LISTEN TO THE WORLD

Short wave radio is by far the fastest and most convenient type of communications for spreading the news about what is going on in the world. And for this reason TRIO's R300 is the right rig for those who'd like to listen to a live report of the Indianapolis Grand Prix, to Radio Peking or to follow the progress of a Himalayan expedition. The R-300 is the invisible bridge to other countries and continents and the bridge to the home country for many journalists, engineers and technical representatives working abroad. They all want a reliable and sturdy multiband receiver for home use and travel, a receiver working from mains voltage or batteries. And just such a receiver is TRIO's new R-300.

Outstanding Input Sensitivity—The dual-gate MOSFET front end assures excellent cross-modulation and spurious characteristics, as well as high input sensitivity. Between 18 and 30 MHz the R-300 operates as a double superhet, giving sensitivity of 1 µV for AM and 0.5 µV for SSB. For full details, contact the sole importers of the exciting TRIO range.

NEW. CL22 Antenna Coupler for the SWL.
Only £14 inc. VAT and postage

LOWE ELECTRONICS
Cavendish Road,
Matlock,
Derbyshire
LOWE ELECTRONICS LTD

PRICE LIST — JANUARY 1978

<table>
<thead>
<tr>
<th>Description</th>
<th>Price inc. VAT</th>
<th>Price Carr.</th>
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<tr>
<td>T5200 160-10m. HF transceiver 200W P.E.P.</td>
<td>£694.00</td>
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<tr>
<td>VFO820 External VFO</td>
<td>£120.00</td>
<td>118.30</td>
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<td>DGI Digital readout to 100Hz</td>
<td>£120.00</td>
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<td>D51A 15V. DC inverter</td>
<td>£40.00</td>
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<td>YGB58 CW filter b pole</td>
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<td>38.20</td>
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<td>SP520 Matching speaker b ohm</td>
<td>£19.00</td>
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<tr>
<td>TV900 HF transceiver all solid state</td>
<td>£178.00</td>
<td>186.00</td>
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<tr>
<td>HSS Communications headsets, tailored response</td>
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<td>T5200HF Transceiver 2400-30m.</td>
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<td>CW58 CW filter b pole</td>
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<td>HSS Communications headsets, tailored response</td>
<td>£60.00</td>
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<tr>
<td>DK520 Conversion kit-all uses of DGS with T5200</td>
<td>£489.00</td>
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<td>T5200S 1-8 MHz. SSB transceiver 200W P.E.P.</td>
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<td>DG5 Digital display to 40 MHz</td>
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<tr>
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JAPAN RADIO COMPANY

NRS05 Professional communications receiver c/w matching speaker | £1000.00 | 1000.00 |

CRYSTALS

We stock FM channels 50, 510 to 525, 532 (145/80) and all current reversed and repeat reversed channels for the equipment we sell.

Price per single crystal | £2.40 | 2.40 |
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Special offer on crystals for TR2200GX, TR7200, TR3200 and TR6000 only for £10.00 |
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Liner 470, 70cm. SSB transceiver—Get ready for OSCAR 81 | £290.25 | 290.25 |
R11SE regulated psu for Liner 430 | £31.50 | 31.50 |
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VHF MARINE RECEIVERS

SR9 Tunable/crystal monitor 156-162 MHz | £52.50 | 52.50 |
AMR217B Scanner with 8 crystals. The best and most popular. Mains/battery | £106.87 | 106.87 |
Seiwa MS5 Scanner less crystals. 4 channel pocket scanner | £67.50 | 67.50 |
Seiwa MR2 Monitor less crystals. 12 channel pocket receiver | £63.00 | 63.00 |
Crystals for the above—each | £2.70 | 2.70 |

MARINE ANTENNAS

Daiwa M41AVI 4 m. wire gutter mounting with whip, clamp and cable | £8.46 | 8.46 |
MAI high gain marine antenna | £8.66 | 8.66 |
B&G/FP Bantex 2 m. whip c/w square hole base mount | £8.16 | 8.16 |
"J" Beam TAS fret 2 m. whip | £13.05 | 13.05 |

VHF AMATEUR RECEIVERS

MR86 Tunable/crystal 2 m. FM receiver. 144-146 MHz | £54.00 | 54.00 |
AMR217B Scanner with 8 crystals. The best and most popular. Mains/battery | £106.87 | 106.87 |
Seiwa MS5 Scanner less crystals. 4 channel pocket scanner | £67.50 | 67.50 |
Seiwa MR2 Monitor less crystals. 12 channel pocket receiver | £63.00 | 63.00 |
Crystals for the above—each | £2.40 | 2.40 |

MICROWAVE MODULES EQUIPMENT

MM070 4m. converter | £20.12 | 20.12 |
MMC120A/28 LO 2m. converter | £20.00 | 20.00 |
MMC120A/70 70cm. converter | £20.00 | 20.00 |
MM70/144 23cm. converter | £20.00 | 20.00 |
MVM120A/28 23cm. converter | £20.00 | 20.00 |
HS5 Communications headsets, tailored response | £12.50 | 12.50 |
LH5 Communications headsets, shorted response | £14.00 | 14.00 |

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Trio LF20A low pass filter 1 kHz. 90 dB stop band rejection | £17.00 | 17.00 |
Trio LP20A, 80Hz band pass filter 144-146 MHz | £27.50 | 27.50 |
HSS Communications headsets, tailored response | £22.00 | 22.00 |
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AT200 I 8 to 30 MHz antenna tuner | £60.00 | 60.00 |

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CS151 Single trace DC to 15 MHz | £334.00 | 334.00 |
CS152 Single trace DC to 10 MHz | £270.00 | 270.00 |
HSS Communications headsets, tailored response | £22.00 | 22.00 |
P56 Power supply Fitting P56 for use with TR5700 | £56.00 | 56.00 |
AT200 I 8 to 30 MHz antenna tuner | £60.00 | 60.00 |

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"G" whip tribander helical 20/15/10 | £19.68 | 19.68 |
"I" whip mobile tribander 20/15/10 | £23.80 | 23.80 |
L.F. coils for the above-3 Special Whether tribander | £5.90 | 5.90 |
Telescopic whip for the above-J220000 | £3.00 | 3.00 |
Base mount for all "G" whips | £3.75 | 3.75 |
Extendor 40 booster | £9.86 | 9.86 |
LOWE ELECTRONICS LTD

Volume XXXV
THE SHORT WAVE MAGAZINE

541

YHF/UHF "J" BEAMS

Price

SW-110 SWR/power meter 1-8-150 MHz. Two power ranges, 9-20 and 0-200 watts ...... 25.92
CS-201 Coax switch (SO239 sockets) Two way ...... 11.25
CS-20IN Coax switch (N type sockets) Two way ...... 15.75

5 Y7M 5 element yagi ..... 7.70
BY/2M 8 element yagi ..... 10.00
107Y/10 10 element para beam ..... 21.31
PM14/2M 14 element crossed yagi ..... 31.16
6X/2M 5 element crossed yagi ..... 6.99
BYX/2M 8 element crossed yagi ..... 19.91
10XY/2M 10 element crossed yagi ..... 36.32
Q6/2M 8 element crossed quad ..... 16.30
Q6/2M 6 element quad ..... 21.71
DS/2M 5 element crossed quad ..... 13.50
DB/2M 8 over 8 slot fed yagi ..... 18.22
UGP/2M Uni-pole ground plan ..... 7.03
MBH/2M 20m. Multi element ..... 51.65
MBH/B70M. Multi beam ..... 28.96
12XY/70M. 12 element crossed yagi ..... 29.70
TAS $2 2m. whip ..... 13.05
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CB/70M, Collinear ..... 39.37
D15/1256 23cm. antenna ..... 23.06

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PMH/70 for 70 cms. ..... 5.90
PMH/40 for 70 cms. ..... 12.28

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CD44 (core cable required) ..... 106.87
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2kW P.E.P. ..... 40.50
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TH3for 3 element yagi for 20-15 and 10m. 600W, P.E.P. ..... 121.50
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I2AQV Trapped vertical vertical support for 20, 15, 10m. ..... 39.93
I4AQ/1V/WB Trapped vertical vertical support for 40, 30, 20, 15, 10m. ..... 56.19
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Bantex BS/GF 2m. \$ whip c/w single hole base mount ..... 8.16
Magnetic mount for all Bantex whips ..... 10.40
Bantex UMT 70cm. coil, collinear ..... 28.53
"J" Beam TAS $2 2m. whip ..... 13.05
Daewoo MAF 2m. \$ wave gutter mounting with whip, clamp and cable. ..... 8.44
Gutter clamp. Accepts most whips ..... 2.81
70cms UMT collinear whip \$ over \$ wave whip with base ..... 16.28
Revo \$ whip ..... 18.50
Revo standard only for \$ whip ..... 1.50
Revo—whip and coil only ..... 5.00

CABLE (prices per metre)

5 core rotator cable for AR40 (60 £) ..... Up to Please use 20m.
8 core rotator cable for CD, HAM 2, TR44, HAM-M. Add 80p
12 core rotator cable—Heavy duty ..... 9.62
UR43 50 ohm coaxial cable, 4-3dB/100ft. at 100 MHz ..... 35.53
UR67/RGBU 50 ohm coaxial cable. 2 dB/100ft. at 100 MHz VAT above ..... 13.05

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C5W/2M 2m. FUT with built-in SWR meter. 80m.-10m. 500W. P.E.P. ..... 101.30
CL-666 light weight power ATU. 160-10m. 2kW. ..... 171.31
CL-65 ATU 80-10m. 500W. P.E.P. 200W. CW ..... 54.00
AT-40000 8 core rotator (240v) ..... 41.04
SWX-787 De luxe SWR/power meter with "cross over" metering ..... 110.16
SW-410 SWR/power meter 144/432 MHz ..... 48.60

Please address all mail orders to Matlock

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HEAD OFFICE AND SERVICE DEPARTMENT
119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE
DE4 3HE

Telephone: 9 a.m. to 9 p.m. Matlock (0629) 2817 or 2430
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Southen Sales Peter, GJZPB, Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01 669 6700.
Midland Sales Peter, GJWXW, Soho House, 362-364 Soho Road, Handsworth, Birmingham. Tel. 021 554 0708.
Northern Sales Tom. G4DYZ, 7 Cookridge Street, Leeds. Tel. 0532 451657.

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Sim, GM35AN 19 Elliamuir Road, Bailleston, Nr. Glasgow. Tel. 041 771 0364.

So, wherever you are, we have a branch or part-time agent not too far away. At Matlock, the branches, or our agents you will see and can try out the very best in new and secondhand HF or VHF equipment, together with every conceivable aid or accessory for the complete station.

With new products coming along all the time, it is difficult to keep a price list up to date. If you send 50p, you will receive all current brochures, catalogues, prices and the antenna booklet that everyone is talking about.
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24 HOUR SECURICOR SERVICE

THE ROLLS-ROYCE OF TRANSCEIVERS

ARE YOU: OPERATIONAL ON HF OR VHF, ACTIVELY LOOKING FOR AN HF TRANSCEIVER, OR WAITING UNTIL THE RIGHT ONE—THE ONE WITH EVERYTHING, AT A REASONABLE PRICE ARRIVES? HAVE YOU EVER SAT BACK AND DRAFTED OUT THE SPECIFICATIONS OF YOUR DREAM MACHINE?

10-80m? No, lets have 160 as well, reception of WWV would be a nice addition.

SSB and CW are a necessity, AM for top band, FSK for RTTY, how about FM (with receiver squelch) for a 10m. net and for use with a transvertor.

Digital readout, of course (to a 100Hz), for accuracy but an analogue system to say, 1 kHz would give one a “feel” of position in the band, we are only dreaming, lets have both.

Mains or battery? Both, two power supplies and the transceiver? Messy! The power supplies must be built in.

Sensitive receiver, with a switchable attenuator (just in case), crystal filters for CW, SSB, AM—how about a tunable IF system with overlapping filters for continuously variable selectivity. A deep notch filter, and an audio peak filter, to complete our specifications.

RF speech processing, VOX, noise blanker, transmitter output level, and microphone gain as front panel controls. How about disabling the PA if we require a lower output only.

A clarifier of some sort is necessary, a potentiometer with zero in the centre! An on/off switch at one end or how about two push switches to bring the rotary into operation for any desired shift on RX and/or TX.

For CW, how about the latest in technology—a Curtis memory keyer actually built into the equipment. Its got to be clean, of course, RF derived feedback and to eliminate out of band spurious, what about a phase locked loop VFO—good idea? Why not then build in a memory that will hold any transmit, receive, or a transceive frequency and recall it in a moment.

STOP DREAMING OF TOMORROW’S TRANSCEIVER TODAY, IT IS HERE. THE FT901. FROM YAESU THROUGH SMC ; THE PEOPLE YOU CAN TRUST

THE HF MOBILE YOU CAN TRIUMPHANTLY FIT TO YOUR ROLLS-ROYCE OR MINI

With insight into the needs of HF mobile in ‘78 Yaesu offer the FT7, in stock in Totton around the end or February. This is a 10-80m. transceiver, VFO controlled (to 1 kHz accuracy) and with that useful crystal control facility. Selectable sidebands, CW, crystal calibrator, clarifier and an advanced noise blanker are some of the features packed into a cabinet only a few inches high, but through careful design the front panel remains remarkably uncluttered. Designed for a linear 10W. output consuming only a few Amps it eliminates 30A cables from the passenger compartment and the cooling problems of a massive heat sink. Need more power for a difficult contact? Flick in a FL1 10A (a 200W. PIP linear) installed in any suitable place in your car.

FOR VHF MOBILE THE FT227R

The new FT227R uses a “single knob” tuned digital synthesizer employing a photoelectric sensor or an optical coupled system which eliminates both noisy, unreliable rotary switches, and crystal banks. Full coverage of 2 metres in 5 kHz divisions with ±600 kHz shift plus a memory feature which permits recall of any entered frequency or particular offset.

Bright, large, digital readout gives unequivocal readout of the frequency in use. The receiver offers 0.3 µV (for 30dB 1-4 kHz) sensitivity into a ±6 kHz (at 6dB) bandwidth whilst maintaining a remarkable immunity to overload and image problems. The 20W, DC input transmitter features Hi/low power outputs, AFP, tone burst on repeaters and an out of band inhibition trip, etc.

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THE NEW FM2015R FROM KYOKUTO

The 2015 transceives across 144-146 (Rx to 149 MHz) in 5 kHz steps tuned by coaxial switches. A major feature is the 4 channel RAM memory (with an internal Ni Cad back up) which may be programmed direct from the front panel by simply dialling in a frequency, no screw drivers, no soldering irons, no fuss. Frequencies can be recalled from the memory instantly or they may be scanned in either of two modes—searching for a vacant or an occupied channel. 3 split (including 2x and a -5 to 600 kHz for receive) allows for even triplers or more use. Multipurpose tone burst, RIT (centre off with "click"), modular constructions, centre zero meter, accessory socket, mounting bracket, microphone etc. are all provided. The scanner itself may be locked out by the DC supply. Sensitive receiver tuned by varicaps by the DC spur. FET's will then replace the tuning and therefore make the receiver spurri way down.

