up and much more. Why not send today for the full colour brochure?

FDK M750E 2m FM/SSB £289 inc VAT

An all mode transceiver gives you the chance to work both local contacts on FM and DX contacts on SSB. What better value then, than the Multi 750E 10 watt transceiver covering 144 to 146MHz. This well known product is superbly built with modular board construction and is ideal for both base and mobile operation. If 70cms interests you there is the promise of the matching transverter to be released this spring. This package contains all that you could wish for in an action packed transceiver, including noise blanker, USB/LSB/CW/FM selector, dual rate tuning, dual VFO control, tone burst, high/low power on all modes, RIT and RF gain controls, etc. etc. As for reliability it's unbeatable—ask the man who owns one—but just in case we give you a full 12 months parts and labour Warranty!

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The Multi 700EX now a firm favourite with amateurs throughout the world—it embodies all the essential features of a completely self contained FM station. Its punchy 25 watt signal beats all the old 10 watt transceivers hands down. The large digital display gives clear and precise frequency readout, controlled by a "click stop" frequency selector knob that provides steps of 25kHz with an additional 12½kHz selector.

Priority scanning provides for the scanning of pre-programmed channels plus the mains dial channel. Repeater operation is taken care of by means of a 600kHz down shift selector and automatic tone-burst switch. For listening on the input frequency of the repeater, instant reverse repeater operation is available at the touch of a button. Local contacts are taken care of by a continuously variable power control that enables power to be reduced right down to 1 watt.

Suitable for base station operation. The transceiver comes with all accessories including microphone, mounting bracket, DC cables, etc.

TRIED 10m FM? AZDEN PCS 2800 £179 inc VAT

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WATERS & STANTON ELECTRONICS 18/20 Main Road, Hockley, Essex. Tel: 0702 206835

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