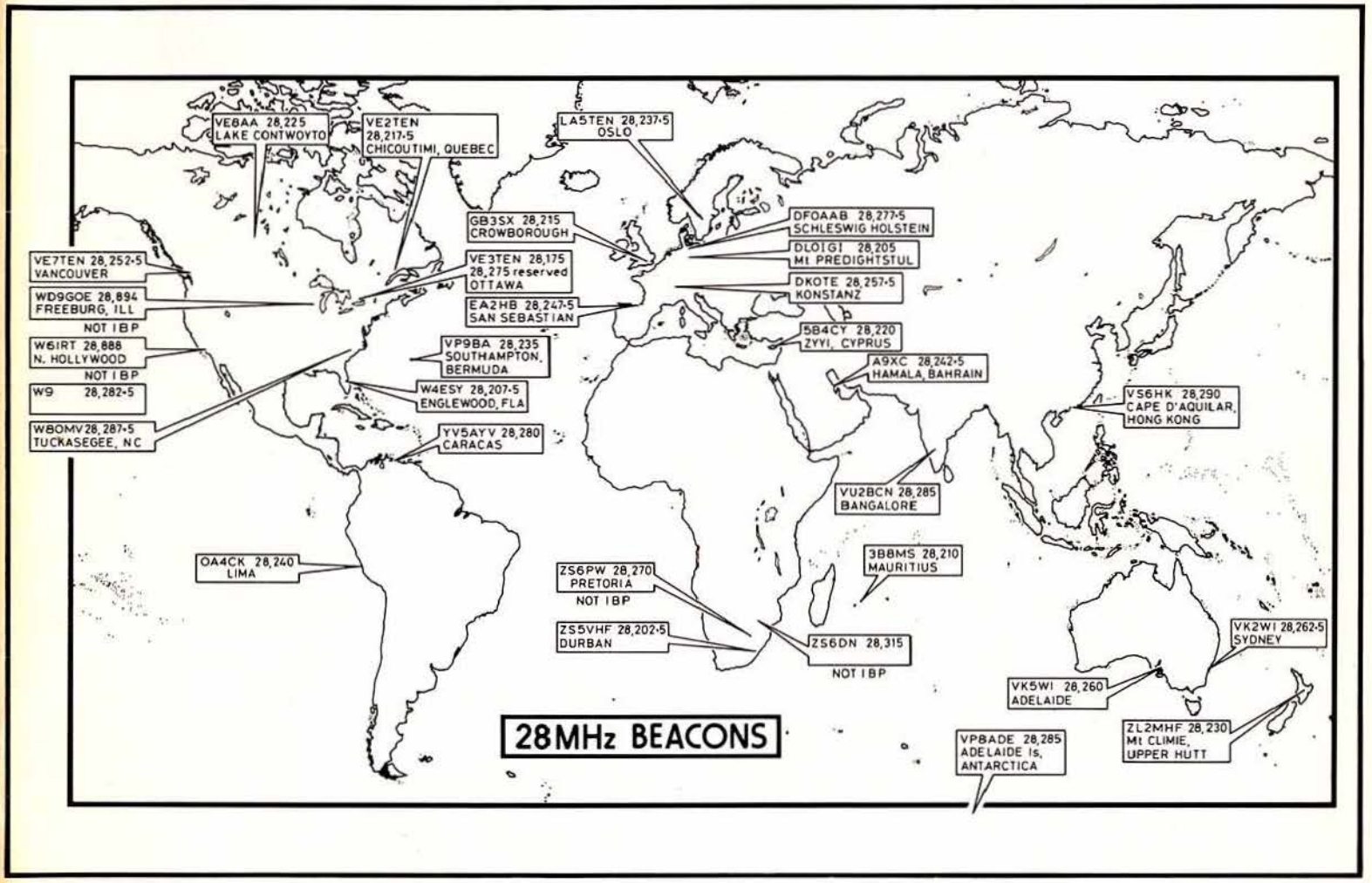
RADio COMmunication

September 1981



Journal of the Radio Society of Great Britain

Catronics

your one-stop shopping centre for complete equipment from 'Trio' and 'Philips', accessories from 'Jaybeam' and 'Microwave Modules', components, kits and the 'Video Genie' Microcomputer system

Available from Catronics—real value for money in microcomputers

video genie system

Advanced features are:

1. **Built-in TV interface, the user's TV set may be used as the display terminal, thus saving money.**
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   - **ii) High quality cassette recorder, enables recording and playback of programs, data and the use of pre-recorded tapes.**
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9. **The system uses the powerful Z80 processor.**

Our cash and Carry Price only £355.00 inc VAT

Also available 9" Monitor—built to full professional specification (NOT a converted television) Model CVM600: £130.00.

Full range of supporting programs and accessories available, including Amateur Radio packages.

70cm SYNTHESIZED TRANSCEIVER PHILIPS TYPE FM321

Catronics are proud to announce the availability of the world's first 70cm 40 channel FM mobile transceiver in the UK. Especially made to our own specification by Philips—Europe's largest manufacturer of Radiotelephone equipment.

Just look at its star packed features:

- ★ Full 40 channel coverage RBO to SU39
- ★ Direct LED display of channel number
- ★ Electronic channel change up or down from front panel
- ★ Remote Control channel change on microphone
- ★ 3 position squelch control for ease of operation
- ★ "Nominated Repeater Position" may be preprogrammed to your local Repeater channel for instant access
- ★ Crystal controlled Toneburst operates in Repeater Mode
- ★ Receiver sensitivity 0·3μV for 12dB SINAD
- ★ Transmitter output power 5W minimum, gives typically 25W e.r.p. with Jaybeam U5 mobile antenna
- ★ Supplied complete with mobile bracket, microphone with P.T.T. and channel change, operating manual etc.

The Philips FM321—We want you to have the best even better value now at £197 + VAT = £226.50.

New RTTY Terminal Unit/Program for Computers

Fabulous new program now available to send and receive RTTY. Complete with Receive Terminal Unit and Transmit AFSK on PCB assy. Suitable for Video Genie and TRS80 computers: CT600 special introductory price £109.20

THINK JAYBEAM—THINK CATRONICS

We generally have the full range of 'Jaybeam' aerials in stock as follows:

FOR 2m Band:		
C5/2M	5dB colinear	£44.25
5Y/2M	5 ele yagi	£11.25
8Y/2M	8 ele yagi	£14.45
10Y/2M	10 ele yagi	£31.05
PBM10/2M	10 ele Parabeam	£36.80
PBM14/2M	14 ele Parabeam	£44.85
5XY/2M	Cross 5 ele yagi	£22.75
8XY/2M	Cross 8 ele yagi	£28.40
10XY/2M	Cross 10 ele yagi	£37.70
Q4/2M	4 ele quad	£23.65
Q6/2M	6 ele quad	£31.35
D5/2M	Double 5 yagi	£20.10
D8/2M	Double 8 yagi	£27.10
UGP/2M	Unipole	£10.10
HO/2M	Mobile 'halo'	£4.50
HM/2M	'Halo' + mast	£5.40
TAS	¼ wave whip	£15.25
X6/2M/X12/70cm	Dual Band	£38.50
LR1/2M	4½dB vertical	£24.15

FOR 70cms Band:		
D8/70cm	Double 8 yagi	£20.70
PBM18/70cm	18 ele Parabeam	£25.30
MBM48/70cm	48 ele Multibeam	£28.75
MBM88/70cm	88 ele Multibeam	£39.30
12XY/70cm	Cross 12 ele yagi	£42.30
8XY/70cm	Cross 8 ele yagi	£34.15
C8/70cm	8dB colinear	£50.00
X6/2M/X12/70cm	Dual Band	£38.50
FOR 23cms Band:		
D15/1296	Double 15 yagi	£34.00
PHASING HARNESSES:		
PMH/2C	2m circular	£7.45
PMH/2M	2m stacking	£9.85
PMH/70	70cms stadking	£8.50
MASTS and ROTATORS, etc:		
SPM	16' portable mast	£15.10
PME	4' extension	£2.53
SVMK	Vertical mount	£7.20
9502	Rotator	£55.75
9523	Align bear	£11.70
KR400	H. Duty Rotator	£105.80

ALL PRICES INCLUDE VAT, but please **ADD CARRIAGE** as follows: Harnesses, halos, and UGPs—£1.00. Other aerials and masts—UK Mainland, £4.50.

COMPONENTS FOR RADCOM (AND OTHER) PROJECTS

G3PLX RTTY VIDEO DISPLAY (April 1977 Rad Com)

Kit (excluding modulator and keyboard), **£107.00.**
Set of printed circuit boards, **£34.10**; 2513, **£8.00**; AY5-1013, **£5.35**; 2102-1, **£1.57**; SN74188, **£2.40** each or ready programmed **£6.60** per pair; 7MHz xtal, **£2.90.**
Also available: Cabinet to match CT100 T.U. **£12.50.**
Flashing cursor kit, £7.90. **Diode Matrix kit, £16.30.**
NOTE regarding PROM program: The PCBs and programmed PROMs supplied by us make use of a slightly different program sequence resulting in different pin connections to those published in the 'Rad Com' article. Whilst constructors buying PROMs and PCBs from us will have no difficulty, those producing their own PCBs or having PROMs programmed elsewhere should note this important difference. A detailed modification sheet is available with the PCBs.

MULTIMODE 1600 TRANSCEIVER

(Oct/Nov 1977 Rad Com)
Special price for component kit, **£275.10.**
Receive only kit also available, **£243.30.**
PCB, **£16.45**; 8545kHz xtal, **£2.90**; 400ns delay line, **£2.27**; MD108, **£8.95**; RS 12V Relay, **£3.80**; Toroid **75p**; **Minikit 3** (Rs and Cs), **£24.05.**

40 WATT 2M PA KIT

For boosting power output of '10-15 Watt' FM mobile rigs.
Auto Transmit/Receive switching. Requires 12-16V d.c. supply.
Complete with cabinet and full instructions.
Kit £28.85 + £1.25 post. Also ready-built at **£38.85.**

10 WATT 2M PA KIT

A 10 watt output version of our famous 40 watt 2M PA kit is available, for boosting the output of 1-2 watt 2M FM transmitters.
Kit £21.75 inc VAT + £1.25 post. Also ready-built at **£31.75.**

G3TDZ FM TRANSCEIVER (March 1978 Rad Com)

PCBs: Audio, **£2.40**; RX, **£5.90**; TX, **£5.75**; xtal Osc, **£1.60.**
KITS: Receiver (less 455kHz coil), **£39.10**; Transmitter, **£31.95.**

G3ZVC SSB TRANSCEIVER (Sept 1974 Rad Com)

PCB **£5.35**; Toroid, **85p**; MD108 Ring Mixer, **£8.95**; QC1246 AX Filter, **£29.65.**
SPECIAL PRICE FOR COMPONENT KIT, £99.95.
Also available—but not included in kits: *Reprint of article,* **15p** plus SAE. Min. 50Ω coaxial connectors—PCB mount socket, **£1.37** and plug, **£2.32.**

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

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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 pass-band 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.

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** inc VAT
Carriage £4.50

NEW

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817

TRIO *pacesetter in amateur radio*

TR-7730 *the new compact 2 metre FM transceiver*

Once again from Trio an absolutely fantastic 2 metre FM Mobile Transceiver. Compact, simple to operate, full 25 watts output – a truly dazzling piece of gear.
Designed by Trio to provide a miniature transceiver, the TR7730 measures 6in wide by 2in high by 8in deep.
In providing both first class performance in transmission and reception Trio engineers have again triumphed.
Switch on your Rig and listen for the outstanding signal from a TR7730.
The five memories, the band and memory scan facility, together with the up/down mike and comprehensive mobile fixing kit make this the rig you have been waiting for.
Remember, sooner or later everyone graduates to Trio equipment.

TR7730 features:

- Compact and lightweight design measuring 147 (5.9) × 51.5 (2.1) × 198 (7.9). Weighing 1.5kg (3.3lb) such a small compact Rig is easily fitted in any small car or for security can be placed in the glove compartment.
- 25 watts output in high power position for good mobile communications – 5 watts in low position.
- Five memories for either Simplex or repeater operation. The fifth memory is capable of non-standard frequency shift.
- Frequency coverage in either 25 or 5kHz steps. Full 2 metre band 144.000 to 145.995.
- Memory scan. Automatically locks on an occupied memory channel and resumes scanning when the signal disappears or when the scan switch is pushed. Scan hold or mike push to talk switch cancels the scan function.
- Band scan. The Rig scans the band in either 25 or 5kHz steps and locks on an occupied channel.
- Both mobile mounting bracket and up/down microphone included with the equipment.

TR7730 **£238.00** inc VAT
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** inc VAT
Carriage £4.50

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TRIO

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TRIO

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R-1000

take a trip around the world, tonight

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.

HS5 Headphones
as illustrated
£21.85 inc VAT
HS4 Headphones
£10.35 inc VAT.
HC10 world clock
£59.34 inc VAT.

SR9 DAIWA

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

XTLS £2.50/CH

SR11 DAIWA

2 mtr TUNABLE/SCANNING XTAL RECEIVER
£52 inc VAT carriage £1.50

MF-083 8-Channel

MARINE SCANNER + FM BROADCAST
£85.10 inc VAT carriage £1.50

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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.

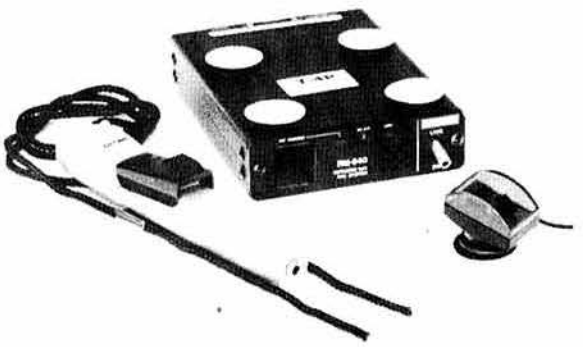
TR-7800 *The Ultimate 2 Metre Mobile FM rig*

£275 inc VAT. Carriage by Securicor £4.50

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817

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



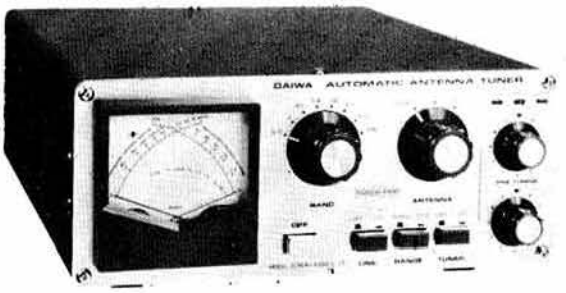
The Daiwa infrared mike system comprising of a control box, sensor and infrared mike enables you to dispense with the hand mike and cable when operating in your car or shack. By using an infrared beam audio is transmitted from the mike to the sensor and then to the control box which activates the transmitter. 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*

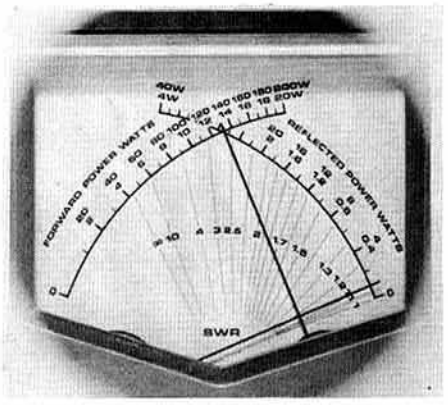
The new CNA1001A antenna tuner from Daiwa has already changed the whole concept of antenna tuning in the amateur radio station. No longer do you have to fiddle with this control and that control in order to reach a match condition, simply push a button and let the tuner do it for you.

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*

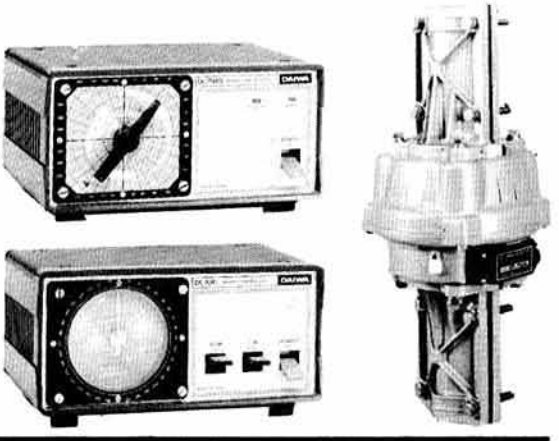
The Daiwa range of rotators are probably the best amateur rotators available. The quality of construction is up to the high standards we have come to expect from Daiwa and the rotator system is of a completely new design which eliminates "out of sync" operation and for the first time gives a true 360°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

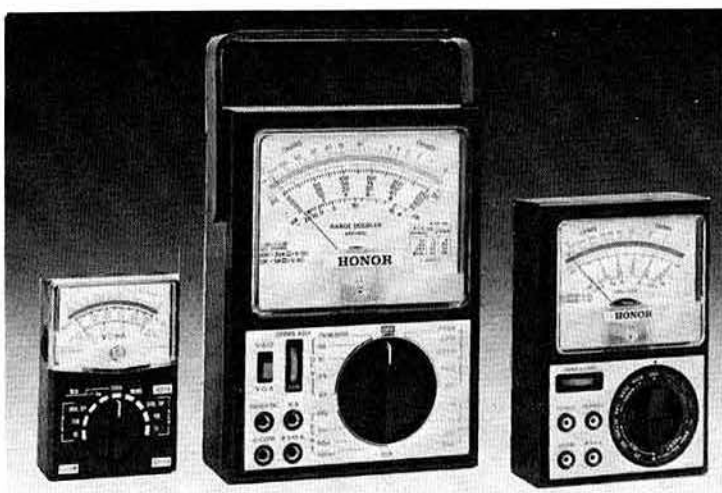


*the **DAIWA** rotator systems*

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

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817



meet the

HONOR

family

KRT100 11 ranges £5.35 inc VAT
KRT200 18 ranges £9.85 inc VAT
KRT500 43 ranges £15.80 inc VAT

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.
AR740A £195.00 inc VAT

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

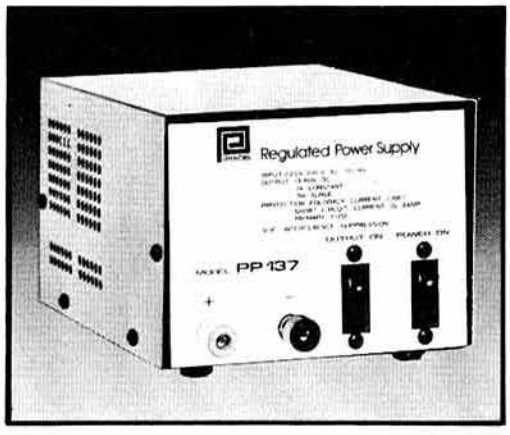
THE HOKUSHIN RANGE

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 £2.00

NOTE PRICES AS OF THE 1st AUGUST 1981

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CLOSED FOR LUNCH 12.30 TO 1.30

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

SEND 56p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK
PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION

Thanet Electronics

IC-2E

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 ansalone 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:—

IC-290E

AVAILABLE NOW!

£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. Internal 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

AVAILABLE VERY SOON!

£249 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 returning 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 ever be as good as this?
The IC2KL has a matching power supply the IC2KLPS delivering 40vDC at 25A continuous for 10 minutes maximum.

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.

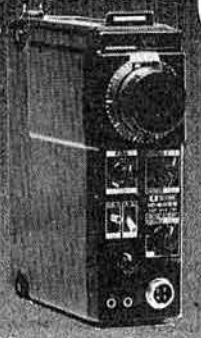
IC-730

£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.

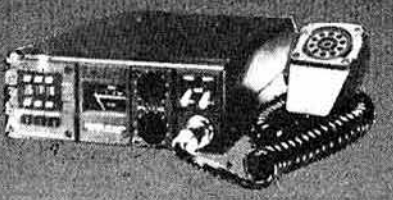


The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW; Large Battery capacity (HP11 type) or Nicads if you wish; A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m; Each of the four 200k Hz band positions allows 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 improved, 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.

ASK ABOUT TONO OR THE MANY OTHER PRODUCTS IN STOCK

Thanet Electronics

ICOM

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

fact: Shure brings intelligibility & reliability to professional communications microphones

Experienced operators recognize that the audio quality of the transmitter is limited by the quality of the input from the microphone. On the air, there's no mistaking the crisp, intelligible messages from Shure microphones.

Shure microphones have been the overwhelming choice of professional communications users all over the world for over 30 years. Many milestone improvements developed for demanding professionals are found on Shure microphones:

ARMO-DUR® Case: Lightweight, immune to oil, grease, fumes, salt spray, sun, rust, and corrosion. Prevents RF burn!

"Million Cycle" leaf switch: Just one of the crucial wear points Shure-tested to ensure reliability and extraordinary durability.

TRIPLE-FLEX® Cable: Provides three or four times longer flex life than previously available cords on hand-held microphones.

CONTROLLED MAGNETIC® or Dynamic Transducer: The exclusive Shure-designed super-rugged transducers that give excellent voice intelligibility and super reliability.

To improve your on-air intelligibility we suggest the following Shure Microphones:

	Mobile Application	Fixed Station Application
SSB	414A* 407A* 577A**	444D 526T Series II
FM	414B* 507B* 577B**	450 526T Series II

*General recommendation: Consult equipment instruction manual for correct microphone inpedance.
**Noise-cancelling.

SHURE Fixed-Station Mics

Controlled Magnetic® Fixed Station Microphone (Models 444D, 450)
Our most popular fixed-station microphones. Unmatched performance characteristics. Adjustable stand raises microphone for most comfortable talking postion.

New Transistorized Fixed-Station Microphone (Model 526T Series II)
A new design for maximum versatility in fixed-station operation. Modulation level (volume) control for high undistorted output with high- or low-impedance inputs.

SHURE Hand-Held Mobile Mics

Omnidirectional Mics (Models 407A, 407B, 507B)
Small, easy-to-handle design, with rugged Dynamic or CONTROLLED MAGNETIC® transducers for excellent voice intelligibility. Hum-shielded and insulated against shock. Model 507B Dynamic version features extended low and high frequency response, especially suitable for mobile FM transmitters. Modular construction simplifies field service.

Compact Mini Mics (Models 414A, 414B)
Ideal for miniaturized or portable communications systems, or where dashboard space is limited. The 414 Series CONTROLLED MAGNETIC® microphones are about half the size and weight of conventional microphones—yet they are rugged units, recommended for critical outdoor or indoor applications.

Noise-Cancelling Mics (Models 577A, 577B)
These Shure Dynamic microphones shut out background noise, permit clear transmission even where the noise level is so great that the operator cannot hear himself talking! The ARMO-DUR® case is lightweight, feels natural to the touch. The 577A is high impedance; the 577B is low impedance.

Communications Microphones by . . .

® SHURE ®

Shure Electronics Limited, Eccleston Road, Maidstone ME15 6AU Telephone: Maidstone (0622) 59881

WATERS & STANTON ELECTRONICS

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

EASY ORDER FORM ON PAGE 791

Why not send for our catalogue?

AZDEN PCS 3000

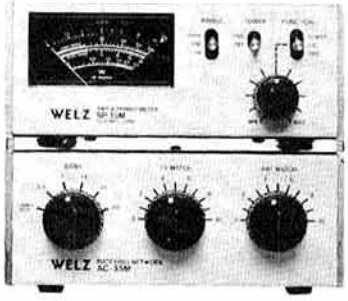
2m 25W FM MOBILE

£219 inc VAT

- ★ 8 memories
- ★ Band scanning
- ★ Tone burst
- ★ Remote mic control
- ★ Digital readout
- ★ Memory scanning
- ★ Priority channel
- ★ Reverse repeater
- ★ 12½kHz switch
- ★ Detachable head unit

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?

WELZ — LABORATORY STYLE EQUIPMENT AT AMATEUR PRICES! — WELZ



SP15M POWER METER

Here's a real economy in line power meter ideal for the HF/VHF operator. Maximum handling is 200 watts and forward/reflected power is directly read in 3 ranges:- 0-2·5, 0-20W and 0-200W. Sensitivity is constant throughout the range 1·8-150MHz.

AC 35m 3·5-29MHz ATU

This is a must for solid state rig owners. Designed for coax feed, this ATU covers 5 bands 3·5 to 30MHz with a straight through position. Rated at 400 watts is will match anything between 10 and 500 ohms.

2 WAY SWITCH DC-450MHz

Now at last we've found a true coaxial switched rated at DC-450MHz at 1kW. Unlike other units the coaxial cavity is perfectly preserved with a small gold plated changeover finger. The insertion loss is an amazing 0·1dB and the isolation an equally amazing 70dB. Made by one of Japan's laboratory equipment manufacturers, this unit is the perfect answer to coax switching at VHF/UHF.

Model CH-20A £13.95 (SO239 sockets)
Model CH-20N £23.95 ("N" sockets)

DUMMY LOADS DC-1300MHz!

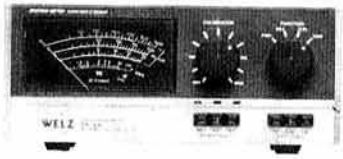
(High power figures refer to intermittent use)

CT-15A
15/50 watts
DC-450MHz
£6.95

CT-15N
as above but
fitted 'N' sockets
£11.75

CT-03N
3/5 watts
DC-1300MHz
£29.00

CT-300
300/1kW
DC-250MHz
£45.00



MODELS

SP200	1·8 160MHz 20W 200W 1kW	**£59.00** (n.c.)
SP300	1·8 500MHz 20W 200W 1kW	**£79.00** (n.c.)
SP400	130 500MHz 5W 20W 150W	**£59.00** (n.c.)

*Note: VHF model has 'N' sockets

PROFESSIONAL QUALITY SWR/POWER METERS NOW LEARN THE TRUTH!

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), and completely flat response.

HP4A TVI FILTER £5.95

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!

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

'Such nice people'

WATERS & STANTON

FAST AND FRIENDLY

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All goods sent are covered free by our own insurance

All prices include VAT

PRICE LIST – SEPTEMBER 1981

Carriage charge in brackets

TRIO PRICE CHANGES – PHONE FOR LATEST INFORMATION

TRIO

TS830S	160-10m transceiver 9 bands	£725.00 (5.00)
VFO230	Digital VFO with memories	220.00 (6.00)
AT230	All-band ATU power meter	121.00 (2.25)
SP230	External speaker unit	37.70 (1.50)
DS2	Optional dc pack for TS830S	45.00 (1.50)
DFC230	Dig fequency remote controller	185.00 (1.50)
YK88C	500Hz CW filter	29.67 (1.00)
YK88CN	270Hz CW filter	32.66 (1.00)
TS530SE	160-10m trans 200w pep digital	561.00 (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	29.67 (.50)
YK88S	Second SSB filter option	29.21 (.50)
PS30	AC power supply for TS180S	85.10 (4.50)
TS130S	8 band 200W pep	547.00 (4.50)
TS130V	8 band 20W pep	450.00 (4.50)
DFC230	Dig frequency remote controller	185.00 (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)
VFO120	External VFO	92.00 (4.50)
SP120	Base station external speaker	26.90 (1.25)
SP40	New mobile speaker unit	12.40 (1.50)
AT130	100W antenna tuner	81.00 (1.50)
PS20	AC power supply TS120/130V	48.00 (4.50)
PS30	AC power supply TS120/130S	85.10 (4.50)
MA5	5 band mobile aerial system	86.00 (4.50)
TL922	160-10 metre 2KW linear	595.70 (4.50)
MC50	dual impedance desk microphone	25.75 (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	19.32 (1.00)
RD300	1kW oil filled dummy load	52.00 (1.50)
TS770E	2m/70cm all mode transceiver	785.00 (4.50)
SP70	External speaker unit	18.60 (1.00)
TR9000	2m synthesised multimode	371.00 (4.50)
TR9500	70cm all-mode	t.b.a.
BO9	Base plinth for TR9000	36.11 (4.50)
TR7800	2m FM synthesised mobile	276.00 (4.50)
TR2300	2M FM synthesised portable	166.75 (4.50)
VB2300	10W amplifier for TR2300	55.00 (1.50)
MB2	Mobile mount TR2300/VB2300	17.70 (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	15.00 (.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	305.00 (4.50)
TR8400	70cm FM synthesized	329.00 (2.50)
TR9500	70cm all mode	482.00 (2.50)

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.)
144V107V901	2 metre transverter	101.20 (n.c.)
50V107V901	6 metre transverter	69.00 (n.c.)
430V107V901	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 FT70/107	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

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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.)
AM802G Base station compressor mic	59.00(n.c.)
SEM	
2m power amplifier/pre-amplifier 5/30W	50.00(1.00)
2m power amplifier/pre-amplifier 16/50W	66.70(1.50)
2m power amplifier/pre-amplifier 16/100W	126.50(1.50)
2m converter	23.00(.35)
2m Auto switching pre-amplifier	21.73(.35)
70cm Auto switching pre-amplifier	24.73(.35)
2m pre-amplifier	14.95(.35)
70cm pre-amplifier	17.73(.35)
2-40MHz pre-amplifier auto switching	18.66(.35)
2-40MHz pre-amplifier	11.73(.35)
PA3 miniature 2m pre-amplifier	8.00(.35)
PA70 miniature 70cm pre-amplifier	10.00(.35)
Z Match Aerial tun unit 1-8-30MHz 500W	47.15(1.50)
EZITUNE Aerial tuning aid	30.48(.75)
IAMBIC Keyer	34.50(.75)
2 METRE PORTABLES	
SB2M 2m SSB portable	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	11.95(.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)
Station log books	1.95(.50)
12BY7A driver valves	2.75(.50)
6146B/S2001A P.A. valves	8.70(.50)
6JS6C P.A. Valves Matched pairs	9.95(.50)
PL259 plugs	.63(n.c.)
PL259 reducers	.17(n.c.)
SO239 chassis sockets	.60(.10)
PL259 joiners	.85(.10)
N. Plugs. Silver plated UR67	2.00(n.c.)
N. Plugs. Silver plated UR43	2.00(n.c.)
4 pin mic plugs	.85(.10)
3 pin mic plugs	.85(.10)
6 pin mic plugs (FDK 750)	1.00(.10)
3 pin chassic socket	.85(.10)
4 pin chassis socket	.85(.10)
BNC plugs (bayonet)	.90(.05)
Pen Cell Ni-cads (HP7 size)	1.20(.05)
Cigar lighter plugs	.55(.10)
UR67 cable 50Ω per metre	.69(.10)
UR43 cable 50Ω per metre	.23(.05)
5 core rotator cable per metre	.30(.05)
BL40X balun 50Ω	11.25(.35)
3 core rotator cable. Per metre	.22(.05)
Ferrite rings 1¼" diameter	.35(.05)
Mosley aerial insulators	.30(.05)
KX2 SWL aerial tuner 0-5-30MHz	29.90(1.50)
APM1 Audio Peak and notch filter	33.00(1.00)
HP3A TVI high pass filter (UHF T.V.)	3.50(.50)
Drake TV3300 LP Low Pass Filter	18.40(1.20)
Shure 444D high impedance desk mic	27.50(1.50)
Shure 201 high impedance hand mic	12.50(1.00)
Trio HCM10 Digital World Clock	55.20(1.50)

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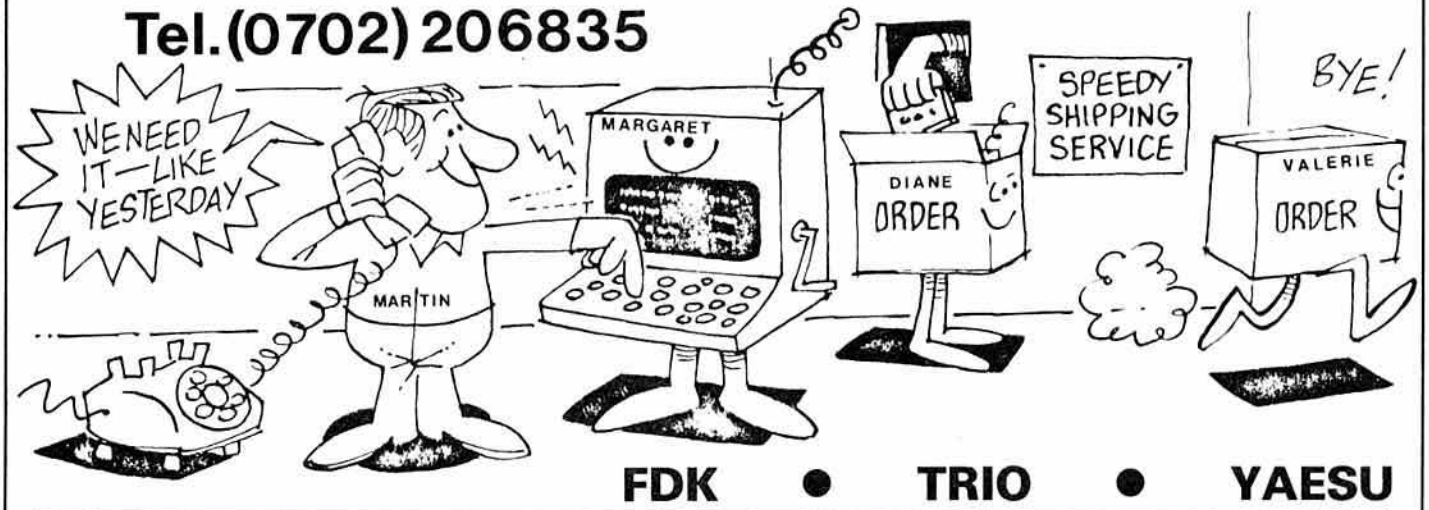

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Model	Description	Inc. VAT	Carr.
TR-7/DR-7	Transceiver/Gen. Cov. Receiver Digital	£1035.00	5.00
PS-7	Power Supply 120/240v for TR-7	207.00	5.00
PS-75	Sideband Duty P.S.U. for TR-7 120/240v	138.00	5.00
RV-7	Remote V.F.O. for TR-7	132.25	2.00
MS-7	Matching 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 1¼" 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 1¼" boom and trombone support	31.05
PBM10/2M	10 element Parabeam with 1¼" boom and trombone support boom	36.80
PBM14/2M	14 element Parabeam with 1¼" boom and 45° braces	44.85
5XY/2M	Crossed 5 element yagi with 1¼" boom	22.77
8XY/2M	Crossed 8 element yagi with 1¼" boom	28.40
10XY/2M	Crossed 10 element yagi with 1¼" 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 ¼" booms	20.70
PBM18/70cm	18 element Parabeam yagi with 1¼" 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

DRAKE ★ SALES ★ SERVICE

Access

RADIO SHACK LTD.

188 BROADHURST GARDENS, LONDON NW6 3AY

BARCLAYCARD VISA

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YAESU

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-

Access BARCLAYCARD VISA

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.

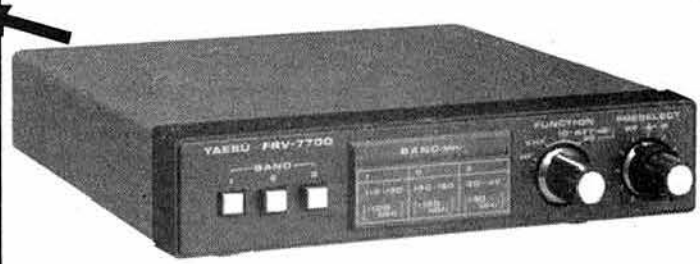
YAESU

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 £3.60p — 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.

AGENTS

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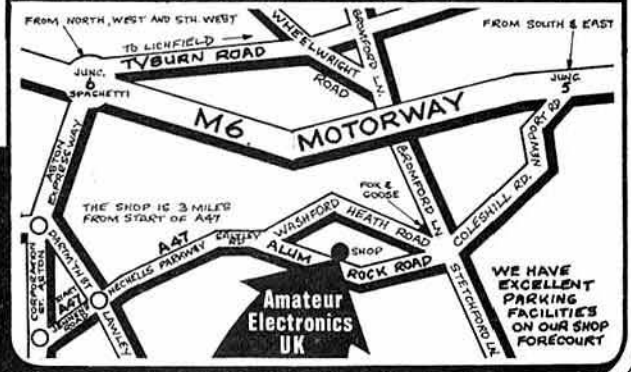
WHERE TO FIND US



Amateur Electronics UK
508-516 Alum Rock Road·Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 337045
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous – CLOSED all day Monday.

AMATEUR RADIO EXCHANGE

For the widest choice of equipment by ALL the leading makers—both new and secondhand—Brenda (G8SXY) and Bernie (G4AOG) invite you to the only shop in London where you can see and try under one roof all the latest gear from YAESU and ICOM and TRIO/KENWOOD and DRAKE and COLLINS etc, and have a cup of Brenda's coffee while you do so . . .

FT-707

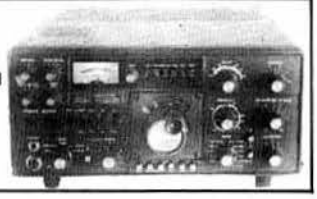
The ultimate in HF mobile transceivers from Yaesu. All the new bands, and all the latest technology.

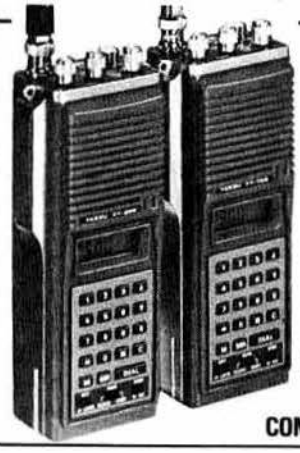
PHONE FOR PRICE— incl. FREE ATU

FT101 Mk III

The tried and tested Yaesu HF base station, now with audio peak filter and reject notch filter as standard, and choice of AM or FM.

PHONE FOR PRICES incl. FREE cooling fan and mic.





FT-208R/FT-708R

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 12·5/25/50kc 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.

PHONE FOR PRICES incl. FREE 12V DC to DC CONVERTER and CHARGING UNIT

TRIO/KENWOOD —LATEST MODEL IMPROVEMENTS

Three best-sellers in the range up-rated with new model designations. The TS-520 and TS-820 become the TS-530S and TS-830S respectively, both with all the new bands, IF shift etc . . . and the TR-7800 becomes the TR-7850, now giving 50W out.

PHONE FOR PRICES

WELZ METERS

Do you want a really accurate reading of your SWR and power, anywhere from 1·8 to 500MHz? A Welz meter will tell you, and there are three models to choose from.

SP-200	1·8–160MHz	200W–200W–1kW	**£49.95**
SP-300	1·8–500MHz	20W–200W–1kW	**£69.95**
SP-400	130–500MHz	5W–200W–150W	**£49.95**

SPECIAL ANNOUNCEMENT

- **SST-1/SST-2** New low-priced ATUs capable of handling 200W from top to 10, from only **£19.00**
- Our popular **HELISCAN** aerial – ideal for the SWL who wants a simple-to-erect indoor antenna for good HF-band reception – now reduced to only **£9.95** (p & p £1).
- **WOOD & DOUGLAS** Full range of kits and modules always in stock.

FRG-7

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

£185 inc. VAT and **FREE HELISCAN AERIAL**

FT-480R/FT-780R

Yaesu's pace-setting mobile format now available for either 2m or 70cm use.

FT-480R WITH FREE PSU
FT-780R WITH 1·6MHz SHIFT

PHONE FOR PRICES

LICENCED CREDIT BROKERS ★ Ask for written quotation
INSTANT HP AND 6-MONTHS NO-INTEREST HP TERMS AVAILABLE FOR LICENCED AMATEURS AND BANK/CREDIT CARD HOLDERS

Access BARCLAYCARD VISA

Credit card sales by telephone

Because of currency fluctuations etc., some prices are unknown as we go to press, and others may vary by publication date. Please phone for latest information.

All prices include VAT, but p&p/carriage are extra.

AMATEUR RADIO EXCHANGE

. . . and where you can find under another roof at our Service Centre across the road a really enormous stock of accessories and components.

For our friends and customers in the North West, an opportunity to enjoy the same warm welcome—and some really outstanding technical expertise—at our new branch in St. Helens run by Mike (G8EWU) at 136 Gladstone Street (near the Rugby Ground). Tel: 0744 53157.

FRG-7700 RANGE

Yaesu's latest receiver with FM right across the band now offers all these optional extras ★ Memory facility ★ FRT-7700 Aerial Tuning Unit at only £34.75 ★ Four VHF converters ranging from 50MHz up to 170MHz.

Basic receiver **£299** inc. VAT and **FREE HELISCAN AERIAL**

Converter specifications ★ Please phone for prices

FRV-7700A	118-130MHz	130-140MHz	140-150MHz
FRV-7700B	118-140MHz	140-150MHz	50-60MHz
FRV-7700C	140-150MHz	150-160MHz	160-170MHz
FRV-7700D	118-130MHz	140-150MHz	70-80MHz

YAESU's LATEST . . .

the all-mode 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 **£229**

How about teaming it up with a MICROWAVE MODULES 25W amplifier to bring it up to base station specification? The cost . . . just £59

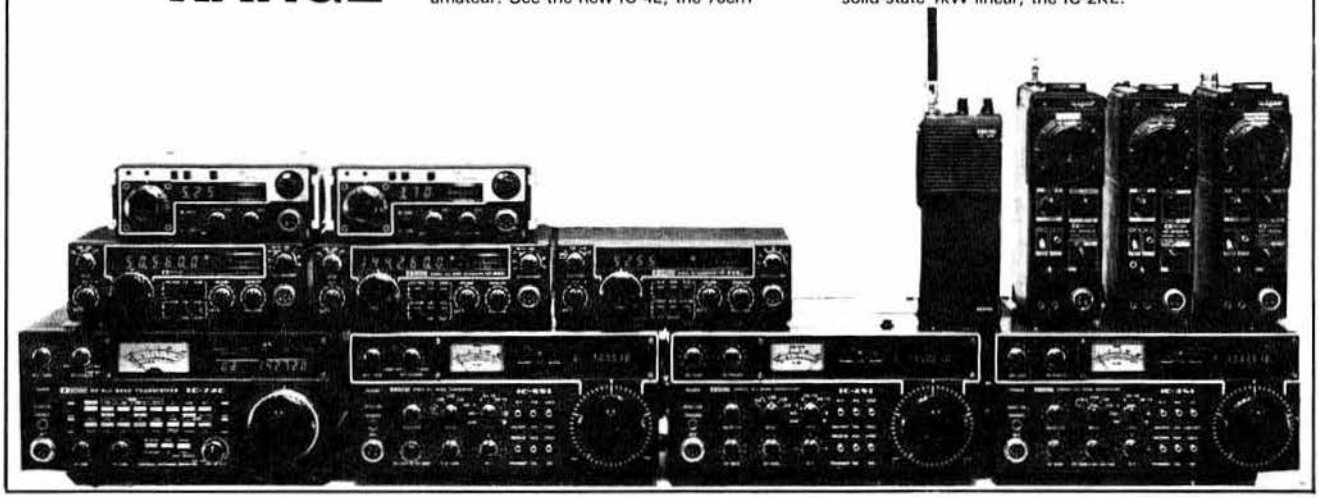
IC-730

The first mobile HF transceiver on the market with two VFOs. Also featuring Band Pass tuning and giving out 100W.

£549 inc. VAT

THE ICOM RANGE

Frequency synthesis . . . complete solid state . . . no tune-up operation . . . these are just three of the advanced technical features that are typical of the 'Icom way' of designing equipment for the knowledgeable amateur. See the new IC-4E, the 70cm version of the tremendously popular IC-2E, or the superb IC-720A HF rig with general coverage receive from 100kc to 30MHz plus transmit facility across its entire range for commercial purposes, and the matching solid-state 1kW linear, the IC-2KL.



Closed Wednesday, but use our 24-hour Ansafone service.

2 NORTHFIELD ROAD, EALING, LONDON, W13 9SY. Tel: 01-579 5311

So easy for Overseas visitors—Northfields is just seven stops from Heathrow on the Piccadilly Line

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

CSC1	£3.45	NC11C	£7.65	NC1.2C	£2.30
MMB11	£20.70	SMC2.2C	£2.70	FL2010	£59.75

- ★ 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
- ★ Scan on memory on clarify (±10KHz)!!
- ★ Long battery life with SMC 2.2A/Hr cells

NB: 83% more battery 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

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GW8EBB	Peter	Swansea	(0792) 872525
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G4EQS	Simon	Redcar	(0642) 480808

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Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire.
Woodhall Spa (0526) 52793
9 5 Tuesday Saturday

FT780R

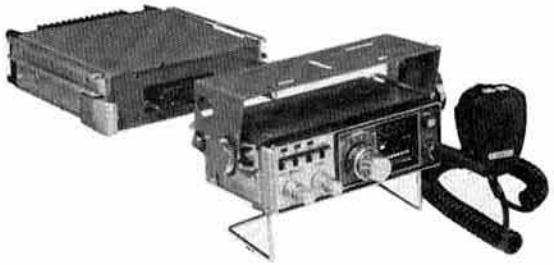
- ★ 430-434MHz (440-445) possible).
- ★ USB-LSB-CW-FM (A3J, A1, F3).
- ★ Input 30W (PEP A3J and A1/F3).
- ★ GaAs Fet RF for incredible sensitivity.
- ★ NMOS four bit micro control.
- ★ Bandwidth 2·2kHz and 14kHz @ −6dB.
- ★ "Dial set" clears unwanted non-integral steps.
- ★ Very bright blue display to 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
- ★ ±600Hz 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, 10½" D
- ★ Sensitivity; 0·3μV 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
- ★ 1¼W 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 burst
- ★ ±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) × (39(D)mm
- ★ C/w NiCad pack and helical

NC7	£24.55	MMB10	£5.75
NC8	£41.40	FNB2	£16.10
NC9C	£7.65	FL2010	£59.75

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 burst
- ★ ±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) × 59(D)mm
- ★ C/w NiCad pack, helical

PA3	£12.25	NC9C	£7.76
FNB2	£16.10	FTS32	T.B.A.
FBA2	£2.70	FL7010	T.B.A.

FT708R
£199 inc.
VAT @ 15%
& POSTAGE

FT207R

- ★ 144–148MHz (144–148 possible)
- ★ 12·5kHz synthesizer steps
- ★ 4 bit CPU chip for frequency 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 volume
- ★ 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

NC3	£39.50	NBP9	£16.85
NC3A	£42.55	FBA1	£2.70
FLC2	£20.70	WMT207	£5.00

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 AF
- ★ 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 520, 21, 22

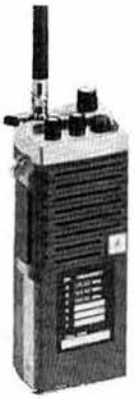
YM24A	£16.85	NC1A	£19.15
FLC1	£20.70	PA2	£13.40
PA1	£19.15	SMC.50A	£0.87

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

NC3	£39.50	NBP9	£16.85
NC3A	£42.55	FBA1	£2.70
FLC2	£20.70	NC9C	£7.65

FT404R



FT202R
£109 inc.
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
GJ4ICD	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 (¼, ⅝, ½) 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	£2.30	£0.40
310	Base. Swivel 1/4λ 60-550MHz	£4.20	£0.40
344	Base. Sprung 1/4λ 60-120MHz	£6.50	£0.52
440	Base. Stand 5/8λ 145MHz	£2.70	£0.40
330	Base. Swivel 5/8λ 145MHz	£5.00	£0.40
341	Base. Sprung 5/8λ 145MHz	£7.30	£0.52
350	Base. Fine tune 1/2λ 45MHz	£7.30	£0.52
351	Base. Sprung 1/2λ 145MHz	£8.05	£0.63
057	Whip, tapered SS 127cms	£1.95	£0.98
056	Whip, parallel SS 63cms	£0.75	£0.75
085	Mount cable 5/8 & 1/4λ	£3.05	£0.63
085LR	Mount cable 5/8 & 1/4λ	£3.85	£0.63
092	Mount Mag. 5/8 & 1/4λ	£10.75	£0.86
084	Mount cable 1/2λ	£5.00	£0.63
088	Mount cowl 1/2λ	£5.75	£0.40
091	Mount Magnetic 1/2λ	£10.75	£0.86
089	Gutter clip adaptor	£5.00	£0.63
093	Boot lip adaptor	£3.80	£0.52

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland shown, max £1.73

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.	£43.13	£1.73
14AVQ/WB	Vertical 10-40m inc.	£58.08	£1.73
18AVT/WB	Vertical 10-80m inc.	£90.85	£1.73
14RMQ	Roof mounting Kit	£30.48	£1.73
18V	Vertical 10-80m inc.	£31.97	£1.73
18HT	"HY Tower" 10-80m	£320.85	£12.54
103BA	3 Ele Yagi 10m	£60.38	£1.73
105BA	3 Ele Yagi 10m	£112.70	£3.16
153BA	3 Ele Yagi 15m	£74.75	£2.36
155BA	5 Ele Yagi 15m	£135.13	£4.77
203BA	3 Ele Yagi 20m	£159.85	£3.97
204BA	4 Ele Yagi 20m	£217.35	£5.87
205BA	5 Ele Yagi 20m	£281.75	£7.59
402BA	2 Ele Yagi 40m	£201.25	£5.23
DB10/15A	3 Ele Yagi 10-15m	£146.06	£3.91
TH3JNR	3 Ele Yagi 10-15-20m	£159.28	£2.47
TH2MK3	2 Ele Yagi 10-15-20m	£136.85	£2.59
TH3MK3	3 Ele Yagi 10-15-20m	£205.85	£4.66
TH5DXX	"Thunderbird" 5 Ele	£228.85	£5.41
TH6DXX	"Thunderbird" 6 Ele	£281.75	£6.97
HYQUAD	2 Ele Quad 10-15-20m	£240.35	£4.89
18TD	Dipole Tape 10-80m	£80.39	£2.30
BN86	Balun 1:1-3 30MHz	£15.53	£1.15
LA1	Lightning Arrestor	TOS	£0.75

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

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	£4.54	£0.63
HM/2M	Halo, 24in mast	−3·0dB	£5.41	£0.75
UGP/2M	Ground plane	0·0dB	£10.12	£1.73
C5/2M	Colinear omni vert	4·8dB	£44.28	£1.73
LR1/2M	Colinear	4·5dB	£24.15	£1.73
5Y/2M	Yagi 5 ele	7·8dB	£11.27	£1.73
8Y/2M	Yagi, 8 ele	9·5dB	£14.49	£1.73
10Y/2M	Long Yagi, 10 ele	11·4dB	£31.05	£1.73
14Y/2M	Long Yagi, 14 ele	13·0dB	£36.00	£1.73
D5/2M	Yagi, 5 over 5 slot	10·6dB	£20.13	£1.73
D8/2M	Yagi, 8 over 8 slot	12·3dB	£27.14	£1.73
PBM10/2M	10 ele parabeam	12·4dB	£36.80	£1.73
PBM14/2M	14 ele parabeam	13·7dB	£44.85	£1.73
Q4/2M	Quad, 4 ele	10·0dB	£23.69	£1.73
Q6/2M	Quad, 6 ele	12·0dB	£31.40	£1.73
5XY/2M	Yagi, 5 ele cross	7·8dB	£22.27	£1.73
8XY/2M	Yagi, 8 ele cross	9·5dB	£28.41	£1.73
10XY/2M	Yagi, 10 ele cross	11·3dB	£37.72	£1.73
PMH2/C	Harness, Cir. Polar		£7.48	£0.52
PMH2/2M	Harness, 2 way		£9.89	£0.86
PMH2/2ML	Hrns, 2 way long		£11.04	£1.15
PMH4/2M	Harness, 4 way		£23.12	£1.73

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

Kenpro

KR600RC
£132.25

360 round type meter
Max: load 200kg.
Rot. 600kg/m, brake 400kg/m.
1¼in-2¾in masts
Lower casting optional.