DIGITAL II from KYOKUTO

SCANNER AND CRYSTAL T.B. OPTIONS

The Digital I1 offers complete 5 KV step coverage across 2 metres and 25 kHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner steps on a required channel for 7 seconds, then unless locked moves on. The bright digital readout component LEDs. Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (Rx to 149 MHz) from a tiny 62 x 32 x 71". Easily underdash mounted with the supplied mounting bracket, or slipped in a glove compartment when in use. For handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixe" (and LO) are all FET's. The front end is tuned by varicaps by the DC spur. FET's will then replace the tuning and therefore make the receiver spurri way down.

ANTENNA? FOR THE RANGE CONTACT SMC FOR QUICK DESPATCH

JAYBEAM 70 (4m), 144 (2m). 79 (4m). £22.55 HAM II 50 (2m). £19.95 CD44 50 (2m). £49.00

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UR67 50 ohm Heavy ... yd. 39p UR39 75 ohm Medium yd. 24p
UR37 75 ohm Heavy ... yd. 24p UR37 75 ohm Heavy ... yd. 24p
UR37 75 ohm Heavy ... yd. 24p UR37 75 ohm Heavy ... yd. 24p

LOOKING FOR A MAST THEN TRY THE

TELETOWERS

HATMOWS

TELESTATIONS

HATMOWS

TELESTATIONS

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Pleased to report that we have a wide range of antennas available for purchase. Please feel free to browse through the selection and choose the one that best suits your needs. The installer will also provide you with information about the installation process and costs. The installer will ensure that the installation is done quickly and efficiently.

Please feel free to contact the installer for any further information or assistance.

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10' telescopic heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging

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Flat 50-150 MHz. SWR ±0.5% (to 3:1). Power 20 & 200W, FSD (±10%), 2° x 4".
FS302M .. . .. £21.50 + 8% VAT
QUARTZ CRYSTALS LOW, PRICE
FT7550, FT10350, FT2250, FT3050, FT2325, FT2925, M20, M21, Combi. £2-20 each (+12½%), £22-£75 pair (+12½%). (P&P 20p)
2M. PRE-AMP WITH RF SENSING
Car or mast head mounting. Typically 12 dB gain, Bandpass characteristics. Handles 30W RF, 1V operation. SO239 sockets 5¼" x 1¼", £22-50 (+12½%), post free.
BOOM MICROPHONE HEADSET
600 ohm magnetic lightweight boom mic. Ideal for mobiles or contests. etc. (Post free but VAT + 12½%).
Microphone only .. . .. £9.75
Footswitch only .. .. £5.95
MD35 complete .. .. £14.75
LEADER WATTMETERS
LMP885 Through line (illustrated). 1.8-54 MHz. 20-200-1000W FSD (P&P 75p) £41.50 + 8% VAT
LMP890. Absorption. 1.8-500 MHz, 5-20-120W, FSD (P&P 95p) £64-00 + 8% VAT
TRANSISTOR DIP OSCILLATOR
LDM815 1-5-250 MHz on fundamentals battery c/w earphone and 6 plugs in 2 kHz modulation. 1-15 MHz Crystal facility, post free £38-50 + 8% VAT
LMP870 Antenna impedance meter 1-8-150 MHz, 0-1Kohm direct reading c/w load, post free £38-50 + 8% VAT
COAX SLIDE SWITCHES
Up to: 1kW, 1-5 GHz, 0-3dB less, 1:2:1 VSWR, SO239 or 50 ohm "N" mini plugs. £3.50 ex-Stock P. & P. 30p (VAT + 8%) EX STOCK
TWS120 1 in 2 out nickel SO239 ... £3.40
TWS150 1 in 4 out nickel SO239 ... £5.35
TWS220 2 in 4 out nickel SO239 ... £9.35
SWR METER TYPE SWR 25
With Power Indications SWR25
Twin meter. Up to 160 MHz, calibrated to 3:1 SWR, SO239 Connectors, £16.00 (+8% VAT) (P&P 40p)
COAX SWITCHES
ANTEX (KURANISHI) (P&P 20p)
1:0:5:1 VSWR, 0.2dB loss, 40dB isolation, 200W, handling all 150 MHz.
KSW1 3 SO239 sockets £7-70 + 8% VAT
KSW1A 2 SO239, 1 P259 plug £6-20 + 8% VAT
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88-108 MHz low noise pre-amp. Fitted flying leads (car plugs) up to 20 dB gain, 12 volts with LED indicator 1½" x 2½" x 2¼".
T293 £7-75 (+12½%) (P&P free)
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ARX450 432 MHz Ringo Ranger £21.50 (+12½%) (post 65p)
ARX2 144 MHz Ringo Ranger 9½" 1½ lbs £21.50 (+12½%) (post 85p)
HANSEN REMOTE RF HEAD WATTMETERS (50-150 MHz)
Separate Directional Coupler 3° x 4½" x 1" and illuminated Indicator 5° x 2½" x 1½" c/w brackets etc. Power 20 & 200W. FSD (±10%) SWR to 3:1 (±2½%). (P&P 85p)
F571/V ideal for mobile £23.50 (+8% VAT)
CRYSTAL FILTERS (P&P free VAT 12½%)
Wide range small selection below.
YF10530 350 MHz F101 CW £16-20
YF30530 350 MHz F101 CW £19-85
YF30512 12.5 kHz F101 £13-90
YF9070 2-4 kHz £5-60
FT72-50 £15-90
ULTRA BAL 2000
Permed Balun 2-30 MHz 50/75 ohm 9 oz. Bond post terminals with 4mm socket, £14.75 (+8% VAT)
FM BOOSTER T203 L7-75 (+12½%) (P&P 20p)
FM BOOSTER T204 2-4 kHz £5-60
ULTRA BAL 2000
Swapped Balun 2-30 MHz 50/75 ohm 9 oz. Bond post terminals with 4mm socket, £14.75 (+8% VAT)
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COAX RELAYS
12v. DC 50 ohm, Silver plated, P. and P. £200/FSD (VAT + 5%) Power 50 ohm crosstalk (at 500 MHz)
CX120 50W 50dB Cable entry £9-50
CX230 300W 40dB BNC sockets £17-90
CX600 600W 40dB N sockets £41-90
CX230 300W 40dB BNC sockets £17-90
CX230 300W 40dB N sockets £41-90
CX600 600W 40dB BNC sockets £17-90
CX230 300W 40dB N sockets £41-90
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12v. DC 50 ohm, Silver plated, P. and P. £200/FSD (VAT + 5%) Power 50 ohm crosstalk (at 500 MHz)
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CX230 300W 40dB BNC sockets £17-90
CX600 600W 40dB N sockets £41-90
CX230 300W 40dB BNC sockets £17-90
CX600 600W 40dB N sockets £41-90
MICROWAVE MODULES post free
(Work-wide), TRANSVERTERS—10W output sensitive etc. (full converter and counter range stacked SAE).
MRT432/28 £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%)
MRT432/144 £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%)
MRT432/28 £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%)
MRT432/144 £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%) £17-90 (+12½%)
MORSE KEYS FROM HI MOUND
HK707 (illustrated left) (P&P 60p)
Hand key 0.5 Kg ex-stock £7-90 (+12½%) £7-90 (+12½%) £7-90 (+12½%) £7-90 (+12½%)
BK100 (P&P 60p) (+12½%)
Mechanical Semi Auto Bug key £12-15 £12-15 £12-15 £12-15
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2 or 70, Superb RF sensing and dc bias arrangements for all modes. C/w mounting bracket
12v. dc 10W drive 2½" x 5" x 7½" (±8-5%) (+ VAT at 12½%), free delivery.
APB82A 145 MHz 80W out ... £120-15 £120-15 £120-15 £120-15
APB872 432 MHz 80W out ... £169-00 £169-00 £169-00 £169-00
APB87A 432 MHz 80W out ... £216-95 £216-95 £216-95 £216-95
HY GAIN Vertical (illustrated right)
1B3Y 144MHz 10-800m.—wide band, 50 ohm, 1kW. Self supporting, 2½" trapped 1/2 or ground mounted, low radiation angle, vertical.
1B3Y/144 £72-60 (+5½% B.S. Delivery).
FULL HY GAIN, HY RANGE IN STOCK...
WILLIAM MUNRO (INVERGORDON) LIMITED
DISTRIBUTORS FOR NEC AMATEUR RADIO EQUIPMENT

CQ301  CQ110E  CQ201

CQ110E Transceiver (ex stock). £645 plus VAT £80.63, total £725.63
(Price includes Securicor Delivery)

- Frequency Range: 10M - 15M - 20M - 40M - 80M - 160M
- Mode: LSB - USB - CW - AM - FSK - FAX/SSTV
- Power Requirements: 100/110/117/200/220/234 volts AC or 13.5 volts DC.
- Input Power: 280 watts PEP (240 watts on 28 MHz).

Digital Readout—Separate Crystal Filters for each of LSB, USB and CW.
AC and DC power units are built in. Switched metering for "S" meter, Relative Output, Plate Current and ALC for setting MIC Gain.

The following accessories are supplied with the Transceiver—Microphone, DC Power Cable, AC Power Cable 5 RCA Plugs, 2 Spare Fuses, 2 Jack Plugs, 2 Allen Keys and a 60-page instruction book. Built-in speaker with 3 watts output.

A hybrid design utilising the best features of valves and semiconductors is used to give a high performance. 7 Valves—49 Transistors—19 FETs—128 Diodes—25 ICs. The use of the RCA low noise beam deflection valve (7360) as receiver mixer gives the CQ110E high sensitivity combined with remarkable crossmodulation characteristics.

CQ301 2kW Linear Amplifier—10 to 160M with built-in power supply and 2 EIMAC3-500Z Valves.
(Ex stock) £760 plus VAT £95, total £855 (Price includes delivery)

We also stock Antennas and Accessories—Microwave Modules—Modular Communication Systems—Polar Electronic Developments—Antex Products—Components etc.

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INCLUDING. YAESU FT30ID/FP301

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THE 2 METRE FM TWINS

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FITTED 7 CHANNELS

NEW MULTI-800D 25 WATTS!
2M FM SYNTHESIZED TRANSCEIVER

MULTI-II
23 CHANNELS + 4 AUTOSCAN
12 WATTS & THE HOTTEST RX

NEW MULTI-800D 25 WATTS!
2M FM SYNTHESIZED TRANSCEIVER

IN STOCK NOW
H.P. DEPOSIT £30
THE MOST ECONOMICAL CHOICE!
25 channel capability, 144-146 MHz with 12 watts output—automatic tone-burst—true "R" and "S" channel dial readings—2 priority channels—remote vfo/synthesise socket—microphone, power cord, mobile mount, fuses, plugs, etc., and English manual plus 12 months guarantee.

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This is it, the hottest little rig around. No hidden extras or add-on units. Auto-scan is included for safer driving and a two-stage RF amplifier for superb weak signal reception. Its features are endless, ex monitoring, centre zero meter, RIT tuning, automatic tone-burst, wide/narrow filters, high/low power, APC, all necessary accessories and a 12 months guarantee. Act now and avoid price increases. 4-page brochure available. Channels fitted S8, S20, R3, R4, R5, R6, R7. Additional channels S21, S22 and S23 available at special price of £7.50 inc. VAT (6 xtals).

£199 inc. VAT (fitted 7 channels)

IN STOCK NOW
H.P. DEPOSIT £15
Remote Display £15

70 cms FM!
MULTI U-II OF COURSE
Now £129 inc. VAT! (fitted 2 channels)
or £249 fitted 10 channels

IN STOCK NOW
Now's the chance to join the fun on 70 cms. With the ever-growing number of 70 cms. repeaters coming on the air, it makes sense to consider 70 cms. as the ideal mobile band. Good strong signals, aided of course by the U-II hot front end and 12 watts output, no QRM and a lot of new friends to meet. The U-II has led the way from the start and is now regarded as THE rig for 70 cms. We can supply the U-II fitted with any of the following channels:

RB2, RB4, RB6, RB10, RB14, SU8, SU16, SU18, SU20 at £5.90 per channel.
MULTI-2700 Mk II
DUAL VFO CONTROL!

MULTI-2700—THE COMPLETE STATION

The FDK Multi-2700 is a front-line all-mode transceiver that incorporates every conceivable feature to ensure maximum enjoyment. In fact, apart from a mains plug and an aerial, there is little else we can sell to the owner of a Multi-2700. All in all it is an unbeatable transceiver at an unbeatable price.

ALL MODES — ALL OCCASIONS

All modes are provided AM, FM, SSB and CW. For SSB operation VOX is included and for CW, fast break-in is provided with completely adjustable side tone. The 2700 can be used at home with its internal 240v. AC PSU or taken out to the local high spot and run from 12v. DC. This really has to be the QSO machine that you will never tire of.

BEAUTIFUL TO OPERATE — BEAUTIFUL TO HEAR

The transmitted audio quality of the 2700 is second to none. Its crisp, clear quality reflects the manufacturing care and knowledge that a clean signal sells more products! The Optimised 16.9 MHz B pole crystal filter gives clean SSB signals and good selectivity. On FM, direct modulation of the VCO gives smooth but generating audio. Typical power output is 16 watts but the flip of a switch and you have 1 watt on all modes. (An internal adjustment permits the power to be adjusted from approx 1 watt to 6 watts for driving linears or transverters.) The Multi-2700 has a built-in receiver RF pre-amp—no problems here with a deaf receiver.

DUAL VFO CONTROL

Until you have handled the Multi-2700 you cannot appreciate the advantages of dual vfo control. The conventional analogue VFO with its dual speed silky smooth feel, permits accurate tuning on all modes with advantages of dual vfo control. The conventional analogue VFO with its receiver has a built-in receiver RF pre-amp—no problems here with a deaf receiver.

DUAL VFO CONTROL

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TM56B AMATEUR VHF MONITOR RECEIVER

230 volts AC
12v. DC
10 Channels fitted

12 CHANNELS
+
4 AUTOSCANN

IN STOCK NOW

Tune into the exciting World of Amateur Radio with this advanced monitor receiver. Listen to your local amateur radio stations both fixed and mobile, direct or through your local repeaters. From the comfort of your fireside chair using the built-in 230 volt AC power supply, this receiver will open up the whole new World of VHF Amateur Radio for you. Alternatively the necessary hardware supplied enables you to power the TM56B from your car radio battery for true mobile operation.

GREAT VALUE

Little wonder that the first shipments of these beautifully engineered receivers were sold out within weeks of the advertisements appearing. We really are amazed at their superb performance at such a low price.

SOUND DESIGN

The design is well and truly tried and tested, and the circuitry is almost identical to the receivers mobile transceivers. Both sensitivity and selectivity leave nothing to be desired and the auto-scan enables the popular calling channels to be continually monitored for activity.

NO HIDDEN EXTRAS

The receiver is supplied complete with all eads, circuit diagram, crystals for Channels 59, 60, 61, 62, 63, R3, 4, 5, 6, and 7 plus space for a further 6 channels making 16 in all. An additional matching desk top aerial is also available at £2.50 extra.

685 including delivery and VAT.

MAIL ORDER & HEAD OFFICE: Hockley Audio, 31 Spa Road, Hockley, Essex. Tel: 03-704 6335 (2 lines)

ALL PRICES INCLUDE VAT

AGENTS: G3JTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex.
Tel: Romford (0708) 668956
G3QOT Bredhurst Electronics, Willowbrook, School Lane, Bishops Stortford.
Cheshire, Tel: (Bunbury) 0829 260708
GM3GRX Eric Simpson, 6 Dossie Road, Falkirk, Stirlingshire. Tel: 0324 24428

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with the

Western 70TV 432MHz TRANSVERTER

We have designed and built the 70TV up to a high standard. Not down to a price! Don’t buy a 70TV if you’re looking for a cheap unit. BUT if you want to hear signals that some others can’t... the 70TV is the answer!

- Fully stabilised AC and DC PSU
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- Built-in relays
- Matches Yaesu styling
- Withstands infinity mismatch
- All units aligned on Hewlett-Packard Spectrum Analyser
- Can be driven by most 28 MHz Transceivers

this will be the new pacesetter!

Ex-Stock Now—ONLY £178.87 inc. VAT

★ ALL MODES (YES - EVEN FM) on ALL HF BANDS and 70 cms

WITH YOUR Western 70TV

and the NEW

FT901DM from

YAESU

The FT-901DM provides unique features far ahead of any other transceiver of its kind on the market today.

FEATURES

- Variable-bandwidth IF passband tuning. Not "IF shift," this feature superimposes two filters upon each other, then tunes one to make the bandwidth as wide or narrow as desired.
- Rejection tuning for elimination of particular interfering signal.
- Audio Peak Frequency tuning provides a narrow audio peak with steep skirts for single-signal CW reception.
- Built-in Curtis 8043 IC electronic keyer.
- PLL frequency derivation.
- Digital plus analogic readout.
- Unique memory circuitry allows storage of a frequency with recall for instant control of transmit, receive, or transceive frequency.
- VOX, semi break-in CW with sidetone, 25 kHz calibrator, advanced noise blanker, RF speech processor, receiver 20 dB RF attenuator and TX/RX clarifiers are built-in.
- Rugged 6146B final tubes. Toroidal output circuitry and RF negative feedback for maximum reliability and purity of emission.
- Plug-in printed circuit boards for ease of maintenance.
- TUNE button provides 10 seconds of "key down" condition, then automatic return to receive for protection of final tubes.
- All band (160 through 10 metres plus WWV/WWVY received) and all mode (LSB, USB, CW, FSK, AM and FM) coverage.
- Choice of supply voltages of 100/110/115/200/220/234 VAC or 13.8 VDC with no external power supply required.
- Diecast front panel and heavy-duty steel case for maximum protection from shock or vibration damage while travelling.

Price £842.62 inc. VAT
GET "PEP"ped UP on 2 METRES for the NEW YEAR!

with

WESTERN’S NEW PM2001

WESTERN—the firm who gave you the PM2000—the first direct PEP reading HF wattmeter—now proudly present the PM2001... the first direct PEP reading VHF wattmeter!

★ Direct measurement of SSB PEP output from 50 to 150 MHz
★ RMS power measurement for AM, FM or CW
★ Forward or reflected power readings at the flick of a switch
★ Full-scale ranges from 5 to 200 watts (RMS or PEP)
★ Accurate to within 7%
★ No calibration dials to set
★ Large, clear, easy-to-read meter scales
★ Can be left "in-line" at all times
★ Styled to match the WESTERN PM2000 HF PEP meter

These superb instruments are now available ex-stock at £52.92 inc. VAT

CHRISTMAS PRESENT MONEY TO SPEND? TRY THESE...

OSKER SWR-300

All the facilities of the long-established and well-known Osker SWR-200, but now with optional add-on couplers for accurate (10%) power and SWR measurements in the 2 metre and 70 centimetre bands. Basic instrument for HF—add couplers for VHF and/or UHF. Couplers not usable without basic instrument.

<table>
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<tr>
<th>Freq. range (MHz)</th>
<th>Power ranges (W)</th>
<th>Accuracy</th>
<th>Impedance (Ω)</th>
<th>PRICES (Inc. VAT, carriage free)</th>
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<tr>
<td>3.5-30</td>
<td>0-20, 0-200</td>
<td>±15% FS</td>
<td>50</td>
<td>£43.20</td>
</tr>
<tr>
<td>144-148</td>
<td>0-20, 0-200</td>
<td>±10% FS</td>
<td>50</td>
<td>£15.98</td>
</tr>
<tr>
<td>420-450</td>
<td>0-2000</td>
<td>±10% FS</td>
<td>50</td>
<td>£75.00</td>
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</tbody>
</table>

OSKER SWR-200

Almost too well known to need description. Power and SWR measurement 3.5 to 150 MHz. Accuracy ±15% FS; 50 or 75 ohms; ranges to 2 kW.

Price: £38.88 inc. VAT, carriage free

ACCESSORY CORNER

- Yaesu YH-55 phones... £9.00
- Yaesu QTR-24 World clock... £14.62
- Yaesu YD-846 hand microphone (50k)...
- Shure 526T desk microphone...
- Vibroplex “Original” Standard key...
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Midland and North West distributors for the XR300 unique crystal controlled receiver. This receiver is designed to provide precision frequency tuning over the full short wave spectrum up to 30 MHz with exceptional frequency stability for both AM and SSB. Separate tuned whip antenna.

<table>
<thead>
<tr>
<th>Price</th>
<th>Description</th>
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<tr>
<td>£145.-00 inc VAT</td>
<td>XCR-30 FM Receiver with FM band 87-S to 101 MHz</td>
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</table>

TR2200GX PRICE £119.00 (3 ch.)
This is the FM receiver 2 metre FM portable rig which has won praise from all over the world. Over 2W, transmitter output with switched reduction to 400 mW for local contacts. High gain receiver with double IF filtering at 107 MHz and 455 kHz for razor sharp selectivity. The TR2200GX is supplied with all accessories including the battery charger for the optional Nimh battery, the removable telescopic antenna, the carrying case, the shoulder strap, external power lead, microphone and handbook. Fitted with 12 channels, the price is only £160 inc. VAT. If you wish to start out at a lower price, we can supply the rig fitted 3 channels for only £130. With all its performance, the TR2200GX is a must for the portable operator. At the price, it has to be the best around. Just look around at the next rally and see how many operators are carrying them. Also available are a mobile mounting bracket at £6.48, a matching 10 Watts amplifier for £45 and a flexible antenna. Send for full details now.

Secondhand Equipment
Drake R4C Receiver  £400.00
Drake T4X with AC PSU  £435.00
KV2000E Transceiver  £315.00
KV2001 Transceiver  £315.00
Drake R4C + 2 filters & N. Blanker  £475.00
Somerset TR200 Transceiver  £365.00
Adas 21DX Transceiver  £375.00
Adas 180 Transceiver  £385.00
Barlow Wadley XCR30 Receiver  £595.00
Heathkit SB330 Linear Amplifier  £315.00
Linier 235B Transceiver  £320.00
Yaesu Friois Receiver  £275.00
Edystone 940 Receiver  £140.00
Drake R4C Noise Blanker  £75.00
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Yaesu FL101 Transmitter  £325.00
We have over 50 secondhand items in stock Send SAE for full details.

TR3200 PRICE £171 inc VAT. Ex stock
The newest FM handy transceiver from the ever expanding TRIO range. Superb performance for the 70 cm operator with all the advantages of portability and TRIO reliability. 12 channel capability in the range 432-436 MHz with three channels fitted (SUB, 18, 20). Transmitter output switched 2W/1000 mW and incorporating the exclusive TRIO 1750 Hz tuning fork access tone generator (does that mean you can ring for credit?) High gain S18 wave antenna for enhanced performance on transmit and receive. Supplied complete with all accessories as for the TR2200 GX and including the all important battery charger.

Other TRIO Models available
TS920 HF Transceiver  £645.00
DG1 Digital Display  £137.00
TS520 HF Transceiver  £489.00
TR200 VHF Transceiver  £486.00
TR700 VHF Transceiver  £542.00
TR7010 VHF Transceiver  £189.00
TR7000 70cm FM Transceiver  £237.50
PSS PSU with clock  £68.00
PSS PSU  £57.00
R39RD All mode HF Receiver  £403.00
VB1200X Mobile Amplifier  £495.00
HC2 World Time Clock  £15.50

Accessories
Single Meter SWR  £10.00
Twin Meter SWR  £15.00
50 ohm Dummy Load  £21.93
Twin Paddle Keys  £15.75
Yaesu YC100 MonitorScope  £9.30
B.W. Antenna Switch  £16.75
3 way Antenna Switch  £5.50
Standard Morse Keys  £7.75
UR43 Co Ax, Cables 18p metre.
TNC 2.0m FM Mic Holder  £5.00
Antenna Insulators  £1.00
PL259 Plugs  £1.875
SO239 Sockets  £1.875
Cable reducers  £1.875
Lp Line conn  £1.875
Alum. Con. Cables Plugs  £1.875
Hy-Mount Morse Keys  £8.75
Nye King Morse Keys  £6.75
Junkers Heavy Duty Morse Key  £5.75
Bauer Keing Paddle  £6.86
Kaisumi Electronic Keys  £6.75
Microphone plugs 4 pin  £7.00
Microphone sockets 4 pin  £7.00
All items despatched same day as order received.

COMTEK 2m. Linear Amplifier Models SSB - CW - FM - DFM Input: Up to 15 watts SSB Up to 5 watts FM Power output: 100 watts PEP SSB 60 watts FM Receiver Pre-Amp 12-18dB. Receiver Pre-Amp 12-18dB. KEF switching for easy control. Price £140-62 inc VAT

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Shop Hours: 9.30 till 5.30 Monday to Friday, 9.30 till 1 p.m. Saturday.
ACCESS and BARCLAYCARD facilities available Instant order on spot HP facilities
We are always looking for good clean equipment and spot cash will be paid for receivers, transmitters, transceivers, etc. If you have equipment surplus to your requirements we would be pleased to sell this for you on commission. Our secondhand stock changes daily.

If you require a specific piece of equipment, send us a SAE and we will let you know as soon as we have the model available. All our secondhand equipment is covered by three months guarantee.

PLEASE NOTE ALL OUR PRICES INCLUDE VAT at the current rate. Carriage, postage is extra. We can quote for delivery in any part of the world. We are located on the A574, Turn at the GREYHOUND MOTEL on the A50 (East Lancs. Road) 5 miles from the M6; 6 miles from the A66, Easy access from North, South, East and West. NO PARKING PROBLEMS.
ARAC 102 receiver, 28-30 MHz. 144-146 MHz. AM-SSB-FM-CW. Price £100.00.

ARIO Mosiet receiver. 28-30 MHz. Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM. SSB and CW reception. 12v. DC.

As sole distributors for the STE range of equipment for four years despite rising prices, we have maintained prices stable for over two years. Surely the finest value for money on the market. With the opening of the 28 MHz band the ARIO Receiver module is now one of our fastest selling lines. Demand for these is growing every month.

PRICE LIST in cluding VAT and postage.

AK20 FM Transceiver ... £165.00
AK20 FM Transceiver Kit ... £105.00
ARAC 102 Receiver ... £100.00
ARACI70 Receiver ... £127.50
ATAL 228 Transmitter ... £127.50
ASAP 154 AC PSU ... £37.50
AR10 Receiver Module ... £37.50
AA1 Audio Amplifier ... £4.10
AD4 FM Discriminator ... £5.00
AT22 Transmitter ... £50.00
AGI0 Tone Generator ... £4.50
AR20 C.C. Receiver ... £45.00
AT23 C.C. Transmitter ... £50.00
AS15 Stabilised DC PSU board ... £10.00
AL8 Linear Amplifier ... £27.00
AB40 Mobile 40 Watt FM Amplifier £55.00

AK20. STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 3 watts output. Sensitivity 0.2 uv AF input sensitivity 2mV adjustable to 50 mV.

S.W.R.200B. Switched 50 and 75 ohm. 3 to 200 MHz. 2000 watts at HF. 2-200 watts at VHF. £36.25

S.W.R.400B. Impedence 50 ohm. 144 and 432 MHz. 20 and 200 watt range. Insertion loss 0:2dB. £55.90

P.W.120B. Dummy Load Wattmeter. Impedance 50 ohm. 5-20-120 watt. Frequency 3-500 MHz. £36.25

D.L.120. 50 ohm Dummy Load. 50 ohm to 500 MHz ... £20.48

C.R.S. 110-B. 4-way coaxial switch ... £37.91

STEPHENS-JAMES LTD.
47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA
telephone 0942 - 676790
THE IC-240 IS NOW £179 inc VAT*

*Prices marked thus have been reduced because of an extremely favourable rate of exchange at the time of purchase.

Sorry to have to bore you with even more comparison lists, but we have had so many phone calls that we felt that we should at least give you one more to compare with the rest! We still think, though, that the best way to choose a rig is to ask the owner of one for his opinion. Remember that ease of use and after sales service are probably the most important parameters.

Try this one:

<table>
<thead>
<tr>
<th>Feature</th>
<th>FT-227R</th>
<th>TR-7500</th>
<th>IC-240</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of clicks required to QSY...</td>
<td>100*</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Need to remember to press extra button for all odd channels</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Channel spacing (normal use requires 25 kHz)</td>
<td>NO</td>
<td>FRONT</td>
<td>FRONT</td>
</tr>
<tr>
<td>Instant reverse repeat on all repeater channels without re-tuning</td>
<td>NO</td>
<td>YES (Automatic select)</td>
<td>YES</td>
</tr>
<tr>
<td>Ability to remain on frequency last used when set is switched off then on again</td>
<td>REAR</td>
<td>FRONT</td>
<td>FRONT</td>
</tr>
<tr>
<td>Position of tone burst switch</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Position of low power switch</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Supplied with all those channels in the FM portion of the band which are used 98% of the time**</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Scanner available to cover all 40 FM channels plus electronic tuning outside this range</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Can be arranged to have the most frequently used channels next to one another</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Price (seems to vary a bit)</td>
<td>180/189</td>
<td>225</td>
<td>179</td>
</tr>
</tbody>
</table>

* or 50 if you confine yourself to the band ** our guess, but it may be nearer to 99.5%.

So there you are folks—the decision is up to you, but if you do buy ICOM from us we will guarantee you the best after sales service we can possibly give.

All data is correct to the best of our knowledge and is collected from adverts and other enquiries.

DON'T FORGET THE PORTABLE TWINS

IC-215  IC-202
3w FM    3w SSP
8Ch £149  *£162

Both provide the best in portables in their field, with crisp, clear modulation, a healthy 3 watts of output, large sensible batteries and an excellent receiver.

Introducing ‘SLIM JIM’ SJ2

An omni-directional 2 metre aerial developed by T & T from a design by F. C. Judd (G2BCX). Derived from the "J" the SJ2 is a free space aerial with better than 50% greater efficiency than conventional ground plane types due to the very low angle radiation field. The aerial is slim and compact (58 inches long) and as there are no radials it is unobtrusive and has low wind resistance. Supplied complete with mast clamp. £15-50 inc. VAT (carriage 70p).