KR400RC
£90.85

360° round type meter.
Max: load 200kg.
Rot. 400kg/m, brake 1,500kg/m.
1¼in-2¾in masts.
Lower casting optional.

KR500
£86.25

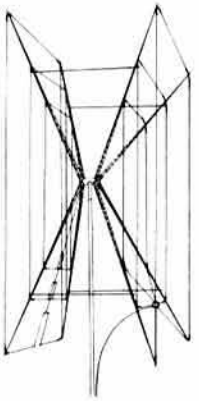
Elevation Rotator (180°).
Up to 50kg of Load.
1¼in-2¾in mast.
1¼in-1¾in boom.

KR250
£44.85

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

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

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	£142.60	£4.31
GQ2E	3 Ele Antenna	£215.05	£7.42
GQ4E	4 Ele Antenna	£286.35	£8.11
GQCK1	Conversion Kit 1 Ele	£72.45	£3.34
GQCK2	Conversion Kit 2 Ele	£143.75	£5.41
GQSPIDER	Centre piece (spare)	£30.19	£1.43
GQSPREADER	Spreader Arm (spare)	£11.33	£1.73

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

CDE

AR40
£65.55

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

CD45
£113.85

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

HAM IV
£189.75

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

T2X
£270.25

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

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

SOUTH MIDLANDS COMMUNICATIONS LIMITED

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

BEST BUYS LOW COST TOWERS

NEW

18FT ONLY £98

28FT ONLY £146

With tiltover base for ease of installation. These are our latest light duty range.

Or for larger headloads and heights we recommend our post mounted series P60 shown on the far left.

STANDARD
Post mounting

13M20P40	40′	£345
13M20P60	60′	£422

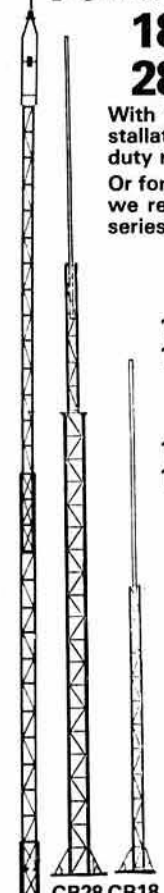
HEAVY DUTY
Post mounting

16M20P60	60′	£584
16M20P80	80′	£880

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.



CB28 CB18

SEND NOW FOR SPECIFICATIONS/PRICES

'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.

FS710; PEP AUTO-SWR RMS LEVEL

FS710 £78.20

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

FS500 £60.95

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 £44.85

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 £40.25

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 £35.65

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

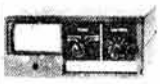
FS711 £32.20

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 × 1½"
coupler 3¼ × 2¾ × 1¼"

FS5E £32.20

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

FS300M £31.05

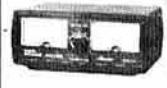


LEVEL RESPONSE, POWER & SWR
FS301M 1·8-30MHz 20, 200W
FS301MH 1·8-30MHz 200, 2kW
FS302M 50-150MHz 20, 200W
Power ±10%. SWR 1:1-3:1 ±3%
Size: 6¼ × 2¾ × 4¼"

SWR3S £23.00

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 £23



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 INCLUDE VAT AT 15%
Carriage free (surface post) worldwide

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 1⅜in 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 7½ft) sloping downwards at 45° to the antenna. It is the perfect answer to restricted locations. Power; 150W PEP, weight 4lbs.

SMCHF5V £40.25 **SMCHF5R £29.90**

(Carriage on either or both together £1.73)

2 METRE COLINEAR

144MHz, 6·5dB gain and low angle of radiation from two $\frac{5}{8}\lambda$ 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 £1.73) **£24.95**

70CMS COLINEAR

432MHz, 6·8dB gain and ultra low angle of radiation from three $\frac{5}{8}\lambda$ 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 2⅜in. Weight 1·1kg, Projected area 0·034 square metres.

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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.

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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

CITIZENS BAND—THE PRESENT POSITION

ON 24 June 1981 the Home Office published its long-awaited formal technical specifications for UK citizens band radio. These specifications were contained in separate documents for 27MHz and for 934MHz*. The main features are given in Table 1.

Table 1. Main parameters for UK cb radio

Parameter	27MHz	934MHz
Modulation type	FM (angle)	FM (angle)
Maximum deviation	±2·5kHz	±5kHz
Maximum transmitter output power	4W	8W
Maximum erp	2W	25W (base/mobile) 3W (portable)
Output power/antenna height requirement	If antenna mounted over 7m high, power to be reduced by 10dB	If antenna mounted over 10m high, power to be reduced by 10dB
Number of channels	40	20 initially
Channel spacing	10kHz	25kHz specification but only 50kHz channels to be used initially
Lowest channel	27,601·25kHz	934·025MHz
Highest channel	27,991·25kHz	934·975MHz
External antenna requirements	(i) Single element only (ii) Maximum length 1·5m	(i) Four elements maximum (ii) Maximum element length 17cm

One of the sections of the specification requires that all equipment must be labelled with the manufacturer's name and type number and must indicate compliance with the specification with a mark stamped or engraved on the front panel of the equipment.

Many members of the RSGB will feel disappointed that the 27MHz allocation has been made despite widespread opposition. The Society has formed an active part of this opposition, and the following is a brief summary of events over recent years and the Society's reactions to them.

Background

The Society first became concerned with cb in 1975. Since that time, interest in the UK has grown rapidly. Throughout this period the Society has kept itself briefed regarding the constantly changing situation in an attempt to ensure that the interests of amateur radio are fully safeguarded.

To understand the problems involved, it is essential to recognize that cb radio and the amateur service are completely different services. Consequently, in the normal course of events the amateur service need not interact directly with cb any more than it reacts with any other user of the frequency spectrum. Amateurs can well understand the pleasure and value of a personal radio communication system, and therefore the Society should have no opposition in principle to cb, provided, and it must emphasize "provided", that the licensing conditions are suitable and operating is under strict control. On the other hand, if this is not to be the case then the Society would rightly be most concerned, as unsatisfactory cb radio will inevitably reflect adversely on amateur radio.

Following from these considerations, the Society has from the very start adopted an attitude of being neither strongly for nor against the principle of cb radio as a low-power short-range personal communication system for the general public at large. However, in stating its views on this topic in "Current Comment", *Rad Com* November 1976, May 1978, and again in April 1981, the Society found it difficult to offer an informed opinion on a matter concerning which nothing definite was known.

Nevertheless the Society developed strong views on the nature of a satisfactory service, which it then publicised. In essence, the Society regarded the use of 27MHz as being particularly inappropriate, and favoured a low-power vhf or uhf fm service using type-approved equipment.

In formulating its views, the Society drew on its long experience of operation of radio transmitters in a domestic and suburban environment. It was particularly concerned with potential tvi and bci: it seemed obvious that perhaps several million transmitters in the hands of users, who did not necessarily have any technical background whatsoever, could be a recipe for disaster in our particularly crowded environment. It was felt that, if the level of domestic interference rose appreciably, then amateur radio would suffer indirectly. This had occurred in other countries, and the Society was able to use its knowledge of these problems in its thinking.

At the time there was considerable publicity in the press regarding the illegal use and abuse of cb, which was monitored by use of a press-cutting agency. Very often users were described as "radio amateurs" or "hams". In an attempt to counter this negative publicity for amateur radio, an information sheet was generated emphasizing the essential differences between cb and amateur radio, part of which is reproduced in Table 2. This was circulated to national and local newspapers, and was later used as the basis for a project in which the Society's regional representatives presented information to their local media. In many cases the document was reproduced word-for-word.

At its meeting in November 1979 the RSGB Council decided that a working party be set up, consisting of the telecommunications liaison officer, general manager, and the hf, vhf, microwave and emergency communications managers, to consider and report on the implications of cb. Many potential areas of concern were identified, and these became part of the current thinking of the Society on the topic.

In August 1980 the Government presented its Green Paper on "Open Channel". This discussion document *inter alia* reviewed a wide range of possible frequency allocations for cb. It concluded that an allocation at 900MHz had much merit and that one at 27MHz was completely ruled out. The Green Paper also invited comments from interested parties. The Society made two contributions. The first consisted of a commentary reiterating its published views, stressing in particular its strong opposition to any 27MHz allocation. It became evident that contributions from many other bodies and from industry pressed similar views.

At that time there was considerable cb publicity to the effect that the likely ranges on 900MHz were limited to a few hundred metres, in contrast

Table 2. Part of an information sheet for the media comparing cb and amateur radio

CB	Amateur radio
A personal radiotelephone facility	A serious technical hobby with a large element of self-training
Intended to be short-range	Worldwide propagation under appropriate conditions
No technical expertise required	Amateurs are required to pass the City & Guilds Radio Amateurs' Examination before the Home Office will issue a transmitting licence
Operator unidentifiable	Individual callsigns identifiable worldwide
Low-power transmitters, typically a few watts output	Relatively high-power transmitters, up to 400W peak output
Operation restricted to two wavebands	Operation on 15 wavebands (23 after 1982) throughout the radio spectrum
Only speech transmissions	Amateurs are permitted to transmit speech, morse code, slow-scan and fast-scan television, radio teletype, facsimile and data
Direct station-to-station transmissions only	Transmissions can be direct or *via* repeaters and amateur communication satellites; experimentally, via unusual propagation modes such as reflection from the aurora, meteor trails and the moon
Uses commercially-built equipment	Much amateur equipment is home-constructed: home construction is inevitable when commercial equipment of adequate standard is unavailable
Little technical development originated by users	Amateurs continue to make significant contributions to the art of radio communication via, for example, research into propagation, development of transmitters and receivers, special communication techniques, and the building of relatively low-cost but effective communication satellites
Local emergency communication	Amateurs have the capacity to set up effective communication systems under disaster conditions on a local and international scale

*Home Office documents MPT 1320 and MPT 1321.

to the large distances claimed for 27MHz. To provide data to counter these claims, members of the Society's Microwave Committee made predictions of the likely range of typical equipment at both 900MHz and 1·3GHz, and then did a large number of mobile-to-mobile and mobile-to-fixed tests at the latter frequency to check their predictions. These data were contributed in a long report to the Home Office in January 1981. One consequence was that the Society was one of a limited number of bodies invited to attend a technical meeting to discuss the input attracted by the Green Paper regarding frequency allocations. It is worth noting that one of the possible frequency bands put forward was within our 430MHz allocation, but this was rejected for a number of reasons.

The consensus of this meeting was that the 900MHz allocation was still the only viable one, a 27MHz allocation again receiving virtually no support. However, in response to widespread rumours that the Government might respond to heavy cb pressure for a 27MHz allocation, the Society sent a letter directly to the Prime Minister early in February, re-stating the Society's views on the problems associated with 27MHz.

The rumours became reality when the Government announced at the end of February that they intended to permit cb at both 27MHz and 934MHz. However, the formal technical specification did not become available until the end of June 1981, the summary of which has been given earlier.

Future action

The Society will of course continue to keep itself briefed on development on the cb front by its various officers and committees, including the CB Working Party. It will be particularly concerned with how the Home Office intends to implement its specifications for equipment, and what changes it will make to the Wireless Telegraphy Act. The continuing concern of Council was reflected in a recent special meeting of Council which was devoted mainly to reviewing the present position regarding cb.

This meeting confirmed the Society's basic policy regarding cb, which can be summarized in the following terms:

1 In accordance with its previously stated policy, the Society welcomes cb, provided that it is suitably regulated. The Society continues to stress the need for strong supervision by the Home Office, especially with regard to the power of equipment and modulation mode, and will continue to press the Home Office to amend the Wireless Telegraphy Act to make it easier to control the use of the spectrum.

2 It will continue to be a fundamental RSGB policy to emphasize the essential difference between amateur radio and cb at every level. Nevertheless, it recognizes that many people may come into amateur radio via cb.

3 Although the Society does not regard 27MHz as a suitable frequency for cb, nevertheless it is prepared to support a low-power fm specification which allows the use of only officially-approved equipment. The Society is therefore strongly against any home-construction of cb equipment: it knows of no other country which permits the use of other than approved equipment.

4 The Society welcomes the 934MHz allocation and intends to extend its experiments to demonstrate the effectiveness of these frequencies for short-range communications.

5 The Society will do whatever is within its power to prevent cb operation within any amateur bands.

QTC
Amateur radio news

DF contests

The attention of organizers of df contests is drawn to the requirement that certain specific information must be given in advance to the office of the appropriate regional telephone manager. The details that must be given are:

1. Date and time of contest;
2. Callsigns of transmitting stations;
3. Frequencies to be used;
4. The locations (eg grid references) of hidden stations.

Class B licences and cw

It is the policy of the Home Office that only those persons who have proved their competence to send and receive cw shall be allowed to use this mode on the air. However, it is pointed out that any Class B licensee may, under supervision of a Class A licensee, operate the latter's station on any frequency and with any mode for which the Class A operator is licensed.

GB2RS

An experimental GB2RS news broadcast is now being transmitted at 1800bst every Sunday evening on 3·650MHz by G8QZ or G2CVV in the Midlands. Additional Sunday evening broadcasts on 3·5MHz are planned from Scotland and the north and the south of England, and will be announced on GB2RS when they are to be introduced.

QSL Bureau

G4NAA-G4NZZ series. The sub-manager for this series is Mr J. Brakespear, G8RZP, The Chequers Stores, Eastchurch Road, Minster, Sheppey, Kent.

Annual holiday. A reminder that the QSL Bureau will be closed from 13 September to 12 October, during which time no QSL cards should be sent as no responsibility can be accepted for any which go astray as a result of their being posted during that period.

SUBSCRIPTION RATES

When the last increases were made at 1 October 1980, it was hoped that the new rates would be held until 1982. Unfortunately this has not proved possible, and at its meeting on 25 June 1981 Council approved an increase in the home corporate subscription from £12.50 to £14.50 per annum, with proportionate increases of 16 per cent to all other subscription rates—except for overseas members who receive *Radio Communication* by airmail, who will bear a larger increase to cover the additional airmail costs imposed within the past year.

P. F. D. Cornish, G3COR
Hon treasurer

1982 Council election

The attention of members is drawn to the notice published on page 709 of *Rad Com* August 1981.

Stolen equipment register

The Society has decided to establish a register of stolen amateur radio equipment on its data processor. This is as a result of the rapidly increasing level of theft of radio equipment, particularly from vehicles. While illegal cb transceivers are apparently the target of this activity both private mobile radio and amateur radio equipment have become involved. The establishment of this register, as an experiment for 12 months, is intended to assist members in the recovery of their equipment.

To report a piece of stolen equipment, contact the membership services officer at RSGB HQ giving the following details: Manufacturer's name; model number; serial number; type (eg 144MHz fm transceiver); special features; date stolen; location of theft; police station to which theft reported; insurance company; and owner's name, callsign and telephone number.

The 70MHz band

One of the decisions of WARC 79 was to alter the frequency above which licences could be issued without a cw test to 30MHz. However, the alteration will not bring any change to the 70MHz allocation in the UK. The allocation was made available following negotiation between the RSGB and the administration and is on a privileged basis and subject to the requirement of the primary user. 70MHz is not an allocation to the amateur service which appears in the Radio Regulations; therefore, any decisions of WARC affecting amateur bands in general do not apply to 70MHz.

December RAE

The next Radio Amateurs' Examination will take place on Monday 7 December 1981. RSGB examination centres are again being arranged in Derby and London, and candidates wishing to enter at either centre should write for an application form to RSGB HQ, enclosing a stamped addressed envelope. Early application, particularly for the London centre, is advised, and the final date for receipt of completed application forms is Monday 19 October.

Stolen equipment

On 25/26 June 1981 from a car: TS130S, serial number 1051183, with microphone type MC30. Information to G3UTC or Billericay police.

On 29 June 1981 from a car at Farlington, Portsmouth: IC240, serial number 6702467. Information to G4IQO, tel 0705 376612, or Cocham police, tel 0705 372211.

On 2 July 1981 from a car at Sheffield Sports Stadium: Sommerkamp TS240. Information to G8XSJ or any police station.

Old-timers' telephony and cw event

For the seventh consecutive year RAOTA and the Dutch Old Timers Club have arranged an activity period for the first Monday and Tuesday in October to enable old-timers in both countries to keep in touch. The event will commence on Monday 5 October at 0830gmt and will continue until 1530gmt on 6 October. There will be no full-time co-ordinators, but PA0DK (on 3,600kHz) and PA0PN (on 7MHz) will be available for information; similarly G2PT will be QRV on 3,600 or 7,025kHz. It is hoped that the oldest amateur in Holland (probably in Europe?) PA0JOB, who is 94 years of age, will be taking part. Although the event is arranged specifically for old-timers, anyone wishing to join in will find a welcome.

CB publications

Two publications are now available from HM Stationery Office and its agents; these are: MPT 1320—*Performance Specification—Angle modulated 27MHz radio equipment for use in the Citizens Band Radio Service;* and MPT 1321—*Performance Specification—Angle modulated 934MHz radio equipment for use in the Citizens Band Radio Service.* These booklets each comprise 14 pages in A4 format. The counter price of each is £1.90.

ITU news

A meeting of the CCIR Interim Working Party 5/4, convened to consider possible revision of division of the world for the purpose of improving the allocation of frequency bands, took place in Geneva from 25 to 29 May 1981. The working party was attended by representatives of 16 countries: Algeria, Canada, Cameroun, France, FR of Germany, Netherlands, Iraq, Iran, Ivory Coast, Japan, Kenya, Nigeria, Sweden, UK, USA and USSR. There were also representatives from Study Groups 2 and 8, Intelsat and IARU (R. L. Baldwin, W1RU; M. Glunt, W3OKN; and C. E. Godsmark, G5CO), as well as officials of the general secretariat, CCIR and IFRB—a total of 46 under the chairmanship of I. O. Lediju (Nigeria).

The formulation of the working party was established as a result of Resolution 66 of WARC 1979, and its conclusions were to be circulated to all study groups of the CCIR at the termination of the meeting. In the event, a conclusion was not obtained, and the meeting contented itself with a number of observations.

It was decided that, for the purpose of study, the present division of the world should be ignored and that consideration should be given to the problems of frequency allocation, bearing in mind technical and operational aspects for more efficient and equitable use of the frequency spectrum. The meeting considered problems related principally to maritime mobile, aeronautical mobile, fixed, broadcasting, land mobile, and radiolocation services. The amateur and amateur satellite services were regarded as a world-wide classification for this purpose, which was in line with our wishes.

By the afternoon of the fourth day, a final draft of the working party's report was nearing completion (12 pages and 3 annexes). The observations implied that the creation of an additional region would be unlikely to produce for itself any reduction of equipment or management costs.

The document produced by the working party will be presented at the next plenary meeting of the CCIR, and it now seems that the creation of a fourth ITU region (eg Africa) will be unlikely, despite the pressures exerted at WARC 79. If so, a great many of the problems that would have been encountered concerning frequency allocations will be avoided.

Can you help?

A graduate engineer requires accommodation in the St Albans area from September/October onwards. Anyone who can assist is asked to contact Ian Jefferson, G4IXI, QTHR.

Francois Claeys, F6CEK, who is blind and aged 26, is looking for work as a switchboard operator or receptionist in an hotel. He worked for two years in Brittany, and then studied at the Rider College, New Jersey, USA, for a year. His address is Croissy-sur-Celle, 60120 Breteuil, France.

Calling Rotaract members

The Rotaract Club of Solihull wishes to establish radio contact with the many Rotaract Clubs in the UK and throughout the world. Members of the RSGB who are also in Rotaract are asked to contact Mr D. C. Sargent, G4JYE, 29 Ravenswood Hill, Coleshill, Birmingham B46 1BN.

HF antennas in theory and practice—a philosophical approach

by LOUIS VARNEY, CEng, MIEE, AIL, G5RV*

SINCE the antenna is such a vitally important component of any radio station, careful consideration of all the factors which govern its performance is essential when choosing one which will fulfil, as nearly as practically possible, one's individual requirements. In making a choice the following questions should be asked and the answers selected which are appropriate to one's requirements:

Q1. *What is my main interest in operating my station on the hf bands?*
A1.1. *Primarily dx chasing (including participation in contests) with a secondary interest in local QSOs—ie up to about 1,000km radius, or*
A1.2. *Primarily "local" QSOs (mainly in the 1·8, 3·5 and 7MHz bands) with a secondary interest in dx working.*
Q2. *What garden shape and space is available?*
A2. *A scale drawing with at least approximate indications of the main cardinal points.*
Q3. *What can I afford?*
A3. *If wire antennas are being considered, this is not important. However, if a commercially produced beam antenna (Yagi or quad) is desired this may be a most important factor. Especially if the purchase of a suitable tower and rotator system is contemplated.*

Whatever the answers to the above questions may be, it is important to realize that the predicted performance of any antenna assumes that it is functioning in *free-space above a perfectly conducting ground*. For virtually all amateur purposes it is reasonable to assume that these two criteria are never satisfied. Nevertheless, the *idealized* performance figures and polar diagrams of radiation—in both the azimuthal and zenithal planes—of various types of antennas may be studied in order to understand how any given type performs *in theory*. Indeed, it is useful to do so in order that the basic principles governing the performance of any particular type of antenna may be understood.

Theoretical considerations of antenna polar diagrams

Single-wire antennas

A vast amount of literature dealing with the theory of operation and performance of all types of antennas exists in the standard textbooks, in the many amateur radio magazine articles written on the subject, and in the numerous amateur radio handbooks and antenna handbooks available. While it is outside the scope of the present article to deal in detail with such a wide subject, the author desires to draw attention to some aspects of antenna performance that, it is felt, are often overlooked by many amateurs when they are trying to decide what is the best type of antenna for their requirements within the limits of area and height available.

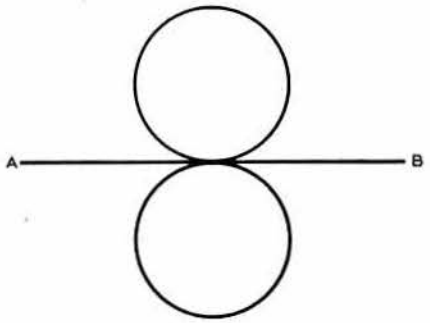

Fig 1. Typical single-plane representation of the polar diagram of a horizontal λ/2 dipole antenna. Line A B represents plane of the antenna

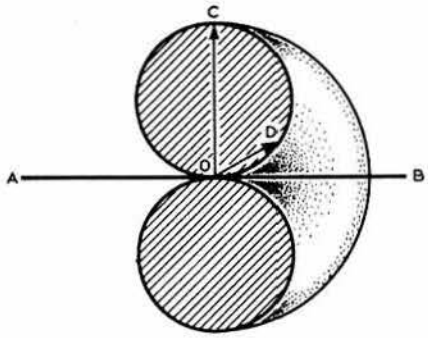

Fig 2. Section through solid polar diagram of a horizontal λ/2 dipole antenna. A B represents plane of the antenna

Polar diagrams—what do they mean? We are all familiar with the horizontal plane polar diagram of a typical horizontal λ/2 antenna (Fig 1) as shown in articles and textbooks. However, it is most important to understand that such a two-dimensional drawing is open to misinterpretation unless it is borne in mind that the radiation pattern is, in fact, *three-dimensional*. The easiest way to do this is to imagine this particular polar diagram to be approximately in the solid form of a doughnut, with the λ/2 horizontal antenna wire passing through the centre of its diameter and perpendicular to it. Fig 2 attempts to show such a "solid" polar diagram in section.

A study of this diagram will dispel a popular misconception that "there is no radiation off the ends of a horizontal λ/2 dipole". If the line A–B represents the antenna wire, then O–C represents the relative amplitude of radiated energy at right angles to the plane of the antenna, and O–D—though of a much smaller amplitude—represents radiation at a quite small angle to the axis of the antenna. In other words, it clearly indicates that *some* radiation takes place virtually "off the ends" of the wire. Now, if one imagines that Fig 2 represents a section through the "doughnut" solid polar diagram in the *vertical* plane, it will be seen that O–D represents radiation off the ends of the antenna *at a very low zenithal angle*. For dx working such low angle radiation is just what is needed and, although this will be of considerably lower amplitude than that taking place at right-angles to the plane of the antenna at a similar zenithal angle, under reasonably good propagation conditions it can be very effective.

This same reasoning and conception of a solid polar diagram equally applies to long-wire antennas embodying a number of out-of-phase half-waves at the operating frequency being considered. The number of "lobes" of radiation produced by such antennas is equal to the number of half-wavelengths of wire comprising the particular antenna. Bearing in mind that, just as in the case of the simple λ/2 antenna, the polar diagram of a long-wire antenna is a solid, three-dimensional figure, it will be evident that, quite apart from the radiation which takes place in the direction of the "main" angle of each lobe of radiation, an appreciable

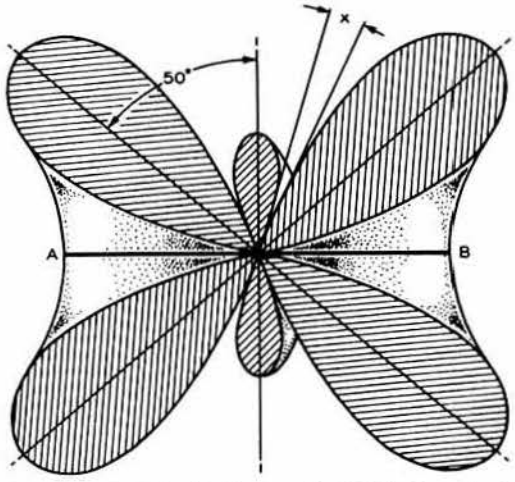

Fig 3. Section through solid polar diagram of a 3λ/2 horizontal antenna. A B represents the plane of the antenna

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amount of low-angle radiation will also take place in line with the axis of the long-wire antenna.

Fig 3 represents a section through the solid polar diagram of a 3λ/2 long-wire antenna. It will be seen that around the centre of the antenna there is a radiation pattern in the form of a "flattened doughnut" while the other two lobes are in the form of hollow "rounded" cones. The angle between a line drawn through the "doughnut" at an angle of 90° to the plane of the antenna wire and a line drawn from the centre of the antenna along the major chord of each of these cones is approximately 50°, and the angle between the plane of the antenna and the major chord of a major lobe is therefore about 40°.

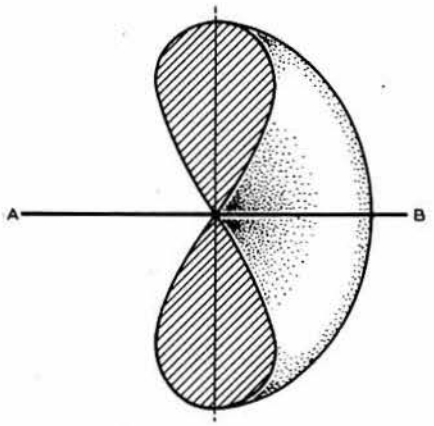


Fig 4. Section through solid polar diagram of a two λ/2 in-phase horizontal antenna. A B represents plane of antenna.

It is important to note that, as distinct from the radiation pattern of a λ/2 antenna where most of the energy is radiated at high zenithal angles, the greater part of the radiated energy from a long-wire antenna takes place at much lower angles. This means, of course, that such long-wire antennas are more effective than a λ/2 antenna for dx working where a zenithal angle of radiation of something between 5° and 15° is desirable.

In the case of a horizontal antenna comprising two or more half-waves fed *in phase*, a multiple lobe pattern is not formed but the typical λ/2 "doughnut" radiation pattern is considerably sharpened so that, for example, the pattern of two half-waves fed in phase will approximate in shape to the "flattened doughnut" shown in Fig 4 about the centre of the antenna, and all the energy supplied to the antenna will now be concentrated in the "doughnut". For illustrations of the theoretical radiation patterns (both in the horizontal and vertical planes) of hf antennas, including information on the gain of long-wire antennas up to, say, five wavelengths long, the reader is referred to the *Radio Communication Handbook*, 5th edition, Vol 2, Chapter 12, and the ARRL *Antenna Handbook*.

It should be noted that, for a given amount of energy fed to the antenna, whereas a dipole "doughnut" radiation pattern distributes this energy in a virtually "all-round" or quasi omni-directional form, the pattern of a 3λ/2 long-wire antenna has four quite sharp nulls, approximately indicated in Fig 3 by the sample null angle "x". The energy that would have been used to fill these nulls, had the radiation pattern been that of a λ/2 dipole, now forms part of the energy contained in the major lobes. This results in some gain over a λ/2 dipole in the directions of the main angles of radiation of these lobes. However, with a 3λ/2 antenna this gain is only about 1dB per major lobe. It is not until a long-wire is about four to five *wavelengths* long that the gain in the directions of the major chords in the major lobes rises to about 3 or 4dB over a dipole.

Wire and tubular element beams

The theoretical gain and front-to-back ratio of any particular beam antenna may be found in articles and text books on the subject. In general it may be said that, apart from these two features, any form of beam antenna tends to produce its main radiation of energy at considerably lower zenithal angles than a simple single-wire antenna, and this is a considerable advantage for dx working. It is also possible to achieve propagation at low zenithal angles by "stacking" dipoles or beam antennas vertically, one over the other, separated by half a wavelength at the operating frequency and fed in phase. However, except for operation on the 28MHz and perhaps the 21MHz band, the space and mast height required for such an arrangement is out of the question for most of us.

For an explanation of how polar diagrams are constructed and for much other helpful information on the theory of operation of many kinds of antennas, the reader is again referred to *Radio Communication Handbook*, Chapter 12.

Practical considerations

In all the foregoing it has been assumed that any particular antenna under discussion is located in free space above a perfectly conducting earth, and is free from the effects of relatively nearby conducting and reflecting objects such as buildings, trees, metal masts or towers, wire fences etc. In practice, in the typical case of an amateur installation, this ideal situation is never, or hardly ever, possible to attain. We must, therefore, recognize that the actual performance of any type of antenna located in a typical back garden will be more or less different from the theoretical performance according to the local circumstances which affect its operation. However, given a height of at least λ/2 above a ground of average conductivity and a reasonably unobstructed location, the actual performance will be fairly close to its theoretical performance.

Nevertheless, it is unlikely that many amateurs will be able to erect horizontal antennas of any type at λ/2 above ground for any frequency band below 14MHz. This constraint on dx performance on 7MHz may be overcome by using a vertical λ/4 antenna (typically a λ/4 ground plane) at this frequency. Assuming that the base of such a gp antenna is supported at about 3m above ground—so as to accommodate the usual four gp wire radials at a suitable zenithal angle and to provide a feedpoint impedance of between 35 and 50Ω—and with the approximately 10m vertical λ/4 radiator mounted on a 3m mast, the total height of the structure will be about 13m. Although it is true that the total height may be reduced by, say, 2m or so by the use of top capacity loading, it will still represent about the maximum that most amateurs could contemplate. Such a construction scaled up in dimensions for 3·5MHz operation is clearly out of the question for all except a tiny minority.

A practical and effective alternative for these two bands is the vertical multiband trap λ/4 antenna, either mounted with its base at ground level and worked against a really effective earth system, or raised up above ground level to a height sufficient to accommodate a gp system. Alternatively a 20·7m (approximately 68ft) end-fed wire could be used in conjunction with a suitable atu as a λ/2 voltage-fed antenna on the 7MHz band and as a λ/4 current-fed antenna on 3·5MHz. In the latter case the antenna would require an atu in the form of a series-tuned LC circuit connected to a good earth system or counterpoise wire.

For the 1·8MHz band few amateurs can hope to erect anything larger than a λ/4 or λ/2 end-fed wire or a centre-fed 3·5 to 28MHz multiband dipole (either trap type or the G5RV) used with the station end of its feeder (whether balanced open-wire, twin-lead or coaxial) shorted, and worked in conjunction with a good earth system or a counterpoise wire and a suitable series-tuned LC circuit atu. A centre-fed antenna used in this way functions as a "Marconi" or "T" antenna and can be surprisingly effective on 1·8MHz, especially if supported at a height of 12m or more.

Antennas for limited space

Despite the desiderata imposed by theory, it is remarkable what liberties can be taken with the geometry of single-wire antennas while still obtaining a satisfactory performance. Provided that an antenna is supported as high as is practicable above the ground, is located as far from local obstructions (particularly metallic ones) as possible, and is well insulated from its supporting structures, it can be bent or partly folded to suit the space available and yet give surprisingly good results. This is not so, of course, for multiwire beam antennas such as the rhombic or V-beam types, the performance of which depends upon the correct spacing, wire length, and the included angles between the wire elements in order to obtain the correct phase relationships between such wire elements to produce the required beam effect. However, many designs for "compact" or "miniature" beams of Yagi or quad type exist and are capable of providing quite good results.

Where it is possible to use one central supporting mast of reasonable height (say 10m or more) but the length of the space available for the antenna is limited, the inverted-V dipole antenna may be used and is capable of excellent results. Such an antenna may be a simple λ/2 wire, centre-fed, for one band only, or may consist of a trap dipole or a G5RV for multiband operation. Although it is desirable that the included angle between the two halves of an inverted-V dipole antenna at its apex should be about 130° to 140° for optimum performance, such an arrangement only results in a relatively small saving of overall length at ground level required for its installation.

Fig 5 shows, to scale, three arrangements of a 3·5MHz band inverted-V dipole antenna. Antennas "A" and "C" are supported at the centre by a 10m mast, and antenna "B" by a 14m mast. Assuming that the outer ends of each of these dipoles are supported about 3m above ground using a 1m length of nylon rope between each end-insulator and each end-support post, it will be seen that a total garden length of about 37m (120ft) will be

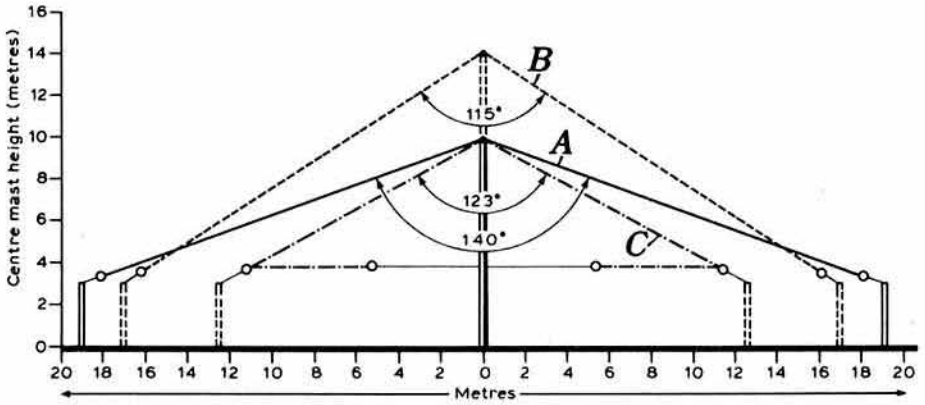


Fig 5. Three possible arrangements of an inverted-V dipole for 3,650kHz. For clarity the centre feeder is not shown

required for antenna "A" but only 34m (112ft) for antenna "B"—if the dipole had been supported at each end by a 10m mast and the same lengths of nylon rope, the masts would have been about 41m (134ft) apart. However, the 14m (46ft) mast of antenna "B" is getting close to the limits of practicality for most amateurs.

It is unfortunate that most of the drawings of inverted-V dipoles appearing in articles or handbooks have not been to scale, so that the mast height requirements have not been readily apparent. However, since most of the useful radiation from a $\lambda/2$ antenna takes place from, approximately, two-thirds of its total length equally disposed about its centre, this means that one-sixth of its physical length at each end may be folded up to save space without noticeable detriment to its radiation efficiency. Antenna "C" in Fig 5 is constructed in this way and, while requiring only a 10m centre mast, permits an included apex angle of 123° and occupies a ground length of only 25m (82ft). On each side of the dipole a length of about 6·5m (21·3ft) is folded in towards the centre support mast and attached to it by suitable lengths of nylon rope.

Similar "liberties" may be taken with dipole or long-wire antennas for the higher frequency bands 7 to 28MHz. In the case of horizontal antennas, up to one-sixth of the antenna length at each end may be folded back or allowed to hang vertically (or at a convenient angle to the horizontal top portion). □

A simple and sensitive field strength meter

by J. M. NOEDING, LA8AK*

IN addition to being a sensitive field strength meter, the device to be described can also be used for (a) unknown frequency tracing, (b) for hf and i.f. amplifier tuning, (c) for balanced modulator carrier suppression adjustments, (d) for spurious tests, (e) as an hf selective voltmeter, and much more. The sensitivity is good, and much better than the passive circuits usually described for such purposes, see Table 1.

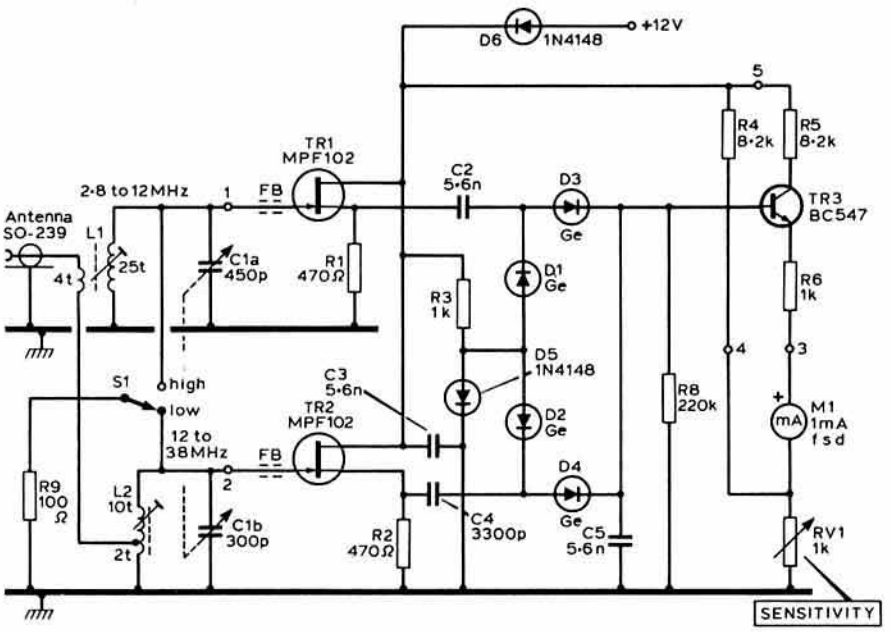


Fig 1. Circuit diagram

Construction

The mechanical construction is shown in Fig 2; the aim being to construct an instrument which would be easy to copy. The transistors and their related components are mounted on a pcb. Most parts can be obtained through "surplus" suppliers, which may mean that larger than usual components may be used.

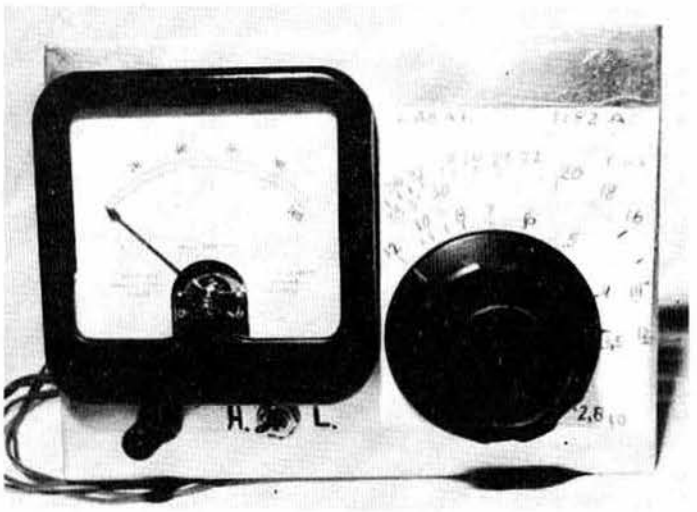
Two selective amplifiers are used, but it is possible to use one and switch between two tuned circuits—a form of construction which the author found easier to use. The amplifiers are almost unique, comprising a rarely-used configuration, which has been described once before in *Technical Topics*. The tuned circuit provides the only voltage gain, and the transistors are used only as a voltage-follower (source follower). Thus the amplifiers are unconditionally stable, and will not cause any problems except at very high LC ratios where the circuit may act as a Colpitts oscillator when the "source" is capacitively loaded.

No input switching is used, as the tuned circuits are fed in series. The opposite tuned circuit to the band in use is damped with a 100Ω resistor, thus eliminating false resonances.

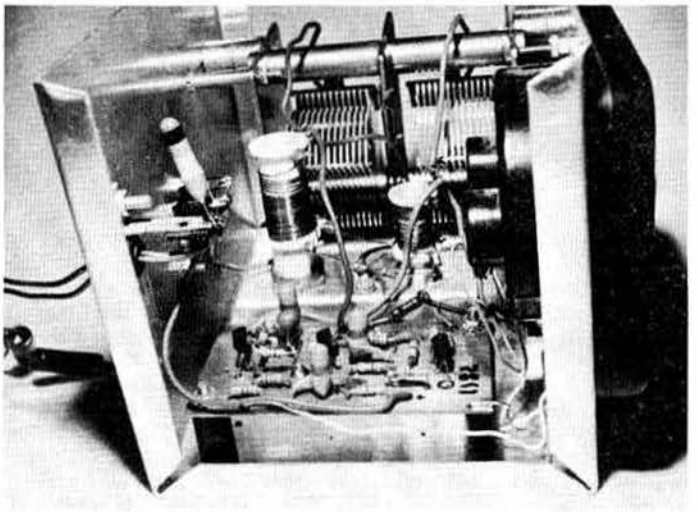
Coils

The constructor may have some difficulty with these, but the easiest method is to wind the coil and then connect a 400pF (250pF) capacitor and "dip" it at 3.5MHz (14MHz). Then remove or add turn's until the required frequency can be adjusted by the slug. Count the turns and make a tapping at approximately 15–20 per cent.

*Voielien 39 B, 4620 Vagsbygd, Norway.



Front view



Interior viewed from side

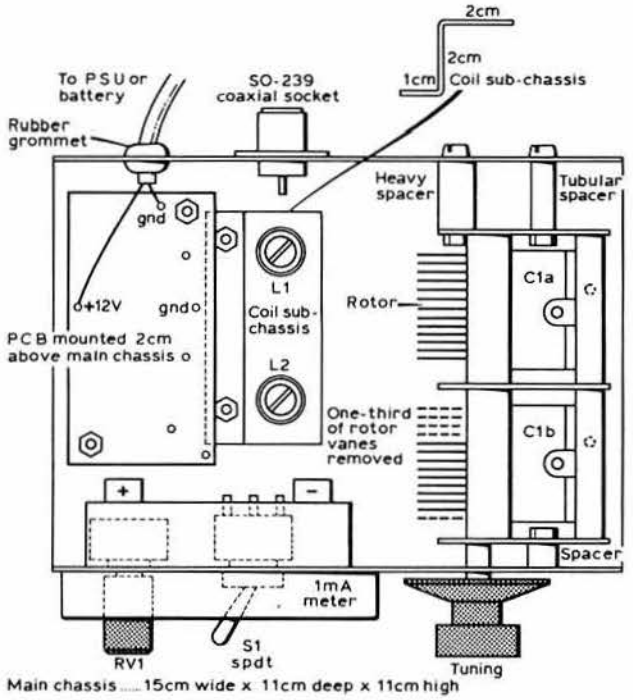


Fig 2. Top view of layout

Components

No critical components are used. The tuning capacitor is an old broadcast type with one-third of the rotor plates removed from the high-band section. MPF102s are used for TR1 and TR2. TR3 is a current amplifier which enables the use of a simple instrument, 1mA fsd. Except D5 and D6, which are 1N4148 types, the rectifying diodes are germanium type, CV7127, 1N34B, OA85, OA95 or similar general purpose devices.

The instrument used has 100Ω series resistance, but if higher resistance types are used, R6 should be reduced by that amount. R5 is used to protect the instrument, and D6 to protect against reverse polarity. In some cases the meter has to be fed from a battery, but the author prefers to use an external source because it is a nuisance to have "dead" batteries in several units.

The meter is housed in an 11 by 11 by 15cm box made from 1mm aluminium plate. The coils are mounted on a sub-chassis with the slugs clear of the main chassis, but in such a way that they can be tuned from below through holes.

Table 1: Sensitivity checks for 1182A field strength meter

	LOW BAND				HIGH BAND		
Freq (MHz)	FSD (mV)	10% (mV)	Min defl (mV)	Freq (MHz)	FSD (mV)	10% (mV)	Min defl (mV)
2·8	75	11		10	85	13	5·5
3·5	75	11	4·5	12	82	11	
4	68	10		14	72	10	4
5	61	9		16	65	8·5	
6	58	8		18	62	8·0	
7	55	8	3·5	20	62	8·0	4
8	54	8		21	58	7·5	
9	53	8		22	58	7·5	
10	53	8	3	24	55	7	
11	52	7·5		26	55	7	
12	50	7·5		28	52	6·5	
				30	54	7	3
				34	55	7	
				39	55	7	4

These measurements will only be approximate, because the input impedance for the instrument has not been checked. A Wavetek 3004 signal generator was used (50Ω output impedance). Three measures are shown: fsd, 10 per cent deflection (maximum sensitivity), and minimum signal for deflection.

Minimum deflection was used for *the lowest detectable level,* and the meter was set to six per cent deflection.

Minimum sensitivity for fsd is a signal greater than 1V rms. Larger signal levels should not be applied, because the transistors may cause load change to the tuned circuits, and the so called "Miller effect" can cause detuning.

Important: Never apply a transmitter output terminal to this instrument without an attenuator in between.

Although the primary intention was to make an instrument to cover 3·5 to 30MHz; in practice it will cover 2·8 to 39MHz, and this is useful for tracing crystal oscillators and lo outside the amateur bands. 1·8MHz coverage was not required, but it may be possible to cover this band using plug-in coils. The low-band coil cannot be used on 1·8MHz because it will need a parallel capacitance of 1,500, 2,000pF. □

BOOK REVIEW

Amateur Radio by Gordon Stokes, G4HWD, and Peter Bubb, G3UWJ. First published 1981 by Lutterworth Press in their "Practical Handbook Series". 192 pages (220×140mm), 85 illustrations. Price £8.95 (hard covers).

This is a very readable, if rather high priced, introduction to the elementary theory needed as a first step towards preparing for the RAE, plus some general information about the operating aspects of the hobby. So far so good, but unfortunately when it comes to the basics of antennas, transmission lines etc, the technical standard falls well below what a newcomer has the right to expect. Some of the short chapters are minefields of misinformation; yet the newcomers for whom the book is intended are unlikely to be able to separate fact from fiction. So, while some of the over-simplifications (and even some of the errors) may help the reader to scrape through his RAE, they may then take years of unlearning. *G3VA*

VHF cw add-on for ssb or fm

by C. NEIL BAUERS, G4JUV*

MANY state-of-the-art black boxes available for vhf use are not well equipped for cw, and this unit overcomes many of the shortcomings of commercial equipment. The circuitry includes vox (or should it be key operated switch?) which earths the push-to-talk line on the transceiver. There is a sidetone, often missing on vhf equipment, which can be used to generate A1 by feeding audio into the microphone input of a sideband rig not equipped for cw. The sidetone can also be used for F2 or even A2. The station microphone is also plugged into the unit, and at the flick of a switch normal push-to-talk working is possible. Facilities are also included for manual transmit/receive switching. The unit has been designed with various black boxes in mind, and switches and sockets are included to enable differing configurations to be accommodated.

Circuit description and theory

The circuit consists of a 741 op-amp Schmidt trigger which generates the vox delay, followed by a transistor used to earth the push-to-talk line. The audio is generated in a multivibrator producing square waves, followed by a low-pass filter giving clean sine waves. The sidetone volume can be increased by reducing the value of R1. The filter inductance should have a value of 5H approximately, but this is not critical. The signal is attenuated before being fed to the microphone input. On sideband equipment the rf level depends linearly on the audio level. Since a sine wave audio input gives a single frequency sine wave rf output, true cw is produced, and the equipment's power can be varied over a wide range by varying the audio input. Care should be taken not to overdrive the set, as poor keying could result. A reading on the rf output meter of something less than the maximum reading on phone should be suitable, and will ensure that the pa is not cooked.

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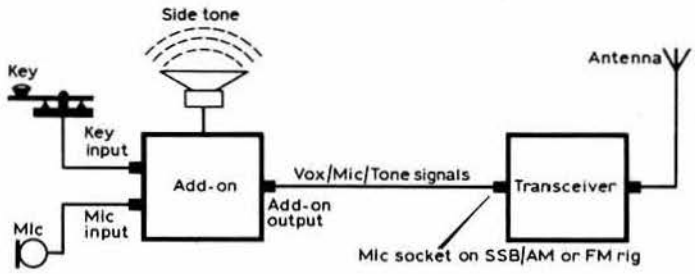

Fig 2. Block diagram for use with equipment without cw keying facility

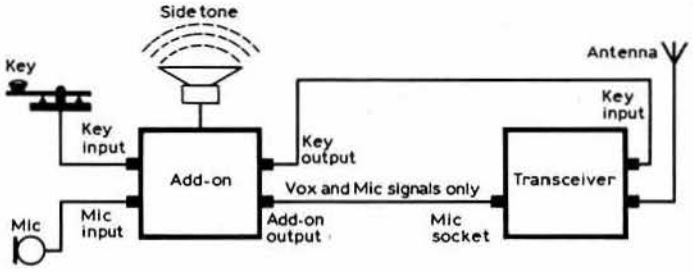

Fig 3. Block diagram for use with equipment with separate key input for cw but without convenient transmit/receive switching on cw

Since keying the oscillator produces dc jumps, a circuit has been included to eliminate these. TR4 and RV1 hold the dc level constant on the low-pass filter whether the key is up or down, so only the audio is keyed. RV1 should be adjusted to give the same dc voltage at "A" (Fig 1) under key up and key down conditions; the dc power supply should be fairly stable to ensure that this works well. RV3 and RV4 are set to give a comfortable sidetone frequency, and to give a voltage at "A" equal to about half the supply voltage when the key is down. This gives an equal mark:space ratio output from the square-wave generator.

Many sideband rigs have a key input for cw but the microphone push-to-talk has to be pressed to transmit, eg the 7010. On this type the vox can be derived from the add-on unit via the microphone input, and the rig is

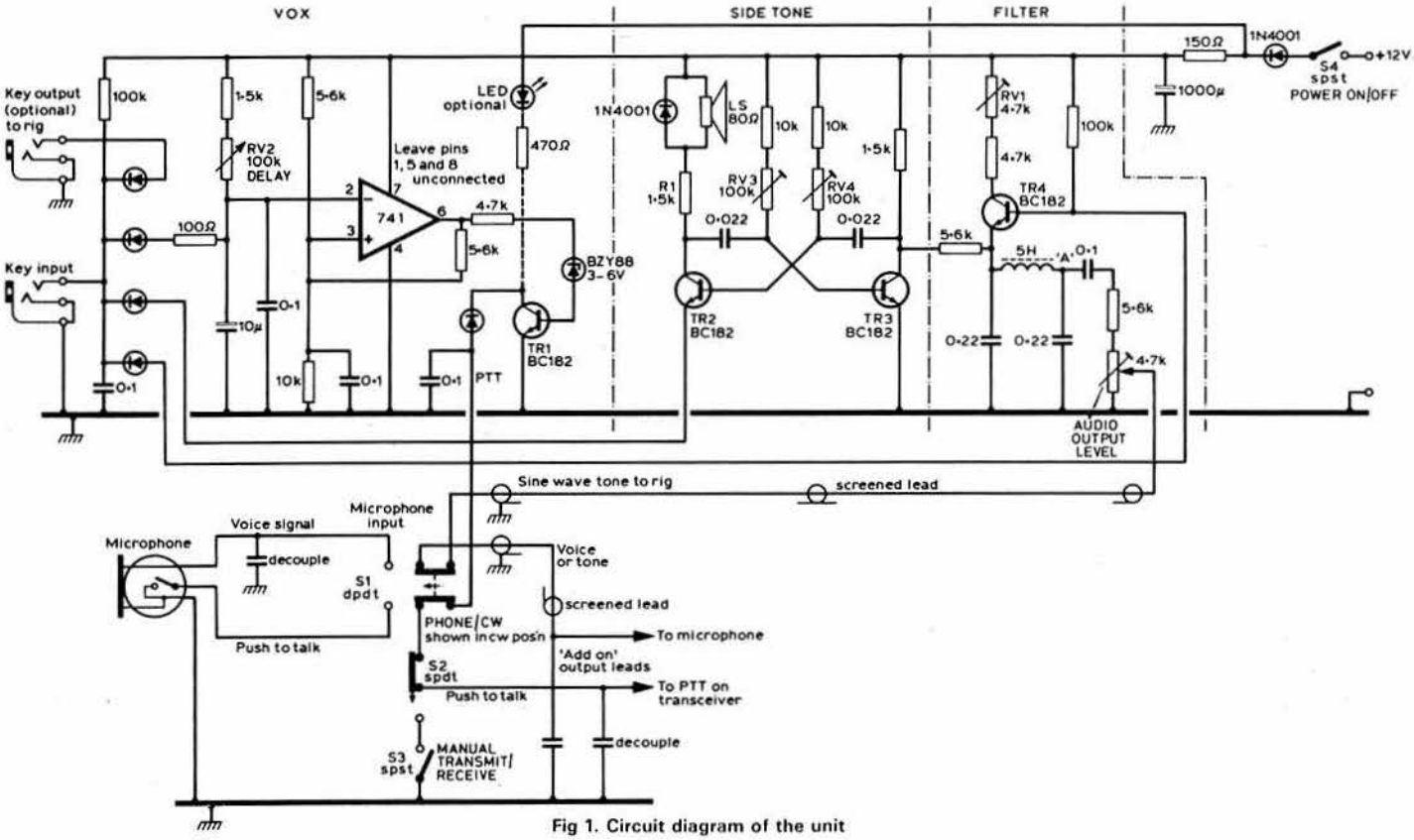

Fig 1. Circuit diagram of the unit

Components list

Resistors (all 0·25W)
One off – 100Ω, 150Ω, 470Ω, 100kΩ pot
Two off – 4·7kΩ, 100kΩ, 4·7kΩ trimmers, 100kΩ trimmers
Three off – 1·5kΩ, 10kΩ
Four off – 5·6kΩ

Diodes
One off – LED (optional)
One off – BZY88 zener between 3V and 6V
Two off – 1A rectifier, eg IN4001
Five off – Si, any type

Capacitors
One off – 10μF, 1,000μF
Two off – 0·022μF, 0·22μF
Five off – 0·1μF

Miscellaneous
Op-amp – 741
Four off – BC182 (any Si npn transistor should work)
Inductance – 5H
Speaker – 80Ω

Switches
One off – DPDT, SPDT
Two off – SPST

keyed from the key input. This takes advantage of the keying circuits and should give optimal performance. If this is the only type of equipment being used, the circuitry from the filter onwards is unnecessary.

S1 connects the microphone or key input to the unit, while S2 disconnects the vox facility and thus enables transmit/receive to be controlled from S3.

The unit is thoroughly decoupled from audio on the dc supply because some rigs contain an inverter supply system, which could cause unpleasant effects while the key is up. Earth current loops should be avoided for the same reason.

Construction and use

The circuit layout is not critical, the author's unit being constructed on matrix board. The delay control is mounted for easy adjustment outside the box. Diodes are liberally placed around the circuit to ensure that dc voltages are not applied to the inputs of expensive equipment. The microphone leads should be screened and decoupled at the sockets to prevent rf feedback on phone. The only problem encountered in use is due to a delay on some equipment between earthing the push-to-talk line and the audio or keying circuits becoming active. To get round this it is necessary to send a "dit" to turn on the rig before sending the actual message. The unit consumes about 12mA or rather more if the LED, which indicates that the unit is in the transmit mode, is included. Finally it should be noted that this unit can be used with any equipment lacking a sidetone and/or morse key input, on any band, including the hf bands. □

Amtor—a progress report

by PETER MARTINEZ, G3PLX*

THE word Amtor first appeared in *Rad Com* in August 1979, where the author described a system for transmitting radioteleprinter signals so as to eliminate most of the errors caused by fading and interference. In *Rad Com* June/July 1980 he also described the design of an easily built unit which will allow any rtty-equipped amateur to operate on this mode.

Although the name Amtor was the author's own idea, the system itself was not, being already an international standard, used for telex communication with ships at sea. Since the first amateur experiments on this mode on 144MHz, activity has expanded steadily, to hf bands, and to other countries. At the end of June 1981, some 40 amateurs in 10 different countries were known to be active. In some countries the licence regulations either already permitted this mode, as in Australia, or have been changed to do so, as in the UK and West Germany. In others, such as Denmark, USA and Holland, permission to operate has been given to individual amateurs. In the remainder, suffice it to say that stations are active! Most of the activity is taking place in the rtty sections of the bands, particularly on 3·5 and 14MHz, with some 144MHz activity in the UK.

Amtor actually consists of two distinct transmission modes, known as mode A and mode B. In mode B, a continuous transmission of frequency-shift data contains enough redundancy for any receiving station to print an error-free copy even if there are patches of fading or interference. In mode A, two stations work in quick-break fashion, and a mutilated signal received at one station automatically triggers a request for a repeat from the other. Even a prolonged period of no-signal does not cause any errors in the copy, only a pause in the message until the signal returns. Most of the Amtor activity takes place on this mode, where the spectacular improvement over conventional rtty is resulting in some new operating techniques and some new uses for hf rtty itself. For example, signal reports are seldom exchanged, since each operator can tell for himself how well his signal is being received by the number of repeat requests he gets from the other. There is no need to repeat vital words, like callsigns or names, as is usually done on other modes. Indeed, if conditions are poor, it pays to abbreviate in order to mitigate the slowing-down effect of frequent repeats. Another technique in use on 14MHz is that of monitoring an agreed "calling frequency" while one is in the shack. The Amtor unit can be set to respond to a general or directed call instantly, thus eliminating long time-wasting calls to see if a particular station, or any station, is workable. This brings all the convenience of a local vhf calling channel to worldwide rtty, without unwanted copy from the noises which are inevitable on hf bands.

Another activity previously confined to local vhf contacts is that of exchanging computer programs over the air. It is not difficult to translate computer programs into Murray code for transmission over Amtor, and back again at the other end. Even Amtor software itself has been transmitted in this way, both in assembly language and machine-code forms, with residual errors typically 1 in 10,000.

One problem with Amtor mode A, which remained a theoretical one until recently, was the limit on maximum distance workable due to the propagation delay time. However, this area was first explored in March 1981 when G3RSP/MM sailed to Australian waters. From the UK it is possible to work to this part of the world both in the early morning, known as the long path, and also in the early evening, known as the short path. It was soon discovered that these names are very apt, as contact was only possible on mode A via the short path. The total there-and-back propagation delay time was measured by using the Amtor system like a radar transponder. It was found that it was 135ms on shortpath and 162ms on longpath. Although mode A is theoretically capable of working up to 170ms, allowance has to be made for inevitable delays through filters in the equipment, and also for the time taken for equipment to change from receive to transmit, and vice versa. All these reduce the maximum range achievable. While it was a disappointment not to be able to work mode A to Australia on long path, no such problem exists with mode B, and most contacts with Australian stations are now made this way.

The question of transmit-receive changeover time does worry prospective Amtor operators. It is true that some transceivers have caused difficulties on mode A, but cures have been found in all cases. It is not so much the relays (except maybe in the big linears) but the use of unnecessarily large coupling or decoupling capacitors in some circuits, such as microphone amplifiers and agc circuits. The cure is usually simple once the problem has been located. Perhaps designers of future transceivers may bear this in mind.

Since the design of the Amtor kit described in *Rad Com* June 1980, some new programming tricks have come to light, new types of ics have become cheaply available, and some in the original design are becoming obsolete. There has been a small addition to the CCIR specification on which Amtor is based, and existing users of Amtor have also suggested additions and improvements. All these factors have been brought together in the Mk2 Amtor kit design. It should be stressed that full compatibility exists between Mk1 and Mk2 designs in their on-air performance. The only additional function in the Mk2 is the facility for one station to close down the contact (if the other station is also a Mk2) in an orderly fashion, eliminating the "time-out" or resynchronization attempt that can occur at one station if the other just switches off. The Mk2 has a combined mode A/B standby facility, so that calls in either mode can be received without switching, and there are other minor software changes to speed the response to a call, and cure some bugs found in the Mk1 program. On the hardware side, the number of components has been significantly reduced, and the unit now only requires a single +5V supply. The buffer store has been increased from 255 to 1,023 characters, and the drive capability of the outputs has been increased. The l.e.d. display has been expanded, and an internal preset has been added to adjust the receive-to-transmit delay, to allow the user to get the best compromise between maximum range and practical transceiver performance. A kit of parts for the pcb assembly, similar to that for the original unit, is again being offered by GPW Electronics Ltd, whose advertisement can be found elsewhere in this issue.

The author hopes this short article has shown that Amtor is out of the experimental phase, and can now take its place among the techniques available to the modern radio amateur. □

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Orbital predictions for UOSAT

by P. T. GREED, G3MQD*

THE following "look-up" table for UOSAT is based on the orbital parameters:

orbital period	98 min;
angle of inclination	97·5°;
+ track separation	+24·505°W

(+ including correction for the rotation and orbit of the earth and the precession of the satellite's orbits)

Column 1. Longitude of the ascending node.
Column 2. Time for acquisition of signal (aos).
Column 3. Time for loss of signal (los).
Column 4. Beam heading at aos.
Column 5. Beam heading at los.
Column 6. Max elevation (ie altitude) at time of closest approach (tca).
Column 7. Compass sector at tca.

Time is given in minutes after ascending node.
Azimuth is based on a ground station at 51·5°N, 0°W.
Beam headings are true bearings.

Long W	Time aos	Time los	Bearing aos	Bearing los	Elevation	Sector
000	7	20	194	338	31	W
002	8	20	198	337	26	W
004	8	20	203	337	22	W
006	8	20	207	336	19	W
008	8	19	211	330	16	W
010	8	19	215	329	14	W
012	9	19	224	328	12	W
014	9	19	228	327	10	W
016	9	19	231	327	8	W
018	10	18	241	319	6	W
020	10	18	244	319	5	WNW
022	11	18	254	318	Horizon	
024	11	17	256	310	Horizon	
026	12	17	266	310	Horizon	
028	13	16	276	302	Horizon	
			Out of range			
140	33	36	58	84	Horizon	
142	32	37	50	94	Horizon	
144	32	38	50	104	Horizon	
146	31	38	42	106	Horizon	
148	31	39	41	117	Horizon	
150	31	39	41	120	6	E
152	30	40	33	130	8	E
154	30	40	33	133	10	E
156	30	40	32	137	12	E
158	30	41	31	146	14	E
160	30	41	30	150	17	E
162	29	41	24	154	20	E
164	29	41	23	158	23	E
166	29	41	23	162	27	E
168	29	41	21	167	31	E
170	29	41	20	171	36	E
172	29	41	19	176	43	E
174	29	41	18	180	51	E
176	29	41	17	185	61	E
178	28	41	14	189	72	ESE
180	28	41	13	194	84	S
182	28	41	12	198	82	W
184	28	41	11	202	70	W
186	28	41	10	207	59	WNW
188	28	41	9	211	50	WNW
190	28	41	8	214	43	WNW
192	28	40	7	220	37	WNW
194	28	40	6	224	32	WNW
196	28	40	4	228	28	WNW
198	28	40	3	231	24	WNW
200	28	39	2	238	21	WNW
202	28	39	1	241	18	WNW
204	28	39	359	244	16	NW
206	28	38	358	252	14	NW
208	28	38	357	254	12	NW
210	28	38	355	256	10	NW
212	28	37	354	264	9	NW
214	28	37	353	266	8	NW
216	28	36	352	274	7	NW
218	28	36	351	276	5	NW
220	28	35	350	284	Horizon	
222	28	35	348	285	Horizon	
224	28	34	347	293	Horizon	
226	28	33	346	302	Horizon	
228	28	33	345	302	Horizon	
230	29	32	336	310	Horizon	
			Out of range			
298	17	20	50	24	Horizon	
300	16	21	58	15	Horizon	
302	16	21	58	14	Horizon	
304	15	21	67	13	Horizon	
306	14	21	75	11	Horizon	
308	14	21	76	10	Horizon	
310	13	21	84	9	5	NE
312	13	21	86	8	7	NE
314	12	21	94	7	8	NE
316	12	21	96	6	9	NE
318	11	21	104	4	11	NE
320	11	21	106	3	12	NE
322	11	21	109	2	14	NE
324	10	21	116	1	16	ENE
326	10	21	119	359	18	ENE
328	10	21	122	358	21	ENE
330	9	21	130	357	24	ENE
332	9	21	133	356	28	ENE
334	9	21	136	354	32	ENE
336	9	21	140	353	37	ENE
338	8	21	146	352	44	ENE
340	8	21	150	351	51	ENE
342	8	21	154	350	60	ENE
344	8	21	158	349	71	ENE
346	8	21	162	346	84	ENE
348	8	21	167	347	83	W
350	8	21	171	346	70	W
352	8	20	176	343	59	W
354	8	20	181	342	50	W
356	8	20	185	341	42	W
358	8	20	190	340	36	W
360	8	20	194	338	31	W

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OSCAR NEWS

At a recent meeting of the European Space Agency attended by Dr Karl Meinzer, DJ4ZC, it was confirmed that the Phase 3B satellite will be launched by the Ariane rocket which will also carry the European communication satellite ECS1. At the present time the launch date has not been fixed but lies between June and October 1982.

For the launch, the satellites will be mounted one above the other on the upper section of the rocket. The Phase 3B satellite will be placed on a Sylda (Systeme de Lancement Double Ariane) support with the ECS1 satellite below it.

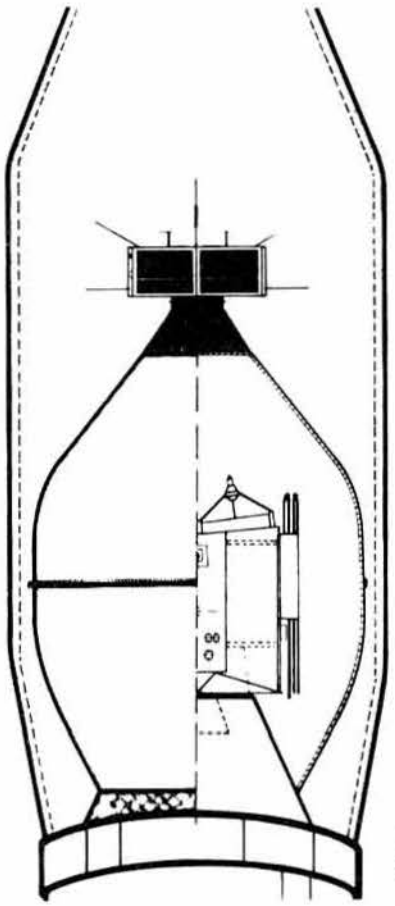
In contrast to the ill-fated Phase 3A, the 3B satellite will have solar cells by AEG-Telefunken. The apogee kick motor is a liquid fuel booster made in Germany by Messerschmitt-Bolkow-Blohm (MBB).

Ariane test flight LO3

The successful launch of Ariane LO3 on 19 June 1981 opened up a new era for European space research when, for the first time, an ESA satellite was put into orbit by an ESA launcher. Less than 17min after lift-off from the launch site in French Guiana, the launcher injected into orbit the two satellites it was carrying: Meteosat-2, the second European meteorological satellite, and APPLE, the Indian experimental telecommunications satellite.

On 20 June, the apogee boost motor of Meteosat-2 injected the spacecraft into geosynchronous orbit at a distance of about 36,000km from the earth, from where it drifted to its operational position of 0° longitude on 19 July 1981. On 21 June, the APPLE apogee boost motor was fired while the satellite was above Africa at 2°E, from where it drifted above the Indian Ocean towards its operational position of 102°E.

The satellites are controlled from two separate centres—the European Space Operations Centre (ESOC) in Darmstadt, Germany, and the Indian



The liquid fuel booster (*Photo:* W. Gladisch)

Mounting system for the Phase 3B (top) and ECS1 (cut-away) satellites on the upper section of the Ariane rocket

Space Research Organisation's Centre at Shar in India—both using for the first time, in a time sharing mode, the same worldwide network set up by ESA. The successful use of these ground facilities by two different payload authorities opens the way for the full exploitation of Ariane's dual launch capability.

The fourth and last Ariane test flight, which will carry the first of the European Maritime Communication satellites (MARECS-A), is scheduled for November this year.

NEW PRODUCTS

Davtrend transceiver power supplies

A range of 13·5V power supplies with 4, 6, 12 and 24A output capability has been introduced by Davtrend Ltd. Featuring foldback current limiting, crowbar overvoltage protection (even into an inductive load), thermal overload protection and better than one per cent regulation, the power supplies are short-circuit proof and ideal for transceiver use. Prices range from £27.95 for the 4A version to £92 for the top-of-the-range 24A variant.

Further information from Davtrend Ltd, 89 Kimbolton Road, Portsmouth, Hants. Tel (0705) 816237.

Multicore coiled leads

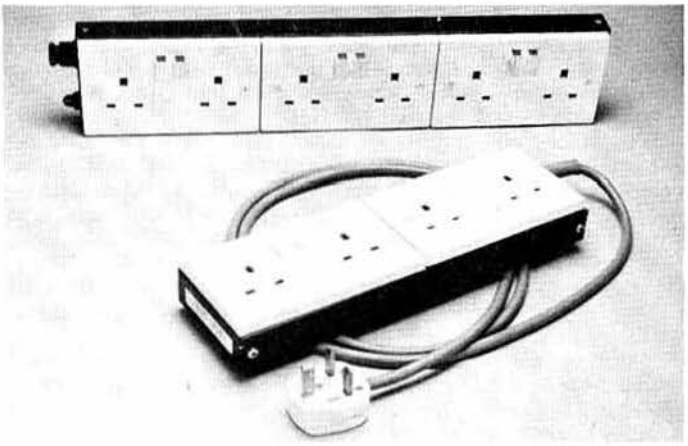
Kalestead announce the availability of a service for the production of multicore coiled leads to meet individual customer requirements. Typical applications include handset leads for communications equipment.

These miniature, multicore coiled leads may be produced with up to 12 individual pvc-insulated copper conductors, the complete assembly being pvc-sheathed to produce a finished cable assembly of from 3·9 to 6·4mm overall diameter. At rest, standard lengths of the finished assembly range from 250 to 1,000mm. Any combination of conductor sizes and types can be assembled, including screened leads and tinsel conductors, and special cable assemblies in either straight or coiled forms can be undertaken. The service offered by Kalestead therefore caters for most general and non-standard requirements for durable, high-performance flexible-cable assemblies.

Further information from Kalestead Kables Ltd, Gransmore Green, Felsted, Dunmow, Essex. Tel (0371) 820006.

Multisocket units

Lab-Aids Limited of Warwick announce a brand new range of elegant slim-line 13A mains multisockets which are all individually switched and comply fully with BS1363. It is believed that these new models are the most compact and unobtrusive switched multisocket units in the UK which conform to British Standards. The high-quality switched sockets are white and embody the latest safety shuttering. The housing is covered with hard-wearing dark-blue leather-grain pvc. Every component is earth bonded for safety through not less than two independent paths and there is a red "mains on" warning lamp. Models are available with four or six sockets, and may be with flexible cable and plug ready-fitted for instant portable use, or without cable for permanent fixing to walls or benches.



Lab-Aids multisocket units

Further information from Lab-Aids Ltd, New Lodge, Ashorne, Warwick CV33 9QN. Tel 092-685 209.

DBM for the FT101

This double-balanced mixer unit is believed to be the first commercial item released using the new Plessey professional double-balanced ic which is stated by Plessey to have a performance similar to that of a diode ring mixer, and certainly improves the FT101. It is priced £11.50, incl VAT, and is extremely simple to fit, being suitable for all the old series of FT101 except for the original Mk1 version (ie for all FT101s that have "160" marked on the front panel).

The microphone matching kit is for the benefit of owners of the Shure 444 microphone who wish to use it with the FT101Z or ZD. The kit includes a matching transformer, plug, capacitors, and full instructions to re-wire the microphone to match the new series, and incorporates switched equalization to improve results when the processor is in circuit.

The double-balanced mixer costs £12, incl VAT, post paid, and the microphone equalization kit £3.99, incl VAT, post paid. Further information from Holdings, Mincing Lane, Darwen Street, Blackburn BB2 2AF. Tel 59595.

Global HP4A tvi filter

This unit is a high-pass design suitable for all UK tv areas. The filter is of a more advanced design than earlier models and provides an extremely high rejection of interfering signals from dc to 180MHz. There is no noticeable degrading of tv picture quality, yet any unwanted signals are totally rejected. Isolation is also provided on the tv coaxial braiding which is a common source of interference, and something that many filters do not adequately protect. It is attractively bubble-packed complete with instructions, and will be available in retail stores throughout the UK. The typical selling price will be £5.95, incl VAT. Further information from Waters & Stanton Electronics, Warren House, 18–20 Main Road, Hockley, Essex. Tel (0702) 206835. □

TECHNICAL TOPICS

Pat Hawker, G3VA

UNTIL 1946 no "amateur" licences were issued in the UK; all licences up to and including those of 1939 were specifically for the purpose of "conducting experiments in wireless telegraphy", based on the provisions of the original Wireless Telegraphy Act, 1904. This made provision for experimental licences and, during its passage through Parliament, the Postmaster-General stated that no request for such a licence would be refused "unless the refusal has been approved by me personally". (Assurances were also given that licences would never be subject to rent or royalty!)

So, until 1946, there was no RAE, only the morse test (which did not apply to "artificial aerial" licences, the holders of which were prohibited from connecting a real antenna to their transmitters). On the other hand, all applicants were expected to outline the type of *experiments* which they wished to conduct—although conveniently the Post Office seldom enquired later as to their progress.

Nevertheless the "experimental" nature of the licences was taken quite seriously by a significant number of licence holders. As late as 1935, even though by that time most of the features of modern amateur radio were well established, one could still find Bill Scarr, G2WS, introducing, in the old *T & R Bulletin* a series of articles on "The technique of experimental work" as follows:

"Experimental work of any kind is conducted with the object of finding out new facts, propounding new theories, and collecting data and evidence which may be of use and application in the future.

"The General Post Office gives radiating permits to amateur transmitters on the understanding that they shall all carry out useful work of this type, and it is therefore the duty of every licence-holder to apply himself seriously to useful experimental research.

"Unfortunately, some amateurs are too lethargic to fulfil their obligations in this respect, others fail to appreciate the terms of their licence and use it merely to amuse themselves and their friends, while a considerable proportion are anxious to do useful experimental work but do not know how to proceed . . ."

While such sentiments may today raise a few smiles, there was certainly in the 'thirties a genuine aura of earnest endeavour about the hobby, and a glance through the old columns of the *Bull* shows experimentally minded amateurs well in the forefront of communications technology, taking up and exploiting new techniques often in advance of the "professionals". Crystal control, crystal-gate filters (Lamb of ARRL adapting Dr Robinson's stenode ideas), pi-matching networks (Art Collins, W0CXX, and his "universal" couplers), the early use of pentode and beam-tetrode rf power valves, rotating close-spaced beam arrays—and of course the development of the general-purpose hf superhet communications receiver which emerged during 1931-6 with such designs as the Comet Pro, FB7XA and the HRO, all produced specifically for amateur radio.

Receivers conference

Today, amateur radio has to a considerable degree moved away from being part do-it-yourself, part an adjunct of the professional communications industry, and has become virtually a small segment of the vast consumer-electronics industry. The British communications industry has also changed, concentrating more and more on defence systems and private mobile radio (pmr). By the beginning of this year there were 16,917 pmr licences in the UK. That may not sound a large number but they covered: 20,616 base stations; 230,857 cars etc; 7,077 ships. 56,565 handportables; and 3,912 transporters—a total of 297,911 two-way radio users (all clamouring for a larger share of the radio spectrum!).

There is what I believe to be a fundamental difference between, on the one hand, the design objectives for defence, pmr, cb and consumer electronics, and on the other hand those for amateur radio as I understand the hobby: the major objective of the first group is to provide equipment *that can be used by anyone,* with a minimum of training or skill, seeking to eliminate the need for operating skills and experience; whereas, in amateur radio, the human in the control loop is of the essence of the hobby. The amateur should still be an "experimenter" and an "operator" in no matter how modest a way: let the others be the appliance users!

The challenge of hf, vhf and microwaves to amateurs is to find out and learn the tricks that give longer ranges or better performance with relatively simple equipment, with both operating and technical skills brought into play. *We* accept the need for knobs if by that means we can get optimum performance; *they* prefer push-buttons, or better still when microprocessor controlled.

Nevertheless there continues to be a useful exchange of ideas, techniques etc between the professionals and the amateurs; by no means a one-way traffic. Then again many of the professional communications designers in their spare time wear an amateur radio hat.

This was very evident at the recent Clerk Maxwell Commemorative Conference on Radio Receivers and Associated Systems at Leeds University, organized by IERE but with the RSGB as one of the sponsoring organizations. Although I was able to spend only a few hours at the conference (to give a paper reflecting a number of the views and ideas expounded in *TT* in the last few years) there were a number of amateurs among the delegates and many items of interest to be found in the conference book (*IERE Conference Proceedings No 50*).

It is interesting to note that although several years of intensive development work have gone into new designs to permit the use of ssb (with pilot) for the pmr services, and this would use 5kHz channelling at uhf/vhf instead of the existing 25/12·5kHz channels, there seem to be few signs of the new designs going into production. Several of the papers at Leeds were concerned with the ssb work, including the use of simple crystal ladder filters to recover the pilot. By comparison, one of the amateur microwave papers (Gannaway, Walters and Suckling) was on the practical results achieved using narrowband ssb at *10GHz* (another was on the use of low-noise gasfets at the relatively low frequency of 432MHz).

"Third method" d-c transceiver

Phasing methods of synchronous detection that eliminate, or at least reduce, the "audio image" and permit effective reception of double-sideband signals (with or without carrier) have always been seen as the ultimate form of direct-conversion receivers, though generally have not found much favour in amateur radio because of the complexity. However, it has been noted on several occasions that *any* of the phasing methods of ssb generation, including the two-phase system, the polyphase system and the Weaver "third method", can be used in the reverse direction to provide so-called ssb demodulation. The suggestion of using polyphase networks or "third method" techniques for d-c receivers has been made on several occasions in *TT,* and there has been considerable work at Swansea University on the development of broadcast receivers using polyphase demodulators.

At the receivers conference, details were given of a new military ssb/cw 20W p.e.p. manpack transceiver ("Callpack" developed by MEL/Philips). This uses the "third method" both for ssb generation and demodulation and for forming a high-performance direct-conversion receiver: Fig 1. In effect this manpack is in many ways comparable with the established Clansman equipments used by British Forces but at lower cost. As now seems obligatory (though not something to be recommended for amateur versions) it uses a frequency-synthesizer with keypad microprocessor control, though there is no reason why a stable vfo should not be substituted, or possibly a limited-range vxo, or fixed channel co.

Readers with long memories may recall that in 1974-6 a good deal of space in *TT* was devoted to low-cost ssb exciters based on "third method" techniques combined with simple digital phase shifting to provide the necessary 90° phase shifts. In particular, Joe Cropper, G3BY, became a firm advocate of this technique, having found that even with very simple af filters—as originally proposed by a Dutch enthusiast (*TT* October 1974, p689, Fig 3)—good results could be obtained on 1·8 and 3·5MHz. The topic led to controversy, with some readers remaining unconvinced that such simple af filters and drift-prone ic devices could be relied upon always to provide an acceptable standard of ssb. Neither side convinced the other, though only quite recently G3BY confirmed that he still finds such simple "third method" entirely satisfactory on the lower frequency bands.

In the conference paper ("An hf packset receiver-transmitter using direct conversion" by W. A. Painter), it is noted that fast switching ecl logic overcomes the phase accuracy problems of the "third method" and a divide-by-four Johnson counter is used; the synthesizer covers the range 6·4 to 120MHz for operation on 1·6 to 30MHz. On receive, this poses the problem that the output is in the form of a square wave with a high harmonic content, which would make the direct-conversion receiver susceptible to a spurious response at the third harmonic of the wanted frequency: this is overcome by providing rf selectivity in the form of eight bandpass filters (for amateur applications a tunable bandpass input circuit would

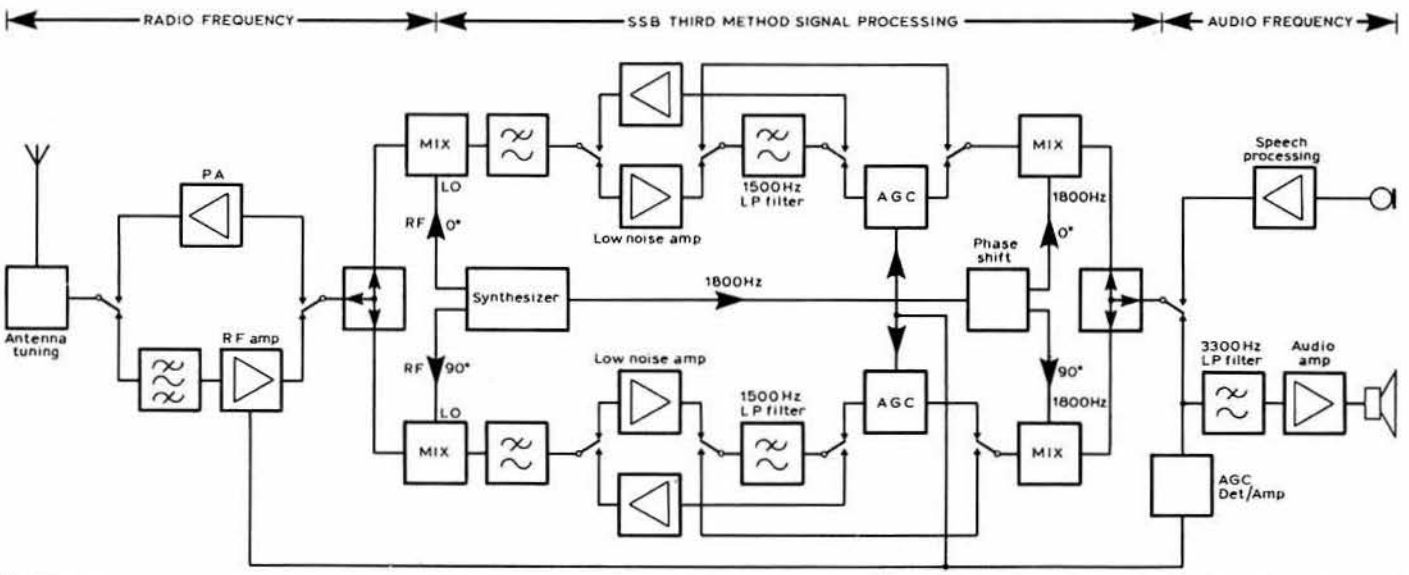


Fig 1. Block diagram of the "Callpac" hf packset using "third method" for ssb generation and for the direct-conversion receiver. Switches shown in receive mode

probably be a better solution). No details are given in the paper of the low-pass 1,500Hz filters.

Despite the basic simplicity, the transceiver performance characteristics are impressive. The synthesizer provides 100Hz step tuning with nine memory channels and a stability of plus/minus one part in a million. Operation is possible on either usb or lsb, with or without speech processing, or on cw. The receiver has a 10dB snr for an input of 1μV emf, with adjacent channel signals 60dB down at 5kHz off tune. There are no image or i.f. responses, and other spurii are at least −80dB at 1μV emf. Full protection is provided against very high level signals, wrong polarity of supply voltage etc. The exciter provides 150mW output into 75Ω, with the transmitter section having an output of 20W p.e.p.. A *mu-metal* screen (effective down to af) is used round the rf front-end.

It is pointed out that since the "third method" relies completely on a cancellation technique, it is of paramount importance to ensure accurate phase and amplitude balance in the two receive paths. Nevertheless, since the unwanted sideband occupies exactly the same bandwidth, centred on the same frequency, as the desired sideband, poor balance results only in a form of audio distortion; in practice, it is noted, an unwanted sideband only—20dB is not particularly detrimental to speech intelligibility. The same effect tends to be true also of ssb generation.

DC paging receiver with saw resonators

Yet another potential application for direct-conversion is for vhf "paging" receivers. At Leeds, in describing various uses of surface acoustic wave (saw) filters for mobile radio, Philips engineers outlined an experimental 153MHz "synchrodyne" (d-c) paging receiver suitable for the British Telecom National Paging System: Fig 2. This uses a low-loss third-order saw filter for front-end selectivity, providing some 22dB rejection of the adjacent channel (25kHz spacing). A fourth saw resonator provides the frequency determining element for the local oscillator. All resonate at the same frequency and can be on the same substrate. While it might be expected that such construction would result in excessive

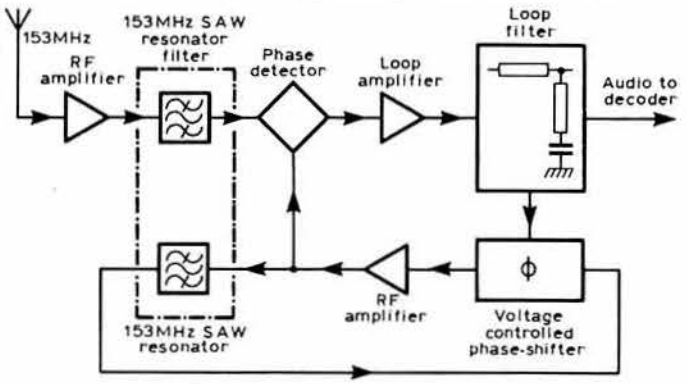


Fig 2. Experimental direct-conversion synchrodyne vhf paging receiver using saw resonators

oscillator radiation, it is claimed that the unit has a low re-radiated level (−50dB relative to the 1mW of local oscillator power). In the proposed circuit arrangement, the saw oscillator has a frequency stability comparable with that offered by a crystal oscillator/multiplier arrangement, but at a fraction of the cost. The unit provides audio tone output of 700mV rms, sufficient to drive an ic decoder for the personal paging signal.

It is admitted that some further refinement would be necessary to make an operational receiver, but the attractions of the compact modular construction and low power consumption are stressed. Clearly such an approach has possibilities for fixed-channel, handheld 144MHz equipment, particularly for working through repeaters.

Recent work by I.A.W. Vance, G3WMS, and a team at STL on direct-conversion vhf nbfm receivers for mobile pmr applications was noted in *TT* (February 1981). At Leeds, a further paper on this work went more fully into the subject of oscillator noise sidebands; phase noise is an important factor in limiting the performance of sine-cosine two-phase fm demodulators, as G4DGU pointed out recently. The paper reveals that an improved fm direct-conversion demodulator (described as an amplitude-normalized sine-cosine demodulator) has now been developed. This has no second noise component, and has a performance similar in respect to oscillator noise to that of a conventional superhet discriminator. Circuit details were not given, but it is recognized that it needs many extra components, though these can be provided in ic form (indeed the whole receiver can be largely integrated). The paper concludes: "It is anticipated that widespread use of this class of receiver will be seen in the near future."

It is fair to claim that the current professional interest in direct-conversion synchrodyne receivers has arisen very largely from more than a decade of amateur experimentation, following recognition of the importance of the work of J. P. Costas, W2CRR, of General Electric (USA) who in the mid-'fifties showed the advantages of direct-conversion for high-performance hf receivers, including their use for the reception of double-sideband, suppressed-carrier transmissions.

Inflationary equipment

In the UK we have had to accept a long period of high inflation, varying exchange rates etc so that it's quite difficult to remember that only a few years ago the idea of spending £350 or £500 on a piece of amateur radio equipment was almost unheard of. By comparison we still tend to look across the Atlantic to judge the cost-effectiveness of equipment in terms of dollars, accepting this as a still-recognizable unit of currency.

In "The effect of inflation on amateur radio equipment prices" (*CQ* April 1981, pp33-5) Neil D. Friedman, N3DF, shows that even the dollar is an uncertain yardstick. While a few years ago virtually no manufacturers were offering equipment costing $1,000 or more, such figures now feature in virtually all lists. He provides a table showing how the purchasing power of the consumer dollar has declined between 1947 and 1980, and this indicates that in real terms the cost of amateur radio equipment has remained pretty steady.

Over the whole range of consumer goods, $1 in 1947 represents about

$3.63 in 1980: a 1957 $1 about $2.88; a 1967 $1 about $2.43; a 1977 $1 about $1.3. This would indicate that a KWM-1 transceiver with a list price of $956 in 1957 would be equivalent to $2,750 today; an FT101 at $500 in 1971 about $1,000 today; a high-grade 75A3 receiver at $530 in 1952 would be almost $1,600 today. And he points out that if American inflation continues at the fairly modest rate of 10 per cent per annum, then today's $1,000 rig will have a price tag of some $17,450 in 2010. One shudders to think what the cost will be in £s!

Constructor or consumer?

Radio & Electronics Constructor comments as follows on the present state of amateur radio: "It seems that the past few years have seen the demise of the practical side of the hobby with the temptation of the ready-made transceiver getting just too irresistible for most amateurs. This dearth of construction has led to a breed of radio amateur that is perilously unfamiliar with the more practical considerations of communications."

Personally, I would suggest that the practical considerations of hf and vhf communication can and do embrace more than equipment construction and that, in any case, home-construction is not as dead as the magazine suggests (although certainly most of this tends to be confined to what might be considered ancillary units). But certainly the all-factory-built station working into a factory-designed antenna does now account for a substantial percentage of activity.

This is not necessarily a disaster for the hobby, provided that we can retain the basic attitude of questioning, observing and experimentation, and do not simply become passive consumers, seeking guidance solely on which black box to buy! At the same time it does place some obligation on those of us who attempt to provide technical information to recognize that the amateur world *has* changed, while leaving it to others to pontificate on whether the changes are for the better or the worse.

For example, the purchase of a factory-built transceiver does represent a substantial investment for the individual amateur, and most of us wish to ensure that we are getting value for money—and also to have some idea of what sort of consumer protection the law provides. The laws indeed are numerous and complex, yet still appear to leave at least some loopholes for the less scrupulous. Again, it seems undesirable to encourage too much of a "barrack-room lawyer" approach towards the buying and selling of amateur radio equipment, no matter how strongly some readers clearly feel about the lack of price-competition among UK importers of equipment. The choice to purchase or not to purchase is still our own; the old tag of *caveat emptor* (let the buyer beware) still has some justification, and we do not (yet) have the problem of the over-persistent door-to-door salesmen operating in this field!

Today, both buyer and seller should have some awareness of a whole series of laws, codes of practice and standards, and may need to keep at the back of his mind such niceties as to recognize that the legal definition of the UK does *not* include the Channel Islands or the Isle of Man—and that the law in, say, Scotland or Northern Ireland may not always be the same as in England and Wales. If you do run into trouble with a purchase you could for instance find it worth your while to check on some of the following:

The *Trade Descriptions Acts* of 1968, 1972, and to note that these now cover oral statements made by sales staff as well as advertisements, printed material, point-of-sale displays etc.

The *Misrepresentation Act* 1967 is quite interesting in relation to the question of any "guesses" made by sales staff as to whether a product will or will not work satisfactorily in certain situations. One wonders, for instance, whether this might not cover positive statements that equipment would not cause interference "in this area" etc. Not all dealers have been careful to restrain staff from making claims of this type.

The *Consumer Safety Act* 1978 is concerned with merchandise found to be hazardous in use, and can cover second-hand as well as new equipment.

The *Fair Trading Act* 1973 is perhaps one of the key pieces of consumer protection, although one should note that it permits advertisers to express possibly undue optimism about the quality or performance of their goods provided such claims do not create a clearly false impression ("best", "finest" etc are considered obvious hyperbole).

The basic *Sales of Goods Act* 1893, (with amendments in 1979) contains very important provisions about "description", "merchantable quality" and "fitness for purpose", though, as for all legal matters, there can still be circumstances when you may think you are covered by such Acts but in practice you are not. For example, you could hardly invoke such Acts if you bought equipment in the UK but found it thoroughly unsatisfactory when used in the tropics, unless you could show that the seller knew you intended to do this. "Fitness for purpose" is an important safeguard for the purchaser, although I believe it can be difficult to invoke against a seller if you have asked for specific branded goods and so have not relied on the seller's skill or judgement. Goods have to correspond with their description and be of merchantable quality *provided* that they are sold "by description". Although fitness for purpose and merchantable quality apply to goods at the time of sale, subsequent events are permitted to throw light on this question. For instance, this raises interesting questions when, say, someone who has bought hi-fi equipment which works satisfactorily until you move next door and begin transmitting, and when it can be shown that the hi-fi is unduly susceptible to local transmissions.

A code that does not have the force of law is likely to apply only to members of the organization concerned. For instance the Code of the Advertising Standards Association is very wide: "Advertisements should not contain any statement or visual presentation which, directly or by implication, omission, ambiguity or exaggerated claim, is likely to mislead the consumer about the product advertised, or about any other product or advertiser".

Similarly, the Consumer Protection Charter of the Council of Europe endorses the principle that sufficient information should be available to the buyer "to enable him to make a rational choice between competing products and services"—a charter intended to cover such matters as product labelling, advertisements, terms of sale, safety, quality etc.

There are also legal obligations incurred by those who provide technical advisory services, so perhaps, to be on the safe side, I had better end my notes with a disclaimer: these notes have been compiled from a number of books and articles on the subject of consumer law, but this is a topic about which I make absolutely no claim to be an expert!

Antenna matching

One of the least understood yet most important aspects of practical radio transmission remains the interface between transmitter and antenna. So many myths and misconceptions abound. How many of us, hand on heart, can avow that we really understand the subtleties of radiation resistance, feedpoint impedance, impedance transformation, antenna resonance, swr and transmission lines? It is perhaps not surprising that even now there are a few amateurs, with quite good equipment, who seldom succeed, even on hf, in working over distances more than about 1-2,000 miles. Yet there are plenty of others who, given a piece of wet string, seem to have little trouble in working a reasonable amount of dx.

It is not a question of mathematics. Rather it is a matter of knowing just enough not to become blind slaves to swr meters, to have some inkling of the difference between resistance and reactance, some appreciation that a "resonant" antenna element does not possess some magical properties of radiation denied to non-resonant lengths of wire, and that unity swr is not the beginning and end of good antenna practice!

Arthur Collins, W0CXX, in the mid-'thirties popularized the "Collins Universal Coupler" (pi-networks) on the basis that any transmitter could work successfully with any length of antenna. Yet some 45 years later the lesson has not really sunk in. As W2DK pointed out some years ago: "When an antenna element presents to the transmission line an impedance other than its characteristic impedance, the impedance offered to the transmitter at the input end of the line may be quite different from either the characteristic impedance of the line *or* (unless the line is an exact multiple of an electrical half wavelength) the impedance at the antenna junction. The impedance represented by the line then depends on the length of the feeder (which acts as an impedance transformer). In such cases, *unless a suitable matching network is interposed* between transmitter and transmission line, the impedance may be of a value (in the form R + jX) with which the transmitter output circuit cannot cope."

But if the reactance is cancelled out, and the impedance falls within the values suitable for the transmitter output circuit, then the antenna *system* is matched and all the real power delivered by the transmitter (other than the usually modest losses in the transmission line) will be radiated.

The problem with designing an atu is that ideally it needs to cope with a very large range of impedances, both very low and very high, and transform them to around the 50Ω output of most modern transmitters. Basically you only need one capacitor and one inductor to do this—but you soon discover that to cover many bands and many possible impedances you need very large value, high-voltage variable capacitors and preferably a very large variable (roller coaster) inductance. In practice, most atus represent configurations that help to reduce these to manageable proportions.

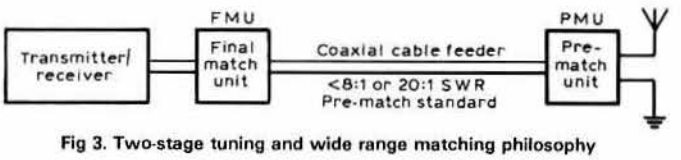


Fig 3. Two-stage tuning and wide range matching philosophy

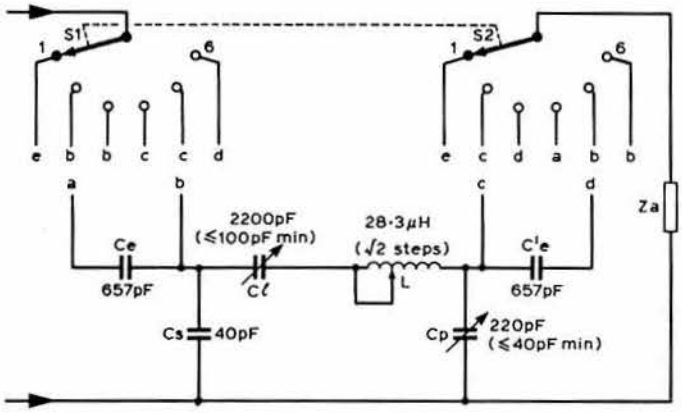


Fig 4. "Final matching unit" for 1·5 to 30MHz and 20:1 swr

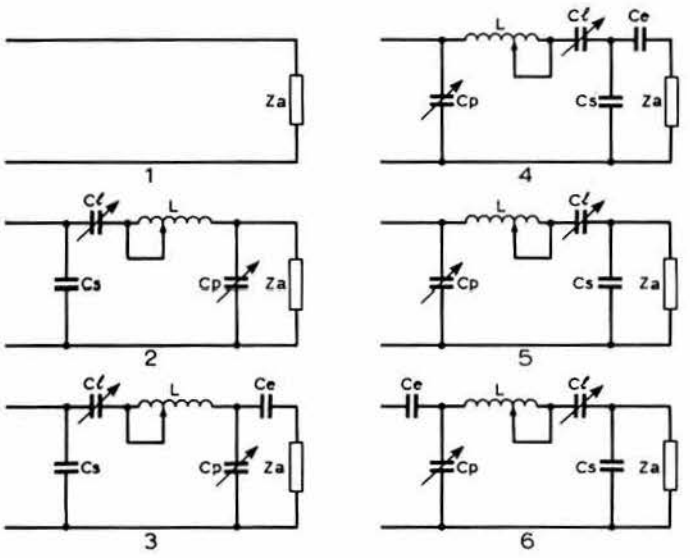


Fig 5. The network configurations of the matching unit of Fig 4

At Leeds, Dr M. J. Underhill, G3LHZ, wearing his Philips Research Laboratories hat, presented a paper showing that practical and versatile wide range antenna matching networks can be readily designed based on a "two stage" philosophy. That is, to have a "pre-match unit" at the antenna junction (which may, for example, consist of a wideband coaxial-cable balun transformer) in order to limit the demands on the "final match unit" (Fig 3). Otherwise component values for an atu covering 1·5 to 30MHz may require maximum to minimum ratios some 20 times greater than would be required for a network designed for a single operating frequency. The paper delves very fully into the theory and mathematics of wide-range matching networks, but Fig 4 shows his proposed "final match unit". The series variable capacitor permits the use of a tapped inductance rather than a roller coaster. The switching provides a choice of six network configurations, and also limits the maximum voltage across the capacitors to reasonable limits. Although such a unit is intended primarily for commercial/defence transmitters requiring continuous frequency coverage, such a design would clearly be useful for adding 10, 18 and 24MHz bands. One hopes that G3LHZ will come up with an article one of these days showing how amateurs can make use of its flexibility etc. G3LHZ confirms the value of coaxial-cable wideband baluns such as the one given in last month's *TT*, although in his case he uses a 4:1 (200-to-50Ω) version, as described in the two-part articles in *Ham Radio* February-March 1980.

Twin-delta loop antenna arrays

In *TT* (March 1981) attention was drawn to the work of Takehiko Tsukiji and Shigehumi Tou of Fukuoka University on the analysis of delta-loop antenna elements, and their conclusion that triangular elements can result in very useful broadband characteristics. John Brodzky, G3HQX, has drawn attention to a later paper by the same authors: "High gain and broadband Yagi-Uda array antenna composed of twin-delta loops" (*IEE Conference Publication No 195 Part 1*—2nd International Conference on Antennas & Propagation, April 1981).