FOR ALL MAIL ORDERS AND SALES DURING BUSINESS HOURS

ICOM FROM THANET ELECTRONICS
HERNE BAY (02273 63859)
THE LEADERS IN SYNTHESIZED TRANSCEIVERS

YOU CAN HAVE IC-211E

—Giving you FM/CW/USB/LSB all produced from the amazing ICOM synthesizer and patent LSI chip. Frequency read out is to the nearest 100 Hz and it is amazingly stable and accurate. You can use the two frequency stores as separate VFOs or for any repeater shift required. The tone burst is automatic, of course, and reverse repeat is available at the flick of a switch. Add a keypad (we will give you the circuit to make your own or you will be able to buy one shortly) and find a new facility which is quite impossible with old fashioned rigs. The original waiting list has now been dealt with and you can now have one from stock.

AND THE IC-245E

This truly amazing little box get you mobile on FM, USB or (if you really think it a good idea) CW! The synthesizer is the same as the IC-211E and can be tuned to the nearest 100Hz, again with amazing accuracy. Of course such a versatile little box will often be used as a base station and facilities such as keypad operation can be added. They are now ex-stock—but only just!

BUT NOT THE IC-701 (YET)

—Because there is only one in the country at the moment—as far as we know—and it’s here at Herne Bay being put through its paces. This is going to be the HF rig to beat them all and is going to be bought by the man who wants the best. These are some of the features which you get with the BASIC rig: There is a full synthesizer with digital read-out to the nearest 100 Hz so amazing accuracy. This has two frequency stores which enable you to store a frequency in one while tuning the band with the other—yes, you CAN even look at and tune another band while waiting for the juicy DX to finish his QSO and then switch straight back to his frequency, or alternatively you can work split frequency either way round providing they are in the same band. There is an RF speech processor built in of course, AND a CW filter, pass-band tuning to help cut down the QRM VOX, semi break-in CW, self cancelling RIT, AGC and a noise blanker. There is no PA tuning and loading to do—just find your man, press the button and talk. (Think of the extra contacts you would make if you didn’t have to waste precious time tuning up!) The PA is solid state and will run 100 watts of R.F. out all day continuously. (How many valve rigs will do that?). A quiet little fan discreetly comes on if it gets a bit hot. There is PA protection of course for the man who is incapable of providing it with a proper aerial (though this is sacrilege with a set like this). A double balance schotky diode mixer is used for both transmit and receive and, just to finish the perfection, ICOM have decided to supply an electret desk microphone with each set. Of course it will run from either 12v. DC or the mains, and an external mains PSU is included. This makes it compact and light for use when mobile. For the keen top band man that bit of the spectrum is covered also. The extras to come will be things like a key-pad to key in any frequency, any band, and a few spare memories. We have had great fun testing our Demo model and have received extremely complementary reports on the mod which is so crisp and clean that it sounds more like ICOM’s famous clear FM than SSB. Like the Rolls Royce this sort of quality will not be cheap—it may well top the £1 mark! If you seriously think you may want one put your name down now. For those who collect letters contacts so far, barefoot, include ZL, VK, W6, PY, JA, KA6, and a few other locals.
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<tr>
<th>TRIO EQUIPMENT</th>
<th>inc. VAT</th>
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<tr>
<td>TS520 160-10 metre HF transceiver, 200W, pep</td>
<td>£845.00</td>
</tr>
<tr>
<td>YF090 External VFO</td>
<td>£112.00</td>
</tr>
<tr>
<td>D51A 12v. DC inverter</td>
<td>£40.00</td>
</tr>
<tr>
<td>YGB2 CW filter, 500 Hz 8 pole</td>
<td>£36.00</td>
</tr>
<tr>
<td>SP520 Matching speaker unit, 8 ohm impedance</td>
<td>£19.00</td>
</tr>
<tr>
<td>TV502 2 metre transverter. All solid state</td>
<td>£780.00</td>
</tr>
<tr>
<td>H53 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>TS520 HF transceiver, 240v, AC/12v, DC, 80-10 metre</td>
<td>£432.00</td>
</tr>
<tr>
<td>YF050 External VFO unit</td>
<td>£22.00</td>
</tr>
<tr>
<td>CW520 CW filter, 500 Hz 8 pole</td>
<td>£36.00</td>
</tr>
<tr>
<td>SP520 Matching speaker unit</td>
<td>£19.00</td>
</tr>
<tr>
<td>TV502 2 metre transverter. All solid state</td>
<td>£178.00</td>
</tr>
<tr>
<td>H53 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>DG3 Digital display. Frequency counter to 40 MHz</td>
<td>£132.00</td>
</tr>
<tr>
<td>CW520 CW filter, 500 Hz 8 pole</td>
<td>£36.00</td>
</tr>
<tr>
<td>H53 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>RS99D 160-10 metre all mode receiver, CW/USB/LSB/AM</td>
<td>£403.00</td>
</tr>
<tr>
<td>TS99S De Luxe HF transmitter, 80-10 metre, CW/USB/LSB/AM</td>
<td>£383.00</td>
</tr>
<tr>
<td>SP99 Matching speaker unit, 8 ohm impedance</td>
<td>£18.00</td>
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<tr>
<td>C229A 2 metre converter for R99D</td>
<td>£20.00</td>
</tr>
<tr>
<td>H53 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>TS700G 2 metre transceiver, CW/USB/LSB/AM</td>
<td>£226.00</td>
</tr>
<tr>
<td>VOX3 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>SP700 New matching speaker unit</td>
<td>£18.00</td>
</tr>
<tr>
<td>TS700S De Luxe 2 metre all mode digital transceiver.</td>
<td>£542.00</td>
</tr>
<tr>
<td>YF0700S External VFO unit. Full facilities for split frequency</td>
<td>£63.00</td>
</tr>
<tr>
<td>TR7010 New matching speaker unit</td>
<td>£18.00</td>
</tr>
<tr>
<td>P55 Matching AC power supply/digital clock</td>
<td>£50.00</td>
</tr>
<tr>
<td>TR7200G 10W FM mobile fitted 10 channels, auto tune burst etc</td>
<td>£109.00</td>
</tr>
<tr>
<td>YF030G Matching VFO with repeater shift</td>
<td>£62.00</td>
</tr>
<tr>
<td>PS5 Matching AC power unit/digital clock</td>
<td>£58.00</td>
</tr>
<tr>
<td>TR7400A 2 metre 30W. FM mobile transmitter, 800 channels</td>
<td>£329.00</td>
</tr>
<tr>
<td>TR7500 2 metre 10W. FM mobile transmitter, 40 channel PLL</td>
<td>£225.00</td>
</tr>
<tr>
<td>P56 Matching speaker and AC power unit</td>
<td>£57.00</td>
</tr>
<tr>
<td>TR2200GX 2 metre PM handy transceiver CW battery charger, microphone, carrying case, fitted three channels</td>
<td>£139.00</td>
</tr>
<tr>
<td>TR2200GX As above but fitted twelve channels</td>
<td>£169.00</td>
</tr>
<tr>
<td>RA1 Helical rubber antenna for TR2200GX</td>
<td>£650.00</td>
</tr>
<tr>
<td>MB1a Quick release mobile mount (also fits 2200 and 2200G)</td>
<td>£97.00</td>
</tr>
<tr>
<td>TR3100 Spare external power lead for 2200G and 2200GX</td>
<td>£1.25</td>
</tr>
<tr>
<td>TR2200GX Mobile 10W amplifier with SWR protection</td>
<td>£45.00</td>
</tr>
<tr>
<td>TR8300 Spare whip antenna (also available for 2200 and 2200G)</td>
<td>£1.90</td>
</tr>
<tr>
<td>TR3200 70cm, PM mobile transmitter. Fitted 4 channels, auto TB etc.</td>
<td>£237.00</td>
</tr>
<tr>
<td>TR7500 70cm, PM handy portable fitted 3 channels. All accessories supplied as for TR2200GX</td>
<td>£138.00</td>
</tr>
<tr>
<td>MB1a Quick release mobile mount</td>
<td>£9.70</td>
</tr>
<tr>
<td>TR9100 Spare external power lead</td>
<td>£1.25</td>
</tr>
<tr>
<td>MB1a Pack of ten rechargeable batteries</td>
<td>£9.72</td>
</tr>
<tr>
<td>VQ300 Mobile 10W amplifier with receiver preamp. Case size as TR2200</td>
<td>£95.62</td>
</tr>
<tr>
<td>R300 General coverage receiver. 170 kHz-30 MHz. Bandspread for the international broadcast bands, 240v. AC or battery operation</td>
<td>£104.50</td>
</tr>
<tr>
<td>H53 Spare AC mains lead for R300</td>
<td>£1.25</td>
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<td>H53 Tailored response communications headsets</td>
<td>£22.00</td>
</tr>
<tr>
<td>TL922 De Luxe 2 metre all mode digital transceiver.</td>
<td>£689.50</td>
</tr>
<tr>
<td>HC2 World time clock. Instant readout of time anywhere in the world. Invaluable accessory for amateur or SWL</td>
<td>£15.50</td>
</tr>
<tr>
<td>MC10 Hand microphone with PTT, 50K impedance. Available in 500 ohm</td>
<td>£9.00</td>
</tr>
<tr>
<td>MC50 De Luxe dual impedance desk microphone</td>
<td>£98.00</td>
</tr>
<tr>
<td>LF30A HF low pass filter, 1kHz rating. 50dB stop band rejection</td>
<td>£17.00</td>
</tr>
<tr>
<td>BPF2A 2 channel band pass filter. 144-166 MHz, 100W, pep</td>
<td>£27.75</td>
</tr>
<tr>
<td>HC3 Tailored response communications headphones</td>
<td>£23.00</td>
</tr>
<tr>
<td>TRIO TEST EQUIPMENT</td>
<td></td>
</tr>
<tr>
<td>CS1570 Dual trace oscilloscope. DC-30 MHz</td>
<td>£646.40</td>
</tr>
<tr>
<td>CS1560A Dual trace oscilloscope. DC-15 MHz</td>
<td>£324.00</td>
</tr>
<tr>
<td>CS1562 Dual trace oscilloscope. DC-10 MHz</td>
<td>£270.00</td>
</tr>
<tr>
<td>FF81 Station power meter. In line measurement with three ranges. Accurate SWR readings.</td>
<td>£64.80</td>
</tr>
<tr>
<td>CO1303D Single trace oscilloscope. DC-5 MHz. Ideal small service scope</td>
<td>£108.00</td>
</tr>
<tr>
<td>CO1303G As above but including station monitor and two tone oscillator</td>
<td>£129.60</td>
</tr>
<tr>
<td>DM800 Dip resonance meter</td>
<td>£43.60</td>
</tr>
<tr>
<td>SM301 FM stereo generator for workshop use</td>
<td>tba</td>
</tr>
</tbody>
</table>

TRIO at Radio Shack Ltd.

TRIO EQUIPMENT: TR-7500 The Sensible One!

TRIO PRICES: inc. VAT

TR-7500 The Sensible One!
YOUR ROUTE TO 70cm REPEATER OPERATION

We are extremely happy to announce a new version of our 144 MHz to 432 MHz double conversion linear transverter, the MMT432/I44R.

The MMT432/I44R, based on its predecessor, features a 1.6 MHz shift, specifically included for U.K. repeater operation.

The 1.6 MHz shift is achieved by the inclusion of two separate local oscillators (101 MHz and 101.4 MHz), which produce two ranges at 70 cms. (LOW RANGE: 432-434 MHz, HIGH RANGE: 433.6-435.6 MHz), both for an IF of 144-146 MHz.

The switching of these ranges, which is accomplished by appropriate linking of the 5 pin DIN power plug, may be wired to allow standard repeater operation, reverse repeater operation etc.

Please note that a suitable toneburst signal must be generated by the 144 MHz transceiver to allow repeater access.

FEATURES

★ 1.6 MHz REPEATER FACILITY OR SIMPLEX
★ HIGHLY STABLE REGULATOR-CONTROLLED CRYSTAL OSCILLATOR STAGES
★ PIN DIODE AERIAL CHANGE-OVER RELAY WITH LESS THAN 0.2 dB THROUGH-LOSS
★ EXTREMELY LOW NOISE RECEIVE CONVERTER
★ BUILT-IN AUTOMATIC RF VOX WITH OVERRIDE FACILITY
★ SEPARATE INTERNAL PA COMPARTMENT ENSURES EXCELLENT ELECTRICAL AND THERMAL STABILITY
★ USE OF LATEST STATE OF THE ART POWER AMPLIFIER TRANSISTORS PROVIDES RELIABLE
★ 10 WATTS CONTINUOUS POWER OUTPUT

SPECIFICATION

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<th>POWER OUTPUT</th>
<th>OUTPUT IMPEDANCE</th>
<th>RELATIVE 404/405.6 MHz OUTPUT</th>
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<th>POWER CONNECTOR</th>
<th>SIZE</th>
<th>WEIGHT</th>
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</thead>
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<tr>
<td>432-434 MHz (LOW RANGE)</td>
<td></td>
<td>1.6 MHz</td>
<td></td>
<td></td>
<td>50 OHM</td>
<td></td>
<td>10 dB TYPICAL</td>
<td></td>
<td>116 MHz</td>
<td>28 MHz</td>
<td>11-138 VOLTS, 12.5 V, NOMINAL</td>
<td>2.5 AMPS, PEAK</td>
<td>50 OHM BNC SOCKETS</td>
<td>5 PIN DIN SOCKET</td>
<td>187 x 120 x 53 mm.</td>
<td>975 g</td>
<td>£151 + VAT (£169.887 inc. VAT)</td>
</tr>
<tr>
<td>433.6-435.6 MHz (HIGH RANGE)</td>
<td></td>
<td>144-146 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>101 MHz or 101-4 MHz</td>
<td></td>
<td></td>
<td>12.5 V, NOMINAL</td>
<td>2.5 AMPS, PEAK</td>
<td>50 OHM BNC SOCKETS</td>
<td>5 PIN DIN SOCKET</td>
<td>187 x 120 x 53 mm.</td>
<td>975 g</td>
</tr>
</tbody>
</table>

MICROWAVE MODULES LIMITED
BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN
TELEPHONE: 051-523 4011. TELEX: 628608 MICRO G
AMATEUR ELECTRONICS UK

MAIN AGENT
ATLAS RADIO INC.
SOLE AGENT
SWAN ELECTRONICS PLUS

YOUR KEENEST BUY FOR YAESU MUSEN!

AS DIRECT IMPORTERS WE OFFER YOU...

1. LOWEST PRICES
2. LARGEST RANGE
3. HIGHEST STOCKS
4. TOP AFTER-SALES SERVICE
5. BEST DEMONSTRATION FACILITIES

MANY THOUSANDS OF AMATEURS AND SWL'S HAVE FOUND IT PAYS TO DEAL DIRECT WITH THE IMPORTER WHEN IT COMES TO PURCHASING TODAY'S SOPHISTICATED AMATEUR GEAR—NOT ONLY DO THEY GAIN BY HAVING THE AFTER-SALES BACK UP THAT ONLY A MAIN AGENT CAN PROVIDE BUT THEY ALSO OFTEN SAVE A SUBSTANTIAL AMOUNT ON THEIR PURCHASE!

THIS IS THE FABULOUS FT-227R
Designed for the man who prefers true frequency read-out rather than CB type channel identification—after all it's the frequency you put in your Log:OM!

£2.50 FOR 25 PENCE!!
25 pence brings the latest Yaesu catalogue with our Credit Voucher for £2.50—A couple of stamps obtains the FT227R, SWAN or ATLAS leaflets or our used equipment list.