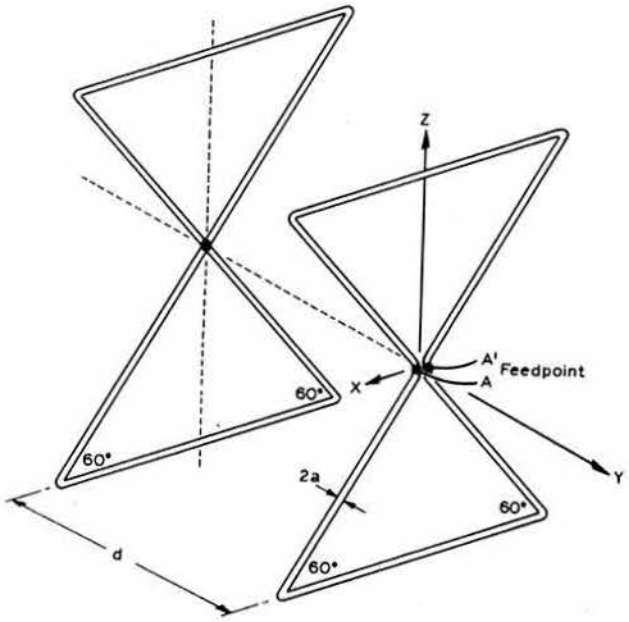


Fig 6. Twin-delta loop array providing wideband characteristics

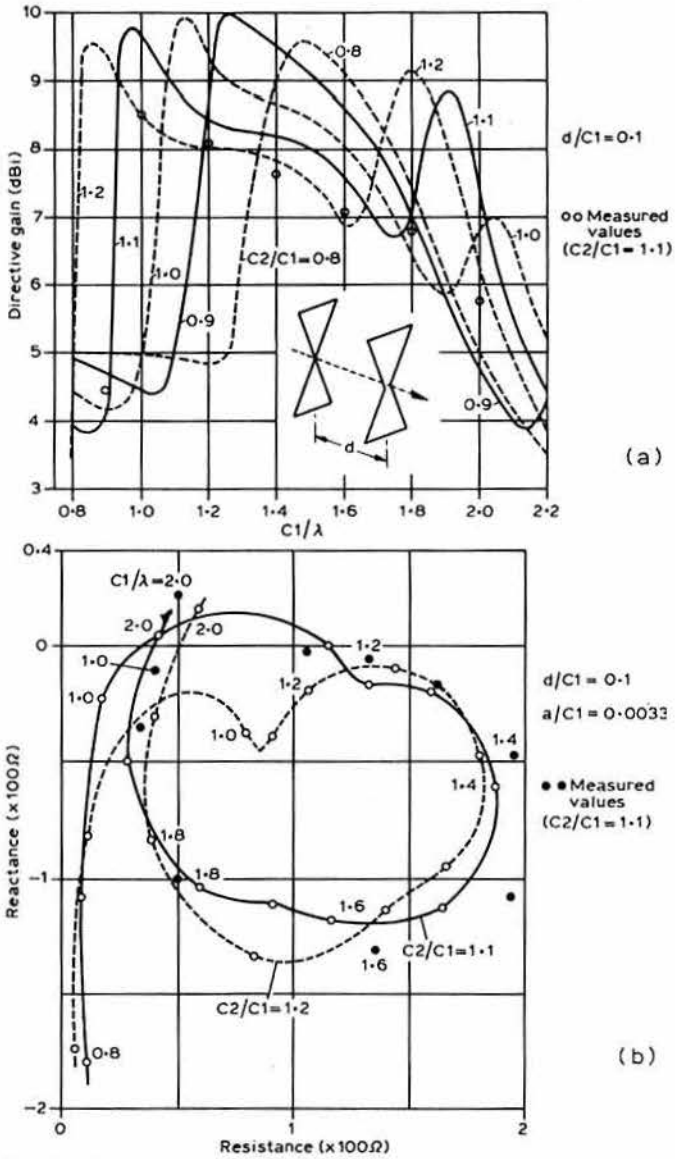


Fig 7. Directive gain and frequency characteristics of input impedance of twin-delta loop array where parasitic element is used as a reflector

The paper describes twin-delta loop arrays having maximum directive gain of about 9·8dBi (ie about 9·8-2·1=7·7dB gain ref dipole) but providing a gain of more than 7dBi over almost an octave frequency span. The broadband characteristics arise from the apex-driven triangular loop configuration. The authors claim that the broadband characteristics mean that it becomes very easy to form a high-gain array without critical dimensions of loop perimeter or element spacing. The paper shows that there are significant advantages in using the parasitic loop as a reflector rather than as a director.

As indicated in Fig 6 the shape of each loop is an equilateral triangle, and the perimeter of the driven and parasitic loop is C1 and C2. The perimeter of the loop is in the range 1–2; C2/C1 for a reflector is 1·1; and the spacing *d* can be as little as d/C1=0·1. Clearly the array would be easier to implement on vhf or uhf than hf, although presumably an hf version could be made to work well on 14, 18, 21, 24 and 28MHz with the same elements!

Rather interestingly, a similar double-delta loop configuration for 144MHz (and also uhf television) was described many years ago in *TT* by John Pegler, G3ENI, and has appeared in many editions of *ART*. However, although he reported it as a very useful array, G3ENI made no particular claims for broadband characteristics.

Multi-turn transmitting loop

One of the contributions to the Radio Receivers and Associated Systems Conference directly relating to amateur radio was a paper by Sven Ramstrom, an SM-amateur, on "HF loop for transmitting and receiving". His SV1 antenna was originally developed at home and tested on the 3·5, 7 and 14MHz amateur bands, although since then it has been subjected to extensive tests and trials by Swedish and British defence establishments, and by Rediffusion Radio Systems Ltd (formerly Redifon Ltd).

The advantages and disadvantages of compact transmitting loop antennas have been the subject of a good deal of investigation both by professionals and amateurs in recent years, particularly since the development in the mid-'sixties at the US Army limited warfare laboratories of the single-turn octagonal loop antenna (5ft sides) as described in *ART*. More recently there has been the TCI Model 629 low-profile loop for diplomatic communications etc (*TT* December 1980, p1296). The trick in both these designs was to use large diameter copper tubing to reduce the power loss brought about by the very low radiation resistance of a small loop.

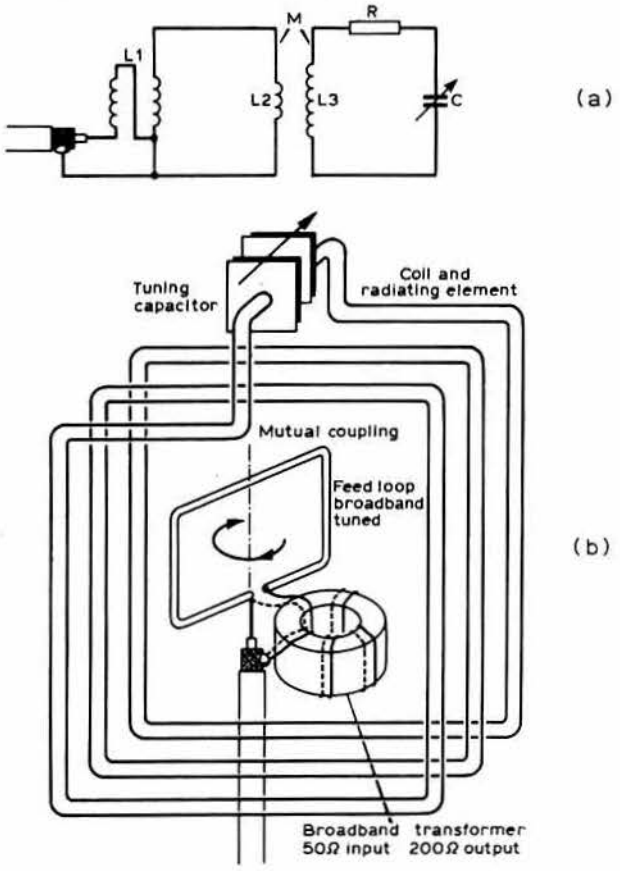


Fig 8. The SV1 compact hf tunable loop antenna for transmitting and receiving with top-driven square loop: (a) equivalent circuit; (b) basic arrangement of the SV1 loop antenna

The Swedish SV1, which has been tested in fixed and marine mobile applications with transmitter powers up to 1kW, is much smaller in overall size, the whole antenna fitting into a cylindrical plastics cover some 0·8m (high) by 0·4m (wide) by 0·7m (deep). Basically it consists of three square turns tuned by a 30–100pF capacitor (vacuum type for high powers) to which a broadband single-turn square loop (each side 500mm) is inductively-coupled (with adjustable coupling): Fig 8. The feed to the single-turn loop is via a 1:4 balun (50–200Ω). From the illustrations the material used to form the main loop appears to be silver-plated (copper?) tubing, roughly about 0·5in diameter for the main loop and about 0·25in diameter for the single-turn loop. No ground plane is used. The final version uses motorized control of the vacuum capacitor and for adjusting the feed loop, and is clearly intended to be mounted at some distance from the transmitter.

The antenna is tunable about 1·9 to 16MHz, but the bandwidth at any given frequency is quite narrow, reflecting the high-Q design (from about 2·4kHz at 3MHz to about 13·2kHz at 10MHz). When tuned, the swr is a maximum of about 1·27 at 2MHz, less than 1·1:1 from 3·5 to 13MHz.

What about performance? In any consideration of small loops one has to accept that radiated power is likely to be significantly below what would be possible with a conventional dipole, and this unit is no exception. However, it is claimed that for high-angle radiation the system compares favourably with a 12m vertical whip antenna, and that the efficiency of both loop and whip antennas increases considerably with frequency. Although the near-field shows sharp nulls, in effect radiation from the loop is omnidirectional with an even vertical radiation pattern from horizon to zenith. From the information in the paper, it would appear that at 8MHz the loop is about −8dB ref dipole; at 4, 6 and 10MHz about −20dB, and at 2·6MHz about −25dB.

The paper includes a list of over 50 contacts made on the amateur bands, mostly between Sweden and other European countries but also including a few dx contacts on 14MHz. The transmitter power used is not stated, but the signal reports are reasonable on both ssb and cw. It is claimed that on reception the loop tends to provide clearer signals than the whip. The interest shown by the defence establishments etc would indicate that the results are sufficiently encouraging to suggest that such loop antennas may well find application in circumstances where only limited space is available, and where the smooth vrp makes it more suitable than a whip for medium-distance contacts. But don't expect it to work as well as a good dipole!

Tips and topics

Jack Maling, G5JL, is a firm believer in simplicity and low-cost, even in factory-built designs. Although never a black box addict, advancing years mean that eyes and hands are less reliable than they were and he would not say no to a black box if he could find one that provided him only with what he needs rather than the all-singing, all-mode, relatively high-cost equipments that the factories turn out. A straightforward transmitter for all (or most) hf bands, 50 to 100W with reasonable tvi precautions—oh yes, and for *cw only* and *cheap*! He writes: "I want no clever gadgets, labour saving or otherwise. I can't see how l.e.d. digital frequency displays would serve me better than an old-fashioned dial but they certainly cost more. The same applies to many of the other recent innovations intended primarily to make older models seem obsolete and to provide an excuse for pushing the price up. A cw transmitter should be simple and inexpensive: am I the only one who thinks so?"

Mike Perry, PA3ASC/G4HWZ, draws attention to the fact that in some recent equipments (certainly the TS180S), turning the rig off by means of the front panel power switch does not isolate the collectors of the final stage output transistors from the supply line. This normally does not create any serious hazard for these expensive devices unless, when operating mobile, large transients appear on the nominally 12V supply line of the vehicle. However, this can happen if insufficient care is taken when installing the rig for mobile operation, or if the power is taken from elsewhere than directly across the battery terminals. An ignition system and a starter motor can produce quite large transient voltages, and these will not be excluded from the rig simply by switching it "off". However, the power on/off switch has a spare pair of contacts which are used for remote switching of the mains power supply, and it would be a simple matter to use these to control a headlamp relay, thus completely isolating the rig. Since these switch contacts are brought out to the input power socket, no internal modification is needed. He has also come up against the more intractable problem that, when using the digitally-synthesized oscillator (dfc), 50Hz hum modulation can appear on the vfo on all bands,

(Continued on page 821)

MICROWAVES

Charles Suckling, G3WDG*

Operating news

The 1·3GHz band was extremely well populated during VHF NFD, with activity at record levels. At least one station is known to have broken the 100 QSO barrier for the first time in any contest on 1·3GHz! One particularly enjoyable aspect of VHF NFD this year was the reappearance of signals from France, after many years absence. For most stations the majority of QSOs were made directly on 1·3GHz, although some of the longer-distance contacts did require schedules to be made from 432MHz.

Contests always provide an excellent opportunity for listeners, and this was indeed the case for G8PSF whose transmitting equipment was not yet ready. He logged 20 stations from his 100ft asl Enfield QTH, using a 15/15 antenna feeding a masthead Mu-Tek NE645 preamplifier into an MRF901 second stage and Mu-Tek converter. The best dx heard was F1KBF/P. He notes that many stations did not give their QTH locator when calling "CQ", and that this can be very frustrating on a difficult path with QSB when trying to align the antenna.

One new station joined the growing ranks of 1·3GHz eme operators during June; YU2RGC, the first active 1·3GHz eme YU station, whose first contact was with DJ4AU—his first 1·3GHz eme QSO, and his first QSO on the band! The equipment at YU2RGC consists of a four-valve 2C39 pa, an MGF1400 gasfet preamp and circularly-polarized W2IMU feedhorn. Another station whose first 1·3GHz QSO will be via eme is ZE5JJ, who says that there is hardly anybody else in Africa even active on the band! He now has a gasfet preamp working using the Plessey GAT 6 device, and is reporting over 20dB of sun noise and 0·55dB of moon noise with his 32ft dish. He is making good progress with the transmitter, and hopefully it will not be too long before Africa becomes active on 1·3GHz eme.

Reverting back to earth, a reminder that Tuesday night is activity night on 1·3GHz, 8pm onwards on 1,296·200MHz. On a personal note, please look out for G3WDG/G4KGC from Towcester, Northants!

On the 10GHz front, activity levels were up during the June leg of the cumulative contest, no doubt due to the first good weather for the contest. A number of stations had 10 or more QSOs during the day. There was also some activity on 5·7GHz during the concurrent Microwave Contest. G4KGC/P, using a G3JVL-type transverter redesigned in WG14 for 5·7GHz, managed a two-way contact from Walbury Hill with G4MBS at his home QTH near Alton. G4CNV and G3JVL are also building for 5·7GHz.

Alan Williams, G3KSU, notes that he is no longer the only Isle of Wight station active on 10GHz now that G8IDZ is active, and he was very pleased to contact him on 10GHz recently—his first 1oW contact after many years' operation on 10GHz!

Finally, congratulations to two well-known microwave G8 stations who have recently changed their callsigns: G8ADP, now G4MBS; and GW8NBK, now GW4LXO.

Forthcoming round table meetings

The next round table meeting to be held at the IBA Engineering HQ, Winchester, venue will be on 27 September. The plan for this meeting is rather different from previous ones in that it is intended to be primarily a 10GHz narrow-band equipment "clinic". Several sets of test equipment (plus operators) will be on hand to align and test G3JVL-type transverters. Therefore please bring along equipment for either setting up from scratch, or improving/measuring. There will also be a demonstration of how to align G3JVL transverters. The next scheduled discussion/lecture meeting at Winchester will be on 17 January 1982.

The next Martlesham Heath round table meeting will be on 18 October. As in previous years tickets will be required, and details of how to get there and more information can be obtained from Graham Murchie, G4FSG, QTHR.

2·3GHz news

Sad news has come in recently that German stations have lost the use of the bottom part of the 2·3GHz band, in particular the narrowband 2,304MHz working frequency. The lowest frequency they can now use is 2,320MHz, and they are proposing to use 2,320·200MHz as their new calling frequency. UK amateurs have been specifically requested to try to get additional receiving equipment going for 2,320MHz so that split-frequency 2,304MHz–2,320MHz contacts can be made between the two countries. The DLs anticipate that they will retain the capability to listen on 2,304MHz for some time to come, so this seems a good idea. □

*46 Windsor Close, Towcester, Northants.

RAE courses 1981-2

(See also August issue, p721)

Aldridge. Aldridge School, Tynings Lane, Aldridge, Walsall, W Midlands. Enrolment 15–16 September, 6.30–8.30pm. Classes commence 22 September, 7–9pm. Details from Mr Winter, c/o the school, or B. Price, G4DDF, QTHR.

Bracknell. Bracknell College, Department of Engineering & Science, Church Road, Bracknell, Berks. Enrolment 10, 11 and 14 September. Course commences 28 September. Course tutor G8KIL. Details from the college, tel Bracknell 20411.

Braintree. Braintree Technical College of Further Education, Bocking. Enrolment 3 and 4 September, 4.30–8pm. Courses Thursdays, 7–9.30pm, commencing mid-September. Participants are advised to obtain *The Radio Amateur's Examination Manual*. Details from course tutor G3ZXX, c/o the college.

Brixton. Brixton College, Ferndown Road, SW4 7SB. Enrolment 7–11 September, 6.30–8.30pm. Courses one evening a week, 6.30–9pm. Course will continue to morse test standard if required. Course tutor Mr R. McEwan Reid, G4GTO. Details from the college, tel 01-737 2323/26.

Crawley. Ifield Evening Centre, Lady Margaret Road, Ifield, Crawley, West Sussex. Enrolment 7 and 9 September, 7–9pm. Classes Mondays, and if sufficient demand, Thursdays, commencing 21 September. Details from course tutor R. Scrivens, G3LNM, tel Crawley 22540.

Dudley. Dudley College of Technology, The Broadway, Dudley, West Midlands DY1 4AS. Enrolment 8 September. Classes Tuesdays, 6.30–8.30pm. Details from course lecturer J.R. Raby, G8RF, c/o the college, tel Dudley 53585.

Great Casterton. Casterton Community College, Great Casterton, Nr Stamford, Lincs. Enrolment 14–18 September. Classes Thursdays, 7–9pm, commencing 24 September. Details from course tutor J. M. Tripp, G3YWO, The Robbis, Manthorpe, nr Bourne, Lincs.

Gosforth. Gosforth Adult Association Classes, Gosforth Secondary School, Gosforth, Nr Newcastle-upon-Tyne. Classes Tuesdays, 7–9pm. Candidates may sit the exam at the school. Course tutor D. R. Loveday, G3FPE. Enquiries to the Principal, c/o the Gosforth Adult Association, tel Newcastle-upon-Tyne 668439.

Hemel Hempstead. Dacorum College, Marlowes, Hemel Hempstead. Enrolment 7 September. Classes Wednesdays, 6.30–9pm, commencing 23 September. Details from course organizer C. Burke, G3VOZ, tel Hemel Hempstead 833300.

Kettering. Latimer Adult Education Centre, Castle Way, Barton Seagrave, Kettering. Enrolment 7–8 September, 7–8.30pm. Course fee: £11.07 for 24 weeks. Postal enrolments from 9 September, cheques payable to "Northants County Council". Details from the college.

Melton Mowbray. Melton Mowbray College of Further Education, Asfordby Road, Melton Mowbray. Enrolment 8 September. Details from college or course tutor, G3WKM, tel Melton Mowbray 68810.

Northampton. Duston Upper School, Classes Tuesdays, 7pm, commencing 8 September. Lecturer G8LHR, tel 0604 499067.

Portsmouth. Further Education Centre, Drayton Road, North End, Portsmouth. Tuesdays and Thursdays. Details from Principal or G6NZ.

Southampton. Southampton Radio Club HQ, Toc H Building, Little Oak Road, Bassett, Southampton. Details from J. R. Compton, G4COM, QTHR, tel Southampton 693017.

Southport. Southport Technical College, Southport, Merseyside. Enrolment 14 September, 7pm. Classes Mondays, 7–9pm, commencing 21 September. Details from course tutor G. T. Kelly, G4FQN, QTHR.

Stretford. North Trafford College of Further Education, Talbot Road, Stretford, Manchester. Enrolment 1–3 September. Classes Mondays, 6–9pm. Course code ERA1. Tutor J. T. Beaumont, G3NGD. Details from college, tel 061-872 3731.

TECHNICAL TOPICS

(Continued from page 820)

though this is not present when the normal vfo is used. After a good deal of investigation he found that the dfc is sensitive to magnetic fields. He has not traced the actual cause of this problem, but a quick solution is to separate the rig from the power supply by about 6in.

In the May *TT* I referred to a new Mullard a.m. radio sub-system ic, type TD1072, quoting the firm's own claim that the minimum signal input is typically 2mV. Actually it is 1,000 times more sensitive than that; the figure should have been 2μV.

Incidentally, a few readers thought my recent reference to devices made by "National Anthem" was some sort of April fool joke. Not so, it *is* a current registered trade mark of the National Semiconductor Corporation, "the practical wizards of Silicon Valley". There is, however, apparently no need for readers to stand to attention while singing the praises of their ic devices! □

4 - 2 - 70

John Morris, G4ANB*

Sporadic-E

Some of the dx worked on 144MHz during the fine Es opening on 7 June was reported in last month's *4-2-70*, and several more log extracts arrived after the deadline for that issue (*hint*). G4IFX (YN57j) was trying out a brand-new TS700S with a halo in the shack and was understandably surprised when the very first contact turned out to be SP9EWU (JK56c) at 1838gmt. G3AWL (ZO14g) worked several Russian, Polish and Romanian stations between 1807 and 1847gmt, including UK5DAK (LI32a), YO6AFP (MG34a), UO5WU (OF02f) and UO5OBE (OF02c). G3AWL has calculated the distance between himself and UO5OBE as approximately 2,303km and wonders if his contact with UO5WU could be a G-UO5 "first". GI8YBZ (WP67b), who claims to be the northernmost station in Northern Ireland, has asked if his 2,182km QSO with UC2ABT (NN18a) is a dx record for Es from GI. Would any other Northern Ireland reader like to lay claim to this record? For EA1QJ (VD59h) the best dx was EA8XS (SO73d) in the Canaries.

There were several other more localized Es openings on 144MHz during June. This type of propagation tends to favour those in the south (perhaps in compensation for the auroral advantage enjoyed by more northerly stations) and GJ4ICD received benefit from this on 9 June when he worked a total of 24 countries by Es or tropo in a single day. G4DGU in north Devon heard many Russian stations on 7 June, including UB5EFQ in QH locator square, a distance of about 2,800km. At 1903gmt on 11 June HG3NL (JG54a) was worked.

G3VZV (ZL08h) left his favourite activity of atv to work I6ZAU/SV8 (JZ20f) on the island of Corfu at 1830gmt on 9 July using just 8W to a six-element quad at 8m. LZ1DT and many YU stations were also heard. Although G3VZV has been on the air for 16 years this was his first encounter with Es, and he commented that it has re-awakened his respect for 144MHz. G8LFB (ZL30b) was also active on 9 July, making contacts with YU4EDO (JF72c) at 1755gmt and YU1NDL (JE37f) at 1800gmt.

There was an excellent sporadic-E opening on 144MHz on 10 July, and news of the dx worked is still coming in as this is being written. Strong Es signals were audible over most of the UK during the early evening. Operators in the south of England were able to work EA9 and CN8 stations in northern Africa, and EA8XS (SO73d) in the Canary Islands attracted a massive pile-up.

For GM3UU (YR70f) the main problem was attracting the attention of Spanish operators in the face of strong competition from G stations. Perseverance finally brought an S9 exchange with EA5AMR (ZZ47a) on ssb at 1655gmt. For GM3VTB (XP09j) the opening lasted from 1630 to 1730gmt and brought contacts with several EA stations, including EA5AVN (ZZ49g). GI8YBZ (WP67b) picked up a very nice square in the form of EA6FB (AY07j) and went on to make several other Spanish contacts.

GM4IHJ (YQ73h) found tv from Minsk, Yugoslavia, Italy, Spain and Portugal on 62MHz, and Spanish fm on 100MHz at 1400gmt. The first 144MHz Es signals were heard at 1550gmt, and GM4IHJ quickly worked stations from EA6AU (BZ square) in the Balearic Islands right across Spain to VD square. EA1, EA3, EA4, EA5, EA6 and EA7 were heard and worked, but the best contact was with CT4IB (WB67c) at 1636gmt. The propagation dropped below 144MHz at 1810gmt, but came back between 1905 and 1952gmt to produce a few more EA5 and EA7 contacts. The Band 2 fm broadcast signals stayed until 2105gmt, at which point a tired GM4IHJ decided to go to bed.

If UK stations have trouble getting through pile-ups, then consider the plight of operators in parts of the world with small amateur populations who find themselves on the receiving end of this enthusiastic attention. EA1QJ (VD59h) found some difficulty in picking out individual callsigns from the morass of stations calling. The QRM caused quite a few stations to be lost but over 100 contacts were successfully completed between 1521 and 1735gmt. Among the countries worked were Czechoslovakia, East and West Germany, Sardinia, The Netherlands and Denmark. The best dx was OZ4VV (EQ square).

Back in the UK the best for G8FLB (ZL30f) was EA7UH (WX76j). G8IXG, in Reading, moved to the top end of the band to avoid the pile-up, and promptly worked half a dozen Spanish stations on fm.

Tropo

The period 13–14 June was characterized by very good tropo conditions over most of Europe, with plenty of dx worked on 144 and 432MHz. Starting with the lower band, G4DGU in north Devon found his XK locator attracted many stations, including F1JG (CD square), HB9QQ (EH), EA1QJ (VD), EA1XH (YD) and OE9GWI (EH). F1JG later telephoned G4DGU and mentioned that he had worked 42 G stations during the day. On 14 June G4DGU heard snatches from a CT1 station but could not get the full callsign. The best dx for G8LFB (ZL30f) included F6ELI (ZE19j), F1FIB/P (BD43c) and HB9D/P (EH64f) on 13 June; with F6FHP (AE21g) on the following day.

EA1QJ (VD59h) has very kindly provided a detailed log extract, which shows over 50 QSOs with UK stations, including GW8EVX (XL30d) and G3VYF (AL32j). Analysis of the EA1QJ log shows the band was open from northwest Spain to the southern UK almost continuously from 1300 to 2200gmt on 13 June and from 0700 to 2230gmt on 14 June.

EA1TH (YC48b), who used to hold the callsign G3URY, also found 144MHz open to the UK on these two days, and worked several south coast and Jersey stations, as well as a number of contestants in the Belgian vhf nfd. The best dx included PA0IHD/P (BL square) and ON7CH/P (CL). EA1TH was particularly pleased by the results of this opening as he has a 1,200m mountain just 20km north of his 380m asl location.

4U1ITU, located in the ITU building in Geneva, was brought on the air by G3NAQ/F0ZY during the opening. One of the stations worked was GJ4ICD, who has claimed his contact with 4U1ITU as a GJ-4U1 "first" on 144MHz.

Up on 432MHz GJ4ICD has claimed another "first" for a contact with Italy. Eight new QTH locator squares were worked during the weekend, bringing GJ4ICD's 432MHz total to 94. BRS41733 in London heard several stations in the south of France, including F1BUU (ZE08d) on 13 June. Other dx contacts reported on this day include EA1QJ to G4HFO (XK56b) at 0830gmt, and G4BYV in Norfolk to F1BUU.

The bands opened again on 21–22 June, this time to Scandinavia. On 144MHz G8LFB heard several Norwegian stations and worked LA6HL (CS09g) and LA3EQ (CS29h) on 21 June. The next day G4BYV used 432MHz to work SM6HYG (FS square) and LA3FV (FT).

G8LFB was busy again on 6–7 July, when the best dx included OZ5DD/LX/P (DK71f), OZ4MM (FP53a), DK7LS (FO55b) and SM7FJE (GQ56b), all on 144MHz.

Repeater news

GB3OS (RB2, Stourbridge, Worcs) is now operational. GB3HE (RB14, Hastings, Sussex), GB3NX (RB2, Crawley, W Sussex) and GB3NA (R3, Barnsley, Yorkshire) are all back on the air after periods off. Site changes are pending for GB3KL (RB4, Kings Lynn, Norfolk) and GB3YL (RB14, Lowestoft, Suffolk). GB3MH (R3, Malvern Hills, Worcs) was put out of action by a lightning strike (of the electrical variety) during June but was expected to be back in service by the end of the month.

SSB repeater proposal

The arguments for and against the proposal for an experimental ssb repeater, GB3SF, have been aired several times in these pages over the past 10 months. The VHF Committee of the RSGB recently held a lengthy discussion on this subject, and concluded that support should be given for a carefully controlled, limited experiment.

Reaction to the proposal has been, to say the least, mixed. Most of the letters to *4-2-70*, which were considered by the committee when taking its decision, have expressed opposition to the idea. However, discussions at club meetings, rallies, conventions and over the air indicated that the written response was not entirely representative of the feelings of amateurs generally. Indeed, there seems to be an inexorable tendency for those who oppose a project to pick up a pen and say so, while those who like (or do not oppose) the idea stay quiet.

Much of the opposition to GB3SF has been based on fears of it being the "thin end of the wedge", and so it is worth taking a close look at the thick end of that wedge, to see where the experiment could lead. Suppose for the moment that GB3SF is a complete success, with no insuperable technical problems, giving a service as good as or better than the present fm repeaters. One may then envisage ssb as *eventually* taking over from fm as the transmission mode for some or all vhf repeaters. The narrower bandwidth of ssb would allow many more channels to be squeezed into the

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available spectrum space, with obvious advantages for mobile operators. Even dx enthusiasts could benefit from the number of ssb-only rigs which would be expected to appear on the market, to say nothing of the reduction in demand on the available spectrum.

On the other hand the experiment could demonstrate conclusively that ssb is *not* a viable mode for repeaters, due to some unexpected technical or operational problem. Although negative results are usually less exciting than positive ones, this would still be a useful piece of information.

Most probably the result will lie somewhere between these extremes, but whatever the outcome it will at least provide information which can be used in future considerations. The discussion so far has been hampered by a complete lack of hard data. Quite simply, nobody has had any experience of vhf ssb repeaters in an amateur environment, so most of the comments made have necessarily been based on conjecture. The only way to get any objective information is actually to make the experiment, and this was the crux of the committee's decision.

If the experiment receives Home Office approval it will run for 12 months, subject to continuous review by the VHF Committee, with regular progress reports. At the end of the year the results will be collated for consideration by the RSGB, presentation to the IARU, and publication in *Rad Com*. The trial period will start when the equipment has been built and has satisfactorily completed dummy-load soak tests. The unit will be located at the University of Sheffield, and the initial input frequency will be 145·185MHz, with the output 600kHz higher.

The results of the GB3SF experiment will hopefully provide data which can be considered when planning for the future. To allay the fear expressed by some correspondents of "repeaters spreading all over the band", to the detriment of dx operation, it is emphasized that the aim is to investigate the possibility of using ssb repeaters to aid *mobile* communications. Local/mobile working and vhf dxing are equally valid but nevertheless fundamentally different, and hence incompatible aspects of amateur radio. At the Brighton IARU conference the principle that repeaters should operate above 145MHz was strongly reiterated, and this viewpoint is whole-heartedly supported by the VHF Committee.

VHF TE Study Group report

May's *4-2-70* included a report of the observation of the ZS1STB 50MHz beacon on the southern tip of Africa by SV1DH in Athens on 16 February. At that time it seemed that the signals had been propagated over the long path, as SV1DH had been beaming north when ZS1STB was heard. SV1DH, ZS6PW and ZE2JV, members of the VHF TE Study Group, have since made a detailed analysis of this observation and concluded that in fact the signals almost certainly travelled along the direct path rather than going the long way round.

The reasoning behind this conclusion was that ZS1STB operates into a two-element delta loop array which is directed north and has a measured front-to-back ratio of better than 20dB. SV1DH, however, was using a commercial broadband tv antenna which subsequent measurements revealed to have virtually no front-to-back ratio, 2dB at best, on 50MHz. The time of the opening, 1845–1902gmt, was optimum for transequatorial propagation on 50MHz, and the signal had the characteristic flutter fading and frequency spreading of this mode.

On behalf of the group ZE2JV has also pointed out that really long-distance 50MHz propagation by modes other than te is remarkably consistent in time and date of occurrence. This was dramatically illustrated by the opening from ZS1STB to the UK on 26 March this year when G3COJ, G4BPY and G4JCC all heard the beacon around 1300gmt. This was exactly on the 34th anniversary of the first Europe to South Africa QSO, which took place at 1300gmt on 26 March 1947 between PA0UN and ZS1T in Cape Town. No further openings have been reported since the 26 March event.

The remarkable feature of the SV1DH–ZS1STB path on 50MHz and the KP4EOR–ZD8TC path on 144MHz which occurred on the same day is their asymmetry about the line of zero magnetic dip. This line crosses Africa at about 10° north of the geographical equator and South America at up to 13° south, so that across the Atlantic it runs NE–SW. The KP4–ZD8 path therefore does not depart greatly from the general rule that te paths are more or less perpendicular to the line of zero magnetic dip. However, KP4 is at a considerably greater distance from the zero-dip line than Ascension Island, and similarly ZS1STB is much further from the line than Athens.

Sporadic-E or tropospheric extensions to one side of the te zone are possible and probably account for many of the G–ZE openings observed on 51·75MHz from UK television, although these tend to occur during the evenings of May and August. It is thought highly probable that the signal from ZS1STB was propagated by *Es* into the te zone, but this is not certain, and there is no supporting evidence of *Es* being active in the right area at the right time. It is unlikely that the shorter KP4–ZD8 path on 144MHz could have been worked by mixed-mode propagation, but was almost certainly pure te. The te zone limits are known to vary considerably, and the possibility of a similar asymmetry occurring on the ZS–SV path cannot be discounted.

UK vhf/uhf beacons, July 1981

Callsign	MHz	QTH locator	ERP (W)	Antenna	Beam direction	Antenna height (m asl)	Keying
GB3SIX*	50·020	XN49f	100	4-el Yagi	270°	58	F1
GB3SX	70·685	AL71d	16	Turnstile	Omni	168	F1
GB3SU	70·695	ZN61a	20	2× tilted turnstile	Omni	440	A1, F1
GB3CTC	144·915	XK64a	75	Stacked clover leaf	Omni	122	A1, F1
GB3VHF	144·925	AL52j	50	5-el Yagi	320°	268	F1
GB3ANG	144·975	YQ35c	20	4-el Yagi	160°	900	F1
GB3WHA	432·810	AL71d	25	2×8-over-8	90°, 330°	165	F1
GB3SUT	432·890	ZM31b	60	2×8-over-8	0°, 135°	270	F1
GB3EM	432·910	ZN32b	50	8-over-8	150°	600	F1

*GB3SIX operates 0100–0830 local time.

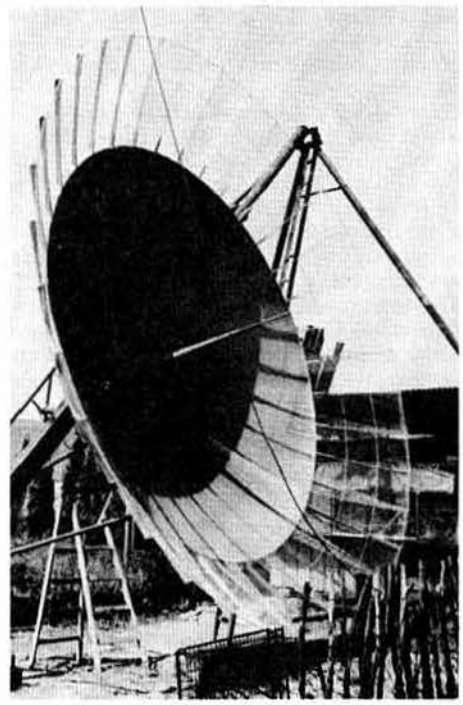
EME activity in Czechoslovakia

The club callsign OK1KIR will be familiar to many contest operators. During the 1980 IARU contests the club worked about 100 UK stations on 144MHz, and several on 432MHz, from its 250m asl portable site in the Krušné Hory mountains (GK45d). Peter Doudĕra, OK1DKW, has written on behalf of the club with details of a 432MHz eme station recently completed by OK1DAK, OK1DAI and OK1DCI at a site near Praha (HJ02j).

The antenna consists of a 4m diameter solid parabolic dish extended by aluminium ribs and chicken wire to 5·5m, giving a focal length to diameter ratio of 0·25. Illumination is by a dipole with rod reflector at λ/4. The antenna gain has been estimated from sun noise measurements as 23·9dBd. The dish is polar mounted with a large screw for declination alignment and correction. At present the antenna is moved by a hand-driven gear arrangement, but automatic moon tracking is under construction.

The receiver chain starts with a 1400 preamplifier mounted on the back of the dish, followed by 6m of 2cm-thick coaxial cable feeding a 432–27MHz converter. The 27MHz is down-converted again to feed a modified vintage receiver tuning 1–3MHz, with an audio filter on the output. The system noise figure is estimated at less than 0·5dB, and the average sun noise is 15–16dB. On transmit the line up is a 145MHz transceiver; 145–432MHz transistorized transverter; 2 by 2C39 intermediate amplifier; and a K2RIW-style power amplifier using a pair of GI7B valves, which are new equivalents of the old German LD7s. The rf output is about 800W, which can be boosted to 1kW by the addition of another intermediate amplifier. The transmit feeder has a loss of about 0·6dB.

During the eme contest on 9–10 May OK1KIR completed 13 contacts



The 5·5m dish used by OK1KIR for 432MHz eme. The building behind the antenna houses the shack and equipment

with 11 different stations and heard but was unable to attract the attention of 28 others, including G3LTF, G3XGS and GW3XYW. The operators of OK1KIR are keen to run skeds with stations equipped for 432MHz eme, especially at weekends or on weekday afternoons and evenings. The station is also nearing readiness for 1·3 and 2·3GHz eme.

Correspondence regarding eme skeds should be sent to Radioclub OK1KIR, Plzenská 131, 15000 Praha 5, Czechoslovakia; or to OK1DKW at: U 1. baterie 1, 16200 Praha 6, Czechoslovakia.

G5KW in WJ square

Ken Ellis, G5KW, has written from the Isles of Scilly with details of some of his recent vhf activities. Since arriving on the island of St Mary's earlier this year G5KW has made 28–50MHz crossband contacts with most parts of the USA and Canada, and he hopes to work the few remaining west coast states and provinces, and of course any other dx around, before leaving at the beginning of December. To this end a Cushcraft 617-6B six-element 50MHz Yagi with a 10m-long boom has been set atop a 15m winch-operated tower, which must be an impressive sight. Two rigs, an IC551 and an FT620B, are used for receiving on 50MHz, and Microwave Modules have supplied two special dual-output preamplifiers.

For the higher bands an FDK750E and appropriate Microwave Modules transverter and amplifiers are used to drive a 16-element slot-fed Yagi on 144MHz, and a scaled-down home-constructed version of the 617-6B on 70MHz. Results on these two bands have been disappointing, it being difficult to get over the high ground of Cornwall, Devon and south Wales except during lifts. During one period the memory keyer was set going on 70MHz at various times of day and night, but no contact resulted for a fortnight, when an S9 each way exchange was completed with ZB2BL. G5KW wonders if G stations are neglecting the chance to work WJ locator square by not turning their beams to the southwest.

From 27 May to 6 June G5KW carried out a 10-day propagation study of the ZB2VHF beacon on 50·035MHz, monitoring the signal strength for long periods, with surprising results. The beacon was audible for about 90 per cent of the time, often reaching well over S9 during the day. Of particular interest was the observation that ZB2VHF could often be heard continuously all through the night. G5KW wonders if the propagation was purely sporadic-E, or if some other mode was also involved.

Awards news

The vhf awards manager has reported several unusually interesting vhf/uhf award claims during the first half of the year. Starting with the Four Metres and Down Series, G3XDY of Ipswich secured 1,296MHz Standard No 26 during April; as he already held Seniors on 144MHz and 432MHz this claim automatically brought him Supreme award No 33.

On the subject of the Supreme award, how many readers spotted the deliberate error in last month's *4-2-70*, where it was stated that only one Class B licensee had claimed this highest category? In fact both G8BHH and G8IFT took Supremes during 1980. They have now been joined by Tony Collett, G8GXE, of Langley, near Slough, whose claim for 1,296MHz Standard No 27 was the final qualification needed for Supreme award No 34.

In the *4-2-70* Squares series G8BWR has taken certificate No 11 for six countries and 30 squares on 432MHz, and G8GXE has earned No 2 in the 10+40 category on the same band.

On 144MHz John Matthews, G3WZT, of West Sussex, ignored the intermediate stages and went straight for the 20 countries and 100 squares category. In fact the 100 cards in the claim included confirmations from 27 countries, and over a quarter of the QSLs were in respect of ms contacts. On the subject of getting the cards in, G3WZT had this to say: "The return rate was rather slow and difficult, with a last desperate attempt with saes and ircs for some cards. One rather interesting point was the large number of direct senders who stated that cards had been sent via bureaux, suggesting that quite a few cards had gone astray in various international sorting offices"! Although G3WZT has worked 150 squares and 35 countries on 144MHz since 1979, it has taken until now to amass the cards for 100+20.

A similar tale has been told by Garry Orford, G4FRO, who had worked 80+18 but at the time of writing had received confirmation for only 39+10. G4FRO has been rather more successful in getting in the cards for 70MHz, where he now becomes only the second operator to take the basic 4+20 award. This success was achieved from a sea-level site, with a three-element Yagi and just 10W of rf most of the time, but occasionally a burst of 100W p.e.p.

The most spectacular claim of the month came from Mike Lee, G3VYF. As if to make the point that the 4-2-70 Squares series could go higher than the present limit of 20+150, G3VYF recently turned in a claim for 144MHz which included cards for 33 countries and no less than 180 squares. This claim is historical not only for being the first of this size, but also for including a verification for the first UK to Israel contact on 144MHz, namely G3YVF-4X4IX on 11 June. The breakdown by propagation shows versatility in choosing the mode to suit the occasion. Of the 180 contacts 50 were made by ms, 12 by aurora, eight by Es, and the rest by tropo. The first-ever 144MHz 20+150 sticker has now been sent to G3VYF to be affixed to his basic certificate, No 3, achieved in 1979.

G5KW and part of his vhf set-up on the Isles of Scilly. The QSL cards are for 28–50MHz crossband contacts

G3VYF's claim makes it clear that further extensions to the upper limits of the 4-2-70 Squares series of awards must now be considered. One possibility which has been mooted would be to make the series open ended, perhaps with an "honour roll", along the lines of DXCC. Do readers have any comments on this idea, or alternative suggestions?

Scatter

At 2120gmt on 21 June G8PWX (ZP73d) completed an rtty QSO with LA3EQ (CS29h) on 432MHz. The 660km contact is thought to be an rtty "first" between the UK and Norway on 432MHz.

GJ4ICD has pointed out that normal UK postage stamps are not valid in Jersey. Those sending a QSL card direct to a GJ station should therefore enclose an irc rather than an sae. It would also be courteous to include an addressed, but unstamped envelope, which may help speed the return of that precious piece of pasteboard.

Several correspondents have mentioned regular skeds run on vhf and uhf. G4DGU, in Devon, for example, works the 600km-distant ON5FF on 144MHz cw most evenings. G4BYV in Norfolk has a working-days-only sked at 7am on 432·22MHz with G8BAV in Derby, 169km away. This has been running for 10 years and has passed the 2,300 contacts mark. The a.m. used in the early days has now been superseded by ssb, and each station uses just 10W.

G2DHV, in Sidcup, is now back on vhf/uhf after a break of 15 years, and finds the modern bands strange. He uses an R216 receiver, which brings back happy memories for G4ANB, and runs 25W cw to a five-element Yagi at 8m on 144MHz; 10W to a three-element on 70MHz; and 10W to a slot-fed 5-over-5 on 432MHz.

Anyone who participates in national field days should expect the unexpected. This includes Brighton & DRS which was operating from a site near Hove during vhf nfd. Early on the Saturday evening G8WBI kicked a lump under the groundsheet in the 70MHz tent and, having removed the offending article, which looked suspiciously like a mortar bomb, the police were called to investigate. Immediate suspicion fell on other groups competing in the same contest, but further investigation suggested it was a smoke device which had been there since the second world war. The object was removed by the police.

Once upon a time several operators claimed they did not send reports to *4-2-70* because of uncertainty as to the deadlines. Curiously, since deadlines have been published hardly any of them have put pen to paper, and names will be named unless they come up with another excuse soon! All news and views for **November** to reach G4ANB by **19 September** (late news by **29 September**) and for **December** by **17 October** (late news by **27 October**) please. □

SWL NEWS

Bob Treacher, BRS32525*

QSL cards

A large number of listeners often ask "How do I get my own QSL card?". Assuming you have an "A" or "BRS" number, the answer is fairly easy: locate a printer who will print them. Your scribe has recently received extremely fast and efficient service from Express Printing Services, 28 Payne Avenue, Hove, E Sussex BN3 5HD, and would certainly recommend them. They have three main designs and are pleased to give quotations for special designs upon receipt of basic details. Prices are very reasonable. Those interested in their first QSL card, or perhaps an older hand simply looking for a new design, can write for a batch of sample cards with no obligation, but please be considerate and send an sae.

QSL cards these days could take prizes for superb artwork, ingenuity and wit. Many listeners and our licensed colleagues pride themselves on a high quality QSL card to entice that rare QSL card from other operators. It is considered in many circles that a well turned-out card, which stands out above the rest, will get the desired results. Some swls perhaps find it difficult, because of their age and lack of earnings, to pay out large amounts on QSL cards, but to gain a respectable return and assuming all swl reports to be on a par, that little extra spent on a "decent" card might just make the difference between receiving a QSL card from a station or not.

Another point, and perhaps of more importance, is to make out the card legibly. Remember, your card has to pass through numerous hands before it reaches its desired location. Illegible cards are invariably misdirected because of poor handwriting. Also ensure that the callsign of the station for which the card is intended is on both sides of the card. The callsign *must* be written legibly on the back—on the top left or right—as it is from this that your card is sorted, not from the information contained in the information box on the front. Also make sure that if you are sending a QSL card to, say, C31VK, the card should be clearly marked "via QSL manager F6EXV". It is in situations like this that QSL manager directories are really important, and, as mentioned in the June issue, Brian Russell, BRS33915, will, for £1 and an sae, send the latest *W6GO/K6HHD QSL Managers List*. These are just a few hints but, if anyone has any other points to raise, answers or remedies can be included in a subsequent issue.

144MHz dx

Welcome to Iris Rabbitts, BRS42676, who reported her 144MHz activity through June and early July. She has an advantage of being the xyl of G8LFB, who is often heard working dx on ssb. She uses an IC202S with a 3SK88 in the front end, and a 16-element Tonna at 30ft, and has logged 17 countries and 43 QRA squares. As she remarks, the hard part is waiting for the cards to come in, although she had received three OZ cards direct while her om—green with envy—is still waiting for his to come via the bureau.

A brief report of conditions from various correspondents follows: 21 and 22 June saw good conditions to LA, with LA7RU at 2100 and LA6HL at 2220 on the 21st, both in CS square, and LA9LS in DS70d on the 22nd at 2214. A French group of operators activated EI during the period in question. EI3VDE was heard at 2130 on 30 June and at 1630 on 6 July signing from VL42a. On 7 July EI2VDX/P was active from the rare square of UL—UL40C—with weak signals. Conditions did not enable the group's signals from UM square to be copied by those listeners who have reported. During NFD, conditions were fairly flat but stations at about 500–600km were copyable. Those /P stations situated on the hill tops certainly reached much further. Tropo dx noted included OZ5DD/LX/P in DK71f, OZ1FTU in FP10j, OZ5IQ in FP38g, DK7LS in FO55b, and SM7FJE in GQ56b.

A quite spectacular sporadic-E opening happened on 10 July, when stations in the London area worked into CT1, EA7, EA8 and EA9. It seems that others further north actually heard stations in CN8, EA6 and ZB2—unfortunately your scribe was not in his shack! Please keep these vhf reports coming while the good conditions exist.

* 79 Granby Road, Eltham, London SE9 1EH

All-time countries list
(Starting score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
G3KMA	301	319	324	254	187	53	1,438	ssb/cw
BRS25429	268	301	326	227	220	53	1,395	ssb
BRS17567	282	317	350	181	226	34	1,390	ssb/cw
BRS32525	259	294	315	228	242	41	1,379	ssb
BRS25901	264	290	321	205	201	32	1,313	ssb/cw
BRS35943	232	274	297	198	218	30	1,249	ssb
G3GIQ	294	318	321	154	126	28	1,241	ssb/cw
RS42604	262	272	266	224	169	46	1,239	ssb
A8808	230	264	290	158	163	53	1,158	ssb/cw
G3MCS	278	293	303	142	118	18	1,152	ssb
BRS8841	220	252	305	156	163	18	1,114	ssb/cw
G3ALI	180	206	299	162	184	0	1,031	ssb/cw
G4FAM	204	222	225	170	115	31	967	ssb/cw
G3IGW	169	188	214	187	127	82	967	ssb/cw
BRS43475	184	229	239	129	107	31	919	ssb/cw
A9191	174	211	250	94	104	18	851	ssb/cw
BRS1066	156	174	251	130	84	42	837	ssb/cw

1981 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS14585	185	186	191	119	120	15	816	ssb/cw
RS42604	160	175	158	136	116	29	774	ssb
BRS48909	164	206	211	76	59	18	734	ssb
A8841	142	164	204	102	87	5	704	ssb/cw
A8808	166	148	140	105	95	34	688	ssb/cw
BRS1066	128	154	155	82	64	37	620	ssb/cw
BRS44703	130	123	139	89	88	8	577	ssb
ARS42503	92	125	145	28	32	0	422	ssb
BRS18529	48	60	111	69	71	20	379	ssb
BRS44266	115	64	110	42	33	8	372	ssb
BRS35509	64	100	118	39	32	1	354	ssb
BRS40705	95	85	92	31	24	1	327	ssb
BRS41992	48	44	101	55	47	15	310	ssb
BRS46708	71	40	85	40	57	0	293	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

News and views

Dave Stewart, BRS40293, reported after a long absence, with a good number of QSL additions: H18XJO, P29JS, S83W, ZD7AL, 5T5ZR and 9Q5GB. He also reported HS1AMH and 5N3PJR (fast QSL via G4GIR).

Leonard Salaman, BRS46149, now uses an FRG7700, FRT7700 atu and a Datong FL2. He also has a 144MHz converter. He passed on information on the East Mediterranean Net at 0800 on 14,303kHz controlled by G8OS. The Vampire Net meets on 3·7MHz around midnight and consists mainly of lighthouse keepers. The Dad's Army Net meets around 3,730kHz at 2130 daily. Quite a selection to listen to there.

Graham Powell, RS46228, reported that most of his listening was on 7MHz between 2200 and 0600. His best scalps seem to have been FR0FLO (prompt QSL direct to PO Box 200, 97430 Tampon, Reunion Is), TL8CN, ZE1EV, ZD8TC, FG7BU and HP1XFZ.

Paul Crankshaw, BRS48909, reported VK2AGT/LH, XZ5A and VE1BL/1 (St Paul Is) for new countries. On 21MHz he has caught up with K6XT/NH9, KP2A/D, ZK1GC/KH8, KS6DV, KX6ZZ and H44DX.

Brian Wainwright, BRS44703, picked 9N1MM as his best catch of the month. He also reported D4CBC, PZ5RC, VR6TC, 9M2BB and 9M6MB.

Other QSL cards reported from various sources include FG0DWT/FS, UA1PAL (Franz Josef Is via UA4HLR), JY3ZH (for an swl report sent in 1974—which proves that you should not give up too soon if you do not receive a card within, say, a year), PY2XB/0 (Fernando de Noronha), TG4NX (via WD8MOV), JA1JWP/JD1 (7MHz ssb) and SP9BPQ (for 144MHz sporadic-E swl report).

Late news

David Clanarhan, BRS47687, wrote for the first time from the Orkney Is. He is particularly interested in 144MHz listening, and was anxious to erect an antenna for the band which would give him satisfactory results. On the hf side he uses an FRG7700.

Brad Bradbury, BRS1066, reported a horde of QSL cards awaiting his return from holiday in SV. The best of the bunch: PA0, OK, EA9 and UC2 on 1·8MHz, plus M1IPA, TYA11, CN29FIC, DK5DB/ST2 and C31WK. On percentage QSL returns direct, Brad offers 80 per cent from July to December 1980, and 69 per cent from July 1980 to July 1981. His high return is obviously accounted for by enclosing two ircs with each QSL request—expensive, but worth it in the long run.

Reminders

Do not forget the Cray Valley RS SWL Contest on 12 September, and the RSGB 144MHz SWL Contest on 5 September; rules for both in July issue. Anyone needing a QSL card for Jersey (GJ) and who logged, or worked, GJ3VLX between 22 August and 1 September should send their QSL cards to your scribe, who is the QSL manager, with sae (or ircs from the dx).

Copy for the **November** issue should be with your scribe no later than **22 September.** For **December,** the copy date is **20 October.** □

THE MONTH ON THE AIR

John Allaway, G3FKM*

The value of DXCC

Like many other amateurs in this country I am a keen dxer. However, I am disgusted with the way in which many contacts are made for the DXCC award. No longer is patience and careful listening rewarded by good dx contacts. List and net operations are the way in which most rare dx is worked now, keeping honest achievement well away from honest dxers, and distributing pseudo-contacts to appliance operators worldwide.