HOW TO REACH US (EASY PRIVATE PARKING ON OUR 70ft. FORECOURT)
FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within 1 mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.

FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds. turn again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.

FROM THE WEST AND SOUTH/WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at Junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

STOP PRESS—New Atlas 350XL now in stock.

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

BRANCH: AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT. KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m. - 10.30 p.m.

BRANCH: AMATEUR ELECTRONICS UK—SCOTLAND 287 MAIN STREET, WISHAW, LANARKSHIRE. GORDON MCALLUM, GM3UCI. TELEPHONE WISHAW 71382. (EVENINGS CARLUKE 70914.)

AGENT: WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 422252.

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(GB3SWM)
ISSN: 0037-4261

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Advertising: Charles Forsyth
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1980's RADIO TODAY:
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EDITORIAL

Pleasure

Over the years, we have had occasional correspondence first with SWL Luxton, then with Jesse Luxton, G8GMI, and now with Jesse Luxton, G4GOF. Jesse is an invalid member of RAIBC, and to pass that Morse test he listened to the stuff for two hours daily over four solid years, logging over 3000 stations in 1977 up to the time of his letter. So what, you may ask. Just this: Jesse had asked if at North Foreland Radio there was somewhere his wife, who had to accompany him, could wait while he did his test. The result was that the examining officer from North Foreland came to the railway station in his car to collect them, gave them a cup of tea after the test, and then drove them back to the station—courtesy going far beyond the call of duty.

It is a pleasure to hear that in the midst of all the turmoil and politics that is amateur radio today, North Foreland Radio have shown us a bit of what we used to call the Spirit of Amateur Radio. We have a lesson to learn from it in most cases.

As soon as he has got his AR88D and DX-100 pasted together, the eighty-metre gang will be able to welcome G4GOF and know a little of the history which led to him being on the air.
High Power

IT is no secret that for many years some amateurs have been licensed to run one kilowatt input on VHF when wishing to conduct E-M-E experiments, for example. A letter received recently by a reader holding such a licence seems to suggest that the Home Office will not consider any further applications of this nature. Its reasoning is that the new, comprehensive licences are sufficiently "liberal" to obviate the need for any further special requests of this kind to be considered.

One reason appears to be the amount of time taken up by consideration of individual applications. It does seem illogical, therefore, that a recent announcement on the GB2RS News Service asked listeners wishing to take out special event callsigns to send their requests to the RSGB as the Home Office was prepared to issue these again.

Several E-M-E experimenters are very keen to attempt such contacts on the 2m. band and the use of something more than 150 watts input would enable a less monstrous aerial system to be employed. That a few radio amateurs are prepared to go to the immense trouble of engineering a system to attempt such communication would suggest that they really are acting in the spirit of using their stations, "... as part of the self-training of the Licensee in communication by wireless telegraphy..." to quote from clause 1.(1)(c).

The tone of the aforementioned letter suggests a scant understanding of E-M-E power budgets and another reply to an earlier request from another reader bears this out. Amateurs in many other countries are able to carry out E-M-E research unfettered by the low power restrictions of the U.K. and with the active encouragement of their national societies.

Assuming there is somebody in the amateur licensing department in the Home Office who could actually understand what some amateurs wish to attempt and why, then it seems high time a meeting was arranged with those highly responsible amateurs as a group. There seems to be an idea that the Home Office will only deal with a couple of RSGB council members on these matters. That is so much rubbish since we are all licensed individually. Perhaps it is time for those genuinely needing to run high power for E-M-E work to band together and insist on dealing directly with technically qualified Home Office engineers. They would be best qualified to present their case rather than two amateurs, neither of whom has expressed any enthusiasm for this most challenging facet of our VHF hobby.

VHFCC Awards

Archie Hoggan, G8ASX, from Bournemouth has won 2m. VHFCC certificate No. 290 and found the return QSL rate "very grim." He was licensed in 1966 when the G8's were restricted to 427 MHz and above. The first station was an all valve affair employing crystal controlled AM. The present station comprises a Trio TS-700 with a 14-ele. Parabeam at 35ft. Archie's interests include RTTY using both FSK and AFSK with a home built ST5 terminal and a Creed 47 tape printer. A VDU is planned for the future.

2m. certificate No. 291 was awarded to David Mappin, G4EDR, from Filey in N. Yorks. who submitted a list of cards from DL, F, PA, ON, OZ and SM stations only. David was first licensed in 1973 as G8HWQ after two years as an s.w.l. The first station consisted of a "G8AEV2" watts AM Tx, Solid State Modules converter and an Edystone EC-10 tunable IF. A Belcom Liner-2 was used for a time but the present station comprises a YAESU FT-200 transceiver with an SSM Europa transverter to a 5-ele. Quad aerial.

Beacon News

The 10.1 GHz beacon GB310W on the Isle of Wight is off the air indefinitely due to gale damage. The 2m. French beacon FX0THF in A146h has now changed its frequency to the more appropriate one of 144-895 MHz. During October, Peter Mathews, G3BPM, pen recorded its strength at his Sunbury-on-Thames QTH. Usually it was 1-3 dB above the thermal noise, occasionally 8 dB over.

Satellite Topics

The launch date for A-O-D, which will become Oscar 8, has been confirmed as March 5, 1978. It has now passed all its environmental and electronic tests and is ready for blast off. Looking more to the future, the model of the casing for the first Phase 3 satellite is undergoing vibration tests.

The 1978 Orbital Predictions for 0-7 should be available now from G3AAJ. AMSAT life members need only send a large s.a.e. AMSAT members should send a remittance of £1.50 (mentioning their membership number with a large s.a.e. for their copy to:-R. Broadbent, 94 Herongate Road, London E12 5EQ. The calendar is available to non-members for £2.00 plus s.a.e.

For much of the time now, 0-7 has been in Mode "A" i.e. 2m. up, 10m. down, due to the possible potential damage to the batteries caused by anti-social QRO Mode "B" vandals. From Jan. 1, the operating schedule will be revised to: Jan. 1, Mode "B," Jan. 2 Mode "C" (this is Mode "B" QRP, 10 watts e.r.p. maximum); Jan. 3 Mode "A" and so on. As before, every Wednesday is reserved for special experiments authorised by AMSAT. Please do not use the satellite if you hear it on as you will likely interfere with an experiment.

New stations heard/worked recently include EA8FB on 29-480 MHz CW; EL2FE on 29-459 MHz SSB and OH1JN on 29-450 MHz SSB and 29-478-29-490 MHz CW. Don't forget the new band plans for the downlinks from January 1—see last month's issue, page 612.

Some satellite noises have been heard on 435-9702 MHz lately. These originate from a non-amateur satellite in a sun-synchronous orbit of 120 minutes period and are harmonics from a lower frequency.

Super DX

Some quite incredible DXs are being spanned on 2m.
stations in the Caribbean and South America. The fact that these possibilities are now being realised and exploited is a direct fall-out from the amateur space programme since the folk involved are QRV on 2m, primarily for satellite operation. On Oct. 29, YV5ZZ in Caracas worked LU1DAU, 50 kms south of Buenos Aires. The first QSO over this 4,446 kms path was on CW at 0230 GMT followed by an SSB contact at 0310. 2 minutes later LU7DJZ made it with the Venezuelan.

Now we have a report that on Nov. 17 LU3AAT in Buenos Aires heard KV4AD on 145.9 MHz while the latter was operating on 0-7 Mode “A.” The distance is about 5940 kms! It seems that at last we have evidence of Class-2 trans-equatorial propagation at 146 MHz. The geomagnetic equator is midway between KV4 and LU’s in Buenos Aires in these longitudes, and peak occurrences are between 2000 and 2300 local mean time. TEP is a seasonal phenomenon and the maximum number of occurrences is around the equinoxes. Regular tests between KV4AD, KV4FZ and the LU’s are being set up. It is a pity that we in the U.K. are too far north to ever be likely to enjoy contacts propagated by this mode. To put this distance in perspective, it is the equivalent of a London station working into Gabon in West Africa!

**Contests**

“This year’s VHF RTTY contest was acclaimed by many of the British competing stations as ‘the best yet!’” Thus begins the letter from G3OZF enclosing the results of the September event. Clear winners were the Martlesham Radio Society, G4BPO/A, led by Alan Melia, G3NYK, with 363 points from 45 contacts, all on 2m. Their best DX was 563 kms. G3PLX was second with 197 points from 30 QSO’s and G8AWN/A was third with 191 points from 24 contacts. 22 stations submitted entries and a further 43 stations were active. There was considerable activity from F, ON, SM, LA and YU, as well as from PA and DL. G3PLX was using 30 watts output to an indoor aerial at sea level!

The next contest is the 70 MHz CW event on January 22. When our scribe telephoned RSGB headquarters to ask the times, nobody could help. One assumes it may be 1000-1500 GMT as last year.

**News from the Azores**

A most interesting letter has been received from David Jarrell, CT2BS, concerning VHF propagation from the Mid-Atlantic. Dave confirms many U.K. FM stations in Band 2 vice E-layer reflection being received, “.. . many able to completely capture the receiver and cover up the local station.” Although the local station is only three blocks away, its 100 watts was no match for these foreign FM stations.

<table>
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<th>70 cm.</th>
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G91CD — 6 120 126
G4FBK — 5 72 77
GMSNCM — 2 52 54
G8LHT — 1 70 71
G8KLN — 1 62 63
G8LLG — 1 38 39
G8JAH — 1 35 36
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G81AJ — — 24 24
G8JKA — — 21 21

Starting Date January 1, 1975. No satellite or repeater QSO’s. “Band of the Month” 70 cm.

He goes on to say, “The local people have informed me that the DX VHF stations and TV are enjoyed on an everyday basis here during the summer. I have watched several programmes on the BBC TV, including Monty Python, a horse show, etc.” On Sept. 4 at about 1200 GMT, he noticed some weak signals on the 2m. band. By 1430 they had built up to S3. At 1447 he worked CT1PQA through the Lisbon repeater. Dave writes:-

“What followed was a pile-up that was peaking 20 dB over S9. The local people were definitely enjoying their DX VHF stations. I noticed many U.K. FM stations in Band 2 over this 4,446 kms path, and many U.K. FM stations in Band 2 were using 30 watts output to an indoor aerial at sea level!”
At 0400 GMT the following morning the 2m. band seemed dead but Dave found he could access at least half a dozen repeaters. Between 0852 and 1209 there occurred, "... another pile-up to shame Field Day." The total for 24 hours operation was 186 QSO's, some through repeaters, some direct using FM and SSB. The gear was a *Yaesu FT-221* and a *KLM* 14-ele. Yagi, and Dave never thought to switch on his 200 watts amplifier.

**CT2BS** ran a programmed beacon during the summer but only received one reception report—from West Africa. Dave is to be stationed near Brechin in Tayside this January, leaving only two Azores stations on 2m. CT2BB on FM and CT2BU on FM SSB. **CT2BD** is buying a transverter.

### Twenty-three Centimetres

Bill Hodgson, G3BW (Cumbria), has at last got planning permission for his tilt-over Versatower now being a Quad Loop device for 23 cm. along with a 68-ele. Multi-beam for 70 cm. and a 10-ele. long Yagi for 2m. But he admits that 23 cm. is a bit of an unknown quantity at present since he cannot hear any beacons. His three QSO's have been with three countries, however:—GD2HDZ, GM8BJF/P and GI3VPK/P, not even one G yet! Bill queried the 23 cm. beacons. GB3AND (ZL63b) on 1296-87 MHz runs 50 watts *e.r.p.* omnidirectionally; GB3DD (ZL08e) on 1296-89 MHz and GB3WRN (YM28g) on 1296-91 MHz both run 2 watts *e.r.p.* beaming due north.

### Seventy Centimetres

Jeremy Royle, G8ACN (Essex), sent along a picture taken by a Dutch TV enthusiast who received a good picture on October 15. G8ACN uses a 4CX250B amplifier running 150 watts peak synchronising level to a 64-ele. stacked array, horizontally polarised on 436 MHz. Transmissions are standard 625 line BBC/ITV monochrome.

G3BW found conditions during the last three weeks of November, "simply abominable—even the *cumulatives* were not really very outstanding." Jack Hum, G5UM (Leicester), reports an enormous increase in activity now that the three local repeaters are in service since mid-October. They are GB3DY (ZN73c) on RB10, GB3LE (ZM24j) on RB4 and GB3NM (ZM05a) on RB6 and give coverage along the M1 from south of Leicester to north of Derby. Jack reports a high standard of operating. Although most contacts are through repeaters, there are some simplex QSO's. In Edinburgh, GB3ED on RB14 came into full service on November 2.
Two Metres

Kevin McMahon, G8JJR, advises of an "AM Revival" in the Doncaster area. Calls are welcomed from AM addicts on Wednesdays and Sundays at 2230 GMT on 145.65 MHz. Chris Baker, G8JKG, has found it hard going lately from his QTH in central Chelmsford. He is really pleased with his 6-ele. Quad on the 60ft. tower and can arrange to get on in an hour from 1425 GMT, nothing else was heard. The opening on the 27th was in progress when Derrick got home at 1727. The first phase ended at 1930 during which period GI's, DL, GM, GW and SM6 were worked at QTF 045-050°. The second phase began at 2310 and was still in progress at 0110 GMT, this producing QSO's with PA, ON and G stations at 070-080° and with GM's at 045°. GB3LER was again auroral on 1657 on the 30th for a few minutes.

The Grafton Radio Society's three hour contest on Nov. 20 attracted some activity but some participants reckoned the James Bond film on TV was a rival attraction! Conditions were pretty flat and the scoring fairly low. Bryn Llewellyn, G4DEZ (Oxon.), made 58 QSO's worth 198 points. Steve Marsh, G4BWG (London), had 31 contacts and George Zittertten G8ITS, (City of London) managed 21 QSO's.

Activity was quite high in the four hour, 2m. leg of the Verulam ARC's contest on Nov. 27. Ian Offer, G4FDX (Beds.), scored 4408 points and John Lemay (Hornchurch), G8KAX, had 57 exchanges with 19 counties. At G3FPK, 29 counties were worked including Antrim and Grampian, Cornwall and Durham so conditions could not have been all that flat. An unexpected aurora happened on Dec. 2 which apparently began around 1757 GMT but your conductor did not realize it until a phone call from G4FRX. SM5FRH was worked at 1850 RSTST7A on QTF 025° in HT80f. SM4AIQ (HT51j) was 56A at 1847 and G3BW at 53A was called at 1906 a few minutes before fade-out.

There was only time for a little listening on the Fixed Contest on Dec. 4. John Nelson, G4FRX, and Steve Low, G8FE0, took John's TS-700 and big amplifier to "The Langham" and put G8BMC on the air concluding 216 QSO's. Other high scoring stations included G3HCL (Weybridge); G4ASR (Essex); G3YEG (Bucks.); G4BWG (London); G4FBK (London) and G8AHK (Guildford). Some signals were a bit rough but several, although tremendously strong at G3FPK, were exceptionally clean and narrow, including G8BBC and G4AVV. Conditions seemed rather poor to the north with GM8FFX barely detectable at the usual noon skirt time, but a number of participants were working PA's.