The whole exercise is strongly reminiscent of the "expert fisherman" who buys a whale from the fishmongers and puts his "catch" in a glass case to show to his admiring friends. Even the smell is the same.

Yes, you might say, but without going on the lists and nets you'll work no dx. Nearly true, more's the pity, but it hasn't got to be that way. As for the argument that "the dx station wants it"—that's fine, but the contrived contacts that result shouldn't be valid for DXCC.

I've tried writing to the ARRL DX Advisory Committee invoking Rule 8 of the dx operating code (look it up in the "Operating a station" chapter of the ARRL *Handbook* if you don't know it). I've tried convincing the ARRL that far from promoting dxing, lists and nets are killing off good operating and devaluing the award. I've asked them to disallow claims where contacts have been clearly manufactured in that way. For my pains last August I had a postcard "thanking me for my comments". No action though—why not?

Am I a voice in the wilderness, or are there some other fools out there who want to do it in the old, hard, honest way, and gain some satisfaction as a result? I'd like to hear from them (via G3FKM please) in order to approach the ARRL again, this time with some significant support from the UK. I had something like a petition in mind—or are you guys happy with the way it is?

If so, you can include me out . . .

Ron G. D. Stone, G3YDX

Page 737 of last month's *MOTA* carried a map which showed a number of coastal stations in Britain which share 1·8MHz and 3·5MHz with the amateur service. As the caption said, "at all times steps must be taken to avoid any possibility of interference by amateur stations". In the case of 1·8MHz we are permitted the use of low power on a secondary occupation basis and may only continue if we are causing no interference to the primary band users. After 1 January next we shall be allowed to use 10MHz on exactly the same basis, and it is quite possible that we *may* even receive permission to utilize the other two new hf bands—18 and 24MHz—as secondary users from the same date. Full use of these last mentioned bands will follow in due course. If we do have limited use of 18 and 24MHz this will be as a special privilege and it will be absolutely essential that we obey all the rules!

Expeditions

Ron, ZL1AMO, hopes to visit the Kermadec Is and operate as ZL1AMO/K during November or December. However, permission to land on the island group is not easily obtained, and should he succeed in getting this the charter of a boat will cost in the region of US $3,000. He welcomes donations which will be answered by used stamps from his incoming mail—his address will be found in "QTH Corner" under VK4ANS/LH.

According to the *Lynx DX Bulletin* there is a possibility that FR7AI will be on Juan de Nova as FR7AI/J during November and December. Operation in this case will be ssb only. Other activity from the same area is promised by FR7BP and FR0FLO who hope to be there around 15 September, if they have managed to cover part of the projected US $11,600 transport costs.

The *Long Island DX Bulletin* mentions a rumour that VK3ADR is planning to be on Spratly Is (1S) on 19 September.

An International Police Association expedition by DL3SZ, WA8VDC and others is being planned for May 1982. On this occasion they will visit Mt Athos. This year's expedition to San Marino as M1IPA resulted in over 12,000 contacts being made.

Activity from San Felix Is (CE0X) is widely forecast for the period 14 to 28 September. The callsign may be SV0BV/CE0X, and the operators are said to be going to be SV0BV, SV1IW, SV1JG, N4NCL, WB9AAD, and W0AX. Operation will be on all bands from 3·5 to 21MHz, both cw and ssb. Donations may be sent to the San Felix Escrow Fund, c/o N4CNL, 1231 W Tharpe, Talahassee, Fla, 32303, USA.

Five members of the N California DX Club will be on Niue Is (ZK2) during October and November. Their stay should cover both sections of the CQ WW DX Contest.

DX news

JW5NM was due to close down on 1 September and return to his LA5NM home QTH. W1JTI will be in the Faeroe Is until 1 October using his OY1KH callsign, and mostly to be found on the cw ends of all bands 3·5 to 28MHz.

XZ5A and XZ9A continue to be worked and are often both on 14MHz—one near 14,170kHz and the other near 14,225kHz. XZ9A has also been heard using cw. It would appear that this operation is taking place from a location in eastern Burma in Karen state and that permission to operate was given by the local military. The political situation in Burma is complicated and it is not yet known whether QSLs will be accepted by ARRL for DXCC credit.

WB0ICS is likely to be on Kure Is for about a year, and is active as WB0ICS/KH7. He has been worked from the UK on 14MHz ssb, and asks for QSLs via WB6FBN.

KX6DC has a new callsign and is now KX6OR. He keeps a schedule with AD1S (who is his QSL manager) at 1100 on Sundays on 14,210kHz, but is also to be found on the band most days after 0800. Another Pacific station who keeps schedules with AD1S is ZK1CE—his is at 0500 on Thursdays on 14,265kHz.

VK9ZD, who left Willis Is at the end of June, said that he would be replaced by VK9ZG. Tom, VR6TC, now meets DL8FL at 0630 each Sunday on 14,140kHz, and says that another Pitcairn station—VR6KB—will be on the air soon.

HC1MD and his wife, HC1MM, return to the Galapagos Is on 15 September for one year. They are both doctors and will be working in the local hospital. Maria will use the HC8MM callsign, but Rick's would be HC8EE or his call may have another suffix.

TJ1GH is believed to work all-comers after his schedule with QSL manager DL1HH at 0830 on Saturdays on 21,190kHz. T5TI should be on the air for the rest of 1981—he is often found near 14,135kHz from 1700, and on 21,300kHz at 2000 when he tries to work into the USA.

7Q7LW is on the air almost daily after 1700, and has been heard on 14, 21 and 28MHz ssb. Les was formerly G3JSU, VQ2LW and 9J2LW, and has been on 21,280kHz after 1800. 9X5WP is newly licensed, and loses his mains power supply at 1930—he has been heard on 21MHz ssb after 1800.

The Sovereign Military Order of Malta has been recommended by the ARRL Awards Committee to be allowed DXCC status. No final announcement had been made when this was being written, and QSLs for contacts with 1A0KM should not be submitted yet.

VQ9QA will be fairly active during September and should be sought near 14,030kHz between 1000 and 1400, and near 21,050kHz between 1600 and 1800. Days of operation will vary but will often include Saturdays and Sundays. Advance notice is given that out-of-turn callers will not receive QSL cards.

G3DQL passed along the information that LX2BQ will only QSL direct, and to those enclosing return postage. He will not send out cards via the bureaux. Willy's address will be found in "QTH Corner".

9U5DS has notified G3DRN that QSLs for Burundi stations should now go via 9U5BB and no longer via UBA or ON5TO (see "QTH Corner"). 9U5s who have QSL managers are as follows: 9U5AV (K5VT), 9U5AC, (via REF), 9U5DP (ON4IY), 9U5SK (ON5GQ), 9U5BZ (ON6LV) and 9U5CR (ON8OF). A 9U5 Net is held on either 14,017, 21,017 or 28,017kHz at 1700 each Thursday.

Overseas news

The Secretary of the IARU Region 3 Association, 9V1RH, has supplied the latest information on licensing in Australia. There are now three classes. **1.** The AOCP—Amateur Operators Certificate of Proficiency. This is the highest class and permits the holder to use all authorized bands with all authorized modes. Callsigns have two- or three-letter suffixes beginning with the letters A, B, C or D. **2.** The AOLCP—Amateur Operators Limited Certificate of Proficiency. The holder of this may operate on all authorized amateur bands above 30MHz. The use of cw is not permitted as the AOLCP does not entail the passing of a morse examination. Stations in this group have three-letter suffixes beginning with X, Y or Z. **3.** The NAOCP—Novice Amateur Operators Certificate of Proficiency. Novice licence holders may operate between 3,525 and

* 10 Knightlow Road, Birmingham B17 8QB

3,625kHz, 21,125 and 21,200kHz, and 28,100 and 28,600kHz with a power of not more than 10W mean power output or 30W p.e.p. output. Callsigns also have three-letter suffixes, in this case beginning with N or V.

A combined licence has just been issued for those holding both AOLCP and NAOCP, and this is identified by the use of the letter K as the first suffix letter.

Top band

Stations in Norway have been given permission to use 1,810–1,840kHz between 2300 on 13 November and 2300 on 15 November, and again from 2300 on 27 November to 2300 29 November.

Steve Lowe, G4JVG/SM0, operated from the Aaland Is in April, and believes that he was only the second non-Finnish amateur to receive such permission. Top band is not permitted on the standard Finnish licence but must be specifically requested and a separate licence is issued. This permits power of 10W p.e.p. only between 1,820 and 1,845kHz and between 1,915 and 1,955kHz. Steve found that stations in the USSR were strong, with UK stations only about S6, although GD4BEG and G3LYW were S9+.

Discussion has now begun in the USA about the future band plan for 1·8MHz. The extremely complicated mechanism whereby the band is to be released to the amateur service will mean that changes can only be gradual; however, it does seem sensible to have ideas ready to put into action when the time comes. Suggestions listed in the spring *160 Meter DX Bulletin* written by W1BB all agree that a segment at the low end should be reserved for cw use and that the "dx window" might be left where it is now. However, viewed from outside the USA, the various footnotes in the ITU Regulations might indicate that it should be moved slightly. Planning in Region 1 will be studied by the permanent HF Working Group set up during the Brighton Conference.

Intruder Watch—the "woodpecker" . . .

G5XB has kindly supplied the following comments on this bane of the hf band user's life: "We believe these amplitude modulated pulses are associated with a long-distance ranging or position fixing system, and most of the evidence available to Intruder Watch (some of it supplied by radar experts) supports this view. There are a number of sources of this signal, the strongest of which apparently comes from SW USSR. Some have been traced to more northerly areas, while others probably come from a more distant point, probably in eastern Siberia. The peak power of the pulses is believed to be in the order of tens of megawatts. The system is frequency-agile and the signals move up and down the hf end of the spectrum following the muf. The amateur bands are affected only when these frequencies are capable of supporting the desired propagation mode. In recent times comparatively short pulse trains have been radiated, and these are believed to be ionospheric soundings made prior to the establishment of more sustained radiation. During the past two years detailed observations have shown that some of the pulses, usually the weaker ones, come from sources outside the USSR, and bearings taken at intervals confirm this. It is therefore not true to describe all the pulse signals as being of USSR origin, although the stronger ones certainly are."

. . . and the motor-bike

Also from G5XB: "The so-called 'motor-bike' is also believed to be a ranging system, except that the rapid 'phut-phut' (at 25/s as opposed to 10/s in the case of the 'woodpecker') is produced by frequency modulating a constant level carrier over a band of 50 or 100kHz. The effect is similar although the difference can be seen easily if the receiver tuning is moved rapidly across the signal. When moved in one direction the apparent pulse-repetition frequency increases, and when moved in the other it decreases. These signals are believed not to come from the USSR but from several areas in the Pacific—hence the reports from Region 3. The radiated power appears to be much lower and probably in the single-figure megawatt range.

"IW world-wide is pressing, and will continue to press, for the removal or scaling down of these globe-saturating intrusions, and it may well be that the excellent co-operation we have from the UK administration will bear fruit both in the domestic and international fields of radio communication."

The "DX Edge"

This rather unusual name describes a very useful operating aid now being produced by Xantek Inc, (PO Box 834, Madison Square Station, New York, NY, 10159). It consists of a plastic background map of the world and a series of 12 clear slides (one for each month of the year) which are marked with daylight and darkness areas. With it one is able to calculate sunrise and sunset times for any location, optimum "grey line" times, expected long-path opening times, and also optimum daylight-path times for the higher frequencies. The whole may be obtained by sending payment in US dollars or any convertible currency to Xantek. The price is £8, plus postage (which for the writer's air-mail kit cost USA$3).

Awards

The UN-DU Award

This most attractive certificate now costs USA $12—not USA $6 as before 31 July. PARA point out that air mail rates, printing and handling costs have more than doubled since the certificate was first introduced.

WAZ

A reminder that the charge for this has also been raised—it now costs USA $10 but *CQ* magazine subscribers need only send USA $4 if they enclose the label from their most recent copy of the magazine. The 5 Band WAZ plaque now costs in the order of USA $60.

Japan Osaka Century Certificate

Three classes: Junior (requires proof of contact with 10 different JA stations whose last callsign letter enables the words "Naniwa Club" to be spelt); Standard (proof of at least 10 Osaka stations having been contacted); and Special (at least 100 Osaka contacts, including 62 of which are located in the 31 cities, 5 guns, and 26 wards of Osaka prefecture. Send certified list and eight ircs to Akio Sonoda, JR3DDQ, 7-24, Daioku 3 Chome, Naniwa-ku, Osaka 556, Japan.

The White Rose Award

Those looking for contacts with Yorkshire for this award will be interested to know that there is a White Rose Net every Thursday at 1900 on 21,350kHz—this is particularly for dx stations. The net will move to 3·5MHz during the winter to help UK and other European stations to obtain contacts. Further information is available from G4EZX or G3KWT, QTHR.

Norgessertifikatet-WALA

For contacts with Norwegian stations since 1 January 1950. Applicants outside Scandinavia require proof of contact with 20 Norwegian stations on any band(s). At least six of these must have been located north of the

A number of Larnaca amateurs visiting the QTH of Mike Townley, ZC4MT, at Dhekelia. L to r, back row: Takis, 5B4FK; Thanos, 5B4CR; Vassos, 5B4CK; Mike, 5B4DV, Doros, 5B4EA, and Takis (swl). Front row: Mike, 5B4 and ZC4MT; Andreas, 5B4PA; Eric, 5B4CJ; and Stanos, 5B4AH

QTH CORNER

A4XCA, A4XIH, A4XIY, A4XJH	PO Box 98, Muscat, Oman
C3ILM	via EA3BDW, C. P. Bertomeus, Transversal 303. Tarrasa, Barna, Spain.
G3MUV/CE0	via WD4HMG, T. M. Seyfried, 662 Cortez Cir, Alamonte Springs, Fla, 32701, USA.
F0CH/FC	J. Laib, Einfangstr 39, CH 8580 Amriswil, Switzerland.
FG0DDV/FS	via W2QM, R. A. Chill, 1150 Brighton Beach Av, Brooklyn, NY, 11235, USA.
HB0ALO	HB9ALO, M. Mombelli, Via R. Simen 9-A, CH 6830 Chiasso 3, Switzerland.
JX5VAA	via LA7JO, M. Kvandal, Tertnesvijn 74, N-5064 Tertnesvijn, Norway.
WB0ICS/KH7	via WB6FBN, Major J. B. Dolman, 5521 Sagitarius Way, Citrus Heights, Cal, 95610, USA.
KX6LO	via KX6BU, Kwajalein ARC, Box 444, APO San Francisco, Cal, 96555, USA.
LX2BQ	W. Bonblet, Box 22, 9 Rue Tudor, 6582 Rosport, Luxembourg.
OJ0AM	via OH2BAD, M. Heikinheimo, Lokkalantie 16-A-19, SF-00330 Helsinki 33, Finland.
OY1KH	via W1JTI, L. Tallman, Star Route, South Effingham, NH, 03882, USA.
T32AB	(new) via N7YL, Janice Weaver, 1501 N. 22nd St, Las Vegas, Nev, 89101, USA.
TI9VVR	TI2VVR, Box 6, Hatillo, 1300 Costa Rica.
VE1BU/1	via W3HNK, J. Arcure, Box 73, Edgemont, Pa, 19028, USA.
VK4ANS/LH	ZL1AMO, R. W. Wright, 28 Charles Av, Massey, Henderson, Auckland 8, New Zealand.
VP2VDG	K4IIF, J. Attaway, PO Box 205, 165 Lake Otis Rd, Winter Haven, Fla, 33880, USA.
ZS6ANL/3D6	N. Taferner, Box 8914, Elandsfontein 1406, Tvl, Rep of S Africa.
9U5 QSL Bureau	Box 14, Bujumbura, Burundi.
9X5WP	Wes Parker, Box 1, Nyanza, Rwanda.
9X5WR	via SP6FER, Z. Pietrzak, Skrytka Pocztowa 2156, 50-985 Wroclaw 47, Poland.

Arctic Circle. Minimum signal reports of RST338 and RS33 must be indicated. Contacts with JW and JX count for the award. Send certified log data (showing date, time, callsigns, reports exchanged, and location of stations) plus 10 ircs to: NRRL Award Manager, Erik Jahnsen, LA7AJ, Kaupamgruta 21, N-3250 Larvik, Norway.

Welcome

The Society was happy to see the following new overseas members join during June: EA4AHZ, EC6FG, EI5EJ, IW5EJE, K9JCR, PY2DBU, VE3JFH, VK5KEN, VK6NGC, VP8AEZ, VP9HK, WB2EZG, 8P6IB and 9J2JN. Listener members included J. Stephen (HZ), D. Winters (A7), A. Blackmore (A4), K. MacDonald (A2), J. McDonagh (EI) and W. Abrahams (ON).

Contests

VK/ZL Contest

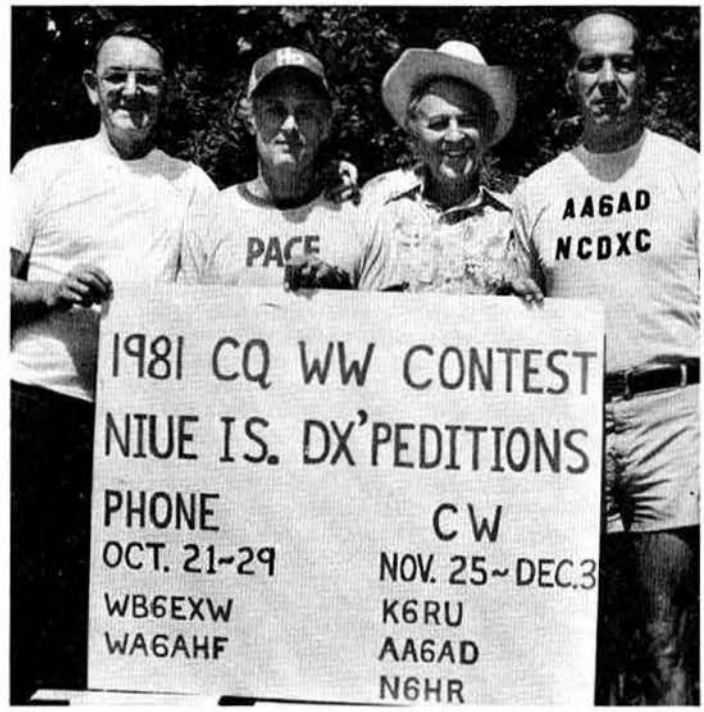
1000 3 October to 1000 4 October (Phone)
1000 10 October to 1000 11 October (CW)

Two points per QSO with VK and ZL, one for each contact with other Oceania countries. The multiplier is the sum of VK/ZL call areas worked on all bands. Exchanges consist of RS/T plus serial QSO number (starting at 001). Logs should show date, time, callsign of station worked, band, serial number sent, serial number received. Underline each new VK/ZL call area worked and make separate log for each band used. Enclose summary sheet showing callsign, name and address (in block letters), details of equipment used, and, for each band, QSO points for that band and the total of VK/ZL call areas worked on that band. A signed declaration must be included that all rules and regulations have been observed. Attractive awards will be sent to top scorers on each mode in each country; if activity warrants, other certificates (second and third) may also be issued. Listeners may also enter and should log VK and ZL stations only, noting date, time, callsign, callsign of station being worked, RS/T of the VK/ZL station, serial number being sent by the VK/ZL station, and band. Scoring and summary sheet as in transmitting section. Phone and cw is combined in the listener section. Send all logs to reach WIA VK/ZL Contest Manager, Neil Penfold, VK6NE, 388 Huntriss Road, Woodlands, 6018, W Australia, Australia, before 31 January 1982.

Scandinavian Activity Contest

1500 19 September to 1800 20 September (CW)
1500 26 September to 1800 27 September (SSB)

Activity is restricted to the following sections: (CW) 3,505-3,575kHz, 7,005-7,040kHz, 14,010-14,075kHz, 21,010-21,125KHz and 28,010-28,125kHz; (SSB) 3,600-3,650kHz, 3,700-3,790kHz, 7,050-7,100kHz, 14,150-14,300kHz, 21,200-21,350kHz, and 28,400-28,700kHz. Non-Scandinavians work Scandinavians, and each station may be worked once per band. For the purpose of the contest Scandinavia is defined as JW, JX, LA, OH, OH0, OJ0, OX, OY, OZ, SM and TF. There are single- and multi-operator single-transmitter and multi-operator multi-transmitter sections. Exchanges consist of RS/T plus serial number (from 001) and each contact counts one point (for European entrants). Others count three points for QSOs on 3·5 and 7MHz. The multiplier is the total of call areas worked on each band added together. A portable station in LA or OZ counts as the tenth call area; eg, G4XYZ/LA counts as LA0. OH0 is the tenth call area in OH, and OJ0 is a separate call



Northern California contesters are geared up for two dxpeditions to ZK2 during the CQ WW DX Contests in the autumn. L to r: Rubin Hughes, WA6AHF; Gary Cervo, WB6EXW; Cameron Pierce, K6RU; and Bruno Bienenfeld, AA6AD. Another, not shown, is Hillar Raamat, N6HR

area. Final score is the sum of QSO points multiplied by the sum of multipliers from all bands. Logs should record date, time, station worked, numbers sent and received, if multiplier, and points. Logs must be posted by 15 October 1981 to: NRRL Contest Manager, Alf Almedal, LA5QK, N-4052 Roeyneberg, Norway.

Results of the **1981 Bermuda Contest** have been received from VP9AD. The UK winner (who will visit Bermuda in October to collect his certificate) is **G5CMX** who scored 800,400 points. Other UK scores were as follows: G3KTJ (787,050), G3VPW (706,820), GU4CHY (679,770), GJ4ICD (393,150), GI4ELQ (284,070), GD4HOO (236,320), GW3NNF (200,475), G3KKJ (106,575), G4FJT (58,940), G4IJW (33,440), G3YBD (11,880), G4BYA (9,170), G4JBH (7,800), G4GFH (5,920), G4HBI (4,140), G2MI (3,630), G3NT (3,360), G4EBK (1,100), G4KAL (1,020), G4HQN (440), G8JD (360) and G3ESF (160). The West German winner is DK5EZ (453,870 points), the Canadian VE3HGZ (285,690), the USA N3RD (516,040), and Bermudian VP9IX (2,327,325).

Readers may wonder whether it is really the intention of the Radio Society of Bermuda for the UK prize to be won by reciprocal licence holders—this has now happened twice in three years.

The ON Contest

0700-1100 4 October (3·5MHz)
0700-1100 11 October (144MHz)

Only contacts with Belgian stations are valid. Any mode. Exchange RS/T plus serial number (from 001). ON stations will give their club code. Each QSO counts three points, and the multiplier is the number of different clubs worked. Post logs no later than 25 October (3·5MHz) or 31 October (144MHz) to Welters Leon, ON5WL, Borgstraat 80, B 2880 Putte, Belgium.

In the **1980 VK/ZL/Oceania Contest** (Phone section) **G3RRS** was top UK entrant with 20,008 points, followed by G3OZF (17,548), G3VPW (9,296), G3UVZ (1,748) and G5MY (160). In the cw section **G5MY** led with 728 points, followed by G3KSH (540), G3VW (360) and G8QZ (8). **RS25429** collected 3,125 points and RS1066 1,168 in the listener section.

Antigua & Barbuda Independence QSL Party

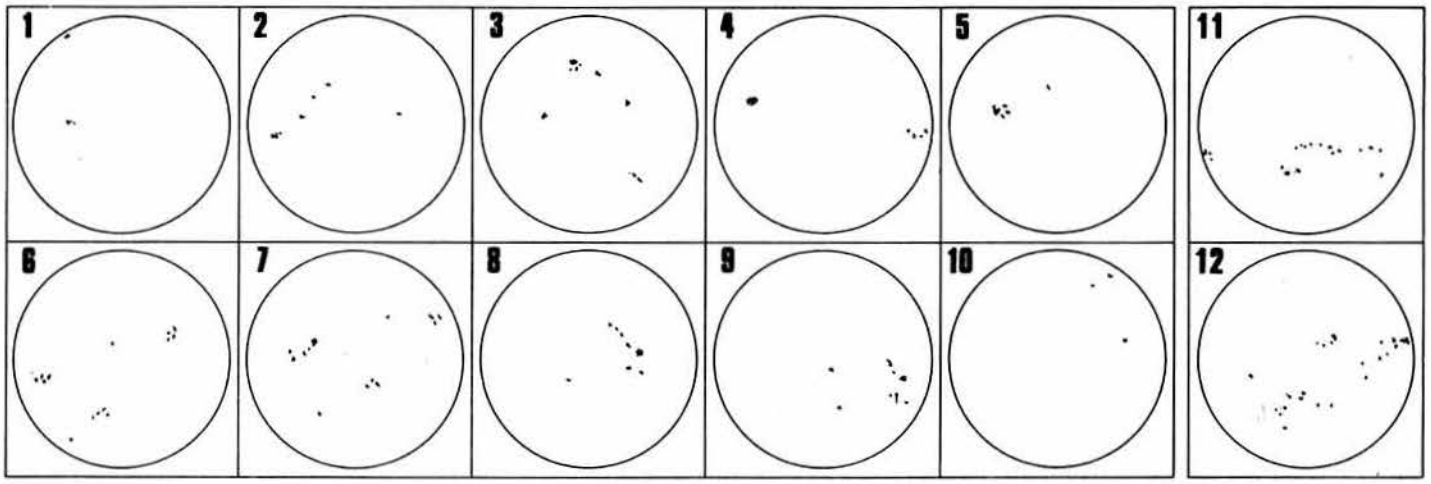
All amateurs are invited to join in this event, which marks the independence of these two territories. Activity starts at 0000 on 7 November, and an attractive certificate will be supplied to those who work four Antiguan stations during the weekend. All that should be submitted is a copy of the log showing stations worked, signal reports, times and bands, together with a self-addressed envelope and USA $1. Activity will be centred around 7,030, 14,030, 21,030, and 28,030kHz on cw between 14,180 and 14,300kHz, 21,150 and 21,300kHz, 28,500 and 28,700kHz, and near

VISUAL SUNSPOT RECORDS

Comparing these records with those for similar periods in 1979 *(Rad Com* August 1979, p749) and 1980 *(Rad Com* November 1980, p1175), the decreasing phase of the present sunspot cycle is becoming apparent.

Two records are shown for April 1981, for the period during which blackouts and high auroral activity were reported.

G2UK



1: 10 June 1981. 2: 13 June 1981. 3: 16 June 1981. 4: 22 June 1981. 5: 23 June 1981. 6: 27 June 1981. 7: 29 June 1981. 8: 2 July 1981. 9: 4 July 1981. 10: 5 July 1981. 11: 9 April 1981. 12: 18 April 1981.

HF propagation study

Band predictions for September 1981

UTC	28MHz	21MHz	14MHz	7MHz	3·5MHz
	000001111122	000001111122	000001111122	000001111122	000001111122
	024680246802	024680246802	024680246802	024680246802	024680246802
EUROPE					
Moscow	....121121..	...26666751.	2.2766667984	874211112588	+4.....25+
Malta	....221111..	...37766662.	522876778997	997421123689	+ +4....3+ +
Gibraltar	.....	....4544451.	21.587777984	998632223589	+ + +3..2+ +
Iceland	.....	.....22122..	47767872	886532223468	+ +52...235
ASIA					
Osaka	....231.....	...366421...	...142124564	.....34.	2
Hong Kong	...2455421..	...36666752.	2...22125886	363	3
Bangkok	...3555642..	...1356678731	4....1125897	1.....366	33
Singapore	...4566653..	...1356668841	4....2125897	1.....366	33
New Delhi	...456662...	..2446667421	631..1125888	4.....368	2.....35
Teheran	...5666663..	1.3655668852	8651..125899	74.....368	4.....35
Colombo	...5666662..	1.2445668852	74....125899	5.....368	2.....35
Bahrain	...67667631.	213644668864	9751..125899	84.....368	5.....35
Cyprus	...3655553..	1.1888888852	867644556899	8731....1478	+4.....4+
Aden	...677777511	424644568976	9861...25899	85.....368	52.....35
OCEANIA					
Suva (s)	.....111.1..	....13545351.	..165212572.	...2....2..	.....
Suva (l)	21.211....63	33276431.574	..374111373.	...2....2..	.....
Wellington (s)	....1221.....	....35555231.	..2742125751	...2....2..	.....
Wellington (l)	11.11.....52	4426531..185	.24741112651	...2....2..	.....
Sydney (s)	...244441....	...167666622.	342125773	.....33.	.....
Sydney (l)	.....1.....21	2212631...75	..1452112473	.....22.	.....
Perth	...576643...	1.247666741.	4...22125886	363	.....3.
Honolulu	.....1..	....12..462.	.124521154..	..12.....	.....
AFRICA					
Seychelles	...666763321	423434667886	974...125899	83.....368	+.....35
Mauritius	...677777632	523545668987	974...115899	83.....368	+.....35
Nairobi	1..677787742	633634468998	9961...15899	871.....367	+4.....34
Salisbury	2..577788753	743744568998	9973...15899	872.....367	+5.....44
Capetown	1..487778854	741865568999	99751..14799	884.....268	552.....35
Lagos	21.387788864	862864447999	99872...3799	7862.....268	453.....35
Ascension Is	11..87667742	762385445897	99875....699	7862.....167	453.....34
Dakar	11..78777862	663585445898	99975....599	7762.....57	553.....24
Las Palmas	....4655552.	21.288888983	986876555799	88741....268	+ +4....4+
S AMERICA					
South Shetland	1....5778862	642246668887	998751114468	6862.....13	353.....
Falkland Is	1...17777862	652466666787	998752111268	7862.....3	4+3.....
Rio de Janeiro	1....8765651	552447544687	998752...169	8762.....16	+43.....3
Buenos Aires	7777762	552336654587	9987521...58	7862.....3	5+3.....
Lima	765651	331143653356	9987521....6	6862.....1	3+3.....
Bogota	1655651	321115643356	9976521....6	6863.....1	3+3.....
N AMERICA					
Barbados	6755651	331147633476	9986521...38	8862.....3	5+3.....
Jamaica	644541	32..14643355	8975421....6	5863.....1	2+3.....
Bermuda	3644541	31..16644576	9875421...37	6862.....2	4+3.....
New York	.....43343.	21...3654565	88533211..26	5862.....1	253.....
Mexico	.....13343.	21....464334	67544111...2	1662.....	.33.....
Montreal	.....33333.	21...3555564	87533211.136	5762.....1	253.....
Denver	.....1211.	1.....145443	56431.112..2	1562.....	.23.....
Los Angeles	.....221.	1.....36432	45332..13..1	.362.....	..3.....
Vancouver	.....	13332	44332..14111	.252.....	..2.....
Fairbanks	.....	11111221	323542124432	..22.....	.....

29,600kHz (the last on fm). The new prefix to be used will b · V2A, and the applications should be sent to: Independence QSL Party, Box 550, St John's, Antigua, WI.

Around the bands

The latest summary from G8KG reads as follows: "It was too much to expect that the high level of solar activity in recent months would continue indefinitely. Activity began to fall sharply in June, and by the last week of the month the average of the solar flux for the preceding 27 days had fallen to a little above 150sfu and had begun to rise slowly.

The monthly mean solar flux for June was only 160sfu, which is the lowest value recorded since November 1978, while the SIDC provisional sunspot number of 89·8 was the lowest since August 1978. These indices were below the average expected for this stage of the cycle so there will probably be a recovery in a month or two. To put them in perspective it should be noted that SIDC forecast that the smoothed monthly sunspot number will have fallen to 116 by the end of this year, but this value is still higher than the peak value reached by Cycle 20 in 1968."

The following very kindly supplied logs from which this section was compiled: G2HKU, G5JL, G3s GVV, HCT, IGW, IMW, LOL, LPS, NWG, GM3YOR, G3YRM, GD4BEG, G4s EHQ, LDS, and LRS and RS1066.

Stations listed in italics were using cw.

1·8MHz. 0000 *EA8AK, EA9EU, LU1DZ, PY1RO, UD6DHC, ZD8TC, ZS5LB, 4X4NJ, 4Z4OL.* **0100** *K2GNC, LU, LZ2CW, PYs 1CUR, 1DMQ, 6BN, VO1HP.* **0200** *LZ1BW, LU1DZ.* **0300** *LU2WM, LU9EIE.* **1200** PA0PN. **2100** *OJ0MA, RF6FFX.* **2200** *C31IU, ŁAs, UK7PAL, ZD8TC, 4U1ITU.* **2300** *LU8DQ, PY1s ARS, ZAE, YU7AZE.*

3·5MHz. 0200 PT2WWW. **0300** J6LF, ZS6DW. **0400** LUs 2DSL, 3AJW, 6DWA, 8EKC, ZP5PX. **0500** *ZL1AZE.* **2200** *OH0MM, OJ0AM, ZD8TC,* 6W8HL. **2300** *EA8AK, UA9CRF, UI8LAG, UL7CZ, ZD8RH, 5B4JP.*

7MHz. 0000 *CT2DE* (QSL to WB3IFD), *VP5PP, 7X5AB.* **0300** *ZF2DT.* **0500** *9L1WS.* **1900** OJ0AM, *TL8CN, VK3s, ZSs.* **2000** *VK3s, ZS6UN, 9K2DR.* **2100** *CN8CU, JW5NM, UA3XBP/4K1* (Antarctica). **2200** *K5IU/C6A, C31HD* (QSL to F6BH), *FM7AV, FG0DDV/FS, JX9AR, LU9CV, VK3MR, 5Z4YV, 9M2LN, 9Y4VU.* **2300** *CE3CGB/6, CP7GM, J88AH, KP2A/D,* W5JMM/SU, VK6s *HD, LK,* OE8AJK/YK, *4K1B, 9U5WR.*

14MHz. 0600 HH0NI. **0700** KH6DQ, *K6XT/KH9, ZD8RH,* ZLs. **0800** CE0AE, JX5VAA. **0900** KL7MF. **1600** DUs, *9V1TL.* **1700** HS5AID. **1800** A4XHI, *A9XDD,* FY7YG, VUs. **1900** *EK1A/N,* VK6s. **2000** HV2VO, J6LOU. **2100** JAs, JT0WA, KL7s, VE6s, ZL2APM. **2200** JT1AN, *KA5BPE/VP2A.*

21MHz. 0000 *HK0BKX.* **0600** EA8RV. **0700** *TY9ER, VU2RPS, 5Z4YW* (propagation test signal). **0800** FO8GU, FO0FB (WB6GFJ), JT0WA, KH6JUU, K7OH, TA8BE (QSL to TA1NAG), WH8AAJ. **0900** JAs. **1000** *JAs, KH3AB,* P29NCB, *PYs, PZs.* **1100** FK8DH, *HZ1AB, TU2JB* (QSL to F6FFS), VK9NYC, 9G1RT. **1200** *HM1AQ.* **1300** *VK9JC, XE2QQ.* **1400** *SV0AA/5.* **1500** *JT0WA, SU1MI, W6-W7s,* 9M2BB. **1600** FR0FLO, S79MC, DL2VK/ST3 (QSL to DF9FM), VS5PP, VS6CT, YB0WP. **1700** *FG7BG,* TL8DC, VS5DD, W6s. **1800** EP2TY, W6-W7s, 5T5ZR. **1900** DU7RLC, JAs, VP2MDG, *VP9DR,* W6-W7s, 5N8PBN. **2000** A7XS, *WB7EHU/KG6,* TR8DX, 7Q7LW, *9U5WR.* **2200** *HH2VP, J73D.* **2300** *KX6LO.*

28MHz. 0800 VK6YO, *XT2AW*. **0900** *ZSs*, 5Z4FB. **1000** A4XIU, JY9XK. **1100** FR0FLO, 9G1DY, *9U5WR*. **1200** ST0AS. **1300** LUs, PYs, YVs, *5R8AL*. **1400** TL8CN. **1600** HZ1AB, 5N0ARV, 9G1AP. **1700** A22AA, *FC0FRV, W6THN* (LP), *ZD8DM, 7X2SX*.

Very many thanks to all who supplied information for this month's column and also to the following for items extracted: the **Ex-G Radio Club Bulletin** *(W3HQO)*, **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/W2IYX)*, **DX News Sheet** *(Geoff Watts)*, and **Long Skip** *(VE3BMV)*.

Please send all items for **November** issue **to reach G3FKM** no later than **2 October** and for **December** by **28 October**—the latter is **earlier than usual.**

Propagation predictions

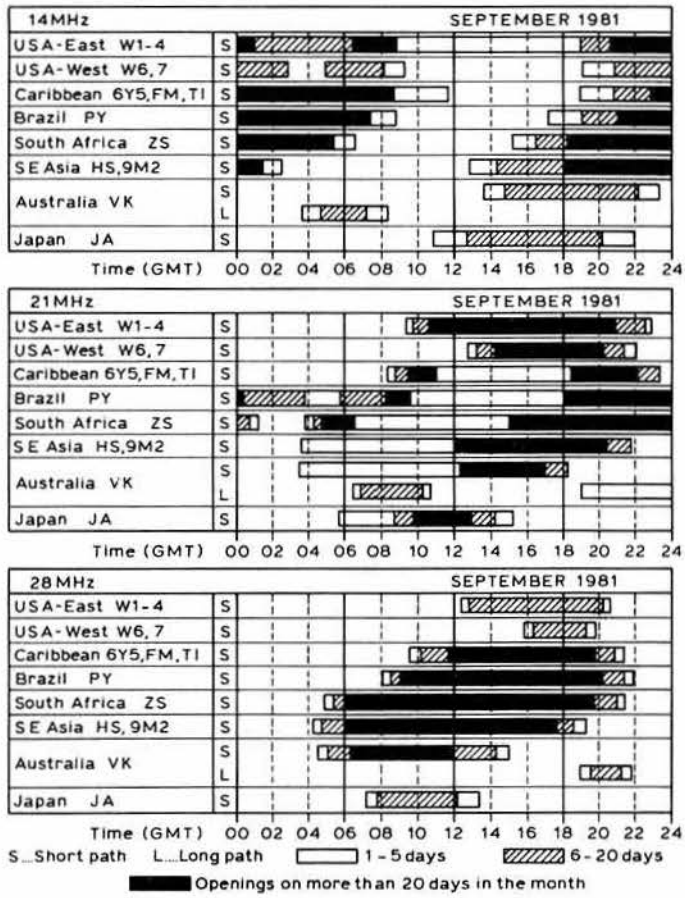
During September, as in March, the propagation predictions are the same for both northern and southern hemispheres. At the same time the slow changeover from summer to autumn conditions takes place in the northern hemisphere, and this means a steady rise in daytime frequencies and a slow end to poor summer conditions. This improvement will reach its yearly maximum during October/November. Conditions will therefore improve considerably in the coming months, especially on **28** and **21MHz**. On favourable days traffic with North America will be possible, and this traffic will improve vastly towards the end of the month. While conditions for traffic with South America and Africa will show little improvement on last month, traffic with Central America and Australia will be greatly improved.

Conditions on **21MHz** will also show an improvement compared with last month, but it will not be as marked as on **28MHz**. Traffic with western North America and Australia will probably be more certain than during August.

The **14MHz** band will remain mostly a night-time dx band even though traffic with North America will be interrupted during the latter half of the night. As dusk falls earlier in the northern hemisphere as the season advances, the best time for dx will be before midnight.

The **7MHz** band remains the ideal band for local traffic uninterrupted by the dead zone. As the season advances the chances for dx will increase while the longer part of the path lies in darkness. Distances covered during daytime will increase slowly on **7** and **3·5MHz** compared with the summer months. Interruptions by the dead zone will occur only infrequently on **3·5MHz** during the latter half of the night.

The provisional sunspot number from the Sunspot Index Data Centre for June was 89·8. Daily numbers vary between 44 and 148. The predicted smoothed numbers for October, November and December are 120, 118 and 116 respectively.



YOUR OPINION

CITIZENS BAND

The Editor

Radio Communication

Sir—Very understandably members have become upset concerning cb, but I think we are basing our opinions mainly on the present activities of the illegal "cowboy" element and we resent the fact that they appear to have bulldozed the authorities into bending to their demands.

I am not suggesting that this illegal element will disappear when the legal service commences in the autumn (I hope so!) but there are aspects of the situation I feel we should be considering. Surely many of the more serious-minded cb operators will be potential amateurs, especially when they discover the restrictive confines of their licence conditions. Should we not be welcoming this element into the membership of the Society and our clubs? Should we not be giving them help and encouragement and fostering their interest in the technicalities of the hobby? Should the Society form a cb committee and give space to cb activities in *Rad Com*?

These suggestions might horrify many but if we become two diametrically-opposed organizations I feel neither will benefit.

L. R. V. Mitchell, G3BHK

Sir—I was somewhat perturbed by the fact that at the last amateur radio exhibition at Alexandra Palace there were at least four exhibitors, no more than 20 yards from the RSGB stand, blatantly exhibiting and selling cb equipment, not to mention the countless numbers of handheld cb radios being operated in and around the exhibition.

In many ways I can sympathize with their predicament, because of the head-in-the-sand hope-it-will-go-away attitude taken by governing bodies and such like. This solves nothing, and we as amateurs are taking the brunt of the spin off.

I am constantly being accused of causing interference, because the mere sight of any form of antenna which is different to the normal in appearance is in for a hiding to nothing. I find it extremely difficult to convince people that I am not the cause of such problems to tv and radio alike. I have even been stopped by the law, who seem never to have heard of the RSGB or amateur radio, even a photocopy of my licence, RSGB and Royal Signals membership cards do nothing to convince them. Yet on several occasions I have heard cb being thanked by the law for help given.

Why is it that we are virtually unknown as a body? Why is it that in the local press, monthly electronic magazines etc, can also publish the sale of cb equipment without any action being taken? What is the RSGB and the Home Office doing about it? Me thinks, nothing.

May I suggest you listen on 28·00–28·04MHz, not to mention 16·70 and 17·20MHz. Yet a mere flicker or tweek on any tv or radio equipment caused by amateurs can mean suspension or restricted operating for an indefinite period.

Let us face it, we are now the minority group, being outnumbered by at least three to one. We have as much chance as a snowball in hell of survival, unless quick action is taken by the RSGB to protect the little we have, but on current trends amateur radio is rapidly approaching extermination.

R. J. Pedder, G3NEE

Sir—A recent correspondent was rightly upset that those with amateur Class B licences were only allowed phone above 144MHz, while cb is to be given 27MHz. A further development of great concern is the recent announcement by *Wireless World* that they propose to publish a design for a cb transceiver for home construction. The result of this will be massive interference with other services if the equipment is not carefully and competently constructed and aligned; and a blurring of the distinction between amateur radio and cb.

Since the operation of homebuilt cb equipment is and will be illegal, surely it is highly irresponsible for *Wireless World* to publish such a design. I have written to the editor of *WW* to this effect, and their acknowledgement states that the set is being designed by a professional electronics manufacturer and it is *WW*'s intention to seek type approval from the Home Office! Quite how equipment which is homebuilt can be type approved is beyond me.

This brings me to a further problem. I understand that the Home Office does not intend to specify type approved equipment only for cb. Instead they intend that a manufacturer's certificate of compliance with the spec should be required, together with suitable labelling of the equipment. One problem with this is that any back-street organization can issue a certificate and stick on a label, but who checks their competence and how? It seems to me that corners are being cut by the Home Office to keep administration costs down, at the expense of possibly massive spectrum pollution in the near future.

I think it might be helpful if RSGB Council could express its concern over these matters to both *Wireless World* and the Home Office before further irrepairable harm is done.

Graham F. Kimbell, G3TCT

Sir—I am sure all Class B licence holders will be grateful to G3LWM for telling them how to get a Class A licence (*Rad Com* July 1981).

But seriously, as I travel around the UK I am amazed at how illegal transmission of radio signals by unlicensed operators has caught on. Every town seems to have its cb shop, and even the village of Chapel-St-Leonards in Lincolnshire has its "cb centre" well stocked with "burners", antennas, caps, shirts etc, but with only a few handportable radiotelephones on show.

In Sleaford I met another amateur on his way home from the Lincolnshire coast and he told me that these shops generally keep the smuggled radiotelephones in a friend's garage. Presumably to minimize the losses in the unlikely event of a Customs raid. If you order a radiotelephone it is delivered to you very discreetly at dead of night.

I saw cb base station gain antennas over houses, shops, garages, hotels, haulage contractors premises and even a police station. On a visit to the Great Central Railway last Sunday I was surprised to find Quorn Station car park given over to a "CB Chapters' Weekend Camp". It is all done so openly. Nobody would imagine that they were doing anything illegal.

But the best cb effort is in the South Haws area of Devonshire where the two most prominent cbers have been invited into the schools to lecture the children on

the joys and rewards of illegal radio transmission. It seems that their teachers feel that as cbers contact stations all over the world the children's knowledge of languages will improve if they have cb equipment. Rather a sick joke, I think many people would agree.

I cannot even get away from cb at home in London. There is a high-power cb base station in the next road, his house now carries two gain antennas, and lately someone has taken to parking a Ford Transit van with cb gear outside my house. I hope nobody thinks it's mine.

L. S. Chase, G8BHT

Sir—I have always believed that the radio waves, like other things which cannot be owned, should be free for anyone to use. Like any such freedom, we need laws and regulations to prevent its abuse and to give everyone a fair crack of the whip.

My experience with cb radio users over the last three years has made me sceptical about this particular hobby and all things connected with it. My first nasty experience occurred on holiday in Cornwall when the occupants of a car covered in cb stickers placed a broken bottle under the tyre of my mobile QTH.

My next nasty experience was of a 70mph juggernaut chasing me down the M1 flashing its lights at me for 5min and waving a cb microphone at my own 28MHz antenna on the rear bumper. The car in front of me, being finally convinced he was being signalled, suddenly swerved onto the hard shoulder (or perhaps he was just letting the idiot pass).

This morning I found a cb net happily established on 28·47MHz, in the middle of my favourite band. To make matters worse, there were no radio amateurs to talk to on the band.

I am thus prompted to put pen to paper and ask the following questions which perhaps someone can answer:

1. How can lorry loads of illegal cb equipment be imported into the country without official connivance?
2. How can a shop near to my QTH be allowed to sell illegally-imported 27MHz and 49MHz transceivers?
3. Why do I have to pay through the nose to the British cartel of amateur radio shops for legal equipment, while cb users can purchase equipment at prices which barely cover the cost of manufacture?
4. How is it that a so-called responsible amateur radio shop which advertises regularly in *Rad Com* is permitted to advertise and sell cordless telephones which illegally transmit on 1·9MHz?
5. Why should licensed operators of radio equipment (including domestic) have to put up with interference to their equipment by unlicensed cb operators? It now costs marine users £17 a year—they would be better off buying cb equipment for boat-to-boat contacts.

I am led to the conclusion that when it comes to matters of law, if a profit is to be made it officially does not matter. What a contrast to the way the law is dragged out and used to bash other sections of the public.

Finally, may I make a suggestion which could help us fight back. If cb is to be legal on 27MHz, should not the G8 amateurs be allowed to use the 70 and 28MHz bands? I would welcome the opportunity of working G8s on 28MHz fm mobile, and of establishing our own amateur chat channels. If we don't, we shall soon find the 28MHz band has been taken over.

D. J. Dunn, G3XRM

EQUIPMENT COSTS

The Editor
Radio Communication

Sir—I wish to endorse the views of G2MI, GW6WM and G3SKI expressed in their letters in *Rad Com* May 1981, on the subject of equipment costs in the UK compared with those in the USA.

The point which I find so offensive is the apparent price fixing which is obviously so well organized in the UK. In the USA, as can be seen from adverts in *QST, Ham Radio* etc, prices are not fixed, the buyer then being free to find the best deal and the dealer being free to advertise his business in more attractive terms.

The mutual protection system operating in the UK, as is apparent in the adverts in *Rad Com,* is in my opinion most undesirable.

It has been suggested that the main importers inform the agents and sub-dealers of the prices at which they must sell their goods, or else! Perhaps the importers may care to comment in *Rad Com* in order to correct any inaccuracy in such a statement.

A. D. Finlay, GM3NEQ

Sir—I read the opinions of G3VZV and G2MI with great interest. I could not agree more with G3VZV's comments, but the area where the government is really losing out is with the illegal equipment now being almost openly sold in this country. Import duty and VAT have not been paid on the majority of the items, and if the number of stations claimed by the organizers of clubs for illegal transmission is true, we can calculate that the government has lost the following revenue to date:
250,000 rigs(?) @, say, £50 each wholesale = £12,500,000.
@ 11% import duty = £1,375,000 lost revenue.
VAT @ 15% on retail price of, say, £80 = £3,000,000 lost revenue.
Total £4,375,000 lost revenue.

Added to this, licence fees of at least £25 annually would add a further £6,250,000, giving a grand total of £10,625,000 lost revenue to date.

I would suggest that the RSGB draw the authorities' attention to this, they obviously do not know the facts.

To G2MI's comments I would add that, from recent information from relatives in the USA and Canada, earnings there are between 1·75 and twice as much as they are here. Therefore the gap is considerably greater than it appears from direct calculations.

H. D. Boocock, G8OVC

Sir—Whether a basic amateur radio rig can be built for £100 in this country (G6FB/G5JL, *Rad Com* June 1981) is beside the point. The fact is that hf ssb/cw 100W transceivers *can* be made in Japan to sell at about £200 ex-factory. There is absolutely no reason why we, as radio amateurs, should not import these sets for ourselves in trade quantities, bypassing the present retail system totally. Working at a profit margin of five per cent, quite adequate on an amateur basis, the resale price here would be of the order of £300 for the FT707 class of rig.

So: is anyone prepared to put themselves out and form an amateur radio purchasers' association? A combined effort on the part of the radio clubs would be quite effective. Radio amateurs should make it quite clear that they are *not* going to pay for a retail service they do not need or want. What shall we have? Retailers and service at dear prices or straight suppliers at cheap prices? It is up to us. But I'll tell you this—continuing to support retailers, professional service departments and the "radio shamateurs" which such places encourage will soon turn *all* our bands into a glorified cb. Hasn't it almost done so already?

S. M. Dyke

AMATEUR RTTY OPERATING STANDARDS

The Editor
Radio Communication

Sir—The spread in the use of 110 baud ASCII code for rtty contacts, as noted by G8QR (June *Rad Com*), especially on the hf bands, is puzzling, since both theory and practice have quite clearly shown that, for hand-typed conversations (which form the vast bulk of amateur rtty contacts), 45 baud Murray code performs much better than 110 baud ASCII in terms of the percentage of character errors caused in the radio link.

I believe the undeserved popularity of ASCII code is a direct result of the spread of home computers, and the relative ease with which the user, or indeed the equipment manufacturer, can adapt such devices to serve as rtty terminals, with little or no effort. If, as G8QR suggests, some 30 per cent of rtty operators can use both ASCII and Murray code, then I submit that those that can should only use ASCII occasionally, spending most of their rtty operating time on Murray code. In contrast, stations equipped with both Murray and Amtor, although few in number at present, invariably prefer Amtor.

The high-speed transmission of large quantities of previously prepared data over strong signal paths, is a different question altogether. However, I would suggest that most of the amateur activity presently described as "data transmission" is not of this type, but merely conversational rtty using a code or speed other than 45 baud Murray code. If, as radio amateurs we are primarily concerned with communicating between ourselves, let us not abandon communication theory in favour of computer theory.