Four Metres

Jack Hum, G5UM, reckons Class "A" men are missing a lot by neglecting 4m. which provides nationwide coverage under any conditions more reliably than 160m. and without all the noises. Sunday mornings on 70-2 MHz will find cross mode SSB/CW QSO's along with AM and some FM. A Yagi beam is very helpful in increasing the e.r.p. and it would seem that an HBCVC design would provide a very compact means of getting a few dB gain.

Moon Bounce

The big, fixed rhombic at G3PIA (Harwell) has pulled in signals from W6PO in San Mateo, California. Bob uses 1 kW to a 160-ele. collinear array. W7FN has also been copied and he uses sixteen 7-ele. Yagis. All this on 2m. It is unlikely that any precise measurement of the gain of the G3PIA rhombic can be made but it is probably over 20 dBd.

Final Miscellany

Angus McKenzie, G3OSS, mentioned a crazy proposal for an SSB repeater with an output around 144-175, in the Sheffield area. As there is active consideration now to utilise this part of the SSB allocation for meteor scatter use, it is suggested that indignant readers communicate their opposition to the whole idea of any repeaters in the exclusive section of the 2m. band to the RSGB VHF Committee.

Deadlines

Sorry the deadline for copy for this issue had to be brought forward. All your copy for the February column by January 5 please along with your final claims for the Three Band Annual table. The March deadline will be Feb. 2, rather early. Everything to:-"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ.

Happy New Year and 73 de G3FPK.
A WARBLING FREQUENCY STANDARD

G. C. DOBBS, G3R.IV

HOW does your frequency measuring equipment measure up to the recommended requirements of the Home Office? In the Leaflet “How To Become A Radio Amateur” Appendix F, Frequency-Checking Equipment in Amateur Stations, section 4(b) reads: “Hetrodyne wavemeters and crystal calibrators. When used in conjunction with a general coverage receiver, a 100 kHz crystal is usually sufficient for checking frequencies up to 4 MHz. For higher frequencies the spacing between 100 kHz marker points is too small for accuracy, and a crystal of 500 kHz, or preferably 1 MHz should be used in addition.”

An amateur with such a receiver, therefore requires 1 MHz and 100 kHz points for “sufficient” accuracy. This calibrator provides both, with the addition of 10 kHz points.

A conventional, and convenient, way to provide such market points is to use a 1 MHz oscillator with digital divider circuits to give the smaller spacings. The circuit shown in Fig. 1, provides such an arrangement, although one problem about such a circuit is that it is often difficult to differentiate between the calibrator “pips” and other signals present on the frequencies being checked.

This circuit provides for modulation of the output to give a distinctive warbling tone to the required signal.

The circuit uses the inexpensive 74 range of TTL IC’s, and the oscillator is a multivibrator based upon two gates from a 7400. Feedback is controlled at the required frequency by the 1 MHz crystal X1 with a series trimmer Ct. Ct may be in the order of some 20 to 30pF and a 3-30pF beehive trimmer was used with good results in the prototype. Ct should be large enough to maintain reliable oscillations, but small enough to enable X1 to oscillate at the exact frequency. A method of checking this is described later.

IC1(C) acts as a simple buffer and the 1 MHz output is taken to S1B to give the 1 MHz points. IC1(D) acts as an output buffer. It will be seen that IC1 alone will produce a simple 1 MHz standard if this is all that is required.

The division of the signal is performed by 7490 IC’s. The 7490 is a versatile IC which is normally used to

Table of Values

| IC1 | 7400 |
| IC2 | 7490 |
| IC3 | 7490 |
| IC4 | NE555 |
| R1  | 2.2K |
| R2  | 2.2K |
| R3  | 680 ohms |
| R4  | 33K |
| R5  | 15K |
| Ct  | See Text |
| C1  | 0.01 µF |
| C2  | 1000pF |
| C3  | 1µF Tant. |
| C4  | 0.1 µF |
| C5  | 100pF |

Fig. 1. CIRCUIT DIAGRAM FOR WARBLING FREQUENCY STANDARD
divide an input by 10, but can also be used to divide by 2 and by 5. In this circuit, two divide by 10 units are used: IC2 and IC3 are both wired in a divide by 10 mode. The usual quoted upper frequency limit for the 7490 is some 20 MHz, but in practice outputs were found to go beyond the top end of the 28-30 MHz band.

The divided outputs appear at pin 12 of each divider IC and go to the 100 kHz (IC2) and 10 kHz (IC3) contacts of S1B. S1A provides a simple on-off facility in one common switch action with the required calibration points. All outputs are buffered by IC1(D).

The modulation is provided by a single 555 timer IC in the astable mode. The 1 MHz signal and the warble tone are mixed at IC1(C) to give a modulated output at pin 11; the frequency of the modulation could be changed by altering R4 and C2, but the named values gave a pleasant and distinctive tone.

The unit requires a nominal 5 volts for operation; this may be reduced to 4.5 volts by using a cycle lamp battery. In the prototype a three terminal regulator type LM309K was used to provide the power source, which in this case was a PP9 battery, but any voltage from 7 to 10 volts fed into the LM309K would be suitable; the arrangement for the regulator is shown in Fig. 2.

Because of the high speed switching of the dividers, a high harmonic output is produced. These harmonics may extend well above the desired frequencies and the prototype out of its case produced patterns on a UHF TV screen. It is therefore important to mount the unit in a screened case with a suitable screened output socket. It may be desirable to decouple each IC: this may be done by adding a 0.1µF capacitor between the positive supply pin of each IC and the earth rail; the capacitors should be mounted as close to the pin as possible. Capacitors on pin 5 of IC2 and IC3 should provide protection in this way.

The exact frequency of the output may be adjusted using Ct to beat against a suitable standard frequency. An obvious standard is the Radio 2 signal which provides an accurate 200 kHz point; it should be sufficient to beat the output to zero beat, with Ct against Radio 2 on a broadcast receiver.

The final unit provides the amateur with a simple unit which can either be built on 0.1in. pitch board or a PCB may be made to any convenient layout. It is also important to have good mechanical stability in the mounting of X1 and Ct.

**The Month with the Clubs**

SOME of our space this time has had to be taken for the MCC report elsewhere in this issue so we must not waste words needlessly; we hope the result of this constraint will be readable without too much taste of sawdust—and we wouldn’t object to some feedback on the matter, come to think of it!

Help!

We have a letter from a gentleman who writes on behalf of his son who is disabled and home-bound, but spends a lot of his spare time tinkering around with radio. If there is anyone within contact distance of Aldborough, near Hull, willing to help, will they please write to your scribe as a matter of urgency. One senses that a little theory and a little practical plus a lot of encouragement would be the task.

The Mail

The top of the pile this time is UK FM Group (London), which is notable for containing in its Newsletter an Editorial which is by way of a direct attack on G6JP and G2BVN in their respective capacities in the RSGB organisation. Now, as we have said so many times before, we don’t hold any briefs for other people; but in this case, we hope that at least the editor concerned (G8CKT) will have had the decency to send a copy to the people concerned. If the guts of his moan is simply that these two have acted when they have felt it necessary, and that he doesn’t agree with what they have done, then the worst crime he can accuse them of is trying to use initiative to keep things rolling: if every decision was referred to a committee, and left to lie till that committee had got around to meeting, debating, maybe referring back, and so on, then nothing would ever be done. On the other hand, it could just possibly be read another way, in which case some hard facts are called for.

South Manchester have every Friday at Sale Moor Community Centre, Norris Road, Sale, and in addition every Monday night sees them occupying the club shack at Greeba, Shady Lane, Baguley.

First Tuesday and third Thursday each month at Lancastrian Boys School, Basin Road, Chichester. The main item of note in their Newsletter was an obituary, that of Tom Streeter, G5CM, a real OT who will be much missed in the area.

The programme at Sutton & Cheam gets a bit complicated out of term-time, and so for January we find but one meeting laid down, this one being January 12, at Sutton College of Liberal Arts, Cheam Road, Sutton.

Its a case of “every Friday” at Coventry, says the new Hon. Sec, whose address appears in the Panel. The venue is Baden Powell House, 121 St. Nicholas Street, Radford, Coventry.

Harrow are another “every Friday” type group, the venue being the Roxeth Community Centre, Scott Crescent, West Harrow, Middx. Incidentally we notice January 20 is the AGM date.

Over to Reigate where they have Natter sessions
the Marquis of Granby, on January 5 and 31st; in between is the main meeting on January 19, for which we are told G3RZP is the speaker, but not where the venue is —so, refer to the Hon. Sec. at the address in the Panel.

Bristol (Shirehampton) have surfaced again, and seem in good heart; they have Hq. at Twyford House, High Street, Shirehampton, where they may be found on any Friday evening. The programme is still, it would seem, being made up so no doubt by the time of your visit, they will have something fixed up.

On to Verulam, where the main meetings are in the Market Hall, St. Albans, on fourth Thursdays, in this particular case January 26 —Slow-Scan TV by G3KRC is the entertainment mentioned. They also have an informal at the R.A.F.A. Hq. on the second Thursday in each month —go to Victoria Street to find this venue.

Now to Nottingham where the venue is the Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham; they will be there every Thursday with Love Electronics giving them the talk/demonstration 26th. If you want to attend the National- Westminister Bank Computer Centre visit in February, you had better on 26th. If you want to attend the National-Westminster with Lowe Electronics giving them the talk/demonstration Road, Nottingham; they will be there every Thursday Community Centre, Woodthorpe House, by the way, is in Knutsford.

At UK FM Group (Western) the main interest FM and repeaters, naturally, and it seems they have well list of names before the date. get on to the Hon. Sec. quickly as he has to give them a Bank Computer Centre visit in February, you had better on 26th. If you want to attend the National —Westminster Bank Computer Centre visit in February, you had better quickly as he has to give them a list of names before the date.

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunningbury Avenue, Acton, London W3 8LB.
AMATEUR RADIO NEWS SERVICE: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ.
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ.
BLACKWOOD: S. R. Cole, GW4BLE, 10 Llantheway Road, Newport, Gwent.
BRISTOL CITY RSGB: B. L. Goddard, G4FRG, 2 Greenfield Road, Portishead BS20 8NQ.
BRIGHTON: N. Hewitt, G8JFT, 74 Carlyle Street, Brighton, Sussex.
BRISTOL SHIREHAMP: R. G. Ford, G8KUM, 2 Jersey Avenue St. Annes, Bristol BS4 4RA.
CHELTENHAM: G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.
CHESTER: T. M. Allen, G4ETU, 2 Grange Cottages, Colworth, Chichester (88069).
CHILTERN: N. C. Ambridge, G4FRL, 53 The Avenue, Chinnor, Oxon. OX9 4PE.
CORNISH: H. F. Adcock, Eskbank, Dalkeith, Midlothian. (031-663 2033.)
CRAY VALLEY: J. M. B. Tripp, G3YW0, 57 Catheart Drive, Orpington (38199), Kent.
CRAWLEY: G. C. Reid, G3OUX, 10 Rectory Road, Croydon, Surrey.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 1 Liphook Crescent, London SE2 3BN.
ECHELFORD: R. S. Hewes, G3RDT, 24 Brightside Avenue, Laleham, Staines, Middx.
EDINBURGH: A. Melvin, GM8MJV, 17 Dundas Crescent, Eskbank, Dalkeith, Midlothian. (031-663 2033.)
GREATER PETERBOROUGH: V. Cunningham, G4DFD, 8 Viney Close, Peterborough, Cambs. PE1 5LS.
GRIMSBY: R. J. Scarlett, 1 St Martins Crescent, Grimsby, South Humberside.
HARLOW: M. A. Kipp, G4FKB, 43 Southdown Crescent, South Harrow, Middlesex HA2 0QT. (01-864 1412.)
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).

Names and Addresses of Club Secretaries reporting in this issue:

IRT3 Region 1: J. Ryan, 23 Dollymount Avenue, Clontarf, Dublin 3.
KIDDERMINSTER: B. Hutchins, G4CTU, 12 Parkland Avenue, Kidderminster, Wores. DY11 6BX.
MALDON: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingh:m B39 5UJ. (021-427 3288.)
MID-SUSSEX: E. L. Latts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.
NORFOLK: P. W. Forster, G3VWQ, 2 Thorn Road, Thorpe St. Andrew, Norwich NR7 9QS.
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (244329) BX2 8XG.
PETERBOROUGH: E. J. Letts, G3EEL, 36 Waterloo Road, Peterborough, Cambs.
REigate: F. H. Mundy, G3XZS, 2 Conifer Close, Reigate (63/30). Surrey.
SOUTH BIRMINGHAM: Mrs. G. Apperley, G8KPA, 35 Dense Drive, Harborne, Birmingham 17.
SOUTH MANCHESTER: W. L. Seddon, G3VW, 12 Barwell Road, Sale, Cheshire M33 5FF. (061-973 3555.)
STOURBRIDGE: A. Dewsbury, G3OJX, 10 Rectory Road, Oldswinford, Stourbridge (3530), West Midlands.
SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Seddon, South Croydon CR2 8PB. (01-857 2558.)
SUTTON & CHEAM: J. Knorndorfer, G2DMR, 19 Park Road, Banstead, Surrey.
TORBAY: M. Yates, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
U.K. FM GROUP (Western): G. L. Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB.
VERULAM: B. Pickford, G4DUS, "Netherwood," 130 The Drive, Rickmansworth (77616), Herts.
WALSALL: K. Boucher, G8KML, 22 Emery Close, Walsall.
WESSEX (Bournemouth): G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth BH8 6PD. (0202 20027.)
WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent. (0732 56708.)
YEOVIL: D. L. Mclean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.
YORK: R. C. Cass, G3WVO, 4 Heworth Village, York.

It is Eltham United Reformed Church Hall, 1 Court Road, if you want the Cray Valley, where the pattern seems to be to take the meetings on the first and third Thursdays; usually the first date is the "main" meeting while the other one is the informal or natter session; but on occasion they may reverse the order if it helps to get a stranglehold on a specially wanted speaker.

Now to Chiltern where the date is January 25, for the AGM, the Hq. address of which this is to be held being 42 Castle Street, High Wycombe, in the conference room.

A.R.M.S. this time carries an Obituary notice of Sylvia Margolis who died in September; we recall that while she and Maurice, G3NMR, often caused a certain amount of dismay within the amateur radio fraternity, one has to say that Sylvia put into Amateur Radio an enormous amount more than she ever got out of it, as indeed did Maurice in his lifetime. She will certainly be missed by those who recall her work for ARMS. As to ARMS itself, this is the group for the /M operator or enthusiast, wherever he may be in the world.

Newsletters

They come in all sorts, shapes, and sizes; from the single duplicator sheet which the Hon. Sec. wields on the kitchen table and containing almost nothing save the essential information—which type are usually the most long-lasting—right through to the really professional—
looking job turned out by a member who is a frustrated journalist at heart. Most of them could do to see the results of others' efforts, and the Amateur Radio News Service is one of the props for many of the better newsletter efforts, containing as it does so much useful material with which to fill out the pages when the locals can't or won't stump up with some news of their own doings. Although it is an American organisation, ARNS is international in scope, and G3FPK is Vice-President International; Norman in fact handles the U.K. end of things, so any club scribes who would like more information can get in touch with him at the address in the Secretaries Panel.

Back to the clubs again now; to Echelford at their Hq. address, The Hall, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. As for the dates, the pattern is the second Monday and the last Thursday of each month.

For Surrey one gathers they have their dates booked on the first and third Wednesdays in each month; and on January 7 in addition they have the Annual Dinner, at "The Grapes," High Street, Sutton. The normal Hq. is at T.S. Terra Nova, 34 The Waldrons, South Croydon.

Ever since they have been reporting in, your scribe has wondered about the same of the Hq. of the Walsall group—"The Hame-Maker" inn in Blue Lane, where the lads can be found on alternate Tuesday evenings; this is one club that reckons to cater for the BC listeners on the SW bands.

On down to Cornwall, where they have a booking on the first Thursday in each month, usually at the SWEB Clubroom, Pool, Camborne, starting at 7.30.

At Acton, Brentford & Chiswick the Annual General Meeting is on January 17, at the usual Chiswick Trades & Social Club address, 66 High Road, Chiswick. It will be followed by a general discussion.

The informal for Crawley will be on January 17, at G3SYD, but the main meeting, as always, is down for the United Reformed Church Hall, Ifield—and oddly enough it is again an AGM, this time on January 25.

Another club to have the informals at members' homes is Crystal Palace; January 10 at G8HAX. As for the main meeting, this is at Emmanuel Church Hall, Barry Road, East Dulwich, speaker G4AVV. One would feel that if you are in either of these last two clubs areas and intending to pay a visit to the informals, it would be courteous to contact the Hon. Sec. first—see Panel.

Its the first and third Fridays in every month at Hereford, but the Newsletter we have to hand at the moment doesn't give details far enough ahead. However we can say that they usually try to fix up something on one or other of the meetings in a given month; the Hq. is at County Control, Civil Defence Hq., Gaol Street, Hereford.

Brighton have a Newsletter in which there isn't an indication of the Hq. address, so we have to steer you in the direction of the Hon. Sec. at the address in the Panel. As to dates, from here it rather looks like the first and third Wednesdays.

Mid-Sussex have their place at Marle Place Further Education Centre, Leylands Road, Burgess Hill, and for them it looks to be the first and third Thursday.

Now to Grimsby, where they have dates of January 5 and 19, the first being to G3RG on PCB's, and the second, provisionally at the date this is being written, for a Dinner. However, again the snag is the lack of details as to the Hq., for which we must refer you to the Hon. Sec.—see Panel.

One of the few twice-weekly groups is at South Birmingham, where they have Fridays for Construction and Morse classes, plus Thursdays for HF operation from the Shack, at Hampstead House, Fairfax Road, West Heath.

The same "fist" passes on the news from Midland, who have a Construction and Shack session at Brasshouse Centre, Broad Street, Birmingham on January 10, but go to Room 110 at Aston University, Gosta Green for an evening of "New Year Resolutions."

On November 7 last, an old-timer and respected member of Torbay passed on: Frank Wadman, G2GK was a founder-member of Torbay in 1946, and in the pre-war years he was a member of the Thames Valley group. Eight of the club members were at the funeral, the memorial service being at All Saints, Babacombe. To turn now to the club's affairs, we see their next date is for January 28, when there will be a lecture, details of which were awaiting confirmation at the time of their letter. The Hq. address is at Bath Lane, rear of 94 Belgrave Road, Torquay.

"It's all happening" is the word from York, who are to be found on every Friday except the third one in each month, at the United Services Club, 61 Micklegate, York. We might note in passing that January 27 is an important date, it being set down for the AGM. Peterborough have their place at the Scout Hut in Occupation Road, on Friday, January 20.

As will be read elsewhere, the Cheltenham Association had been in being just two days when they set out after fame and fortune in MCC, using the call G5BK. The new arrangements are that the combined outfit now have two meetings each month, on the first Thursday and the third Friday. There is a proposal for a dinner in late January, of which no doubt details may be obtained from the Hon. Sec. The address for all normal meetings will be the Old Bakery, Chester Walk, off Clarence Street.

January in Stourbridge means an informal at the Shrubbery Cottage pub., in Heath Lane, Oldswinford on January 4. The evening before is down for a constructional session, and on January 17 they have the annual constructors contest; both these two dates at Longlands School, Brook Street, Stourbridge.

New Formations

We have a couple of these to mention this time. Our first comes from the East Coast, namely Harwich. The
club foregather at the home of G4BBH, 8 Marine Parade, Dovercourt; his telephone number is Dovercourt 4000. The routine is "every Thursday" and we would feel it would be a good thing to contact either G4BBH or the Hon. Sec.—see Panel—for the go-ahead to join before actually turning up; houses are such un-elastic places!

The Youth Centre, Bromsgrove Street, is Hq. for the newly formed Kidderminster group. On January 4 they have a demonstration of the use of lecher lines for frequency measurement, and on 18th they have an "on the air" night.

Turning back to the old-established customers, we have Northern Heights, who have Hq. at the Peat Pitts Inn, some four miles North of Halifax Town Centre, where they are "in residence" on alternate Wednesdays. January 4 and 18 are the normal sessions, but in addition this month they have the West Yorkshire Dinner and Dance, on January 28, at the Laithe Restaurant, Ogden. And, while we are with this group, we have to congratulate G3U1, the Minutes Secretary, who has received the Queen's Silver Jubilee Medal for services to the ATC; and also to G3USH, Paul Allen, for his very fine model fair-organ (electronics inside, of course!) that was one of the major exhibits at the Bradford Model Engineering Exhibition.

Down to Bournemouth, where they have bookings on January 6 and 20; the former was down for a talk on Coast Guard Communications, but this has had to be postponed, and G4EMN advises he is fixing up some lectures on technical topics instead; the 20th is down for G3MXJ to give a talk on them on the IARU and WARC 1979.

We like some of the things that appear off-the-cuff in the mail now and again—this time it is Bristol City RSGB group, who described their AGM as the "Annual Arm-Twisting!!" If you want to watch the fun—or to allow your arm to be twisted—January 30, Queens Building, University Walk, Clifton, Bristol at 7 p.m. If the arms are suitably compliant, there will then be a Bring and Buy Sale.

At West Kent, the main evenings are at the Adult Education Centre, Monson Road, Tunbridge Wells, with a Junk Sale on January 6, followed by G3XPX talking about reflected power on 20th. In addition, on the Tuesdays after the Friday meetings, they have an informal at the Drill Hall behind Marks & Spencers. Incidentally, and as a reminder to all club scribes, one thing we just can't do is to "carry over" material for several months at a time—there is too much chance of error and the whole thing becomes too cumbersome to be, as it were in today's jargon, "cost-effective."

It's AGM time for Greater Peterborough on January 26, and to help oil the wheels of election, they will be using up time left over after the AGM to get into the club project of a two-metre FM Portable a bit further. The venue is the Stanground School.

At Edinburgh and District the venue is the Observatory of the Edinburgh Astronomical Society at Calton, on Tuesdays; and it is interesting to note that there is some astronomical activity in the radio context to bind the two groups of hobbies together.

Yeovil have weekly dates, every Thursday evening. The month of January is almost all taken up with talks on various aspects of aerials and transmission lines, save for 12th when they will be enjoying a show of the slides of members on subjects connected with radio. The venue is not given this time, so we must refer you to the Hon. Sec. for this.

Next we have Blackwood, who have Friday, January 13 for their date; starting at 2030 at Oakdale Community Centre, near Blackwood, Gwent, they will be hearing from GW4DWN of his recent adventures as GW4DWN/VE8, complete with slide show.

Nofolk are one of the few groups on the East Coast and they have a permanent place at Crome Community Centre, Telegraph Lane East, Norwich, every Wednesday evening. Perhaps the main event is the Surplus Sale on 18th; 11th and 25th are down for informal plus CW tuition.

Finally this month we have the IRTS Newsletter, and in it we find news of various EI clubs and individuals; all sorts of things seem to be happening over there, both in the group and the individual contexts—details from the Hon. Sec. at the address in the Panel.

Wind-Up

Which says we have mentioned all those who wrote in for this month—or overshot last month's deadline! This time the deadline will be December 30—by which time you should have had time to receive and read your January issue. However if you are one of the unlucky ones who have trouble getting your copy, either through postal or newsagent delays (or both), the next date you can make will appear in the "box" in the body of the piece. Address, as always, to Club Secretary, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

MARCONI 75th ANNIVERSARY

The Cornish Radio Amateur Club is setting-up and operating on behalf of the RSGB, an amateur station at the Poldhu Hotel, Cornwall, to celebrate the 75th anniversary of the first two-way radio transmission across the Atlantic on January 18th, 1903—by Marconi.

The station, with the callsign GB3MSA, will be in continuous operation from 1200 hrs. GMT January 14 1978 to 1200 hrs. GMT January 21 1978 and working 20/15/10 metres (A3J and A1), 80/40 metres (A3J and A1) and 2 metres (F3, A3J and A1); it will be manned by shifts of amateur operators supplemented by any visiting holders of an amateur licence who wish to operate. During its operational period the station will contact amateur stations all over the world, including other special stations set up at historic sites linked with Marconi—-in particular, one set up on behalf of the ARRL at South Wellfleet, Mass. (the site of the American end of the original link).

It is also hoped to use SSTV and RTTY communication, if possible; in addition, a display of historic items and photographs has been arranged by the Poldhu Hotel in association with Marconi Electronics Ltd.
R.A.E. Q. & A.

SUBJECT NO. 765, MAY 1977—ANSWERING

ALL QUESTIONS

ONCE again we present, as for so many years past, a set of "model" answers to the previous May's RAE. Before a candidate for 1978 looks at them may we add a few, hopefully useful, comments.

While these model answers take a lot more than three hours for us to prepare, the written draft is done in the specified time—we then tidy up the spelling, the drawings, pick out any bad bits and rewrite them if they are felt to be less than clear. For the candidate, the two problems are simple: firstly, he/she is probably out of practice at writing school compositions on specified topics—and that is just what an RAE answer is!—and secondly there comes, in the examination-room, the difficult question of what to tackle and what to leave out. You must do both the questions in Part I, as the paper instructs; but in Part II one has the choice of any six from eight questions. Note that if you do seven questions in this part, instead of six, you won't get any more marks; so you might as well cross one of your seven out as being poorer than the one has the choice of any six from eight questions. Note is just what an RAE answer is!—and secondly there comes, in the examination-room, the difficult question of what to tackle and what to leave out. You must do both the questions in Part I, as the paper instructs; but in Part II one has the choice of any six from eight questions. Note that if you do seven questions in this part, instead of six, you won't get any more marks; so you might as well cross one of your seven out as being poorer than the others—but better still devote the time to doing a firm six questions, carefully chosen when the paper is first opened and you are into exam. time. As to which question to kick off with, it doesn't matter a jot; but if you can contrive to find one which to you looks to be easiest, then do that one first, while your examination nerves calm down and concentration takes over.

For the rest, it ought to be superfluous to tell you to take along with you the tools, namely pen (or ball-point) checked before setting off to have enough ink to see you through (indeed a spare is no bad idea), pencil, ruler, rubber, maybe a set-square and compasses, and above all a watch, with which to time yourself to not one minute over twenty for any one question until you have done all that is called for, even if it means stopping in mid-sentence. That way at least you guarantee yourself the best chance of getting most marks, and after this is done and checked, you can always turn back to the one you hadn't completed, write under it "continued on page whatever-it-is" and go back to the end of the paper to add "question whatever-it-is, continued" and get on with finishing it as far as time permits. It is axiomatic that you can do a perfect answer to one question but you cannot possibly secure a pass if you only answer one question! Therefore you must at least have a stab at the total number of questions you are called upon to answer.

RADIO AMATEURS' EXAMINATION, MAY 1977

This examination is divided into two parts; failure in either part will carry with it failure in the examination as a whole.

Each question in Part I carries 15 marks; each question in Part II carries 10 marks.

Answer EIGHT of the following ten questions as follows: BOTH questions in Part I, and SIX questions from Part II.

PART I—Answer BOTH questions in this part.

Qu. 1. (a) State the qualifications required by applicants for the Amateur (Sound) Licence A.

(b) Give the form of callsign assigned to a United Kingdom amateur radio station.

(c) State the prefix letters used to indicate EACH of the following countries.

(i) Channel Islands
(ii) Northern Ireland
(iii) Isle of Man
(iv) Scotland
(v) Wales.

Answer 1

(a) Applicants must be over 14 years of age, and must provide valid evidence of British Nationality. In addition, an RAE pass is required, plus a pass in the Morse test which must be not more than twelve months old at the time of applying for the licence. In addition the licence fee must be paid, initially and thereafter annually.

(b) A prefix letter, G or as shown below, a number which is currently 4 for an A licence and 8 for a B; plus the actual call-letters of which there will be three, allocated to new licences in alphabetical order.

(c) Respectively, GU and GJ, GI, GD, GM, GW.

Qu. 2. (a) What are keyclicks in a radio transmission?

(b) What effects may they have on other services and stations?

(c) How can they be minimised?

Answer 2

(a) Keyclicks are the signals radiated at the beginning and end of Morse dots and dashes, due to the over-abrupt switching on and off of the carrier, which have significant energy on frequencies other than that of the carrier. They should not be confused with the effects of sparking at the keying contacts which are normally only apparent very locally, whereas the true key-click can be, and often is, a world-wide signal.

(b) Heavy keyclicks cause a signal to be radiated at the beginning and end of each dot or dash which will be heard as interference on signals many kilocycles on either side of the carrier frequency, either CW or telephony reception being affected, particularly if AGC is in use, when other receivers may be desensitised to the point of loss of their wanted signal; more selectivity in the receiver concerned is no solution, and the clicks may be radiated outside of amateur bands.

(c) We require to slow down the rate of change of the output signal; zero rate of change equals either a continuous carrier or continuous non-carrier condition, while the keyclick condition approximates the other extreme of an infinite rate of change. We require to reduce the rate of change such that the click-level is acceptable and yet the dots-and-dashes are still clearly readable, at the speed at which they are being sent, by the distant receiver. This slowing of the rate of change is achieved by the presence of a circuit having a time-constant, either L and R, or C and R, as may suit the keying method used. Fig. I shows a typical keying method and the circuit required to cut the clicks to an acceptable minimum; values may best be found by trial and error to achieve the best compromise on the individual transmitter.
RF Drive
Input

200 V

47K 1W

RF Drive

Fig. 1 To go with Q2

“Grid-block” keying. Resistor R1 has the normal value for the grid resistor of such a stage. C serves, with R2, to determine the keying characteristic; the product R1 (K-ohm) x C (µF) should be from 5 to 10, and will determine the “make” characteristic. R2, shown as nominally 47 K-ohm, may be adjusted to alter the “break” characteristic.

The nominal 200-volt supply must be capable of (a) ensuring the valve is completely cut off, and (b) of delivering the current drain through R2 when the key is down—in this case about 4 mA.

Qu. 3. (a) Explain what is meant by the term “capacitance” in an electrical circuit, and define its unit.

(b) A capacitor of 12 microfarads is connected in parallel with one of 6 microfarads. What is the total capacitance?

(c) What would be the total capacitance when they are connected in series?