Peter Martinez, G3PLX

OPERATING ON 144MHz

The Editor
Radio Communication

Sir—During the period we have been licensed (since 1969), the vhf bands, and most notably 144MHz, have undergone great changes in all aspects of operation and techniques. Technology has definitely improved, as indeed it always has, but what of operating techniques and the aims of amateur radio. Whether you define the "aims" by the licence conditions or just common sense, then we appear to be drifting off target.

From records of the early 'seventies, an average antenna gain was 10dB(d) and this was almost certainly outdoor. In the 'eighties for fm use a colinear would be considered a good antenna, 4dB(d), but more frequently used are "Slim Jims", dipoles, quarter-waves or "rubber ducks" (what gain?). Taking dipoles as an average—as opposed to the eight-element beam, 10dB—the relative path loss is 20dB plus a loss from indoor siting. In addition, power levels were typically 25W a.m.; 10W or less are now used.

The result of such installations is a lack of interest in simplex operation and fm as a serious mode. We believe that this degeneration of station standards has been fostered by the existence of repeaters which provide guaranteed communication from poor installations.

Achievement has become a dirty word and any remaining home-brewers are pitied as poor relations. While not condoning the use of illegal cb equipment, operating techniques on this band are often better than those used on 144MHz (excepting the jargon).

Would not the closure of 144MHz repeaters bring about a revival of enthusiasm for the construction of efficient stations and a return to good operating techniques in order to establish communication? This move would also liberate many channels to cater for the predicted upsurge in activity.

M. J. Smith, G4FQI
R. Brown, G8CXV

DEMETRICATION

The Editor
Radio Communication

Sir—Is it not time that we amateurs made up our minds to join the other services, and the authorities, by henceforth designating our bands in terms exclusively of frequency? The use of metres, indicating wavelength of emission, has a revered history but is now archaic and quaint. I suggest that, for identifying bands both on the air and in print, wavelength and the metre should be rather firmly pensioned off.

One result, or is it a contributory cause, of this undue persistence of the designation of bands by wavelength I see everyday, when I am invited by my FT401 to select a working frequency by means of a band switch marked in metres and an interpolating (tuning) knob calibrated in kilohertz. The occasional preoccupation of all of us in the construction of antennas does not justify this and similar nonsense.

Please may nobody take the trouble to work out what the new 10, 18 and 24MHz bands are in terms of metres. Rather let us celebrate the winning of these bands by resolving henceforth always to designate all our bands in terms of megahertz and gigahertz. This goes for manufacturers too.

James Watt, G6ZC

A VIEW FROM THE AIR

The Editor
Radio Communication

Sir—As an airline pilot who regularly flies the North Atlantic, I frequently observe the Aurora Borealis from a good viewpoint. However, at 0300gmt on 9 May while flying in an easterly direction just east of Newfoundland I observed a most unusual aurora which may be of interest to *Rad Com* readers. It appeared with strong intensity to the *east* on a bearing of 095° magnetic instead of the usual North Pole position. By 0400gmt our position was 56N 54W and the aurora was still plainly visible but it had veered further south, so that it was on a bearing of 145° magnetic from our position, and appeared spread out parallel to our track of 060° true! I have never observed the aurora in anything but a northerly direction before, and neither had any of my crew, so this must have been a very rare occurrence. HF conditions were also very poor that night on 2,868 and 5,624kHz.

On another topic, several amateurs have expressed an interest in chartering a Concorde for a supersonic trip around the Bay of Biscay, but at present we do not have sufficient numbers to make up the group—we need 80–100 people to get it off the ground. The flight would be a 2·5h trip, with a cold meal and drinks included, from Heathrow to the Bay of Biscay and back, with time for each passenger to make a quick visit to the flight deck. The date would be arranged once the charter was feasible, probably being on a Saturday. The cost would be £250 per head, which is cheap compared with any other means of getting a flight in this unique aircraft. Anyone interested is asked to contact me.

Ian H. Shepherd (Capt), G4LJF,
22 Martin's Drive, Wokingham,
Berks RG11 1NY.
Tel 0734 789610.

QSL ROGER

The Editor
Radio Communication

Sir—I fear that G4GTH makes a rod for his own back by the use of "QSL" in contests (*Rad Com* July 1981). What is wrong with "R" or "Roger"—your message received and understood?

This use of three letters where one will do is typical of the largiloquent verbosity, ie waffle, which bedevils amateur radio.

J. E. Hodgkins, G3EJF

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 28 March 1981

Present: Mr B. O'Brien (President, in the chair), Dr E. J. Allaway, Messrs J. Anthony, P. Balestrini, J. Bazley, R. Bellerby, P. F. D. Cornish, Dr D. S. Evans, Messrs K. A. M. Fisher, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs G. R. Jessop, G. I. Knight, D. M. Pratt, G. M. C. Stone (members of Council), D. A. Evans (general manager) and A. W. Hutchinson (editor).

Apologies for absence were received from Mr R. G. Barrett, GW8HEZ. In addition, the President reported that two council members had resigned; Mr D. J. Andrews, G3MXJ, for business reasons, and Mr W. F. McGonigle, GI3GXP, for health reasons. Council expressed its grateful thanks to both Mr Andrews and Mr McGonigle for their past service on Council.

Financial report
The hon treasurer reported that at the end of December the Society had made a small surplus, and continued by discussing budgeting for subscriptions, and forecasts. Other items in the accounts were discussed.

General manager's report
Mr Evans reported that membership continued to increase at over 10 per cent per year. While more members were leaving, more were also joining. Of those leaving there was a noticeable trend in letters of resignation which cited the present economic climate and unemployment as the reason. Many were saying that they hoped to rejoin the Society later.

Staff problems at HQ due to sickness and workloads were reported.

The RSGB had been accepted as a member of IARU Region 3.

A letter had been received from the Lord Chamberlain's Office inviting two persons representing the RSGB to a Buckingham Palace garden party. Following discussion it was agreed that the President and the executive vice-President, with their respective wives, should accept the invitation.

Review of committee business
Education (25/10/80, 24/1/81)
Discussion took place on a recommendation that the three nominated RSGB representatives on the City & Guilds Subject Committee should be appointed for a period of three years. Mr Anthony was asked to clarify the position further at a later meeting of Council.

Council approved the appointment of Mr M. Topham, G8NUC, as a member of the committee.

Finance & Staff (15/1/81, 19/2/81)
Dr Allaway said a paper presented to the Brighton Conference suggested an extra IARU contribution from national societies of 20 Swiss centimes per member in order to aid amateur radio in underdeveloped countries. The Committee had suggested that the RSGB support this increase provided it was under proper control; it was estimated that it would cost the Society approximately £1,000 per year. Council accepted the proposal.

HF (8/1/81)
Mr Jessop reported two items of correspondence which he had received regarding sstv calling frequencies on 3·5MHz and interference problems on 1·8MHz. Both were passed to the committee.

HF Contests (21/1/81, 5/3/81)
The minutes were accepted by Council.

IARU (29/1/81, 26/2/81)
It was agreed that the Society should support a proposal that the Solomon Islands become a member of IARU Region 3.

Interference (16/1/81)
Council accepted a proposal that Messrs A. S. Kessler, G4DXA; P. A. Braham, G4BYA; D. J. Collins, G2FLB; Miss S. Gabrial, G3HCQ; and Mr G. W. Brind, G4CMU, be appointed to the committee.

Membership & Representation (29/1/81)
The possibility of holding a Regional Representatives Conference in London on 17 October 1981 was discussed.

Council approved the appointment of Mr D. S. Smith, G4DAX, to the committee.

Microwave (14/12/80, 1/2/81, 1/3/81)
Council accepted a proposal that Mr K. L. Smith, G3JIX, become a corresponding member of the committee and that Mr P. J. Marcham, G3YXZ, should join the committee.

Propagation Studies
Mr Fisher raised the question of propagation warnings via beacon stations. It was agreed that while this was considered to be an excellent concept there did appear to be practical technical considerations to be overcome.

Rally & Exhibition (9/12/80, 20/1/81, 17/2/81)
Council discussed matters connected with the trade exhibition at the VHF Convention, and the Alexandra Palace exhibition.

Raynet (13/12/80, 17/1/81, 28/2/81)
Council accepted a recommendation that Mrs Heathershaw be asked to join the committee.

A recommendation that the cost of laminating Raynet identity cards be at the Society's expense, led to a discussion on financial support of Raynet.

Mr Balestrini circulated his ECM's report.

Mr Fisher sought further information on the usage of 145·8MHz by Raynet groups. Mrs Heathershaw said she would try to obtain this information via the Raynet Committee.

Technical & Publication (3/12/80, 14/1/81, 23/2/81)
It was noted that Mr Holliday, G3UVZ, had resigned from the committee because of work commitments.

Mr Hawkyard made some comments with regard to fees being paid to authors of *Rad Com* articles and the decline in component advertising.

Mr Stone said he would like to see full details of the Society's book publishing programme. After discussion it was agreed that this matter would be an agenda item at the next Council meeting.

Telecommunications Liaison (11/12/80, 22/1/81).
Council had been asked by the telecommunications liaison officer if the Society would be prepared to finance a private prosecution against any person causing deliberate interference to a repeater station. After a brief discussion the President said that he felt this matter should be considered and discussed again at a later meeting of Council.

Mr Bellerby commented on the draft of the proposed novice licence. Mr Stevens said that at present there was a tacit agreement with the Home Office, which had accepted the licence in principle. However no frequencies have yet been put forward, and the time scale for the novice licence was related to the computerization of amateur licensing by the Home Office. It was agreed that this matter would be further discussed at the next Council meeting.

VHF (29/11/80, 24/1/81)
Mr Fisher reported on the status of the London repeaters, and said that it was hoped to get all these repeaters back on the air as quickly as possible.

VHF Contests (12/11/80, 14/1/81, 18/2/81)
Council agreed that the Arthur Watts Trophy should be used for the winner of the restricted section (limited power section) of National Field Day.

Membership and representation
Council approved:
(i) the affiliation of the Sunderland Radio Club and the Border Television Radio Club.
(ii) the appointment of Mr K. Baker, G4GNX, as an area representative for the Brighton area.
(iii) the granting of life membership to Mr M. T. George-Powell, G3NNO.

IYDP
Mr Jessop reported that the Bristol group had run a two-day show for disabled amateurs, and that another was being planned for Bath in June. It was felt that more support for RAIBC activities was required; this help was needed both with the administration and physical sides of RAIBC in order to assist in any way which may be required. Good progress was being made in Wales by Cyril Parsons, GW8NP.

Citizens band
After a prolonged discussion it was agreed that this would be a main agenda item for the next Council meeting.

New Council members
The President raised the question of the resignation from Council of Messrs Andrews and McGonigle. Council could fill these vacancies if it wished. After discussion Council agreed to co-opt until the end of 1981, Mr Ian Kyle, GI8AYZ, who was the regional representative for the Society in Northern Ireland, to represent Zone F, and Mr McClintock, G3VPK, who had been the runner-up in the last Zone C election, to represent Zone C.

Reports
Mr Bellerby said that he could obtain from Mr Taylor, G3DME, a device for showing 35mm slides at exhibitions. It was recommended that this be accepted.

Mr Knight reported on a recent meeting in Scotland of regional and area representatives; it had been a successful day. Mr Knight also announced his intention not to stand for Zone G at the end of 1981.

Next Council meeting
In view of the fact that there were several subjects which needed urgent discussion it was agreed that there should be a special meeting of Council on 6 June, before the next scheduled meeting on 25 June.

GB2RS NEWS SERVICE

Report on the April 1980 Survey

by the GB2RS *AD HOC* COMMITTEE

The GB2RS news bulletin service provided by the RSGB for the benefit of all radio amateurs and short wave listeners has been broadcast weekly since the late 'forties. Initially this was transmitted on 7MHz, changing later to 3·5MHz, with 144MHz broadcasts eventually being added. That these broadcasts are very popular is confirmed by the large number of reports, both verbal and written, which the volunteer news readers and RSGB HQ regularly receive.

The administration of the news service is undertaken by the GB2RS *ad hoc* committee, which is a small working party reporting to Council through the Membership & Representation Committee. The *ad hoc* committee has as its responsibility the requirement to keep the news broadcasting operation as up to date and professional as is possible, and to be aware at all times of the views and needs, not only of the membership, but of the general listening audience. Although members have been asked from time to time for their opinions about the GB2RS transmissions, it was felt that the year 1980 with its now expanded service and different news format would be an appropriate time to seek the opinions of the membership once again. At the present time the GB2RS script is prepared by the Society's membership services officer, Mike Hawkins, G3ZNI. He and other staff are involved in the administration, record keeping, preparation, checking and distribution of the weekly scripts. In all, this represents an effort of approximately two person days per week.

When the revised news service was introduced there was an immediate favourable reaction from those who listened to the transmissions, and the Sunday morning audience grew month by month as the word got around about the usefulness and availability of GB2RS news on 3·5, 7 and 144MHz. The *ad hoc* committee then decided that the best way to obtain members' opinions was to issue a printed survey form with *Radio Communication* and to make forms available also at the Alexandra Palace Exhibition. The survey form consisted of 22 questions which required just a tick to answer, and, in addition, some questions asked for written comment or opinion. The actual survey produced over 1,500 returned forms, and the information gained from these provided the *ad hoc* committee with a considerable amount of detail and opinion. As soon as this had been sifted through, the committee began to take action on those points which could be put into effect simply and without delay, while the other data was then subject to deeper discussion at subsequent meetings of the committee. To the small band of helpers whose task it was to collate all the answers

given in the survey, it became apparent that whatever one did it would never be possible to please all the listeners all the time. However, there was no doubt in their minds that the new GB2RS news service did seem to satisfy the majority of its listeners for much of the time.

Readers might like to know the general trend of the replies which were received, and a summary of these follows, but it should be emphasized that what is stated is purely that of a fair number of listeners and in no way represents any agreement with such statements by the *ad hoc* committee. Nevertheless it is of interest to know the trends of opinion. Many of the replies contradict one another, but this is inevitable when personal likes and dislikes are being discussed.

Listening routine. In general the GB2RS news had a large and consistent following, most of whom listened every week as a matter of routine, while others tuned in just when it was convenient for them to do so. As 3·5MHz has the largest area covered by any one transmission, it was no surprise to find that this band had the largest listening audience. VHF, however, was very popular, particularly with the fm broadcasts in areas of high density, although ssb did serve large numbers in the more rural and remote districts.

Reception. The general consensus was that reception was satisfactory from the main news readers within the service area expected. Reserve news readers had a slightly less favourable reply, although this was still considered to be reasonably adequate. Complaints of poor reception seemed to be centred on interference from other stations, particularly on 3·5 and 7MHz, and fading was also troublesome for many. Some electrical interference problems reduced the readability at times for a few listeners. Choice of station or mode listened to was often a function of the time of transmission being convenient, although readability was also a dominant feature of preference. There seemed to be a call for some evening transmissions, mainly on Sundays. In general the presence of audible news broadcasts was not considered to be a check of propagation conditions, and those who tuned in to GB2RS were interested in the news content only. Post-news reports were considered to have some use by a fair number of listeners, mainly on 3·5MHz.

News content. This was one of the more controversial items among listeners, but the largest number seemed to be satisfied with the general content. Where there were strong feelings these seemed to be directed at propagation summaries, satellite timings and the usefulness of local news or otherwise. Lack of hf dx news was also a recurring item of criticism. There were as many supporters as critics of some specific items. On balance the general content of the present newscasts seemed to find favour, and local news in particular was most popular in the larger population areas—particularly so on vhf. Local news on 3·5MHz was considered by many to be tedious.

Station coverages. From a study of the survey forms it is perhaps not surprising that the largest audience is that of the Home Counties and the southeast of England. There were also sizeable audiences in and around centres associated with the main cities of the UK.

Suggestions for improving newscasts. It was very heartening to find that there was so much interest in the news broadcasts, and that there were so many positive suggestions for improving this important service to all radio amateurs and short wave listeners—whether members of the RSGB or not. There were of course several facetious remarks which, if not exactly acceptable, did at least brighten up the rather tedious task of wading through all the survey forms. One point of which many listeners seemed to be blissfully unaware was the constraints imposed by the terms of the licence, and also the needs of the other legitimate users of the amateur bands. There were many references to inadequate coverage in certain areas, mainly on vhf.

All these have been discussed by the *ad hoc* committee in recent months and improvements have already been made in different parts of the country, showing that the survey was not just a paper exercise but has a useful and practical purpose as its main objective. Improvements in the service are an ongoing exercise and these will become more apparent as the months go by and the points raised by the survey are discussed in depth.

To give readers some idea of the suggestions, and their variety, which have been put forward, the following is a much shortened list of comments received—remember that these are factual and, as said previously, do not imply any agreement by the GB2RS committee in any way:

More club news—less club news—more hf information and dx news—more propagation and satellite news—less propagation and satellite news—mention content of next Rad Com*—more news of RSGB committee work—more rally reports—more items of technical interest—more beacon and repeater information—less local news on 3·5MHz—summary of band conditions in layman's terms—14MHz transmission needed—reminder of band plans on occasion—mention European contests more—Raynet items as a regular feature—eme activity—overseas news—stolen equipment details—expedition news—news from HQ—items from awards managers—forthcoming events repeated over two weeks—local news on vhf only—make news more interesting—encourage societies to send in more local news—update local repeater and beacon lists—use real a.m. on 7MHz—return to a.m. on 3·5MHz—144MHz ssb frequency not good when contests on—too much 50MHz information—more publicity to keep S21 clear during newscasts—put Oscar on Teletext—more publicity for GB2RS needed—use 14MHz for international news—use 70MHz—improve signal quality of some transmissions—use correct polarization on 144MHz modes—contest dates earlier—hire Angela Rippon or Anna Ford to read the news—vet news readers for their suitability as readers, and their station for adequacy etc.*

Readers will see from the foregoing that the GB2RS service has the impossible task of trying to be all things to all people!

Many of the suggestions have already been adopted, as regular listeners will have observed, and there are others which in themselves are valid and need more thought before setting up in the future. It was noted that most of those who took the trouble to return the survey forms were pleased that the RSGB was consulting them, and there were many heartwarming letters, particularly from the disabled; as one person commented, "the GB2RS news makes you feel you belong".

It must not be forgotten that all those concerned with the service, outside of HQ, are volunteers who willingly give of their time for the benefit of others, and that there are constraints, which have been mentioned, as to operation in the amateur bands. It is the aim of the RSGB to ensure that its news broadcasting operation is a useful service to amateur radio in the UK and in tune with the needs of its audience. □

Report on the Region 2 ORM held on 21 June 1981

The Denby Dale Mobile Rally proved to be an excellent venue for the ORM, not only because of the excellent Yorkshire weather, but also by virtue of the spacious and clean surroundings. Having sampled the delights of a well-organized rally, and perhaps enjoyed a picnic in the glorious sunshine, about 60 members attended the meeting in the small lecture theatre.

The RSGB was represented by Council members Dain Evans, G3RPE; Joan Heathershaw, G4CHH, Zone A member; and David Pratt, G3KEC; and headquarters by David Evans, G3OUF, general manager. G4DAX was in the chair.

After giving a regional report, G4DAX introduced Joan Heathershaw, who gave a zonal update. This was followed with the national scene from Dain Evans. David Evans gave the headquarter's view, and then introduced the Society's information officer, Mike Hawkins, G3ZNI, who described the preparation and broadcasting of the GB2RS news service.

The meeting was then opened to the floor for comments and questions.

Predictably, many questions referred to cb and the Society's attitude towards it. It is worth repeating here that, just as a horse can be led to water but cannot be forced to drink, articles and corrections can be sent to newspaper editors but they cannot be forced to print them.

Other subjects were rather overshadowed by the cb issue, but included RSGB kits, the 50MHz band, the RSGB monitoring service, trade advertising, the new bands (modes and availability), simplification of the licence, cw on 144MHz for Class B licensees, open microphone and ARRL book prices. Many other points were also raised.

A draft of the "G8EOP petition" was presented and briefly discussed as a forerunner to presentation of the whole at a later date.

The meeting closed at 4.35pm.

RR2 would like to thank the Denby Dale Club, and its rally committee for providing the venue, their assistance in organizing the meeting and a very pleasant day.

D. S. Smith, G4DAX

SUPPLEMENTARY LIST OF AREA REPRESENTATIVES

Bromsgrove and South Birmingham	J. K. Harvey, G4IVJ
Preston	G. Lancefield, G3DWQ
Kirklees	J. Clegg, G3FQH
Wakefield	I. R. Firth, G3WWF
Perthshire and Kinross	R. M. Grant, GM4DQJ
Gloucester	E. A. Perkins, G3MA
Plymouth	J. Butcher, G4GWJ
York	K. R. Cass, G3WVO
Acton, Brentford and Chiswick	W. G. Dyer, G3GEH
Southport	N. Horrocks, G2CUZ
Weston-Super-Mare and Clevedon	J. Thorn, G3PQE
Eastbourne and Hastings	K. J. Homewood, G8NPC
North Bucks	D. R. Stimson, G3THC
Fylde Coast	R. F. Redhead, G4FXG
Conwy Valley	J. Lawson-Reay, GW8WFS
St Albans	B. Pickford, G4DUS
Port Talbot	A. J. Glassford, GW3ACF

This list is additional to that on page 517 of *Rad Com* June 1981 and contains all nominations received up to 23 July 1981. Any nominations received subsequently will be processed as new nominations and not as part of the tri-ennial election.

OBITUARIES

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

Mr R. Anderson, G4FLE
Bob Anderson died on 9 July. He had been an active supporter of the Maidenhead & D ARC for many years. He operated on the hf bands and maintained a number of schedules.

Mr J. Austen, G3CPR
Mr Austen died on 1 May, aged 57. His main interest was in cw, and he was a radio officer in the RAF during the war.

Mr D. Auton, G3IHI
Dennis Auton died on 14 June, aged 53. He was an enthusiastic "homebrewer", and was respected for the technical knowledge with which he helped other amateurs, although he had not been active for some time.

Dr J. Bower, MRCPsych, DPM, MD, VE7TL
John Bower, whose callsigns included G3OSM, EI9AI, VE6TN, VE4TN, VE4TN/W7 and VE1TN, died on 11 June, aged 69. He held numerous awards for his dx work, including DXCC and WAC, and was known as "Doc VE7TL" by fellow amateurs. His particular interest in New Zealand earned him many awards from the country. His long interest in amateur radio made him one of Canada's best-known amateurs.

Mr K. Hadley, G4COC
Mr Hadley, who died on 26 May, had helped others in amateur radio by running RAE classes for many years at the Nuneaton Technical College.

Mr V. Hartopp, G8COB
Vic Hartopp, who died just before Christmas, was a pioneer antenna designer who, in conjunction with G2HCG, originated many of the vhf/uhf antennas which are in widespread use today in the UK and in many countries of the world. He was a member of the Northampton Amateur Radio Society for many years, and belonged to many radio industry technical committees.

Mr K. Hooper, G3UUW
Ken Hooper, who died on 18 June, was known for his overseas cw work.

Also:

Mr J. M. Burnford, RS39287;

Mr W. Major, G8LLD; and

Mr W. McAllan, G3WOB, on 25 May.

CONTEST NEWS

Commonwealth Contest 1981 results

AWARD WINNERS

Senior Rose Bowl .....J. Sluymer, VE6OU
Junior Rose Bowl.....A. J. Slater, G3FXB
Col Thomas Rose Bowl .....A. J. Slater, G3FXB
Receiving Rose Bowl .....R. W. Thomas, BRS15822

BAND LEADERS

7MHz overseas	VK3APN	14MHz home	G3PVA
14MHz overseas	VK6RU	21MHz home	G3CCZ
21MHz overseas	ZL1IL	28MHz home	GW3GHC
28MHz overseas	VK8HA		

How the leaders made their scores

	QSOs/bonus 3·5	7	14	21	28	Equipment
VE6OU	9/9	53/29	229/54	160/40	30/26	T4XB/MLA2500 R4B. 3·5MHz: dipole/delta loop 7MHz: dipole/2-el 14MHz: 3-el 21MHz: 4-el 28MHz: 5-el CL36
G3FXB	11/11	47/31	116/59	72/50	34/26	T4XC R4C 3·5MHz: dipole 7MHz: fixed wire Yagis 14, 21, 28MHz quad/Yagi
VE5RA	4/4	42/46	186/55	135/38	23/22	T4XC/SB220 R4C 3·5MHz inv·V 7MHz: 4-el Yagi 14MHz: 4-over-4-el Yagi 21MHz: 6-over-6-el Yagi 28MHz: 5-over-5-el Yagi
G3FPQ	14/12	42/28	105/55	73/47	28/21	IC701 FT101 3·5MHz: vertical 7MHz: ZL Special 14, 21, 28MHz: 5-el log Yagi quad
VK4XA	23/14	16/11	178/52	80/35	40/25	TS520S 3·5/7MHz: Zepp 14, 21, 28MHz: 3-el tribander

"First time in all the years I've been operating that I have taken part in 'BERU'. If they've all been like this, then I'm sorry I've missed them."—G3HAL.

The unique character of this contest is again reflected in the comments of entrants. A combination of somewhat indifferent conditions and rather poor publicity in Canada reduced the overall entry a little from recent years and the lower leading scores are evidence of the move away from the peak sunspot period.

Heading the table this year is John Sluymer, VE6OU, who with the help of a very competitive antenna system, totalled 480 contacts and 158 bonuses to take the Senior Rose Bowl.

Al Slater, G3FXB, continues his domination of the UK scene with his ninth successive win of the Col Thomas Rose Bowl. Although QSO and bonus totals were well down on last year, his 280 contacts and 177 bonuses were sufficient to put him in overall second place, giving him the Junior Rose Bowl in addition.

The varied band conditions put Russ Coleston, VK4XA, in sight of the leaders in overall fifth place and leading the Australian representation with 337 QSOs and 137 bonuses.

Ivor and Mavis Stafford, VK3XB and VK3KS, are regular Commonwealth Contest entrants

Eric Trebilcock, BCRS195, who this year notched up his 40th "BERU" entry, was presented with his award for winning the 1980 receiving section by G3MXJ in Melbourne earlier this year

It is a pleasure to see increased participation in the receiving section this year. Top honours and the Receiving Rose Bowl go to Ron Thomas, BRS15822. In second place is a newcomer, as far as recent years are concerned, C. Bradbury, BRS1066, although he mentions that he did participate in 1938 and 1939! Another listener who has experience of "BERU" operations over many years is Eric Trebilcock, BCRS195, of Melbourne, whose 40th entry in this contest puts him in third place.

Bonus points on the lower frequency bands were somewhat scarce. On 3·5MHz the leading UK stations managed to find VE1, 2, 3, VO, VP5, 9H1, ZB2, 5N and C5, but there was no sign of ZL or VK this year. Western Canada and Oceania were limited to semi-local contacts on this band and there was no evidence of trans-Pacific openings.

7MHz conditions were average, though not up to the levels of recent years. Most G stations worked the few exotic prefixes in Africa and the Caribbean without too much difficulty and the long path opening to VK/ZL was reasonable, although somewhat hard going, as the skip shortened and European signals built up in strength.

14 and 21MHz carried the bulk of QSO traffic as would be expected. The short path from Europe to VK in the first 6h of the contest provided plenty of bonus points on both bands, with the opportunity to fill in any gaps next morning on the long path. 21MHz appears to have remained active in Eastern Australia until about 2am local time on the short path, and European stations needed to keep an ear on this band to catch the sporadic long path openings which persisted throughout their night. However in VE the band seems to have closed fairly early with no "small-hours" activity.

28MHz was the disappointment this year. After very good conditions in recent events, scores were well down. Marginal openings to VK and VE from Europe provided some bonus points but were not sustained long enough to build up any significant number of contacts. Conditions were a little better in the southern hemisphere and VK8HA remarked that from his location this band was open during virtually the whole of the contest period.

The Australian entry accounts for almost 40 per cent of the tabulation and this is due in no small part of the efforts of John Tutton, VK3ZC, and Eric Trebilcock, BCRS195, who for many years have undertaken "BERU" publicity for VK. The committee acknowledges their continued help with grateful thanks. We hope that a similar situation can be established for Canada and New Zealand.

Comments

"A pleasure to get RSTs given which were not usual contest '599' "—*BRS44395.*

"BERU" stalwart, Al Slater, G3FXB, winner of the Col Thomas Rose Bowl for the ninth successive year and also overall runner-up

"Conditions flat–28MHz disappointing–hope to have better lower frequency antennas next year."–*G3OZF*.
"Night boring–fell asleep."–*G3PDL*.
"Problems with HW101, so operated with 5W battery rig."–*ZE3JO*.
"Conditions varied between very poor and downright awful. Maybe my turn next year!"–*9V1TL*.
"Disaster! Terrible conditions up north."–*GM3OXC*.
"BERU gets more boring each year. Please replace by an event more international."–*G3PVA*.
"Once again, a very enjoyable contest with the usual familiar callsigns, excellent operating procedures and good humour."–*VK2BPN*.
"25th anniversary of homebrew tx (807) built in 1956 while MP4BBE. Wonder how many more vintage transmitters still in use?"–*G3VDL*.

G3MXJ

TRANSMITTING SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	VE6OU	5,436	56	VK3BKU	1,370
2	G3FXB	4,895	57	VK1CC	1,345
3	VE5RA	4,794	58	VK2DBL	1,270
4	G3FPQ	4,438	59	G3HRY	1,250
5	VK4XA	4,365	60	VK6RU**	1,228
6	G3MXJ	4,181	61	VE4RF	1,165
7	C5AAP	4,143	62	VK1UD	1,075
8	VK2BPN	4,129	63	VK8HA†	1,009
9	G3OZF	4,079	64	G3CCZ***	970
10	VE2WA	4,024	65	VK3AUQ	955
11	9H1CH	4,015	66	GW3MPB	950
12	ZL2BR	3,848	67	G5ND**	935
13	G4CP	3,710		VK3BDH	935
14	G3NOM	3,648	69	VK3CG	925
15	VE3JKZ	3,590	70	VK5FG	915
16	G2QT	3,405	71	ZD8RH	910
17	ZB2EO	3,375	72	VK3KS	905
18	VK7BC	3,208	73	9J2KO†	901
19	G3PDL	3,085	74	G8BM	885
20	VK3XB	3,065	75	VK3APN*	845
21	VO1AW	2,823	76	VK7GB	785
22	ZL1HV	2,758	77	G8DI	740
23	VK3AEW	2,705	78	G3JBQ***	735
24	T3OAT	2,690	79	G3ZDW	715
25	VK2GW	2,545	80	G3SXW	705
26	G5MY	2,453	81	ZL1IL***	650
27	VE1ASJ	2,260	82	G3COJ	625
28	GM3OXC	2,225	83	G8QZ	600
29	VK3KF	2,180	84	GW3GHC†	595
30	G3EBH	2,175	85	G3HAL	580
31	G4BUO	2,150	86	VK2II	575
32	G3PSM	2,140	87	VK4SF†	555
33	VK3ZC	2,123	88	G3OLU	505
34	G3ZFC	2,115	89	G3AWR	500
35	P29EJ	2,110	90	VK5DL	480
36	G3ESF	2,063	91	VK5HO	470
37	G3JJG	2,040	92	VK3YL	460
38	G3VW	2,015	93	VS6JR	450
39	G5RS	1,915	94	G3ATU†	430
40	VK6FS	1,880	95	VK1BR	400
41	VK3CM	1,775	96	VK2DKU	365
42	G2HLU	1,765	97	ZE3JO†	340
	VK3YD	1,765	98	VK3ABA***	320
44	G3XTT	1,760	99	VK5NLC	275
45	VK7RY	1,695	100	G8JD	250
46	9V1TL	1,690			
47	G3KSH	1,675			
48	VK3YK	1,625			
49	VK3RJ	1,565			
50	VO1HP	1,558			
51	VK2DID	1,463			
52	G3VDL	1,450			
53	VK7CH	1,410			
54	G3PVA**	1,393			
55	VK5BO	1,385			

RECEIVING SECTION

Posn	Callsign	Points
1	BRS15822	2,644
2	BRS1066	2,569
3	BCRS195	2,245
4	BRS44395	1,225

*7MHz single band **14MHz single band ***21MHz single band †28MHz single band

144MHz Low Power May 1981 results

Comments gleaned from the 427s show that the 25W p.e.p. limit was favourable, allowing easy portable operation. There were some complaints and accusations of QRO. Propagation conditions during the contest period were generally flat. The wx gave rise to static rain, thunderstorms and wind, especially in the Midlands, and fronts undoubtedly enabled certain stations to take advantage of 5–10min of dx burst conditions. The Shefford club, G3FJE, was visited by Contests Committee member Cliff Sharpe, G2HIF, at its /P site near Bedford.

The leading Section O station G4LIP/P used two 16-el Yagis at 42ft agl, at 3,202ft asl, and runner-up G4DEZ/A used two 16-el Tonnas at 50ft agl, at 155ft asl. Eleven stations were single-operator.

The leading Section F station, G8ZHF used two 16-el Tonnas at 30ft agl, at 150ft asl, and the runner-up, GM8YJU used 16-el Tonnas at 30ft agl, at 100ft asl. Fourteen stations were single-operator.

Thanks for check logs from GB4MF, G8NQP, G8UDV, G8WRD and G8XAH.

G8ACJ

SECTION O

Posn	Callsign	Points	QSOs	Locator	Best dx	Km
1	G4LIP/P	3,760	320	AN61	DD3UD	772
2	G4DEZ/A	2,805	272	AL34	DC9SD/A	694
3	G8SVG/P	2,330	243	ZO46	F1FHI	790
4	GW4ASR/P	2,316	312	YM55	DB6DC	715
5	GW3NNG/P	2,101	282	YL03	PE1EWR	631
6	G3EFX/P	1,888	221	ZK10	DC6RW	637
7	G8TFI/A	1,760	225	ZK23	GM3TGL/P	608
8	G4APA/P	1,704	283	ZL15	DB6WK	640
9	GW6GW/P	1,615	227	YL06	DB6DC	703
10	G4EMV/P	1,265	168	AK12	DD9FB	596
11	G3LCH/P	1,220	216	ZN71	F6BKS	780
12	G8SRC/P	1,195	217	ZL32	DJ7CL	606
13	GW6SW/P	1,167	218	YM05	F1[illegible]	654
14	G8RMA/P	1,137	180	AK12	D[illegible]FAW/P	530
15	G8ZWJ/P	1,118	158	AK22	DB6DC	497
16	G3LRS/P	1,001	253	ZM24	F1FHI	–
17	G4HBA/P	984	162	ZN07	GJ8SBT	525
18	GW3UCB/P	980	190	YN75	G3DAH	349
19	G4BOH/P	967	241	ZN61	F1FHI	887
20	G4KZD/P	946	152	YK40	PE0RBE	648
21	G3FJE/P	873	154	ZM79	DB6DC	527
22	G4DZO/P	867	173	AK11	GM8KAP	519
23	G8GBY/P	847	123	ZN18	DB6DC	601
24	G8GLQ/P	830	150	YL57	PA3DBY	568
25	G4HRO/P	826	202	ZN71	ON7EH	498
26	G6BNB/P	794	110	AL76	DB6BU	440
27	G8ERX/P	748	158	ZN07	G8DPU	460
28	G4DAR/P	743	190	YM40	F6DBI/P	468
29	G3LTY/P	741	132	AL65	DJ0QZ	462
30	G8KAX/P	725	137	AM71	GM8HVB/P	526
31	G3ORA/P	720	138	YL68	G4KBX	430
32	G3UFB/P	688	180	ZL17	PE1DVM	485
33	G8ABI/P	679	105	YL72	G8PXB/P	405
34	G3WFW/P	665	159	YN29	G3RMA/P	370
35	G4AYM/P	658	160	YL29	F1FHI	512
36	G2BRS/P	651	112	YK19	GM8YPI/P	509
37	G8KGI/P	640	156	ZK05	F1FHL	405
38	G8MLO/P	629	183	AL41	GM8YJU	442
39	G4FAM/P	599	143	AL52	–	–
	GI4KIS/P	599	95	XO11	G8TFI/A	540
41	G8GCP/P	597	155	ZK09	GM8YJU	489
42	G8PXB/P	588	88	ZO57	G8DPV	500
43	GW4BRA/P	575	60	XL04	F0CRI/P	490
44	G4GUR/P	530	130	ZN52	GI4KIS/P	320
45	G3SXE/P	514	154	ZL30	GM8YJU	415
46	G6AOY/P	511	123	ZM75	GM4CXM	475
47	G8SDS/P	489	101	YK28	PE1ARC	511
48	G4IOG/A	477	95	AL54	DK8SG	619
49	G4KKC/P	476	115	ZM80	GM8YJU	–
50	GW4HNZ/P	463	94	YL15	F6CTW	505
51	G8KMK/P	428	106	ZN32	PA0BLD	415
52	G8DDW/P	420	116	AL52	F6DBI/P	410
53	GM8HVB/P	416	34	XO80	G8RMD/P	651
54	G6BSE/A	404	60	AM64	DL3EMG/P	504
55	GM8YPI/P	394	50	YP49	G8TFI/A	520
56	G8YLZ/P	387	119	ZN61	G8DPV	360
57	G4ECT/P	378	105	ZL30	GM8YJU	410
58	G8WRB/P	366	117	ZL40	PE0EMC	348
59	GW8KYV/P	368	66	YN72	G4DFI	310
60	GM3TGL/P	360	49	YO66	G8TFI/A	620
61	G8ZPQ/P	322	85	YL18	GM4YIP/P	393
62	G3CNX/P	321	63	ZN38	G8TFI/A	390
63	G8MWA/A	301	79	AL53	DB6DC	469
64	G4HYG/A	253	78	YN28	GI4KIS/P	275
65	G4GYE/P	224	58	AL23	GW3NNG/P	279
66	G6BDA/P	218	102	YN79	GW6GW/P	190
67	GW41GF/A	205	58	YN75	G5YC	245
68	G3UXA/P	157	23	AM58	GW4ASR/P	312

SECTION F

Posn	Callsign	Points	QSOs	Locator	Best dx	Km
1	G8ZHP	2,198	214	ZM29	DD3UD	770
2	GM8YJU	1,270	127	YO05	G8RMA/P	515
3	G8MAG	670	135	ZL16	DB6DC	600
4	G5YC	660	168	ZL50	DG1DJ	518
5	G4DFI	462	122	AL41	G8SVG/P	327
6	G6CAQ	440	144	ZL39	DB6DC	535
7	G8ETB	425	117	ZL31	PE0EMC	365
8	G8WZL	405	83	ZN35	G8TFI/A	340
9	G8OHM	368	98	ZM41	G4EMV/P	230
10	G4IJJ	310	91	ZL18	G8ABI/P	247
11	G8GGG	306	78	ZL24	G8SVG/P	297
12	G8PNM	305	65	ZN52	GM8HVB/P	355
13	G8KUC	282	58	AL56	GW3UCB/P	347
14	G4LEF	220	56	ZL55	G8SVG/P	340
15	G8XTJ	202	58	ZL27	G8SVG/P	302
16	G4AGO	200	79	ZL66	F6DBI/P	364
	G4KVI	200	80	ZL37	G8SVG/P	325
18	G8XDR	199	79	AL41	GW3NNG/P	254
19	G3IUB	185	55	ZM41	G8SVG/P	226
20	G8WSR	129	53	YN55	G4APA/P	215
21	G4DDL	118	32	ZL47	PA0WWM	368
22	G8VRW	96	32	ZL46	F0CRI/P	190
23	G8LXY	70	31	ZL09	G4LIP/P	142
24	GI8SQU	59	25	XO31	G8BZR/P	177

LISTENER SECTION

Posn	Station	Points	QSOs	Locator	Best dx	Km
1	BRS32525	468	132	AL41	F1FLN/P	440
2	BRS28198	240	54	AK04	DB6DC	445
3	BRS45400	229	55	YL38	G8SVG/P	320
4	BRS15822	209	57	ZL40	PA3AMP	340

DF Qualifying Event Coventry results

The Coventry event was the third in this year's qualifying rounds for the RSGB national final. Twenty-five teams assembled at the start, nine miles south east of Warwick, for an afternoon of fun and excitement.

Station A, G4CFG/P, was hidden in a narrow stretch of woodland on the north side of the Grand Union Canal, approximately five miles north west of the start. Electricity cables running parallel with the long wire antenna on the other side of the wood caused signal problems for most competitors; some deciding that the transmitter was on the south side of the canal while others started on the right side and then ran to the wrong side before returning to find the transmitter. Teams looked at each other across the canal, each trying to decide who was on the right side.

Station B, G3TFA/P, was located in a wood near the village of Swalcliffe, approximately 14 miles south of the start. The entrance to the wood was very muddy and slippery due to rain over the weekend. This made it difficult to run up the slope to the transmitter and the sound of teams falling head over heels warned the operator that irate competitors were about to descend upon him. Bodies covered in mud, scratches and stings gradually appeared at the station–proving that impenetrable brambles and nettles are no match for df competitors.

Sixty people sat down for tea after the event where Roger Parsons told us how he had won, and Brian Bristow gave a string of excuses why he had not. Bill North then gave us an amusing account of how he had managed to get stuck down the only impassable track leading to station A, and had to be towed out by another team after a short May Day call on 144MHz!

Posn	Name	Club	Time of arrival Station A	Station B
1	R. Parsons	Burton-on-Trent	1440	1530
2	B. Bristow	Mid-Thames	1440	1542
3	C. Oliver	Dartford Heath	1547	1435
4	B. Mahony	Hereford	1552	1437
5	D. York	South Manchester	1552·25	1437·5
6	D. Holland	South Manchester	1552·5	1438
7	P. Lisle	Mid-Thames	1440	1553
8	A. Simmons	Mid-Thames	1441	1553·25
9	A. Butcher	Chelmsford	1454	1553·5
10	E. Mollart	Mid-Thames	1455	1554
11	M. Hawkins	Chelmsford	1450	1555
12	R. Vickers	Slade	1456	1605
13	T. Gage	Mid-Thames	1615	1456
14	C. Plummer	Mid-Thames	1616	1436
15	D. Newman	Slade	1616·5	1437
16	P. Pechey	Mid-Thames	1503	1624
17	J. Drakeley	Slade	1448	1626
18	C. Wells	Mid-Thames	1629	1522
19	R. Shepherd	Mid-Thames	–	1453
20	W. North	Mid-Thames	–	1457
21	R. Goodearl	Mid-Thames	1510	–
22	J. Warburton	South Manchester	–	1541
23	M. Sheridan	Stratford-on-Avon	1602	–
24	M. Easterbrook	Dartford Heath	1618	–
25	R. Smith	Slade	1622	–

C. Oliver and B. Mahony qualify for the national final

Region Round-up Contest 1981 results—erratum

The winner of the Listener Section was RS15822, not RS11445, as shown in the August issue.

Contests calendar

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)*
19 September	WAB VHF FM SSB *(Rules from G4FQO, 10 Chestnut Avenue, Cranwell, Sleaford, Lincs NG34 8HT)*
19-20 September	Scandinavian Activity (CW) *(Rules in September 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)*
26-27 September	Scandinavian Activity (SSB) *(Rules in September issue)*
3-4 October	VK/ZL (Phone) *(Rules in September issue)*
***3-4 October**	RSGB UHF/SHF *(Rules in August issue)*
	IARU UHF/SHF *(Rules in July issue)*
10-11 October	VK/ZL (CW) *(Rules in September 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	Esperanto (ILERA) *(Details from G4MR, QTHR)*
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.

GB2WRC, 5 September
Operational by the Watford RC during the Watford Show on hf and vhf. Details from John French, G4IET, tel Watford 37321.

GB8WES, 5 September
At the 2nd Northolt Scout Group grand summer fete, Russell Road, Northolt, Middx, on 144 and 432MHz fm. Visitors welcome. Details from Bob Cocerell, G6ABC, 15 Halsbury Road West, Northolt, Middx UB5 4PL.

GB2BAE, 12 September
The station will be at the British Aerospace Open Day at Hatfield, from 9am-5pm. It will be active on hf, vhf and uhf bands, all modes. Special QSL cards will be available. QRA locator is ZL19d, height above sea level is 78m. Details from G4KGP, tel Hatfield 62300, ext 378.

G2NM, 13 September
This station is operated in memory of the late Gerald Marcuse, at his last QTH at Tidewaters, Bosham, West Sussex. His callsign is now held by the Chichester & D ARC. It will operate on 3·5MHz. Special QSL cards will be available. Details from sec G8FCX, QTHR.

GB2HWE, 18-20 September
This station will operate from the High Wycombe East District Scout Fun Camp, Green Park, Aston Clinton. It will operate on hf and vhf. Details from G3HBR, QTHR.

The following special event stations will be operating during the 1981 Jamboree on the Air, taking place on 17-18 October:
GB3RN, 7 October to 3 November, from HMS Mercury, Leydene, Petersfield, Hants; **GB4KVS**, on 16-18 October, by Kimberley Venture Scouts, Fir Tree Lane, St George, Bristol; **GB4DSG**, on 16-18 October by Microwave Associates ARG for 1st Dunstable Scout Group at their hq, off Brewers Hill Road, Dunstable, Beds; **GB4AVS**, on 16-18 October by Ardnavally Venture Scouts, Baden-Powell Chalet, Ardnavally Scout Centre, 109 Milltown Road, Belfast 8, NI; **GB4SDS**, on 16-18 October, by Sandringham District Scouts, the Scout Hut, Wolferton, Sandringham, Kings Lynn, Norfolk; **GB2KSG**, by Kew Scout Group at the hq, Station Avenue, Kew, Richmond, Surrey; **GB2SSG**, at the Stokenchurch Scout Group HQ, Longburrow Park, Stokenchurch, High Wycombe, Bucks; **GB2ASH**, at the Scout Hut, Napier Road, Ashford, Middx; GB4HS, by Hanworth Scouts, at the Scout Hut, Methodist Church, Churchfields, Hanworth, Middx; **GB4TS**, by Twyford Scout Group, at the Scout Hut, London Hall Road, Twyford; and **GB4NNG**, at the 99th Glasgow Scout Group HQ, 166 Kingsbridge Drive, Glasgow.

Mobile rallies calendar

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

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.
20 September—IoW Rally. The annual IoW "get-together" will be held at the National Wireless Museum, Arreton Manor, nr Newport, on the main A3056 Newport to Sandown Road, at 2.30pm; Talk-in via GB3WM on S22 and RB4 (GB3IW). Admission 75p, includes the 14th century manor and the grounds. Refreshments available. Details from G3KPO, tel Ryde 72513.
27 September—Harlow Mobile Rally in Harlow Sports Centre, Hammarskjold Road, Harlow. Talk-in on vhf, uhf. Facilities include licensed bar, full catering, easy parking, 10,000sq ft traders' area, bring and buy, grand draw. Admission 30p. Details from Phil Dunbar, G8FRG, QTHR. Tel 0279 32486.
13 December—Leeds & DARS Christmas Rally, at Pudsey Civic Centre, Cote Lane, Pudsey, W. Yorkshire. Details from G8NVP, G3YEE or G4FIM.

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 be be confused with the ARRA exhibition to be held at Castle Donington on 29-31 October.
29-31 October—Amateur Radio Retailers Association Tenth National Amateur Radio Exhibition, Donington Park, Castle Donington, Derbyshire. **Please note change of venue.**
6 November—RSGB lecture at the IEE, London. "F-layer propagation above 30MHz during sunspot maximum of Cycle 21", by F. M. Smith, G8KG.
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 **November** issue should reach them by **17 September** and for the **December** issue by **15 October.**

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)—1, 15, 29 September, Ainsdale Scout HQ. Details from sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls Royce ARC)—2 September ("Early radio", by Gerry Openshaw, G2BTO), 8pm. Rolls Royce Sports & Social Club, Barnoldswick. Sec Leslie Logan, G4ILG, tel Barnoldswick 812288. The club has booked 27 June for its 1982 mobile rally.

Blackburn (East Lancs ARC)—1 September (Surplus equipment sale), 6 October (Demonstration of large screen video), 7.30pm. Shadsworth Centre, Blackburn. Pro Norman Jenkins, G4CGT, tel 0254 75037.

Blackpool (Blackpool & Fylde ARS)—2 September. Details of venue from sec Jim Newland, G5ND, tel 0253 64508

Bury (BRS)—8 September ("Meteor scatter", by J. M. Lovell, G8JHL), 7.30pm. Mosses Community Centre, Cecil Street, Bury. Informal meetings 1, 15, 22, 29 September. Publicity sec Peter Butterworth, 6 Wilton Avenue, Prestwich, tel 061-798 0970.

Leyland (LHARC)—14 September, 7.30pm. Rose & Crown, Ulnes Walton, Leyland. Details from sec Arthur Jolly, G4JCO, 30 Crawford Avenue, Chorley.

Manchester (South Manchester RC)—4 September ("Getting going on 4m" by John Taylor, G8PUE), 11 September (A mystery visit), 18 September ("How cleaner is clean?", by Dave Bolton, G8UQC), 25 September (Surplus equipment sale), 2 October (Lecture, to be arranged), 13 November (Reserve this date for the annual dinner), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays, 8pm. Sec David Holland, G3WFT, tel 061-973 1837.

Stockport (SRS)—9 September (Surplus equipment sale), 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec Ray Phillips, G3FYE, tel 061-456 7239.

Thornton Cleveleys (TCARS)—7 September (Gemini Communications), 14 September (Natter night), 21 September (Telecoms), 28 September (Surplus equipment sale), 7.30pm. Thornton Cleveleys Sports Centre, Victoria Road, Cleveleys. Sec Arthur Parr, G3IWP, tel 884931.

Warrington (UK FM Group Western)—21 September (AGM) 7.30pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—2 September (Sale of surplus equipment), 16 September (Film night—selection from RSGB Library), 7.45pm. Sports & Recreational Centre, Grange Road West, Claughton, Birkenhead. Sec Garry O'Keefe-Wilson, G8VPF, tel 051-677 1531.

Wirral (W&DRC)—9 September (Surplus equipment sale), 23 September ("Antique radios" by M. Green), 8pm. Sports Concourse, West Kirby, Wirral. Publicity sec J. Mills, G8NOY.

Region 1 VHF Contest—13 September, rules in July *Rad Com.* Note that /P operators may go up 20 miles outside the region.

Some of those who attended the Pontefract & D ARS df contest held on 25 June. The trophy was donated by swl Bill Hartley (l of centre) and won by G6BGN (r of centre). ***Photo: G41SU***

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

Barnsley (UK FM Group Northern)—4 October, 1 November, 7.30pm. The Royal Hotel, Church Street, Barnsley, Sec G8PLJ.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Pie Hall, Denby Dale. After a very successful rally the club is preparing its winter calendar. Sec J. Cleg, G3FQH.

Doncaster (DMIofHEARC)—Details from new sec Robert Lane, G8VLQ. Club call G3UER.

Halifax (H&DARS)—This club has been re-formed. First Tuesday in each month, 7.30pm. The Halifax Constitutional Club, Highfield House, Parkinson Lane, Halifax. Details from sec G4LEC, tel 0422 33080. It is intended to hold a club net on S21 at 7.30pm on the Tuesdays other than meeting nights.

Halifax (Northern Heights ARS)—7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. New sec G4CMK. New chairman is G3TQA. The autumn syllabus is now being prepared and suggestions are welcome. A recent well-received lecture was "HF antennas", by G3NXM.

Otley (OR&ES)—Tuesdays, 8 September ("Amateur tv", by G8CJS), 10 September (Visit to Dray Power Station), 8pm. Back of Court House Street, Otley. Sec Jack Annakin. Contact G8DFZ for details.

Pontefract (P&DARS)—Details from G4ISU, 43 Red Hill Drive, Airdale, Castleford, Yorks. 17 September ("Raynet", by G3KWT), 1 October ("Microwaves", by G3ZIV), 9 October (Disco dance), 15 October ("American ham radio", by G4KYL and G4AAQ). The df contest was well supported with 11 teams competing. The trophy, which was donated by swl Bill Hartley, went to Tony, G6BGN. The club now has a new 3-el tribander.

Wakefield (W&DARS)—8 September (Visit to Emley Moor transmitter site), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

Wharfedale Repeater Group—40 members attended the AGM at the Royalty Inn, Otley Chevin on 2 July, and heard various reports covering the year's operation of GB3WF. A unanimous vote of thanks was offered to retiring chairman G3PSM, and G3CQQ was elected chairman for the next year. Formal proceedings lasted about 1h, and were followed by the usual pie and pea supper. Members were brought up-to-date on the replacement of the original GB3WF with an all solid-state machine, and also heard of the group's proposal to install a 432MHz repeater in Leeds. Sec G3KKP.

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

Atherstone (AARC)—The regular pattern of meetings is now established as second Thursday in each month (Talk, demonstration, visit, etc), third Thursday in each month (Informal), 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G8SYE, tel Atherstone (08277) 5995.

Birmingham (Midland ARS)—22 September ("Unique method of constructing", by George Hunt, G8FU), 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. 7 October ("Four metre equipment and operation", by Dale Harvey, G3XBY), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104.

Birmingham (UoBARS)—26 and 27 September (Annual Freshers' Fayre will be held and will include a multi-band station using the callsign GB2UB—all visitors welcome). Fridays during term, 7.30pm.

Some of the visitors at the first mobile rally organized by the Rolls Royce RC, Barnoldswick. ***Photo: G8XFQ***

Tuesdays (RAE classes), 7.30pm. Club room, second floor Students' Union (above shop). Sec Dave Thomas, G4HHJ.

Bromsgrove (B&DARC)—11 September (Talk on spy nets), 8pm. Avoncroft Art Centre, Bromsgrove. Club net Wednesdays, 144·850MHz, 8pm. 20 September (Bromsgrove Mobile Picnic will be held at the Avoncroft Museum of Buildings). Sec G4HFP, tel Stourport (02993) 3818.

Kidderminster (K&DARC)—15 September (AGM), 29 September (Informal evening), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Malvern Hills (MHRAC)—8 September (Regular morse class followed by a talk on receiver performance by Roger Dixon, G4BVY), 7.30pm. The Foresters' Arms, Wilton Road, Barnards Green, Malvern. Sec G4BVY, 9 Wyche Road, Malvern, tel Malvern (06845) 62900.

Mid-Warwickshire (MWARS)—7 September (Surplus sale), 21 September ("Fast scan amateur television", by Malcolm Beddows, G8UBC), 5 October (Night on the air), 8pm. 61 Emscote Road, Warwick. Club net Mondays on non-meeting days, 145·350MHz, 8pm. Sec G8RZR, tel Warwick (0926) 496453.

Shrewsbury (Salop ARS)—3 September (Talk by P. Parker, G8CKM), 10 September (Natter night), 17 September ("Radio astronomy", by Warren Davies), 24 September (Natter night), 1 October (AGM), 8 October (Natter night), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3VWH, tel Shrewsbury (0743) 51833.

Solihull (SARS)—15 September ("Where the hell are we?", talk on aircraft navigation by John Croxford, G3OIC), 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. Sec G4JDL, tel 021-745 3098. Morse classes available.

Stourbridge (StARS)—21 September ("12 years of colour television", by Tony Colton, G8PAW), 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G4JTL, tel Lye (038482) 4019.

Walsall (WARC)—16 September, 30 September (Night on the air), 8pm. Forest Comprehensive School, Bloxwich. Club net Fridays 3·70MHz ssb, 9pm. Sec G4GKC, tel Walsall (0922) 39457.

Wolverhampton (WARS)—7 September ("Facts and mythology of coaxial cables", by John Cook, G8EDG), 14 September (Natter night), 21 September (Home-built gadgets—bring your own), 5 October (AGM), 8pm. Wolverhampton Chamber of Commerce and Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G8EDG, tel Wolverhampton (0902) 763617.

Worcester (W&DARC)—7 September (Discussion evening), 21 September (AGM and free buffet), 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)—2 September (Junk sale), 9 September (Natter night), 16 September ("Technical topics", by Pat Hawker, G3VA), 23 September (Night on the air), 30 September ("The metre waves then and now", by Jack Hum, G5UM), 7.30pm. Tuesdays and Thursdays, morse classes, 7pm. 119 Green Lane. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grimsby (GARS)—10 September (Amateur television), 24 September ("Computers—how safe are they?"), 8pm. New Alexandra Social Club, Cleethorpes. Sec Trevor Matthews, G3RGC, tel Grimsby 884060.

Ibstock (IARS)—1 September (DF hunt), 7.30pm. Hastings Arms, Ibstock. At the recent AGM the following officers were elected: chairman, Gordon West, G3YZK; secretary, Steve Haywood, G8UZQ; treasurer, John Cheshire; committee, Ken Elton, G8MCZ, and Ted Bowen, G4JKQ. Sec Steve Haywood, G8UZQ, tel Ibstock 62158.

Louth (L&DARS)—8 September (Amateur television demonstration by G4IPE). Eastgate Union Church, Eastgate. Sec Ron Padbury, G4GAB.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.

Aylesbury Vale (AVRS)—6 October (Film and talk on df by G6AGE), 8pm. Elmurst Youth Centre, Fairfax Crescent. Details from sec G8BQH, tel 029664 783.

High Wycombe (Chiltern ARC)—30 September (Talk on radio interference by Werner Kolterman from Home & Post Office, members should not miss this interesting talk), 23 November (Surplus gear sale), 8pm. John Hawkins Canteen, Victoria Street. G4LLM, tel High Wycombe 24095.

Maidenhead (M&DARS)—For details of meetings please contact sec J. Patrick, G3TWG, tel Bourne End (06285) 25275.

Reading (RARC)—29 September (Demonstration by Mutek Ltd, Chris Bartram, G4DGU), 13 October (Award winning ARRL film "The World of Amateur Radio"), 27 October (Latest products from Wood & Douglas Ltd). Details from sec Chris Young, G4CCC.

Vale of the White Horse (VWHARS)—For meeting details contact G4FLX, tel Wallingford 37482, or G3SEK, tel Didcot 812584.

Club secs, please update your news! *RR6*

REGION 7—*(RR to be appointed)*

Crystal Palace (CP&DRC)—19 September (to be advised), 8pm. Emmanuel Church Hall, Barry Road, London SE22. Sec G3FZL, tel 01-699 6940.

Thames Ditton (Thames Valley ARTS)—6 October ("Amateur slow scan tv", talk and demonstration by Roddy Clews, G3CDK), 8pm. Ditton's Library Reading Room, Watts Road, Thames Ditton, Surrey. Details from sec Malcolm Bell, G8RLB, tel 01-977 6122, daytime only.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7LR. Tel 0303 85241.

Burgess Hill (Mid-Sussex ARS)—17 September (Junk sale), 7.30pm. Marle Place, Leylands Road, Burgess Hill. Further details from Jack Brooker, G3JMB, tel Hassocks 4965.

Canterbury (East Kent RS)—Now meeting on Tuesdays. 1 September, 5 October (Shrew be Shrewed ph at Heardson, lecture), 7.30pm. Details from G8PFE.

Chichester (C&DARC)—1 September ("Electronic games machines", by P. Brooks), 13 September (G2NM special event station on 80m, from Bosham), 17 September (Junk sale). Further details from S. Talbot, G8FCX, tel Littlehampton 5082.

Dover (South East Kent YMCA RC)—2 September (Natter night), 9 September (Club projects), 16 September (G3OWQ, how to df), 23 September (2m fox hunt), 30 September (10min talks by club members), 7.30 for 8pm. Further details from G8KEN, QTHR.

Medway (MARTS)—Fridays, 25 September (TBA), 7.30pm. No 1 Hall, St Lukes Church, King Williams Road, Gillingham. Listen to Radio Medway's "What's on diary". More details from G4EVY, tel Medway 76463.

Thanet (RCoT)—Fridays, 11 September (Natter night), 18 September (Proposed visit of RR8), 25 September (To be confirmed), 8pm, morse at 7.30pm, at the Birchington Village Hall. All details from sec Ian Gane, G8HLG, tel 0843 54154.

Tunbridge Wells (West Kent ARS)—4 September (2m fox hunt, 8pm, meet behind Marks & Spencer), 18 September (Open evening, special welcome to newcomers, displays of equipment, hf station, book sale), 2 October ("Pulsars, the radio astronomer's puzzle", by Jocelyn Burnell, who as a student discovered that some stars emit regular pulses of radio waves). Adult Education Centre, Monson Road, Tunbridge Wells. More details from Brian Castle, G4DYF, tel 0732 56708.

As the newly-elected RR I would like to thank all those who took the trouble to vote for me and for giving me their support. Thank you, also, to Denis, G3MDO, for all his work as AR from 1958 to 1961 and RR from 1961-1981.

Would all club secretaries please now send me their club's details, news and programmes by the dates in the leader panels so that I can send them for inclusion in "Club News".

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726-860 485.

Camborne (Cornish RAC)—3 September ("Avionics", by G8DPV), 7.30pm. SWEB Clubroom, Pool, Camborne. Computer section meets on second Monday in each month, same place. Cornish net weekends, 3·7MHz, Sundays 144·275MHz ssb, 10.30pm; 3·692MHz, 11am. Pro Ron, G2ABC, tel Truro 78393.

Newquay (N&DARS)—9 September ("ATUs and the use of", by G3XC), 23 September ("Frequency drift in transceivers", by G3YJX), 7.30pm. Treviglas School, Newquay. Sec Bob, G4LDA, 29 Greenhill Road, Egloshayle, Wadebridge PL27 6AY, tel Wadebridge 3649.

Plymouth (PRC)—Officers elected at AGM: president, Steve Rance, G3WL; chairman, Kenneth Huxham, G8MLI; secretary, Ivor Budding, G4GWK; treasurer, Julie Butcher, G4HKZ; publicity officer, Allan Huxham. Alternate Mondays. Club HQ, Tamar Secondary School, Paradise Road, Millbridge, Plymouth. Details from sec.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Cardiff (CRSGBG) — 14 September (Informal), 7.30pm, The Pantmawr Inn, Pantmawr Estate, Cardiff. Joe Brooke, GW3GHC, would like to thank all the local amateurs who have visited him during his recent term in hospital, and he hopes that as his health improves he will be able to keep in touch with club members via the rf. Further details from GW3GHC.

Swansea (SARS)—Thursdays, fortnightly, 3 September, 17 September ("Microprocessors and amateur radio", by Tim Davies, GW4ADL, in Lecture Room "N", Applied Sciences Block, Swansea University College, 8pm. Club net each Sunday, 1000gmt, 28·530MHz ±QRM, net controller Cen, GW4BIQ, other local stations are welcome to join in. A programme of talks and demonstrations is being compiled for the winter meetings. 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) 49388.

Colwyn Bay (Conway Valley ARC) (GW6TM)—10 September (Talk on radio astronomy with a film entitled "Radio sky"), 4 October (Special meeting for the visit and talk by the RSGB President Mr Basil O'Brien, 2.30pm), other meetings on 3 and 17 September, 13 September (Coach trip to Telford Rally). Meetings at Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, 11 Bryn Derwin, Abergele, tel 0745 823674.

Would all club secs in Region 11 send their news to RR11 in writing, as soon as possible.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus, DD8 3NR. Tel 0307 67565.

Invergordon (Easter Ross RC)—Wednesdays, 7.30pm. 100 High Street, Invergordon. The club is going from strength to strength. The club callsign is GM4MFL. There are 15 licensed members, of which more than half were licensed during the past two years. The club runs an RAE and cw instruction class each week. Details from GM4DKL.

Elgin (Moray Firth RS)—Wednesdays, 7.30pm. Club Room, Moray College of Further Education, Elgin. Office bearers: president, A. Dawson, swl; vice-president, D. Scott, GM4IZN; secretary, J. G. Harris, GM8YMY; treasurer, A. Wills, GM4IZY. Details from sec GM8YMY.

If your club is not mentioned here it means that no monthly update has been received by your RR. This is your club outlet for news, why not make use of it?

The system of representation within the Society will only operate effectively if areas are represented and maintain contact with the RR. Area representatives are required in all areas of Region 12, and nominations of suitable members will be welcome as soon as possible. Existing areas are: Tayside, Grampian, Northern, and the Northern Islands. If desired the areas can be further divided where distance is a problem. *RR12*

REGION 16—RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.

Braintree (B&DARS)—First Monday (Informal), 8pm. Third Monday (Formal), 7.45pm, in each month. Braintree Community Centre, Victoria Street. 21 September (AGM). Short lectures for swl and junior members are given by Danny Begg, G3YXJ, at 7.30pm on informal meeting evenings. Details from Alan Heritage, G4EOG, tel Braintree 25109.

Chelmsford (CARS)—25 September (Top band df hunt, 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)—17 September (Subject to be arranged), 1 October (AGM), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189. Club is holding a top band df hunt on 4 September at 7.30pm at Fordham Heath, ngr 945 264. OS Map 168 will be required. Details from Ian Butson, G4HKC, tel Colchester 860724.

(Continued on page 842)

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 **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

Plessey PR1553, latest model rx, 15kHz to 30MHz, all modes, accurate to 5Hz, frequency lock, comprehensive service manual, l.e.d. display, delivered up to 100 miles, £900 ono. G8PB, QTHR. Tel Peter, 024 366 3584.

Brenell Mk5 professional type three-speed mono tape recorder, exc cond, recent overhaul, manuals, some spares, owing to weight buyer collects, £25 only. Tel 01-979 3591, anytime.

Convair sw rx, portable, £12. Mag mount $\lambda/4$ wave 2m antenna, £9. Lafayette stereo tuner, £12. Daiwa atu, £10. G8SJG, QTHR. Tel 01-574 4323.

IC202, six months old, in orig packing, nicads, built-in 12V charger, four xtals, £150. DST100 rx, wkg, old, heavy, £20. G3UVY, QTHR. Tel 0765 3387.

Large quantity of magazines: *Radio Communication, QST, CQ, Radio,* pre-war and post-war, buyer must take the lot. Tel 024 454 5177.

FT101E, orig packing, plastic still on panel, fan, rf processor, 160–10, mic, ac, dc leads, used little, need smaller rig, £400 or sensible offer. GM3JOA, QTHR. Tel Edinburgh 031-669 2284.

KW Vanguard, 160–10, a.m., cw, manual, £60. Microwave Modules transverter, MMT432-144R, repeater shift and reverse, £130. Write first with sae. Buyer arranges collection. Charles Cotter, c/o Kerjons Green, Chagford, Devon.

FT220 2m tx/rx, lower side band and cw not wkg, but otherwise ok, offers? G4DPZ. Tel 0245 353221, ext 748.

Xtals for IC215 etc, popular fm channels, £2.50 pair. ASP 5λ/8 2m whip, vgc, £8. Nikkor 28mm wide-angle lens, good cond, £45 ono. G4UAG, QTHR. Tel Robert, 021-453 5138.

Wireless World, 1968–79 inclusive, what offers? Buyer collects, Kingston-upon-Thames. Tel 01-942 1230, evenings.

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.

8MHz and 45MHz xtals for 2m, many other frequencies, £1.25 each. SAE for list. Pye Cambridge fm multichannel tx/rx on 2m, £35. QQV06-40A, £7.50. G3ZVC ssb tx/rx kit comprising pcb, ics, mixer, £20. G3NGK, QTHR. Tel 01-462 2178.

Datong ASP speech processor, six months old, as new, £60, or exchange for Mini Products HQ1 2-el quad. G4LHE NOT QTHR. Tel Iver 655059, after 7pm.

Four ITT Starphone M5 mobile uhf tx/rx, suitable for 70cm conversion, £40 each. G8YLJ, QTHR. Tel Sheffield 395845, evenings.

KW2000A, ac psu, mic, handbook, prefer buyer inspects, £90. Ex-Army portable cw "spy set" Mk123, comp, £40. Various ribbed porcelain atu type coil formers, £3 each. Storno Viscount for spares, £10. All items carriage extra. G3TRR NOT QTHR. Tel Merseyside 051-327 7309.

Realistic DX200 comm rx, 0·15–30MHz, calib, ant trim, exc cond, £100. Tel David, Southport (0704) 24794.

Ham Radio, comp set from first issue, March 1968 to end 1980; *RSGB Bulletin,* 1951–5 inclusive, 1962–7 inclusive; *Radio Communication* 1968–75 inclusive, what offers? Buyer collects, Kingston-upon-Thames. Tel 01-942 1230, evenings.

Superb performance Drake C-Line T4XC tx, R4C rx, all bands, accessories, filters, £699. Barlow Wadley XCR30 Mk2 portable general coverage rx, £99. All in unmarked cond, orig packing, offers invited. GM3WTA, QTHR.

PW **Nimbus** tx/rx in exc wkg order, incl transmitting and receiving xtals for S20–22, R4, £50. Preamp/pa pcb comp except for two TO220 mounting kits, £15. G4LUF NOT QTHR. Tel Swindon 782787, evenings.

Standard C146A handheld, S16, S20, S22, R0, R5, 2W, leather case, nicads with charger, £75. Kelman, 61 The Fairway, Oadby, Leicester. Tel 708585.

RTTY-TU Catronics CT100 Mk2, vgc, inputs for audio fsk, data in from vdu, tty keyboard, outputs for vdu and tty magnet single or double current, afsk to tx, £70 plus carriage. G3UZB, 42 Stirling Road, Redcar, Cleveland. Tel 0642 470623.

QTH NW Wolverhampton, three bedroom pre-war semi with garage, town centre 3m, 97ft garden, good rf site, shops and schools, planning permission for towers usually ok, emigrating hence £24,500 for quick sale. G4IRD, QTHR. Tel Wolverhampton 755468.

FRG7 comm rx, perfect cond, no mods, under warranty, owner gone G4, snip at £150. Buyer can see set in use. G4KJN, QTHR.

Standard C146A, carrying case, nicads, charger, helical, whip, antennas, xtalled S0–22, R5, external mic, £66. Walter Pearce, G8WCP, QTHR. Tel Gloucester (0452) 22371, evenings.

FT227R with ARE scanner, £180. MM transverter, 432–144MHz, £95. MM converter 144·3–5·4·5MHz, i.f., £10. MM hf preamp, £8. Hand-portable two channel fm marine band with hod charger, £30. 70cm preamp TP491, £7. G3NPZ, QTHR. Tel Fareham (0329) 283736.

Tamaphone 1510S, synthesized 2m mobile tx/rx, 12W, 144–148, repeater shift etc, £185. 5/8 and mag mount, £10. G-whip, base, 80–160m coils, rod for 10m, £14. *Radio Communication* 1975–80, £5 per year. Buyer collects or carriage extra. G4CPI, QTHR. Tel 0530 38377.

Electronic organ parts: two four-octave C–C keyboards, comp with oscillators, five pitches, many voices, 13-note pedalboard, 50W spkr and amplifier, sell for £90 or w.h.y? G8VPQ, QTHR. Tel 021-770 5920.

KW Viceroy with KW77 rx, £100. Racal 117E with matching preselector, £250. G3VTZ, QTHR. Tel New Milton 616702.

Yaesu 227 2m tx/rx, mic scanning, 10W, memories, 1·5 yr old, superb unit, cost £287, accept £170 ovno. Alba tuner, amplifier, compact unit, £30. Trio 2300, nicads, antennas, cost over £185, practically new, accept £135. G6ASA. Tel Sutton Courtney (023 582) 249.

FT221R, £300. Matching spkr, £12. Belcom LA106 80W linear, £100. 8-over-8 slot antenna, nearly new, £15. 8XY, £10. Yaesu 500Ω mic, £4. KSW1 coaxial switch, £3. TR2200G, 10W amp, £100. G8EGF, QTHR. Tel 0732 862014.

FT901DM, YO901P, vgc, light rx use only since new, manuals, leads, £750 ovno. Buyer collects please. *Wanted:* CV253/ALR plug-in tuning unit for AN/APR4 rx. AN/ARR8B series airborne vhf/uhf panoramic rxs. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

TS120V with cw filter, exc cond, £300. Carriage extra. G3XHY, QTHR. Tel 0632 679106.

Racal RA117E, good cond. sideband converter, no cases, all wkg, £320 for quick sale. IC255E std mic, incl exc Mutek front end, £210. National Panasonic vcr, approx two years old, £400 ono. Colin Ward. Tel 0962 882246 to view.

Pye PF70, wkg on RB0, RB4, RB14, tb, two new nicads, one used, Crayford helical antenna, spkr/mic, mod courier leather case, photo ccts, info, colinear mobile amp, gutter clip, cable, £65 ono. G8SYS, QTHR. Tel 021-358 5474.

IC202S 2m ssb, nicads (1·2AH), charger, Oscar xtal, orig packing, yours for £100. 10m in, 2m out converter, diecast box, £5. *Wanted:* 10·7MHz fm i.f. strip. GM8MRK. Tel Troon 316300, or Ayr 266955, ext 281, daytime.

Tektronix type 545A oscilloscope ca unit, £110 ono. AR88D, good cond, spkr, manual, £55 ono. Prefer buyers collect. G4HHB, QTHR, Sussex. Tel 04446 45182.

FRG7, exc cond, orig packing, handbook, etc, SME 2m converter, £150. G4JKF, QTHR. Tel 0474 61296.

TR7010, fitted SD306 preamp, £130. Two pairs PF1, one nightcall unit, spare nicads, £75. Carriage extra. Damian Fisher, G8UZY, QTHR. Tel 0902 764945.

FT202R handheld, new cond, xtals for S20–23, R5, R1, manual, dry cells, carrying case, straps, £80. Buyer collects. Warwick, 10 Douglas Way, Hythe, Southampton. Tel 0703 847183.

Six bound volumes *T&R Bulletin,* 1933–42, many single issues from No 1, July 1925, to June 1932, (some complete volumes), offers. Tel Redhill 61794.

KW Atlanta, ext vfo, psu, new tubes, Shure mic, 10–80, cw/ssb/a.m., 500W p.e.p., compact, vgc, £235. TA33Jr, 3-el, 10/15/20m, 8dBi, vgc, £65. QM70 Buccaneer 2m transverter, 10m i.f., 40W p.e.p., all mode, vgc, £65. (Computer? See my other ad). Tel Paul, BRS45810, Suckley (08864) 588.

Standard C8800 2m 10W fm tx/rx, exc cond, £200. Will take fm portable in part exchange. G4GZM. Tel Torquay (0803) 34222.

CQS 145MHz linear, 2–18W, £20. Star SR200 ham bands rx, £20. 145MHz auto-switching SEM preamp, £10. *Wanted:* Any TW (Withers) equipment or gen. P. Turner, G4IIL, QTHR. Tel Brighton 607737, evenings.

Microwave Modules converters: MMC70/28, £12; MMC144/28, £12; MMC432/28, dual band converter, £17. 12V dc 3A psu, £12. Tel Kim, Morden (Surrey) 01-648 0028, after 6pm.

FT200, FP200, mic, G3LLL speech clipper, mint cond, black finish model, £250 ono. Pye Westminster W15 fm, R3–7, S0, S20–23, mic, not in orig case, vgc, £70 ono. G6AUW. Tel Weymouth 786930.

Nascom 1 computer, 32k ram, 4k rom, 19in rack keyboard, case, psu, Nas-sys, Nas-pen word processor, 8k tape Basic, memory board, buffer board, video blanking, mains filter, pio chip, very well made, intermittent memory fault, swap for FT290 multimode or £220. Tel Paul, BRS45810, Suckley (08864) 588.

Uniden 2030 2m fm tx/rx, fitted RR0, R0, R3–7, S19–23, S32, auto xtal toneburst on repeaters, c/w mic, mobile mount, handbook, £80. Buyer collects or carriage at cost. G8KLV, QTHR. Tel Chippenham 50880, after 6pm.

FT101E, cw filter, used little. £390. G3VOK, QTHR. Tel 0582 23729, day, 0582 52934, evening.

Yaesu FT501/FP501, vgc, 560W p.e.p., digital readout, £275 ono. Buyer collects or would exchange for good hf linear amplifier, Datong rf clipper, as new, £30. GW4BIQ, QTHR. Tel 044 128 3245.

Microwave Modules transverter, 28/432, latest switched Oscar MMT432/28S, £115. Barlow Wadley rx, XCR30, £65. G3CDK, QTHR.

Redifon GR415M hf ssb tx/rx, 12V dc, unused, £65. MK123 tx/rx, 1–20MHz, 240 ac, £35. FT480R 2m multimode, £250. Eddystone 880/2 rx, £175. 2m pa/preamp, 12V dc, £20. Racal 801M frequency counter, needs attention, £45. G3DVF, QTHR. Tel Alnwick 602487.

AM10D modified for fm, £30. Unica UNR30 550kHz 30MHz gen cov tx, £12. Heath HM102 power/swr meter, handbook, £10. Tel Cambridge 246107.

Army set 123, xtal control tx/rx, 2–21MHz, 250V ac mains. or 12V dc, spare rx, spare tx valve, handbook, £50 ono. Details G3DOP. Tel Camborne 717515.

Icom IC720 with ICSP3 spkr, almost new, perfect in

every respect, with or without Heathkit 20A supply, new baby so back to old rig! Offers. G5DDC. Tel 01-486 4137.

Multi 11, fitted R2-7, S8, S11, S20-23, scans four rx, S1, S6 only, manual, boxed with accessories, as new, £130 ono. G3FNV, QTHR. Tel Chester 35357.

FRG7, fine tune, no mods, manual, £140. G3VEZ, QTHR. Tel 0202 425044, after 5pm.

Odd xtals, FDK, KP202, etc. SAE for list. G8APX, QTHR.

FRDX400S rx, all options incl 2m and 4m, FLDX500 tx, matching spkr, 2m transverter, Shure 444 mic, all vgc, £325. Philips monochrome vtr, 1in, some tapes, £50. Tel Jerry, Windsor 54873, evenings and weekends.

C8800 2m fm tx/rx, five memory scan fac, rev rep, hardly used, nine months old, as new cond, £195. 32 Jenkins Dale, Chatham, Kent. Tel Medway 722693.

KW E-Zee Match, £30. QQVO320, unused, £7.50. Kokusai MF455/15CK mech filter, with chart, £12. 204 copies of *Practical Wireless*, 1950-80, (not 1978), offers. One pair Goodmans acoustical resistance units (172ARU), £3 each or £5 the pair. Please add postage. G3OEI, QTHR.

52 set tx, comp, no mods, £40 ono. 123 set tx/rx, manual, 12V inverter, spare valves, £50 ono. 10in Stentorian loudspkr, £3. Morris 8cwt Minor van, good runner, no MoT, £60 ono. 2XKT66, new. G4JSX NOT QTHR. Tel 085881 570.

Geloso tuner with dial, £15. KW Q-multiplier, £5. AR88 handbook, £2. Eight valves, ex-AR88, £5. 707 valves, £2. Tel Crowthorne 71591, evenings. G4EAH, QTHR.

Long-established dxing semi-detached, 6 miles west of Birmingham, comp with tower, purpose-built shack, 820 digital and SB200 etc if required. Tel 021-422 4113 for details.

HF5 five-band vertical antenna, £32. HF5R radial kit, £20. Perfect. Carriage extra. G3HWX, QTHR. Tel 0704 840328.

Sinclair ZX80, as new, only £45. Fujica ST605 slr, ttl meter u.s., otherwise perfect, £25. G4CKN, QTHR. Tel Dave, 01-790 3123, evenings.

Blaupunkt "Frankfurt" car radio, in exc cond, short, medium, long wave, vhf fm, push-button and manual tuning, provision for external cassette player, cost over £200 new, bargain at £60. No offers. Taylor, G3UCT, QTHR.Tel Fleet (02514) 6998.

Lattice tower, heavy duty, 40ft, in four sections, £65 ono. Buyer collects. G8GYS, QTHR. Tel 0264 52747.

Trio 2200G auto toneburst, £90. Modular Electronics PM225 (25W pa), £15. 2N5591, £2.50. Buyer collects or pays carriage. G4OIK, QTHR. Tel Witney 4867.

FT7, used little, incl 10/15 whip, £245. Realistic PRO2001 scanner, USA model, £150. G3XWP, QTHR. Tel Stourport 3200, evenings/weekends.

GDX1 discone antenna, 3dB gain, 80-480MHz, mounting hardware etc, good cond, £20 incl carriage. G8EPQ NOT QTHR. Tel Milton Keynes (0908) 640249, evenings.

CR100 communications rx, 60kHz-30MHz, £40. 2m converter, 2-4MHz i.f., with powerpack, £10. G4CG, QTHR.

Back issues *Radio Communication*, June 1977, May-August, and October 1978, February 1979, 30p each plus large sae. *PE, SWM* and *TV*, send sae for details. Robin Bayley, 8 Field Lane, Kemberton, Nr Shifnal, Salop TF11 9LR.

Vintage wireless magazines, 'twenties and 'thirties, *Wireless Constructor, Modern Wireless, T&R Bulletins*, etc, all wartime *Wireless World*s continuing to early 'sixties, *Practical Wireless*, 'forties to 'sixties, several 1920-30 wireless sets, all wkg, offers invited. G3WIF, QTHR. Tel Bristol (0272) 293738.

Trio R1000, exc rx, as new, £230. Microwave Modules MM2000 rtty to tv converter, new, £150, G4GIQ, QTHR. Tel Northwich 45584.

TS802 2m handheld, fully synth, scanning, 80-ch, as new, £110. Elf 1802 microprocessor, basic board, £30. MM 40W 2m power preamp, £45. 5/8 whip, £5. G8PGX. Tel Guildford 37726.

FT207R, two complete, two extra batteries, one spkr, mic, YM24, one NC2 base unit charger, two $\lambda/4$ flexible whips, £300. G3OUX, QTHR. Tel 0293 34139, after 5pm.

Sommerkamp FT250, (same FT200) FP200, fan, black case, some mods, hence £135 ovno. Buyer collects. G3WWO, QTHR. Tel 99560745, evenings.

IC255E, £175. G4LAW. Tel Frank, Bristol (0272) 20820, home, 218305, work.

Sommerkamp TS280FM 10W, vgc, £110 or will consider exchange for hf bands rx. G6BFS. Tel 0228 41222, or 22843 after 6pm.

FDK2700 Mk2, all mode, 2m synth, and vfo 240/12V, Oscar converter, speech processor, no mods, handbook, service manual supplied, prefer buyer views, £250 ono. BLW60 45W, 2m, new, £5. G8RZC, QTHR. Tel Newmarket 5783.

9R59DS Trio gen cov rx, good cond, £45. Post and packing incl. G3ZOG, QTHR. Tel 0783 280080.

Sell/exchange 5-el Hygain 105BA beam (when new £105) plus CDE45 rotator (when new £113), will sell pair for £110 or exchange for 2m mobile or handheld tx/rx, both used approx 6h. Tel Burnley (0282) 23751.

Icom IC211E multimode 2m, immac, orig packing, used little, technically perfect, £350 ono plus carriage. Securicor delivery arranged. Professionally designed 12-16V stabilized psu, loafs along at 10A, £25 collect. GM8JFZ, QTHR. Tel 03552 30860, evenings, weekdays.

Yaesu FRG7 general coverage receiver, fine-tune, battery box, mains, 12V, £120. Yaesu FT207R, nicad, YM24, NC1A, charger, complete, £175. Microwave Modules converters MMC432-28, £15. MMC144-28LO, £15. Xtal RB6 reverse transmit for U11, C430, £1. G4ITF (Mick) QTHR, tel Cosham (0705) 386184.

Microtan 65 fitted graphics, lower-case chips, Micron type case and power supply, comp with keypad, manual, text books, programming course, etc, all mint, cost about £200, £115 ono. G4CTO, QTHR. Tel Blandford (Dorset) 52027.

Atlas 180, 160-20m, 12V mobile cw/ssb, very compact, £250. Trio 2200G 12ch, £80. Icom IC240, £120. Casio FX501 programmable calculator, £35. 4m 4-el Yagi, £12. D. Skye, G3PLR. Tel Harpenden (05827) 66410.

FT101E, SP101 spkr, used only about 10h on receive, transmit side even less! Immaculate, unmarked, completely as new, orig packing, manual, leads, plugs, mic etc, one of the last series of this fine tx/rx with external processor control, NEC valves etc, American workshop manual, two comp sets of valves incl, if you are interested in what must be one of the best 101Es around please contact me (but no ridiculous offers please). G4GCL, QTHR. Tel John, 0924 402257.

Kenwood TS520SE cw MM 144MHz transverter, with SEIF, PS134, regulated 13·5V dc power supply, Shure 201 mic, Ringo Ranger antenna, buyer inspect/collect, £325. G8YUZ, Itchenor, Chichester, W Sussex. Tel Birdham 512423.

TenTec PM2B QRP with full QSK and audio filter, £25. TI59 card programmable calculator with thermal printer, UK power specs, £175. Conar 2m synth tx/rx, 25W output, 144-148MHz, £100. *Wanted:* FV301 vfo, FC301 atu for FT301. G5CSU, QTHR.

FLDX/FRDX500 tx/rx, comp set of unused valves, rx has vhf converter, can be run together as tx/rx or as a twin with split frequency wkg, comp hf station, mic, £300. Thomas, G4JJP, QTHR. Tel Winchester 3777.

Racal RA17, good cond, incl manual, £150. *Wanted:* 80m coil pack for HRO. G3UVR NOT QTHR. Tel 051-652 7454, daytime, 051-342 7880, evenings.

Creed equipment: 75, £40; two 54s, £60 pair, will separate; tape reader, £10; ST8 terminal unit, £40; ditto (MK Products), £20; monitorscope, £40; rolls of punch tape paper and printout paper, £10; will deliver 20 miles otherwise buyer collects. G8MAT, QTHR. Tel Mansfield (0623) 823184.

Creed 444, Creed 7ERP, both comp with bases and silence covers, 444 just overhauled by Creed mechanic, Creed 6S6 tape reader, will deliver 100 miles, offers? Andy Allan, GM3ZXL, 2 Lanrig, Chryston, Glasgow G69 9HU. Tel 041-779 2303.

TS520S in good cond, DS1A 12V power supply fitted, YG3395C 500Hz cw filter fitted, in orig packing, £385. Shure 444 in good cond, £10 to rig purchaser. Tel Chester (0244) 533051, after 4.30pm.

Datong up-converter UC1, active antenna AD170, two mpus, all in exc cond, £100 ono the lot. G4MBT. Tel Redcar 485355.

IC260E, exc cond, £260. Pye Bantam, wkg, 2m fm, xtalled R7, S22, flexi whip, nicad, manual, case, £45. Pye Pocketfones, wrk, SU8, nicads, £25. Pye base charger for same, £12. Base charger KP202, £5. All ono. G8HST, QTHR. Tel 01-550 8480.

TW 10-2m transverter, 640 pa valve, own power pack, instructions, circuit 60W out, £60. Trio MC50 mic, £20. Moseley Elan beam, £40. SSM Z-Match, £45. FRG7, £130. G4JFE. Tel Newbury (0635) 41613.

IC251E with SM5 desk mic, £340. T435 power meter, £20. Stolle 2050 rotator, £30. 4-el quad, £10. All 1yr old, Datong morse tutor, £35. G3HSC morse records, £2. Going hf. G8WCU, QTHR. Tel 01-675 0280.

TR7500, 1 or 10W, synthesized 80-ch fm tx/rx, manual, mobile mount, orig packing, £155. G3VGO, QTHR. Tel 0872 864255.

Racal RA117E, rx RA98, ssb—adaptor, MA197B preselector, comp station, 19in rack cabinet, £375 ono. Alan Doherty, GI8YDZ, 21 Ramore Street, Portrush, Co Antrim, N Ireland. Tel Portrush 822173.

Pye Ranger low band, dash mounts, some wkg, other suitable spares, 15 available, buyer collects, £5 each, or £60 the lot. Tel 0761 414519 (Avon).

Trio 2200GX, vgc, 10 channels xtalled, hi-lo power switching dial, lamp, nicads, charger, case, strap, etc, £100 or offers. G8ASX, 25 Clingan Road, Bournemouth. Tel 0202 474347.

Icom 240 2m tx, fitted seven repeaters, 13 simplex, £120. Lowe SRX30D gen cov digital rx, 200kHz-30MHz, usb/lsb/a.m., £160. Datong FL2 audio filter, £60. All perfect, boxed as new, morse hopeless, going multimode with converter. G6BGY. Tel John, Clevedon 871039.

FT225RD as new cond, 10 months old, car purchase forces sale, £400 ono. G8YSM, 10 Arcot Park, Sidmouth, Devon EX10 9HW.

Europa transverter, 2m BF900 preamp, £60. 2200GX, comp 8-chs, £80. RTTY 7E printer, ttu moniscope, £55. Will haggle. G3LTN, QTHR. Tel Banbury 710623.

Robot 300E sstv converter, Trio TS120V,Microwave Modules 144/432 transverter, Tonna 144/432 dual beam, rotator, Icom IC260E multimode, offers. w.h.y.? Buyer collects. G8TKB, QTHR Chard.

RTTY rectifier 66B, 160-80+80, £25. Rectifier 26B 80+80, £15. Low pass filter, 4B, £4. TG988 unit, £5. Auto transmitter head, £5. Governor contacts, £2.50 per set. G8PIT. Tel Poole (Dorset) (0202) 707013.

FRG7, fine tune, carefully fitted with ssb filter, exc cond, in orig packing, £140 ono. Datong morse tutor, model 070, as new, in orig packing, £40. Reason for sales—G4 awaits. Offers to G6ALB. Tel Orpington 21030, evenings and weekends.

Datong morse tutor, five months old, £36 incl. p+p. G4LXZ. Tel Keith, Birmingham 021-747 8661, after 6pm.

FDK Multi 700EX 2m fm synth, 1-25W, immac cond, in orig packing, comp with mobile mount, £170 ono. Will exchange for TR2400. G8ZPK. Tel Crewe (0270) 661187.

TR2200G tx/rx, seven channels, R0, RR0, R3, R7, S20-22, auto toneburst mod, plus orig packing, charger, helical, manual, ps/charger, £80. G6BAW. Tel 021-705 1253.

FDK Multi 2700, 2m multimode, 143-147MHz, synthesizer, vfo with 10m Oscar rx converter, speech compressor, vox, nb, no mods, full wkg order, manual, boxed, £350 ono. G8TYQ. Tel 01-691 7555 (Brockley).

CW transmission keyboard and morse tutor with built-in psu, bit memory, see *Radio Communication* 1980 p149, and 1979 p619, selling for parts cost, pro-type keyboard, very compact, prize-winning construction. £65. G4FAS, QTHR.

Trio 2300, fitted reverse repeater, nicads, charger, case, etc, helical rubber antenna, VB2300 10W amplifier, mobile mount, Revco 5λ/8 mobile whip, £170 ono. G4KLI NOT QTHR. Tel Macclesfield (0625) 29748.

KW1000 la, £180. Three-el G2BAR 15m mono Yagi, £35. G4KDZ. Tel Tony, Grays (Essex) (0375) 78783.

Pye Cambridge, boot mount type, KW Valiant a.m./cw hf rig, offers or swap for 70cm rig. G4IEB, QTHR. Tel Stourbridge (West Midlands) 2006.

Trio 520SE, boxed, manual, mint, £350. KW202 rx, manual, £140. Standard 8800, £175. Sommerkamp TS802, £95. Yaesu FR101 rx, £250. 26ft glass fibre pole, £25. Cash or swap w.h.y.? G3RCQ. Tel Hornchurch 55733, evenings.

KW Vespa Mk2, Shure mic 201, power supply, £75. KW 201 rx, £75. G3USZ, QTHR. Tel Upminster 23699.

FT227R, fitted 25/5kHz stepper and scanner, good cond, boxed, £175. Multi U11, 70cm, fitted 12 channels, boxed, £145. G8YHF. Tel Broadstone (0202) 698015, evenings and weekends.

Triumph 1500, 1972, 39,000 miles, tax, February 1982, 1yr MoT, £500 or p-ex 2m multimode base station (FT221, IC251 etc). Bob Enright, G8SAS NOT QTHR. Tel 0732 357361, or 09328 66941, ext 27.

Multimeter, Russian instrument, taut band movement, 20,000Ω/V dc 200Ω/V ac, comp with metal case, leads, operating handbook, £13 post paid. G3RDG, QTHR. Tel 01-455 8831.

FT101B, as new, fan, mic, all leads, etc, hb atu, swr bridge, dummy load, G5RV antenna, comp station, ready to operate, £325. Cowl gill motor, pair Selsyn indicators, suitable transformer, powerful beam rotator for £29. G2HCV. Tel 01-866 4871, home, 01-952 7722, work.

2400 synthesized 2m portable, £135. 2200 in use every day, fitted R5-7, S20-22, £45. Storno Viscount, fully functional on 2m, £15. G3OLB, QTHR. Tel 04203 3649, after 7pm.

RTTY Creed 75RP/K4 Mk3 teleprinter, exc order, fitted sync motor, spare governed motor, machine less keyboard for spares, maintenance manual, spares manual, operator's handbook, £50. 6S/6M auto tx with manual, £12. Carriage extra. G3RDG, QTHR. Tel 01-455 8831.

Racal RA17 rx, Wadley loop, a superb rx, exc cond, spot-on performance, handbooks, £150. Buyer to inspect and collect. Gerry Kennedy, G3OGK. Tel Chilbolton (Hants) 391, after 7pm only please.

Atlas 210X solid-state 12V tx/rx, 200W p.e.p. input, ideal for mobile/portable or fixed station, exc cond, £315 ono. Reed, 73 Dudley Road, Brighton, Sussex BN1 7GL. Tel 504634, evenings/weekends.

TR2400, as new, orig packing, gone multimode, £160 ono. Six-channel oscillograph, SE Labs 3006, vgc. £330. Taylor 62A am/fm sig gen, 4 120MHz, £140. G8ZPC. Tel Holmes Chapel (Cheshire) (0477) 33011.

Creed 75 teleprinter, five-line ASCII (Elliot) coded. integral five-hole paper tape punch, good cond, full workshop manual, ideal microprocessor, hard copy, 69-char line width, spares, £55. Buyer collects. Kennedy, G3OGK. Tel Chilbolton (Hants) 391 after 7pm only please.

FL2000B, one spare valve, £200 ono. Magnum 2 transverter, £50. Drake R4A, £110. 240/110V auto transformer, 500VA, £15. G3XTT, Sunnyside, West Drive, Highfields, Caldecote, Cambridge CB3 7NX. Tel 0954 210630.

2300, cond as new, comp with nicads, helical, £140 or swap for IC2E or 2400, must be new cond. G4MAG, QTHR G8TJL. Tel Crewe (0270) 664916.

FT707 with noise cancelling mic, £475. HRO-MX, all bandspread coils, £35. BC221, orig charts, mains psu, £20. TCS12 tx, £10. PSU, 600V, 500mA, 250/350V, 250mA, 6·3/12·6V, 12A, 12V dc 5A, £10. All exc cond, buyers collect. Tel 0243 822891.

Atlas 180, the ideal mobile rig, 160–20m, exc cond, £185. G4KTY. Tel Burnham (06286) 65536.

SR9 Daiwa 2m rx, fm, tunable, six xtals fitted, 12 months old, £40. L. J. Whitemore, 2 Netherton Wood Farm Cottages, West End, Nailsea, Bristol, Avon. Tel Flax Bourton 3695.

FT202R 2m fm handie portable, six channels, nicads, charger, helical, whip antennas, carrying case, £80. G4JBJ, QTHR. Tel 021-378 0540.

Sagent EL40X dipole antenna, 3·5/7MHz, will also resonate on 21MHz, comp with balun, full instructions, £21. SST T1 random wire antenna tuner, £15. Both items post paid. Michaelson, G3RDG, QTHR. Tel 01-455 8831.

Drake R4C, nb, extra filter, bc xtals, exc, £295. Yaesu FT227R 2m fm tx/rx, as new, £150. Trio PS30, £75. AT120, £55. MB100, £15. All new, suit TS120, 130SV. *Wanted:* TS830S, TS130S, TR7 or similar. Jim Taylor, G4ERU, QTHR. Tel 0202 510400.

Yaesu rx, FRDX400, 2m board, calibrator, handbook, cases, £140 ono. PX ssb 2m tx/rx or hf antenna. *Wanted:* two 6146Bs. G3KPW, QTHR. Tel 0474 62051, evenings.

TRS80 Level 2, 16k, two months old, £330 ono. MM2000 rtty to tv converter, three months old, 45·5, 50, 75 baud Murray, and 300 baud ASCII, £110. GM8OAH. Tel Bishopton (Renfrewshire) 3741, after 6pm.

Trio R1000, immac cond, £220. Boxed Decca Supermatch, £95. Datong FL2, mains unit, £70. FWE wide range signal generator, 15Hz–1MHz, £30. BC221 frequency set, power pack, charts, £18. Heathkit low pass filter, £10. G4IZG, QTHR. Tel 0903 41109.

Umatic portable vcr, JVC CR4400E, incl mains psu, charger, two batteries, new £2,185, sell £1,480. 40 cassettes, £120. G8KGA, QTHR. Tel Albrighton (090-722) 4509, evenings.

Going QRT due to bereavement. Swan 350 30ft Telomast, rotator, TA33JR, all cables, guys, spare lengths, worked worldwide, buyer dismantle antenna and collect. Swan antenna etc, £250. LG50 good cw tx, £25. GW2BOU, QTHR.

Heathkit HW100, HP23 psu, two-speed tuning drive, comp with full manuals, can be air-tested, £160. G3MNK, QTHR. Tel 0525-220 568.

Drake TR4C 10–80m ssb tx/rx, matching AC4 psu, MS4 spkr, quality engineering, servicing easy, in exc cond, £265. Shure 562T table mic, £18. Shure 202 hand mic, £6.50. TenTec KR5A electronic keyer, new, £19. G2HCV. Tel 01-866 4871, home, 01-952 7722, work.

SEM 50W 144MHz amp incl preamp, £45. G3NMZ, QTHR. Tel Luton (0582) 591749.

TR7500, Trio 2m fm tx/rx, digital display of channel numbers, mobile mount, £130. Sinclair DM2 digital multimeter, accessory mains power supply, £25. Sinclair PFM200 pocket frequency counter, 20Hz–200MHz, £28. G3XHX, QTHR. Tel Liskeard (0579) 43749.

Trio TS120V, mic, cw filter, TL120 linear, £415. Microwave Modules 2m transverter with attenuator, £90. HF5 vertical antenna, £32. SWR bridge, £7. All few hours use only. G4DUE, QTHR. Tel Penkridge (Staffs) 2744.

Icom IC22A, all repeaters, S16, S20–23, auto toneburst, mobile bracket, handbook, £100. Pye Bantam 2m fm, three channels, nicads, helical, diagrams, £40. Murphy MR121 Navy rx, 60kHz–30MHz, psu, diagrams, £100. R1155N, audio output stage, psu, £15. 13m RG213/U new, £6. Jaybeam 6/6 slot, £7. Various ally masts, 12–14, £6. Jointing sleeves, chimney lashings, etc, all £3 each. G8SSI NOT QTHR. Tel Martin, 01-686 9646 (Croydon).

Philips professional stereo audio recorder N4450, 2 by 20W sinewave, six heads, three motors, auto reverse, digital position, time, 10½in reels, three speeds, ideal wx satellite apt, exc cond, manual, £180. Buyer collects. Kennedy, G3OGK. Tel Chilbolton (Hants) 391, after 7pm only please.

IC251E 2m base stn, mains or 12V dc, mint cond, £410. IC255E 2m mobile, exc cond, £210. Both with orig packing etc, not getting married but going hf carr by arrangement! GM8DMZ, QTHR. Tel Patna 225.

FT101B tx/rx, £325. HF linear FL2000B, £220. Philips 70cm tx/rx FM321, offers over £100. SEM Transmatch atu, 160–10m, DA1, £15. Buyer collect. G3FXA. Tel 0242 35727.

Trio TS120V, £280. TL120 linear, £90. AT120 tuner unit, £40. Mobile bracket, £10. All mint, orig packing. Sentinel top band converter, brand new, £15. G3YBD, QTHR. Tel 061-998 5648.

Trio 520SE, used for 1h only, mint cond, delivery included by Securicor, £360. Tel 0624 27044.

Yaesu FR50B, hambands only, rx 10–80m, no mods, a.m. ssb, double superhet, mint cond, boxed, manual, built-in spkr, S-meter, xtal facility, £85. BRS171991. Tel 0206 250819.

FRG7700, mint cond, orig packing, manual, few hours use, £285. Tel Wimborne (0202) 888130, daytime, (0202) 884516, evenings.

Yaesu YR901 cw/rtty reader, hardly used, a beautiful instrument, leads, manual, cost £425, a bargain at £270. Sony HP511A radiogram, pair of 10in spkrs/cabinets, manuals, exc cond, £80. CCTV bw camera, Ikegami model VR622 with 25mm f1.9 Cosmicar lens, manual, £60. BW tv, 11in monitor, suitable for YR901 above. Tel Bulls Green (Welwyn, Herts) 219.

Drake SSR1 rx, vgc, in orig packing, £90, cp. TA33 hp with balun, 1·5yr old, £75. Carriage paid. GM4HPF, QTHR. Tel 0463 41211.

Xtal mic, desk model, £3. Kenwood ptt mic, MC355, brand new, boxed, £8. SEM 144MHz converter, new, £15. Joymatch, all band atu, £5. Command rx, BC453B, 190/550kHz, £5. Small mains psu, 350HT, two by 6·3V, £5. G3OAZ, QTHR. Tel 0256 65126.

Marconi Atalanta rx, 10kHz–30MHz, vgc, £75. Avo 8 Mk5, new cond, £80. G4BLZ, QTHR. Tel Locksheath 5166, daytime.

KW2000E, exc cond, ac psu, spkr, 160–10, Shure 444 mic, 18AVTW antenna, spare valves, manual, prefer buyer inspects and collects, £290 the lot. G3ACB NOT QTHR. Tel 01-670 4337 (Seaford).

TS820S digital readout, dc supply, Sherwood cw filter, £500 ono. Heath SB301/401, dual cw filters, full QSK, £300 ono. *Wanted:* sections of Western Electronics Alumast. G5CMX. Tel Bill, 049-481 3956.

DX4OU 80–10m tx, manual, £25. AR88LF, manual, £35. Liner 2 2m ssb tx/rx, preamp, clean output on tx, £80. Ken, G4APB, 107 Bysing Wood Road, Faversham, Kent.

Robot 400 and modulator, £550. Hitachi camera, £125. Video recorder, £25. Tested tx unused due illness, comp with harness, £700. Matched TS820 tx/rx, recently re-aligned by agents, £490. GW3CVY, QTHR. Tel 0570 470292.

Barlow Wadley Mk2 rx, £140. SEM Sentinel X, 2m converter, batt/mains, £20. Sentinel hf wideband preamplifier, £9. Catronics CT100 terminal unit, t/r, £85. Creda 54 teleprinter, £35. Everything as new. G4BYW, QTHR. Tel 0484 40867, evenings.

FT200, FP200, black, G3LLL clipper, spare pa valves, mic, vgc, £250. GW4KDD. Tel Blackwood (0495) 224782.

Atlas 210X, plus 206 external vfo/digital display/counter, ac console, deluxe mobile mount, £360 ono. Freq agile filter FL1, £40. MMT 144/28 transverter, £65. G3LMH, QTHR. Tel 0962 881644.

Drake 2C rx, vgc, £90. HRO, comp set of BS and GC coils, £30. KW Viceroy tx, re-built psu, £40. Electroniques front end coil pack, 888 dial, £10. 2×813, new, with bases, £15. G4DJX, QTHR. Tel 0727 54190, after 6pm.

Trio R1000, eight months old, still boxed, £230. MK sstv monitor, faulty psu, £20 or £240 the lot. Tel Weston-super-Mare 417407.

Tower, 55ft, three-section, tilt-over tower, brand new, £350. One ex-commercial tower, 20, 30 or 40ft, comp with base, £150 ono. FT202 handheld with nicads, charger, battery eliminator, spkr mic, carrying case, orig boxes, £95. HF5 vertical, five-band, £30. Tel 0269 860649.

IC202S,nicads, £110, FTV250, preamp, £100. Rotating 25ft sectional mast, £25. Copper-clad vertical, £20. BC221, mains psu, £18. Marconi CT211 rf power meter, £20. Oil-filled 50Ω dummy load, £20 etc. G8HBW, QTHR. Tel 09655 466.

KW2000A ac psu, spare valves, handbook, £150 ono. G3KCA, QTHR. Tel Southampton 760454.

Cupar Fife: three bed det villa, gas ch, lounge, dining room, cloakroom, 25ft garage inc shack, splendid view, to include carpets, blinds, etc, £38,000. J. Nicolson, 24 Pottersfield Road, Woodmancote, Cheltenham.

Eddystone 840C gen cov rx, vgc, £65. KW76 a.m. bands rx, vgc, psu, £25. 15W 2m pa used 1h, £20. Telescope 50 by 40mm, tripod, exc cond, £15. Gnome Beta 3 enlarger, £15. ONO on all items. G4MAP, QTHR. Tel 021-453 4028.

VHF QTH Sutton Coldfield, detached house, three bedrooms, playroom, large lounge, separate dining, breakfast/kitchen, large garden, worked FMD Supreme Award, DXCC, etc, incl carpets, mast, antennas, no tvi, offers around £43,000. G3OHC, QTHR. Tel 021-308 2512.

35ft lightweight strong Duralumin 10in triangular lattice mast, comprising bolted 6ft sections, comp with heavy duty hinged base, 4:1 winch, £100. Buyer dismantles/collects. G3OFK, QTHR. Tel 0734 733674.

Admiralty ssb/rtty converter for B40, rx, Avo CT160 valve tester/vcm, both mint, manuals, connectors, etc, £50 each, plus carriage. HRO dial, brand new, £5.50. B&R vhf coaxial relay, 1kW rating new, boxed, plugs, £7. Postage extra. Tel 0995 40387.

Yaesu FRDX400 rx, amateur bands, handbook, 4+6m converters, built-in, £125. Catronic DFM5 50Hz–200MHz, seven digs, handbook, £75. Telford 2m converter, 4–6MHz, £7. *Radio Communication* mags, 1952–66, £2. Volume complete, good cond. Buyer collects. G4IVJ, QTHR. Tel 021-477 7447.

Icom IC202S 2m ssb portable, comp with nicads, charger xtalled 144·0, 144·4, beacons and Oscar, PF1 pocketphones, two pairs, RB14 and RB10, nicads, offers. Tel 0501 33442, after 6pm.

FT101B with 350Hz filter, mic, manual, used mainly for field days, £310. G3KLH, QTHR. Tel 0722 710430.

Shack clearance: Philips desk dictation unit, uses 5min tapes, in pwo, offers. Daiwa Cross Pointer swr and power meter, mint, £40. Logic monitor test unit for ics, £15. GI3ZCK, QTHR.

TR2300 station: TR2300, manual, helical, nicads, soft case, strap, one spare case panel; constant current charger worth £10; VB2300, manual, two spare panels; mobile mount, never been used. What can you offer me? G4IAC, QTHR. Tel Knowle 78218, anytime.

FT200, FP200 with 10m, 28–29·5MHz, good cond, £200. G4BOF, QTHR Hertfordshire. Tel 056-881 658.

FT200/FP200, full 10m coverage, good cond, £200 ono. Matching Magnum Two 2m transverter, £50 ono. G8PVF. Tel Warrington 38211.

Pye Westminsters: W15AM B5 low-band bootmount with control box, £60; W30AM low-band bootmount with control box, £50; W15AM low-band dashmount, £65; some Westminster spares a.m./fm high/low. SAE with enquiries please. G4BLH, QTHR. Tel 0282 695904.

TRS80 48k system with one disk, CTR80, new design interface, green screen vdu, new rom cpu with lower case, loads of software including Newdos/80, Adventure, etc, all equipment few months old, please ring for details. G4IAC, QTHR. Tel Knowle 78218.

Ex-TR2200G, toneburst, £3. SD306 preamp, £4. Two PA3 preamps, £4 each. Nicad charger up to 50mA £6. MM202G mobile mic, £15. IC245E, RM3, £235. ITC 9in monitor, new, £100. CGE extra. G8ESK, QTHR. Tel 0274 45611.

Trio R1000, one year old, used three months only, as new, 2m Microwave Modules converter incl, £185 the lot. HP or Barclaycard. Howard Welchman, 11 Springfield Place, Lansdown, Bath. Tel Bath 318128 or 310940.

WANTED

Pair YL1080 valves, new preferred. Will buy or exchange pair QQZO310 or 5763 or QQVO310. G6ASK, QTHR. Tel 0642 590966.

Circuit diagram or service manual for Marconi industrial television camera type 4339B, (596) purchase or loan. G3NZU, QTHR. Tel 061-437 8614.

Manual for Eddystone S640 or photostat. *Shortwave Magazine*, January 1966. Cost will be reimbursed. Please write to Ted Short, Sunnside, Knapp Road, Thorbury, Avon BS12 2HF.

Heathkit fm transmitter adapter, model HWA172 for use with HW17 series 2m a.m. tx/rx, wkg or not. Will pay all costs. Any mods for receiving fm on above. G8YAL, NOT QTHR. Tel Peter, Diss 51193.

Half-lattice xtals for Heathkit RA1/RG1 rx, spec freqs 1·6214 and 1·6197MHz, H6CU, pair spaced 2kHz near 1620kHz suitable, or even one for use with phasing cap, two H6CU sockets. Collins, 60 Alexandra Road, Skegness, Lincs PE25 3RE.

ATU, 1kW and above, capable of matching tuned parallel feeders. Tel Leeds 638919, anytime.

Manual for Hammarlund SP600 rx, good quality morse key. Dr Smith. Tel 0272 24161 ext 600, day, or 0272 30542, evenings.

For restoration of tx type 53: rack mounting cabinet No 12; antenna coupling unit; modulation transformer; one roller coaster. Will buy any other 53 set units. B2 units. Morriss, G4GEN, QTHR. Tel 082-571 2205.

Drake MN4 ant, matching unit, 200+200pF wide-spaced variable, suitable 250W, cond and price please. G3CPM, QTHR. Tel 0386 852753.

Collins 32S3 and 516F2 power supply, no mods, must be in mint cond and appearance. State serial number, wing or dot series. GM2FVV, QTHR. Tel 0786 811237.

Suitcase tx/rxs: B2 (Type 3 Mk2), B2 Minor (Type A Mk3), Mk119, Mk122, Mk128, Mk217, BP5 or T5, AR11

and A3. Any American suitcase sets. A510. RA117 comp with case in exc cond. WS62. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.
Avo model 8 Mk3. Please write price and condition. G8MSD, QTHR.
One or more 813 valves, one base, used or new, for restoration projects, SX28 cabinet or comp rx, AR88 spkr and hopefully S-meter, AR77 handbook, w.h.y.? G4JOW, 19 Cheer Lane, Westonzoyland, Bridgwater, Somerset. Tel Westonzoyland 740.
Keen collector seeks vintage xtal sets such as BTH, Marconi, Gecophone No 2, Burndept. Early valve rxs, horn spkrs, components, early valves, Brights Top Pip, old magazines, books 'twenties. Best prices paid. Norman Richardson, 2 Edna Road, Maidstone, Kent ME14 2QJ.
Trio TR310 to pair with JR310 rx. Any cond accepted. *For sale:* 40W 2m class C amp, built from kit, £15 incl. G4MHE. Tel Ralph, 0983 298928, evenings.
Hygain 18AVT/WB or Cushcraft ATV5. Prices and details to G4KEK, 40 Lynwood Road, Ealing, London W5 1JJ. Tel Abi, 01-997 2941, after 8pm.
GEC BRT400 gen cov rx, wkg order preferred, will collect. G8YVU. Tel 0282 62493, after 6pm.
Manual for Collins 51J4 rx. Mechanical filters Collins type F500B31 and F500B60. G3OPF, 78C Aylesbury Street, Wolverton, Milton Keynes, Bucks.
Handbook to borrow for copying for Atal 228 tx. Will pay postage etc both ways. P. Marshall, 14 Oak Road, Horfield, Bristol BS7 8RY. Tel 0272 47057.
CW tx with power supply. Old a.m. rig ok, but must be reasonably compact for operation from North London flat. VK3NR/G4JZG. Tel 01-359 6013, after 6pm.
Rotator for vhf uhf beams etc, AR30, AR40 or similar unit. G4ANW, 4 Silver Trees, Shanklin, Isle of Wight. Tel Shanklin (098386) 6687.
KW202, 204 and 107 or 109 atu, Codar T28 rx. G4LMQ. Tel Upminster 23310.
Buy, borrow, hire ***Elektor*** January, April 1980, manuals R1155, T1154. G3ICB, QTHR. Tel 0635 64345.
Large binoculars, 20×80 or similar, preferably with mount. 8in or 10in Newtonian telescope or 4-5in refractor type. Datong audio filter FL1 or FL2. Vertical 18AVT/WB. Holden, GM4MF, QTHR. Tel Falkirk 24832.
AR40 rotator, Jaybeam 6-el quad antenna and desk mic for FT101. *For sale:* Joystick vfa System 'A', only used swl, £25 ono. HF12A12 vhf monitor rx, 12 channels, S20-23, R0-7, £50 ono. Both fb. Tel Savin, Nottingham 254741.
VFO VF1U for Heathkit DX40U, must be good cond. D. Spence. Tel Oban 62536, after 5pm.
Trio TS830S, TS130S, or Drake TR7, L7, MN2700. FT707. Any similar gear considered for cash. Jim Taylor, G4ERU, QTHR. Tel Bournemouth 510400.
Xtals, 10x/ type required. (Three-quarter inch pin displacement) only frequencies within the amateur bands wanted. 50p paid for each one. Any information service sheet/manual on the ex-service tx No 76. Tel Brighton 418755.

CLUB NEWS

(Continued from page 838)

Ipswich (IRC)—2 September (SSB Field Day planning), 9 September (ESWR 1982 planning), 30 September (Surplus equipment sale), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill G4IFF, tel Ipswich 44047.

REGION 19—RR R. J. C. Broadbent, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (CDRC)—2 September ("Electrical safety and installation", by Peter, G3XDS), 9 September (Natter night), 16 September (Equipment evening—beer and skittles?), 23 September (Natter/cw practice), 30 September ("Antennas", by David Woolard of Rediffusion), 8pm. The Church Room, Church Lane, Wormsley, Herts. Enquiries to Jim Sleight, G3OJI, tel Ware 4316.
Chiswick (ABCARC)—15 September (To increase activity on 28MHz a discussion). The Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Edgware (EDRS)—5-6 September (SSB Field Day at the Copthall Playing Fields, Hendon), 10 September (Informal), 24 September (Club project evening). 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)—4 September (Quiz), 11 September (Informal), 18 September (Constructional contest), 25 September (Short talk on fundamentals—Basics part 2), 8pm. Harrow Arts Centre, High Road, Harrow Weald, sec G4AUF, tel 01-868 5002.
St Albans (Verulam ARC)—22 September ("Meteor scatter and other phenomena", by J. R. Matthews, G3WZT), 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)—Note new QTH from August 1981, tel G8EWG, 01-440 7353, for all details.
Wanstead (ELGRSGB)—Note that this group restarts its winter session on 20 September with a talk on "Raynet and its activities", by G8VDD. Details from Rod Holmes, G3PKQ, tel 01-558 2928, or G3AMF, tel 01-669 9224.

RR19 thanks those members who sent in the information about club activities on or before the deadline, and asks all club officials to read the preamble to current "Club news".

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.

Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. 26 September (Special "open day", when visitors will be welcome to see the club's facilities), 29 September (Start of RAE course). Further info from sec G8GFZ.
Bristol (BRSGBG)—28 September (Talk and demonstration by Ross Clare, GW3NWS, on hf linear amplifiers), 7.15pm. Queens Building, Bristol University. Further info from G8GLQ.
Bristol (North Bristol ARC)—Fridays, 7.30pm. C/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Secretary reports RAE class fully booked and unable to accept for the time being any new candidates. Sec G4EUV.
Cheltenham (CARA)—3 September (The talk on "The Cotswold Hospital Radio Service" is still subject to confirmation), 18 September (Natter night), 7.30pm. The Old Bakery, Chester Walk, Clarence Street, Cheltenham. Sec G4ILI.
Gloucester (GARS)—Thursdays, 3 September (AGM), 7.30pm. Chequers Bridge Centre, Painswick Road, Gloucester. Sec G3MA.
Portishead (Gordano ARG)—23 September, 8pm. The Ship Hotel, Down Road, Portishead. This is a new club serving the Portishead, Clevedon, Nailsea area of Bristol. Further information from John Davies, G3LJD.
Weston-super-Mare (WsMRS)—Second Monday in each month, 10 September (New construction competition starts, with final judging at December meeting), 7.30pm. Details and further info from G3BLO.
Yeovil (Y&DARC)—3 September (Hints and kinks night), 10 September ("My favourite QSL cards", by G3KSK), 17 September ("What is power output", by G3MYM), and 24 September (Natter night), 7.30pm. Building 101, Houndstone Camp, Yeovil. Sec G3NOF.

AMATEUR RADIO EXHIBITION 81

WHAT?

The NEW Leicester Amateur Radio Exhibition. That's what.

WHERE?

The Granby Halls, "as usual," but with improved facilities including new catering arrangements, easier car parking and quicker admission. That's where.

WHEN?

Friday, Saturday, Sunday, 23, 24, 25 October 1981, 10am-6pm Fri/Sat, 10am-5pm Sun. That's when.

WHO?

At this independent show you will find some of the best-known retailers in the country. You will also find many specialist traders not previously invited to participate at Leicester. This way you'll have a real chance of finding the rig you want – at a keen price too – and also some of those awkward bits and pieces you're always looking for and can never track down. That's who you'll see there.

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DONINGTON CASTLE
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£500 IN VOUCHER PRIZES MUST BE WON!
PLUS FABULOUS *FREE* DRAW PRIZES THROUGHOUT THE EXHIBITION!

ADMISSION: £1.00. Concessionary Tickets 80p for Parties of 15 or over

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NEW! SSTV Scan Converter SC-422A

- ★ 2 full-size picture memories (128 × 128 pixels—16 shades of grey)
- ★ Prepared for COLOUR-SSTV (3rd memory plug-in board available Oct. 81)
- ★ Receives and transmits ANIMATED PICTURES
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- ★ Ready for cabling to any radio station (microphone input and speaker output).
- ★ Small dimensions: Only 30 × 10 × 18 cm.
- ★ Fast factory-direct delivery by air parcel post.

Product of Germany (West).
PRICE SC-422A **only £520** excl. **VAT.)**
OPTIONS: Lightpen LG-422A **£35** excl. VAT; Keyboard KB-422A **£118** excl. VAT.

OTHER PRODUCTS:

SC-160 SSTV-SCANCONVERTER-KIT for receiving and transmitting sstv 2 pc-boards assembled and tested **only £188**

SC-140 SSTV SCANCONVERTER BOARD for receiving sstv assembled and tested **only £130**

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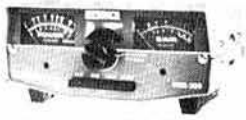
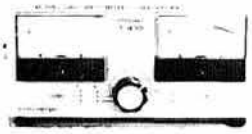
OSKER BLOCK RANGE

SWR200B swr/power meter covering 3-200MHz, 50/75 Ohm power range 3-30MHz, 20/200/2kW, VHF 2/20/200W **£49.00** inc VAT. P&P £1.00.

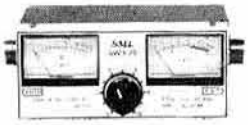


SWR300 swr/power meter 3-30MHz (2m and 70cm with adaptors) power range 20/200/2kW with SPC-2B 20/200W at 2m with SPC07A 2/20W at 70cm. Respective prices **£45.94, £17.49, £21.79** inc VAT. P&P £1.00.

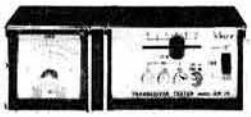
SWRVVV meter body only, covers 144/432MHz with adaptors SPC-2B and SPC07A, **£19.95** inc VAT. P&P £1.00. Adaptors as SWR300.



T-435: VHF/UHF swr and power meter with 2/20/120 watt with N type connecters power measurement. **£34.44** inc. VAT. P&P 75p.



SWR25: This ever-popular twin SWR and power meter covers 3·5-150MHz at **£12.08** inc VAT. P&P 75p.



UH74 SWR & power meter switchable HF, 2m & 432MHz with remote head at **£16.38** inc VAT. P&P 75p.

DL30 Dummy load 25W DC-150 MHz **£6.61** inc VAT. P&P 50p.
TS80 100W Dummy load DC-150 MHz **£20.12** inc VAT. P&P £1.00.
T150 250W Dummy load DC-500 MHz **£28.50** inc VAT. P&P £1.00.
T200 200W Dummy load DC-500 MHz **£31.62** inc VAT. P&P £1.50.

POWER SUPPLIES

PX402

PM103 4·5/6/7·5/9/12V dc 500mA fully stabilised **£13.50** inc. VAT. P&P £1.00
PX402 13·8V dc 3A cont. 4A max. fully stabilised power supply with overload protection **£19.95** inc. VAT. P&P £2.00.
PH5000 13·8V dc 5A continuous 7A max. Fully stabilised **£19.95** nc. VAT. P&P £2.00.

HELICAL ANTENNAS

2m with BNC plug	**£4.50**
2m with P1259 plug	**£4.50**
2m with IC215/Standard/Trio screw	**£4.25**
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ALL PRICES INCLUDE VAT. P&P 25p

COAX SWITCHES

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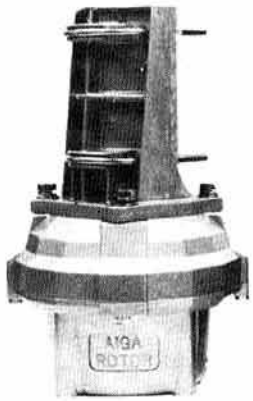
High quality coax switch housed in a diecast box with SO239s

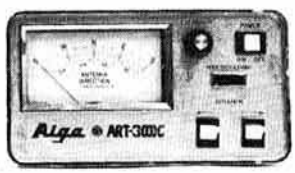
Frequency	3·5-500MHz
Weight	450gms
Max power	2·5kW
Impedance	50ohm

CT-1 Coax toggle, 3 SO239s **£6.85** inc. VAT. P&P 25p.

CT-2 Coax toggle, 2 SO239s, 1 PL259 **£6.85** inc. VAT. P&P 25p.

TS-120 Coax slide switch, 3 SO239s **£6.75** inc. VAT. P&P 25p.





ART3000C

This rotator delivers the highest performance that can be expected of the standard size rotator. The unit has disc brakes to ensure excellent stopping and handles maximum load of 250kg/550lbs. **£91.94** inc VAT.

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KH707	Straight Up/Down keyer	**£10.06**
BK100	Semi auto/mechanical bug	**£17.88**
HK702	Up/Down keyer on marble base	**£22.43**
MK702	Manipulator	**£22.43**
MK704	Squeeze paddle	**£10.63**
MK705	Squeeze paddle on marble base	**£22.43**

ALL PRICES INC. VAT. P&P 50p

ADONIS MICS

AM802	Desk mic	**£59.95**
AM502	Desk mic	**£29.95**
202S	Boom mic	**£20.98**
202HD	Headset	**£28.17**
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MK-1024

A semi- or fully-automatic squeeze keyer producing dots and dashes in the precise ratio required for perfect code. The speed is adjustable from 0 60wpm. Power inputs 110/ 240V AC or 9-14V DC. **£65** plus VAT. P&P £1.

EK-150

As EK-150 but with four memories each capable of storing 256 bits making a total of 1,024 bits. This can be recalled separately or in sequence for one long message. **£117.50** plus VAT. P&P £1.

KB105

80–40–20–15–10m

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STANDARD C58!

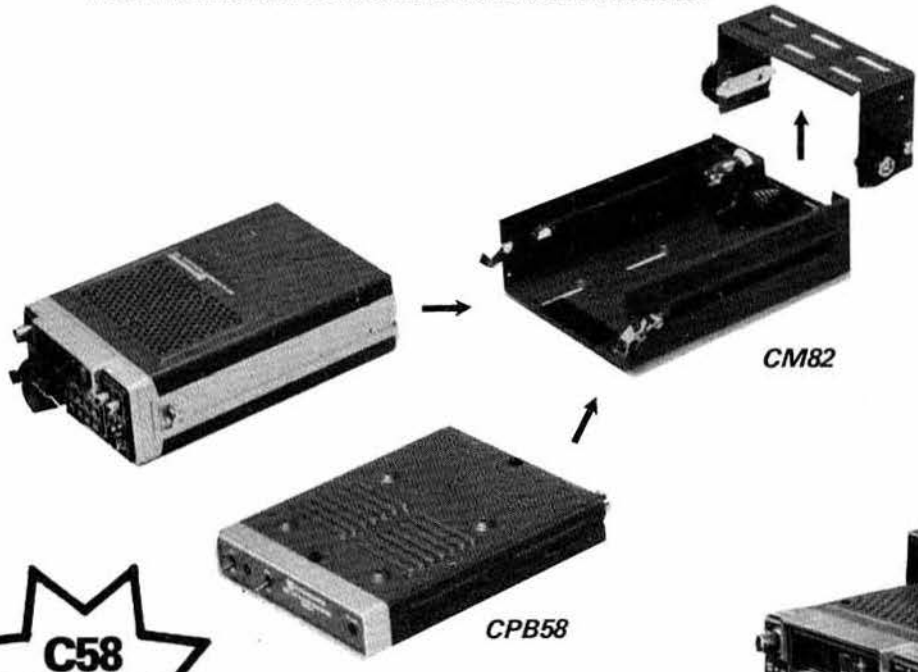
The C58 is the ultimate 2 metre transportable offering a superb performance on FM/USB/LSB & CW unequalled in any transceiver to date.
The C58's small size makes it truly a portable and when used with the CM8 mounting cradle it has all the features, and more, of a mobile multi-mode transceiver.

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.

IN ITS PORTABLE FORM

FULL TECHNICAL SPECIFICATION AVAILABLE ON REQUEST



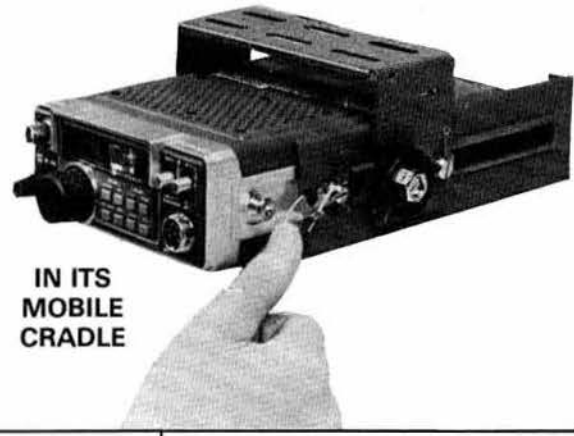
CM82

CPB58

WITH ITS MOBILE OPTIONS

C58 £239.00 INC VAT

CL8 CARRY CASE	**£6.95**
CM8 MOBILE MOUNT	**£19.95**
C230 240V CHARGER	**£7.95**
NC8 SET OF Ni-CADS	**£11.00**
CPB58 25W LINEAR	**£79.50**



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Access

BARCLAYCARD VISA

Bredhurst electronics

BREDHURST NEWS

July 1981

Page 1

TRIO

		£	carriage
TS 830S	160 10m transceiver 9 bands	726 00	–
VFO 230	Digital VFO with memories	226 00	(2 00)
AT 230	All band ATU power meter	121 00	(2 00)
SP 230	External speaker unit	37 70	(1 50)
DFC 230	Dig. frequency remote controller	185 00	(1 50)
YK 88C	500 Hz CW filter	29 67	(0 50)
YK 88CN	270 Hz CW filter	32 66	(0 50)
TS 130S	8 band 200 W pep	547 00	–
TS 130V	8 band 20 W pep	450 00	–
VFO 120	External VFO	92 46	(1 50)
TL 120	200 W pep linear for TS 130V	139 00	(1 50)
MB 100	Mobile mount for TS 120/130	17 25	(1 50)
SP 120	Base station external speaker	26 91	(1 50)
AT 130	100 W antenna tuner	81 00	(1 50)
PS 20	A.C. power supply TS 120V/130V	48 30	(2 50)
PS 30	A.C. power supply TS 120S/130S	85 00	(5 00)
MA5	5 band mobile aerial system	86 00	(5 00)
MC 50	dual impedance desk microphone	25 76	(1 50)
MC 35S	Fist microphone 50K impedance	13 80	(0 75)
MC 30S	Fist microphone 500 ohm impedance	13 80	(0 75)
LF 30A	H.F. low pass filter 1 kW	19 30	(1 00)
TS 770E	2m/70cm all mode transceiver	785 00	–
SP 70	External speaker unit	18 63	(1 50)
TR 9000	2m synthesised multimode	371 00	–
BO 9	Base plinth for TR 9000	36 11	(1 50)
TR 7800	2m F.M. synthesised mobile 2 5W	276 00	–
TR 2300	2m F.M. synthesised portable	166 00	–
VB 2300	1 OW amplifier for TR 2300	55 43	(1 00)
MB 2	Mobile mount for TS 2300/VB 2300	17 71	(1 00)
TR 2400	2m F.M. synthesised handheld	198 00	–
ST 1	Base stand and quick charger	43 70	(1 50)
BC 5	12v quick charger	17 25	(1 00)
SC 3	Soft carrying case	11 50	(0 75)
PB 24	Spare battery pack/charger lead	15 18	(1 00)
SMC 24	Ext Speaker-Mic	13 80	(0 75)
R 1000	Gen coverage receiver	305 00	–
SP 100	External speaker unit	26 91	(1 50)
HS 4	Economy headphones	10 35	(0 75)
HS 5	Deluxe headphones	21 85	(0 75)
HC 10	Digital station world time clock	59 34	(1 50)

FDK VHF/UHF EQUIPMENT

Multi 700EX	2m F.M. synthesised mobile 2 5W	189 00	–
Multi 750E	2m synthesised multimode - mobile	289 00	–
Expander	70 cm transverter for M 750E	169 00	–

STANDARD VHF/UHF

C78	70cm FM transportable	219 95	–
CPB 78	10W Linear Amp	67 50	(1 50)
C58	2m multimode transportable	247 50	–
CPB 58E	25W Linear Amp	79 50	(1 50)
CM8	Mobile bracket	19 95	(1 00)
CL8	Soft Case	6 95	(0 75)
–	Charger	7 59	(0 75)

MORSE EQUIPMENT

HK 707	Up/Down Key	10 50	(0 50)
MK 704	Squeeze paddle	10 50	(0 50)
EK 121	Elbug	29 95	(0 50)
EKM 12	Matching side tone monitor	10 95	(0 50)
EK 150	Electronic keyer	74 00	–

POWER SUPPLIES – Overvolts current limit protection

4 Amp	Continuous 4 amp 12v P.S.U.	27 95	(1 50)
6 Amp	Continuous 6 amp 12v P.S.U.	44 95	(2 00)
12 Amp	Continuous 12 amp 12v P.S.U.	69 00	(2 50)
24 Amp	Continuous 24 amp 12v P.S.U.	99 00	(5 00)

SWR – POWER METERS

SWR 25	Twin Meter	11 50	(0 50)
SW 110A	Daiwa (1 8 – 150 MHz)	35 00	(0 75)
SP 200	Welz (1 8 – 150 MHz)	59 95	(0 75)
SP 400	Welz (130 – 500 MHz)	59 95	(0 75)
CN 620A	Daiwa (1 8 – 150 MHz) cross-pointers	52 80	–
SP 300	Welz (1 8 – 500 MHz)	79 95	–
CN 630	Daiwa (140 – 500 MHz) cross-pointers	71 00	–

MICROPHONES

MM 202S	Adonis clip on safety mic	20 95	(0 50)
MM 202HD	Adonis head band safety mic + Up/Down	29 00	(0 50)
MM 202FU	Adonis swan kneck safety mic + Up/Down	30 00	(0 50)
AM 502	Adonis compressor mic – 1 O/P	39 00	(0 75)
AM 802	Adonis compressor mic 30/P s	£59 00	(0 75)
RM 940	Daiwa infra red link safety mic	45 00	(0 50)

YAESU

FT 101Z	160-10m 9 band transceiver (FM)	£529 00	–
FT 101ZD	160-10m 9 band transceiver (FM)	£599 00	–
DCT 101Z	12 v d c adaptor	34 50	(1 00)
FV 101Z	remote VFO for FT 101Z/ZD	121 90	(1 00)
FT 107M	160 – 10m 9 band transceiver	690 00	–
FV 107	remote VFO for FT 107M	92 00	(1 00)
FC 107	160 – 10m atu aerial switch p/meter	102 00	(1 00)
FP 107E	230v a c power supply for FT 107	106 00	(2 00)
FP 107	power supply for internal fitting	97 75	(2 00)
FTV 107(2)	transverter main frame with 2 metres	207 00	–
430 V107V901	70cm transverter card	175 00	–
SP 107P	external speaker in cabinet	57 50	(1 50)
SP 107	external speaker in cabinet	27 60	(1 50)
DMST 107	12 channel memory for FT 107	£88 00	(1 00)
CW	CW filter for FT 107	23 00	(0 50)
AM	AM filter for FT 107	23 00	(0 50)
YM 34	desk mic for FT 707/107 dual imp	18 80	(1 50)
YM 35	500 ohm up/down mic FT 707/107	12 65	(0 75)
YM 36	500 ohm noise cancelling FT 707/107	11 90	(0 75)
YM 37	500 ohm manual mic FT 707/107	6 15	(0 75)
FT 707S	80-10m 8 band transceiver – low pwr	454 00	–
FT 707	80 – 10m 8 band transceiver – high pwr	529 00	–
FP 707	230v a c to 12v d c psu for FT 707	109 00	(2 00)
FC 707	80 – 10m a t u for FT 707	80 00	(1 00)
FV 707DM	Ext. digital V F O for FT 707	186 00	(1 00)
MR 7	Metal rack for FT 707	14 95	(1 00)
MMB 2	Mobile mounting bracket for FT 707	16 10	(1 00)
FL 2100Z	160 – 10m 1200 watt linear	385 00	(5 00)
YH 55	8 ohm headphones	9 95	(0 50)
FF 501	Low pass filter 1 kW	22 25	(0 75)
QTR 24D	World clock (quartz)	25 70	(0 75)
FP 12	230v a c 12 amp D.C. power supply	78 00	(2 00)
FP 4	230v a c 4 amp D.C. power supply	41 00	(1 50)
FSP 1	Mobile speaker 8 ohm 6 watt	9 60	(0 75)
FRG 7	0.5 – 30 MHz communication receiver	189 00	–
FRG 7700	Latest gen cov receiver from Yaesu	309 00	–
FRG 7700M	as above but with memories	389 00	–
FT 208R	2M F.M. handheld	190 00	–
FT 290R	2M multimode transportable	229 00	–
FRT 7700	Antenna tuning unit	34 75	(1 00)
FT 480R	2M synthesised multimode	359 00	–
FP 80	Matching 230v a c. power supply	59 00	(1 50)

ICOM

IC 2E	2M F.M. synthesised handheld	169 00	–
IC L1/2/3	Soft cases	3 50	(0 50)
IC HM 9	Speaker – microphone	12 00	(0 75)
IC BC 30	230v a c. base charger and hod	37 00	(1 50)
IC BC 25	230v a c. charger	4 25	(0 75)
IC CP 1	Car charging head	3 20	(0 50)
IC BP 2	6v Nicad pack for IC 2E	22 00	(1 00)
IC BP 3	9v Nicad pack for IC 2E	17 70	(1 00)
IC BP 4	Empty battery case for IC 2E	5 80	(0 75)
IC BP 5	11 5v Nicad pack for IC 2E	30 50	(1 50)
IC ML 1	10W mobile booster for IC 2E	49 00	(1 00)
IC 255E	2M F.M. synthesised mobile (25w)	255 00	–
IC 260E	2M sythesised multimode (10w)	339 00	–
IC 251E	2M multimode base station	495 00	–
IC 202S	2M SSB portable	189 00	–
IC 720A	H.F. Transceiver, gen. cov. receiver	873 00	–
IC 730	H.F. Transceiver	599 00	–
IC PS 15	20 amp power supply for IC 720	95 00	(2 50)
IC HM 10	Scanning Mic for IC 255/260	20 00	(0 75)

STATION ACCESSORIES

H1 Q	1 1 balun PL259 fitting	9 95	(0 75)
T piece	Polyprop dipole centre	1 00	(0 20)
75 ohm	Ceramic strain insulator 60mm	0 40	–
300 ohm	Light duty twin feeder (per mtr)	0 20	(0 02)
DM 801	Ribbon (per mtr)	0 14	(0 02)
FX 1	Trio grid dip meter	51 75	(0 75)
DRAE	250 MHz wave meter	28 00	(0 75)
HP 4A	130 – 450 MHz wave meter	24 95	–
TVI 30	High pass filter – TV down lead	5 95	–
	Low pass filter – 30 MHz cut-off	5 95	(0 50)
DL 20	Ferrite rings – top quality 1½" dia (per pair)	0 80	(0 20)
DL 60	30W Dummy Load (150 MHz)	5 00	(0 30)
T 100	60W Dummy Load (150 MHz)	8 80	(0 50)
T 200	100W Dummy Load (500 MHz)	24 00	(0 50)
10 CORE	200W Dummy Load (500 MHz)	35 00	(0 50)
URM 67	Rotator cable (per meter)	0 28	(0 20)
UR 76	Low loss 50 ohm coax	0 60	(0 20)
SA 450	50 ohm coax	0 25	(0 05)
TA 55M	2 way 500 MHz coax switch	10 00	(0 50)
	SO 239 connector magnetic mount	6 95	(0 75)

All prices correct at time of going to press.

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

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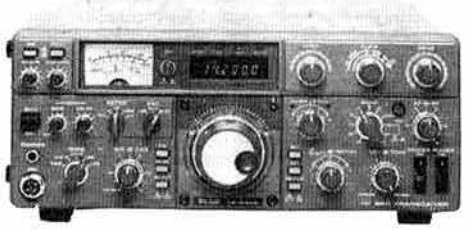
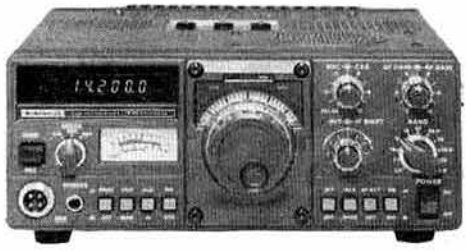
TRIO R-1000

TR-9000

TRIO TS-830S



TRIO TS-130S



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Full Range of Accessories Available

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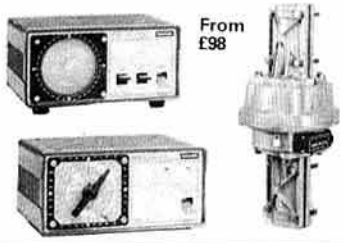
AT230	£121.21	TS130S	£547.40	TR7800	£276.00	R1000	£305.00
SP230	£37.72	PS30	£85.10	TR8400	£329.13	SP100	£26.91
TS530S	£561.20	PS20	£48.30	TR2300	£166.75	TR7850	£324.07
VFO230	£121.21	AT130	£81.19	TR7850	£324.07	TR9500	£428.54

DAIWA Full range of reliable antenna rotators



From £98

DAIWA ANTENNA TUNER

CN1001A 200 watt £129.95
CN2002 2kW £190.00

NRD-515 RECEIVER

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

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2-way Antenna switch (V2) £6.50
3-way Antenna switch (V3) £10.80
4-way Antenna switch (V4) £11.00
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FX1 Station Wavemeter £29.00
Wellz SP200 swr/power £49.95
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50 watt Dummy Load 50ohm £7.25
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Full range of aluminium tubing, wall clamps, brackets "V" bolts for the caller.

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SYNTHESIZED TRANSCEIVER

144MHz – 25W – 12½/25kHz

KDK 2025

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

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

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

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

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

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

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

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

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

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

★ £199 INC. VAT AT 15% AND SECURICOR ★

The 2025 is available from the importers or selected dealers

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muTek limited

rf technology from G4DGU

We've had several queries as to why we have been discouraging visitors. It's not, as has been suggested by one or two people heard over the local repeaters that we're just plain grumpy . . . far from it! We do however earn the bulk of our income not from Amateur Radio but from contract design work of rf circuitry, and we have to take commercial security extremely seriously. Fairly obviously, we can't just allow people to come and go just as they wish.

FT101 front-end boards
Fitting these boards to your FT101Mk.11, B, E or EE will improve the dynamic range of the receiver portion of these transceivers. They use an optimum combination of component technologies including v-mos, mos, pin switching, and schottky ring mixers. These boards are direct plug-in replacements for the originals so there is no friggery involved in fitting them!

FT101GTA – replaces PB-1181 – **£29·83**
FT101GTB – replaces PB-1180 – **TBA**

FT221/225GT front-end board
By the time you read this we'll probably have sold quite a few on the strength of the performance of equipment using the board during vhf nfd. As a service to customers we have put together an application note detailing two relatively simply mods which will further enhance the performance of these fine transceivers. We'd be grateful for an sae plus 12p in stamps to cover our printing costs.

FT221/225GT – **£56·00**

144MHz preamplifiers
We have both switched and unswitched versions available – please see our previous advertisements for details – all are properly aligned and have excellent bandpass filtering. This means that you don't present your receiver with 40 or 50MHz of amplified spectrum as with many competitors products . . . . .

Unswitched: boxed – **£17·72.** unboxed – **£10·79**
Switched: environmental case – **£31·39.** boxed **£24·85.** unboxed – **£19·85**

1·3GHz preamplifier £26·13 unboxed.

1·3GHz converter. £22·00

TVI filter
This is a bandpass filter covering the 470 860MHz band, synthesised using microstripline techniques. Many people have found it very useful in dealing with TVI from both hf and vhf transmitter. – **£1·80**

Kungsimport Antenna Combiners and Dish Feeds – prices and other details listed in previous ads.

For your information we list our European Agents:
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Data on request. SAE appreciated. CWO. Please add 50p p&p unless otherwise stated, and then VAT. Tnx!

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TONNA

NEW from TONNA – as well as the **144MHz 13 element Portable** and the **1296MHz 23 element antennas** – the **50MHz 5 element antenna** – price **£31.74** (a) – send for full details.

	length (M)	weight (kg)	
144MHz			
4 element	1·37	0·5	**£14.20** (a)
9 element fixed	3·30	1·9	**£16.56** (a)
9 element portable	3·30	1·7	**£18.44** (a)
9 element crossed	3·50	2·0	**£28.75** (a)
13 element portable*	4·50	2·5	**£29.75** (a)
16 element fixed	6·40	4·4	**£31.74** (a)
435MHz			
19 element	3·20	1·1	**£19.00** (a)
19 element crossed	3·30	1·8	**£30.14** (a)
21 element	4·60	2·6	**£26.43** (a)
21 element ATV	4·60	2·6	**£26.43** (a)
1296MHz			
23 element*	1·64	0·9	**£28.75** (b)
4 × 23 element antennas – power splitter – stacking frame			**£161.46** (a)
135MHz Satellite			
9 element crossed	3·50	1·8	**£35.67** (a)

*Denotes 50Ω only. All others 50Ω or 75Ω impedance.
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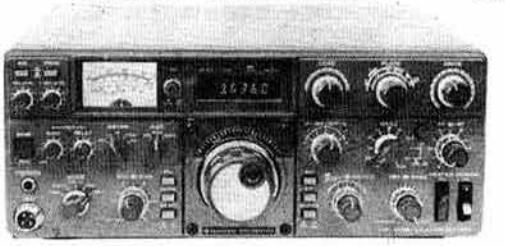

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Cable required	5-way
PRICE	**£34.95**

FU-400 — MEDIUM DUTY

Direction indicator	Meter (NESW)
Rotation torque	550kg.cm.
Braking torque (stationary)	1,500kg.cm.
Rotation time	50 seconds
Antenna weight (max)	200kg
Mast size	38–50mm
Wind load area (max)	0·5sq.m. (basic 0·8sq.m. (with stay bearing)
Cable required	6-way
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Rotation time	55 seconds
Antenna weight (max)	150kg
Wind load area (max)	0·5sq.m.
Cable required	6-way
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EMOTO 502SAX — HEAVY DUTY

Direction indicator	360° circular dial
Rotation torque	600kg.cm.
Braking torque	4,000kg.cm.
Rotation time	66 seconds
Antenna weight (max)	400kg
Wind load area (max)	1·5sq.m.
Cable required	6-way
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EMOTO 1102MXX/1103MXX — EXTRA-HEAVY DUTY

Direction indicator	Meter (NESW)
Rotation torque	800kg.cm. (1102); 1,000kg.cm. (1103)
Braking torque	1,000kg.cm.
Rotation time	80sec (1102); 110sec (1100)
Antenna weight (max)	400kg
Wind load area (max)	2·5sq.m.
Cable required	7-way
PRICES	**1102MXX £189.75** **1103MXX £194.35**

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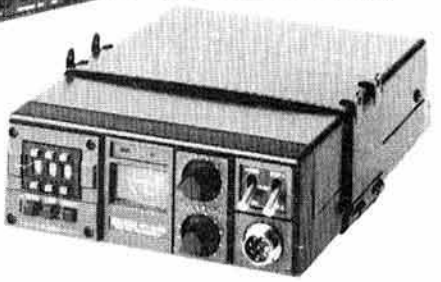

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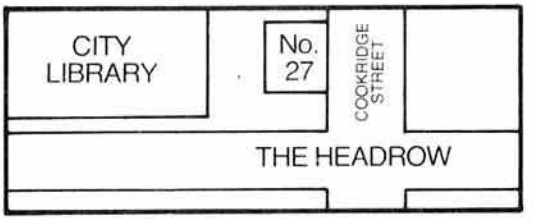

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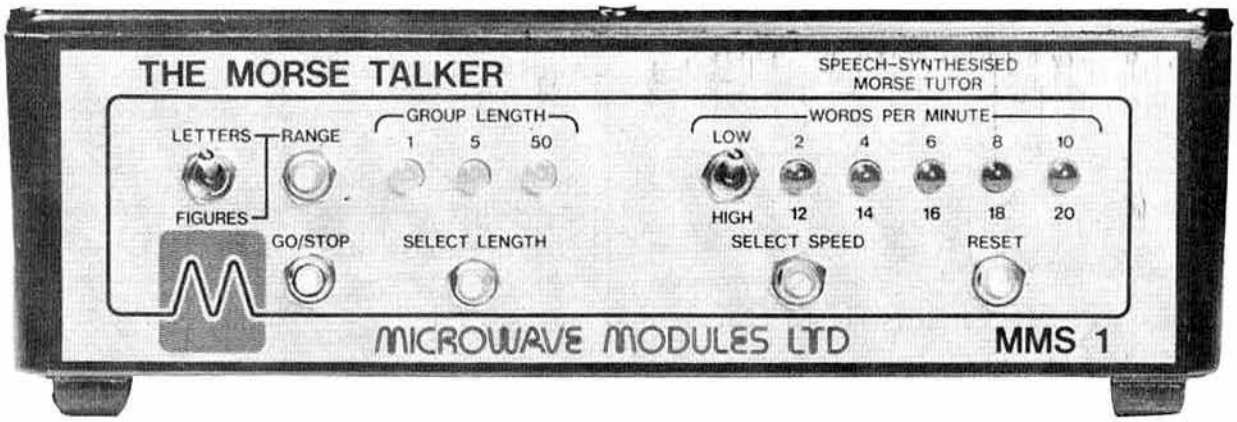

FEATURES

- ★ Complete self-contained Speaking Morse Tutor
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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.

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LETTERS ONLY:	A–F, A–M, A–U, A–Z.
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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.

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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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Now check the summary below to see why the Datong Keyboard beats other keyboards.
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- BUFFER MEMORY: ensures perfect sending despite less than perfect typing.
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- 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

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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.

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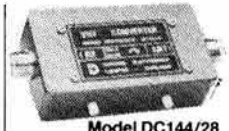
If you don't have enough space to put up traditional receiving antennas, our active antennas are the answer. They need no tuning yet have constant sensitivity from 200 kHz to well over 30 MHz.
Results are quite comparable to full size conventional antennas but the space saving is enormous. The indoor 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

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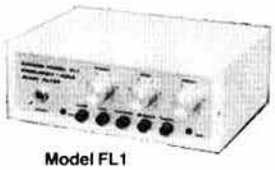
Model D70



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.
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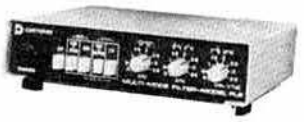
Model FL1 works in a similar way but has the unique feature of being able to notch out interference whistles automatically.
The cost of a Datong audio filter is little more than the cost of a single accessory crystal filter, yet in terms of versatility and performance the audio filter is far superior.

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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144	2·75	7	44	51	35	63	12·3	0·98	15·19
144	4·91	11	35	38	83	147	14·5	2·20	29·23
144*	6·72	13	31	33	160	285	15·6	3·70	47·20
432	1·55	10	36	40	22	39	14·3	0·68	24·39
432	3·10	16	28	30	59	105	16·5	1·69	27·17
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*Indicates 8mm diameter aluminium rod elements.

We are normally loath to quote antenna gains, however, we have confidence in the measurement techniques used by DL6WU to generate the above figures, which we believe to be rather more reliable than most! A point worth noting is that his measurements indicate the H-A-G 11 element to have about the same gain as a well-known 16 element!!

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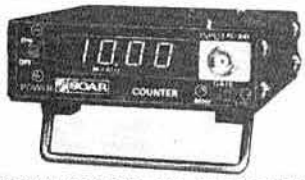

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PT4555	8	25W	12	150	**£4.00**
SD1212-6	8·2	3min	12	175	**£2.50**
PT4556	7	40W	12	80	**£4.50**
PT4236A	10	1W min	12	175	**£0.75**
PT4236B	10	11W	12	88	**£3.00**
PT4236C	6	35W	12	88	**£4.50**
2N5070	13	25W (pep)	24	30	**£5.00**
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2N3866	10	1W	28	175	**£0.75**

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— 2 — 70 — 23 —

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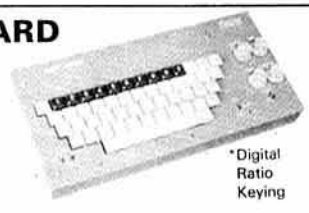

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WOOD & DOUGLAS

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NEW PRODUCTS
As announced last month, we have introduced a number of new products for the radio amateur market. Full details of these are available in our new revised specification sheets. We also now have a full 'spare parts' list. All data will be sent on receipt on a large SAE. The main new projects available are:

70SY25B 70cms Synthesiser
This long-awaited kit will make your 70FM05TR one of the most-versatile rigs available for 70cms. The kit consists of two pcb's which are designed to fit the same-size standard diecast as the 2M synthesiser. The logic board uses a special synthesiser integrated circuit to give 25kHz step simplex coverage of channel '00' to '99' ie 433·000 to 435·475MHz. In addition you have repeater and reverse repeater splits up to channel '19'. The lower section of the band (432–433MHz) is also covered in 25kHz steps. The board has an automatic crystal-controlled toneburst, out of lock inhibit and voltage stabiliser. Channel selection is in bcd for thumbwheels, MPU's and is of course fully compatible with the PROSCAN and DISP1/2. Interfacing is simple for customers already owning a W&D transceiver while new constructors will be offered dedicated new transmit hardware and the standard receiver. Prices and further details are now available, please ring.

144PA4/S RF Switched 2M Pre-Amplifier.
Such has been the popularity of the 144PA3 that we have brought out an r.f. switched version for those people who just couldn't squeeze it into their commercial equipment. The board has one or two extra refinements and is very attractively priced. Again please ring for details.

Above is a brief listing of the current product range as full kits. These cannot be split and sold in component parts. We do have, however, many components that are hard to get for the average amateur which include 23cms pre-amp boards and devices (NE64535), diecast boxes, chip resistors (51Ω and 100Ω). PTFE trimmers, Mullard thick-film amplifiers (OM335, OM361) etc. A large SAE (A4 size) will bring you the latest lists and new projects. The range is constantly expanding and it is worth giving a call if you have a simple query on TADLEY (07356) 5324 and BASINGSTOKE (0256) 24611 during evenings and weekends. The above prices include VAT at the current rate. Please include 60p on your total order for post and packing. The kits include all pcb components except crystals unless stated otherwise. Suitable boxes and external hardware is not supplied in the kit but some suitable stock is held. Any kit purchased from the range will be gladly serviced but a £2.50 cover charge would be appreciated on larger items. All items in kit form are usually ex-stock either with us or our rally agent J. Birkett of Lincoln. Assembled items unless stock will be 10–14 days from receipt of order, and will be tested and aligned to specification. London stockist is Amateur Radio Exchange in Ealing.

A. WOOD, G4EEE **M. P. TELKMAN, G8DCA**

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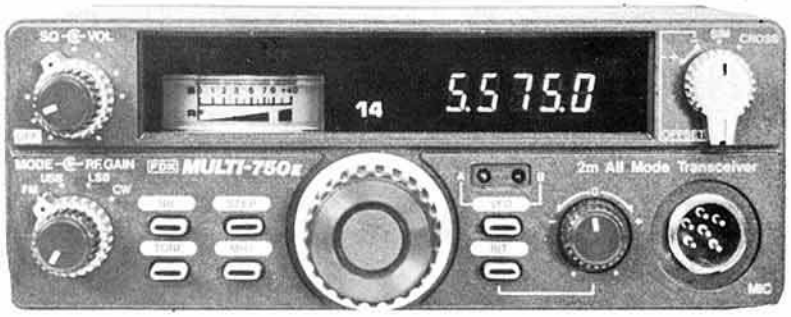

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The illustration to the left shows part of the FT707 System here neatly mounted in the MR7 rack unit along with a YM35 fist microphone with scanning controls. Alternatively there are two other 600 ohm fist mics, the noise cancelling YM36 or the larger YM37 and two 50K/600 ohm swan neck desk mics the standard YM34 or the scanning YM38.

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