Answer 3

(a) Consider Fig. 2. Two pieces of conducting material are separated by an insulating material. If the combination is connected through a switch to a battery, when the switch is closed, current flows in the wires momentarily until one plate carries an excess of electrons and the other a shortage of electrons (i.e. a positive charge) such that the potential difference is equal to the battery voltage, when current ceases. Thus energy is stored in the capacitance, the amount being dependent on the area of the plates, the nature of the insulation between them (the dielectric), and the voltage impressed on the capacitor. The capacitance is given by the relationship C = KA/d where K is the dielectric constant of the insulator (K = 1 for air, up to several thousands for certain ceramics), A is the cross-sectional area of the plates, assumed to be equal on both sides, and d is the spacing between the plates. For a given capacitor, the energy stored in joules is equal to 1/2 CV^2 where V is the voltage between the plates. The unit of capacitance is the Farad (usually microfarads or picofarads in practice), where a capacitor of one farad will have a voltage of one volt between the plates when charged by one coulomb of electricity or 6 x 10^18 electrons.

(b) The relationship is C = C1 + C2

Thus C = 6 + 12 = 18 microfarads.

(c) The relationship is:

1/C = 1/C1 + 1/C2

Thus 1/C = 1/12 + 1/6 or 3/12

Inverting, we get C = 12/3 or 4 microfarads.

(Ed. note: It is interesting to note that the farad is not formally defined in either the ARRL or RSGB “Handbooks.” The definition given above was taken from Chambers’ Twentieth-Century Dictionary; the Shorter Oxford Dictionary is not so clear. However, we feel the question to be quite fair, and thus the “standard reference works” on amateur radio available generally are at fault in not giving a definition.)

Qu. 4. (a) What is meant by “resonance” in an AC circuit?

(b) What value of capacitor would be required in series with an inductor of 100 microhenries in order for the combination to resonate at 1 MHz?

Answer 4

(a) Resonance is the condition which arises in a circuit having inductance and capacitance in series (or for that matter in parallel) when the inductive and capacitive reactances become equal, which will occur at some calculable frequency. At such frequency, since the two reactances cancel out, we are left in a series case with only the residual R of the practical case to stop the current from being infinite; likewise in a parallel case, where a perfect capacitor and perfect inductor at resonance would cause zero input current or infinite resistance.

(b) XL = 2πFL and XC = 1/2πFC

(1) At resonance XL = XC and we are given L and F. Transposing Eqn. 1 above we get:

C = 4π^2F^2L farads (L in henrys and F in farads).

Inserting figures we get

1/C = 4 x π^2 x (1 x 10^6) x (100 x 10^-6).

Inverting both sides:

10^12

C = x 9.86 x 10^12 x 10^-4

4

cancelling through, we get

10^4

C = x 9.86 (making π^2 = 9.86)

4

C = 253 pF

Qu. 5. With the aid of a circuit diagram explain the action of a frequency changer stage for a superheterodyne receiver.
Answer 5

See Fig. 3. Essentially, when two frequencies are passed through a stage having non-linearity present, there will be in the output the original frequencies $F_1$ and $F_2$, harmonics of $F_1$ and $F_2$, and products such as $F_1 + F_2$, $F_1 - F_2$, $2F_1 + F_2$, $F_1 + 2F_2$ and so on. In a frequency changer such as is used in a simple broadcast receiver, let $F_1$ be the signal frequency and $F_2$ the local oscillator frequency. By ganging the output of the local oscillator to the signal frequency such that $F_2 - F_1$ is a constant, we can follow the mixer with an amplifier resonated at the frequency of the constant ($F_2 - F_1$), in which we can shape the frequency response to the desired bandwidth, and embody most of the receiver's gain. In order that the input port shall be capable of coping with large unwanted signals without distortion of the wanted (probably very small) input signal, careful attention must be paid to mixer circuit design, and to the relative levels of $F_1$ and $F_2$.

![Diagram](Fig 3)

A good mixer circuit with few components. Note how the diodes are connected—*not* like a bridge rectifier! The diodes should be matched or, preferably, hot-carrier diodes. Note the high injection at the local oscillator input—this is important for best response and good overload characteristics. This mixer will have a few dB of insertion loss and should be preceded, above 144 MHz at least, by an RF stage.

Qu. 6. Fig. 4 (overleaf) shows the circuit of a low-power transmitter for use in the 144-146 MHz band. *(Ed. note: Our Fig. 4 is in fact Fig. 1 of the examination paper itself).*

(a) At what frequency could the oscillator operate, and how is this converted to 144 MHz?

(b) What modes of emission are available?

(c) What method of speech modulation is employed?

(d) State the type and impedance of a typical microphone suitable for use with this transmitter.

Answer 6

(a) The oscillator is a harmonic type, using the crystal in its parallel mode. Such a crystal may have a fundamental frequency in the 8, 12, or 16 MHz range; in the first two cases the oscillator tuned circuit could be at 36 MHz, and in the third at 48 MHz. Thus, the second stage would in the first two cases multiply by four and in the third case triple, to give the RF output transistor drive at 144 MHz.

(b) A3 telephony (double-sideband AM) and A1 CW.

(c) Audio from the microphone is amplified and connected to the base and the collector of the RF output transistor, modulating the RF voltages on those electrodes.

(d) A high-output, high-impedance crystal microphone would be suitable.

Qu. 7. With the aid of a block diagram describe the principles of reception of single-sideband suppressed carrier transmissions.

Answer 7

See Fig. 5. The receiver front-end is conventional and not shown. The IF output from the mixer is passed through an IF strip having gain, and bandwidth suitable for an SSB signal to fill the bandwidth, having steep sides (*i.e.* an IF strip having correct bandwidth and shape factor of 2:1 or better). This gives IF output to a mixer stage (often a so-called "product detector") into which is also applied an RF signal at the frequency of the suppressed carrier in the IF strip. The output of this mixing is at various frequencies, as discussed in Question 5 (*q.v.*), of which one is at audio and carries the intelligence; this is passed on to the audio stages while the others are decoupled away. (It is of interest to note that the "image frequency" of this detector is the opposite sideband which has been suppressed at the distant transmitter, and is in any case not passed through the IF selectivity, so that a double-sideband suppressed carrier is in fact received as a single-sideband one. If in such a circuit as we have shown, we connect the aerial in place of the IF, and adjust the aerial and local oscillator signal frequency in gang, we have obtained the simple homodyne or direct conversion receiver.)

![Diagram](Fig 5)

The front-end of an SSB receiver can be conventional and is not shown. IF signals are amplified in the selective stages before going to a mixer ("product-detector") stage. The AF output goes through an amplifier and AGC may be audio-derived as shown. Carrier re-insertion is by way of the BFO, which is set to be at the "carrier frequency" when the signal is correctly centred down the IF amplifier.

Qu. 8. (a) What is meant by the skip distance of an HF radio transmission?

(b) Describe the part played by the ionosphere in this phenomenon.

Answer 8

(a) When considering an HF radio transmission which is being propagated by way of the ionosphere, there will be a short distance from the transmitter along which the signal can be heard by way of the ground wave. Once this is lost, there will be some—usually quite considerable—distance before the signal again becomes
Fig. 4

This is Fig. 1 of the actual examination paper.

audible. This distance, between the end of the ground wave and the nearest point at which the sky wave is heard, is the skip distance. Since the ground-wave range is so small, the skip distance is often taken as the distance between the transmitter and the point of the first return of the sky wave.

(b) Above the earth’s surface are several layers of ionised air, the ionisation being due to the presence of the sun’s rays. In simple terms the lower D and E layers are only present in daylight and act as absorbers of signals, particularly at the lower frequencies. The higher F (or sometimes F1 and F2 when splitting occurs) are those where refraction of the signal path occurs, and here the ionisation is more long-lived, falling to its minimum just before dawn; when the F1 and F2 layers are both present (during the day) it is the F2 layer which refracts, otherwise the F. Thus, at low frequencies such as 1.8 and 3.5 MHz, ground-wave signals in daylight permit relatively local propagation by ground wave, the longer-distance contacts being confined to darkness paths. On the other hand 14, 21, and 28 MHz tend to be "daylight-only" bands, and indeed at low sunspot levels 28 MHz may behave purely as a VHF band for two or three years, 21 MHz be open only occasionally, and 14 MHz open most days but closing at dusk; 7 MHz under these conditions may show propagation under both dark and daylight conditions. However, when the sunspot count is high, 7 MHz behaves more like 3.5 MHz, 14 MHz becomes on occasion open for all the 24 hours, and 28 MHz open to East-West propagation on most days.

Qu. 9. (a) Describe ONE of the following aerial systems (i.e. aerial, feeder and tuning unit):
(i) half-wave dipole
(ii) half-wave folded dipole
(iii) zeppelin
(iv) loaded whip.

(b) Describe the polar diagram of the aerial chosen in (a) and state its advantages and disadvantages for use in an amateur station.

Answer 9

(Ed. note: Although we are commenting on each of the aerials in question, a candidate in the examination would not do so, of course.)

See Fig. 6 for a drawing of each aerial. The half-wave dipole will have a length of \(\frac{468}{f}\) where \(f\) is in MHz and the result in feet, and its feedpoint impedance (nominally 73 ohms in free space) will lie between about 50 and 100 ohms at normal heights, falling considerably as the height drops below about \(\frac{1}{2}\)-wavelength. It is in essence a balanced aerial and should therefore be fed either with balanced feeders of 50 or 75 ohms nominal impedance, or by coaxial feeder with a balun having a transformation ratio of 1:1 in impedance. The folded dipole displays a higher feed impedance—around 300
Fig 6.
(i) Half-wave dipole—see text.  (ii) Half-wave folded dipole—see text.  Note that this aerial is made of twice as much wire as the simple dipole, shorted at the ends and spaced by spreaders.  A short length of 300-ohm balanced feeder is shown, but in practice the balun in (i) and (ii) would be right at the “eye” of the aerial for mechanical strength.

(iii) (a) End-fed Zeppelin.  To set up, disconnect aerial and hoist feeders to final position alone.  Load Tx into dummy load, then switch to ATU.  Adjust ATU for maximum current in each leg with RF ammeter, and note the settings.  Connect aerial slightly over length, hoist, check ATU tuning; trim aerial length until maximum current in feeders is at same ATU and Tx settings as already noted for feeders only.  On other bands, tune for maximum and equal feeder current.  (iii) (b) Centre-fed Zeppelin.  Adjust ATU for equal and maximum setting of current up feeders.  (iv) Loaded vertical.  Loading coil should have enough inductance to make the aerial radial system resonant at desired frequency.  If the upper section is an extendable whip use full extension for the LF band-edge, then shorten whip to resonate to frequencies higher up the band.

For the Zeppelin we come to an entirely different situation; the aerial may be made half-wave length and fed either (a) at one end, with only one feeder wire connected at the top, the other being insulated, or (b) at the centre; in either case, the feeder is operated with a high VSWR and is usually of open-wire construction.  The presence of a high VSWR on the open-wire feed line makes the presence of an aerial tuning unit an essential (the first two types, as described, need no ATU).  The trade-off is that, against the penalty of high VSWR and the need for an ATU, the aerial system becomes a multi-band device, if the half-wave length is chosen for the lowest band in use; indeed a 3.5 MHz end-fed Zeppelin aerial can be used on 1.8 MHz by shorting the bottom of the feeders and operating it as a Marconi aerial against earth.  Reverting to the Zeppelin properly fed, either at the end or the centre, it will almost certainly be found that the feeder length will need to be “trimmed” to some degree if a multi-band aerial tuner is used to make this aerial operate on five or six bands.

The loaded whip is, in essence, a shortened version of the quarter-wave Marconi aerial, used in conjunction with a ground connection to provide the “mirror image” which completes the aerial.  The aerial is at ground level (or, if elevated is used with quarter-wave radials to simulate the earth connection) and so is rather prone to pick up man-made interference which is usually of a vertically-polarised nature, as well as suffering from absorption of the signal in surrounding brickwork and buildings; again, the vertical is very apt to suffer from “rain static” as compared with a horizontal aerial.  On the other hand, it requires a much smaller investment in real-estate to set up, and as will be seen below, has a different polar diagram.

(b) Assuming the Zeppelin to be of half-wave length, either centre or end-fed, the first three aerials will have a polar diagram as shown (Fig. 7) in plan.  A three-dimensional polar diagram may be imagined as a doughnut with the aerial element in the hole in the middle and poking through at each end.  The loaded vertical will have an all-round polar diagram in plan, the dimen-
To "look at" an amplitude-modulated signal on an oscilloscope one can use various methods. Perhaps the simplest requires an oscilloscope with a "Y" amplifier bandwidth a little greater than the frequency in question. A sample of signal is collected and injected into the "Y" amp. input terminal through a 10:1 isolating probe—a convenient method is to fit an extra terminal on the aerial matching unit, with a wire from its rear taken to be close to the coil as a pick-up aerial so that the 'scope does not detune anything. Setting the time-base to repetitive sweep at a convenient speed and talking into the microphone will result in the modulated RF signal appearing on the trace; adjustment of controls and of the pick-up will enable a good trace amplitude without overloading the 'scope. Over-modulation will be shown up instantly by small bright patches along the centre-line of the trace where the modulation has "broken the carrier.

To look at the CW waveform with a 'scope one can use the method already outlined; it may be better to use a triggered timebase rather than a repeating one if such is available. An alternative is to pass the signal from the pick-up terminal through a suitable diode probe, and apply that to the "Y" amplifier input terminals of the 'scope. Set the transmitter to its CW condition, and plug an electronic keyer into the appropriate socket. Set up the speed of the keyer suitably, and run off a string of dots the while locking the trace. Once it is locked, in either case the shape of the dots should show a "rounding-off" of the square wave form at the corners but no tendency for the dots to "run into" each other when the keyer is sending dots at the maximum speed it can sustain.

The diode probe method is also applicable to AM signal monitoring and should be used whenever the 'scope does not have bandwidth to cope with the RF band frequency.

(b) Monitoring is always advisable in practice, in that there is then no reason why a problem on the outgoing signal cannot be noted and dealt with before it can become a nuisance to others or contravenes the terms of the licence. In addition, when keying and using the diode probe, one may often be able to spot mild parasitics in the PA stage; there is not enough feedback to sustain them, but at transients the waveform seen will become blurred, the leading and trailing edges of Morse dots being a perfect example and easiest to examine.

Qu. 10. (a) Describe the use of a cathode ray oscilloscope for:
EITHER (i) Monitoring depth of modulation of an amplitude modulated wave (including over-modulation) OR (ii) Monitoring the keying waveform of a Morse telegraphy continuous wave transmitter.

(b) Why is monitoring advisable?

Answer 10
(Ed. note: we answer both parts of the question here; the candidate will of course not need to do so, only to answer his chosen alternative.)
NOWHERE is it as true as in SWL, that “one man’s meat is another man’s poison.” One SWL will insist on general-coverage, another on amateur-bands only, a third will have no interest in anything but the broadcast bands; and the fourth may not be interested in any of the hobby save in the fact that it enables him to hear a language as spoken by a native user, so he can correct his own pronunciation and improve his fluency. All these are listeners—and they don’t even take into account the fraction who are constructors and often only listen to a receiver when it is completed or to compare it against a standard, or to while away the time listening to the local net while the tin-snips and the soldering iron are doing their work.

Talking of home-brew, one can extend the description to the work of J. W. Grice (Castleford) who seems to have finally extracted the gremlins from his dial-drive; this allows him more time for playing with aerials, in which he is most interested. On a different tack, in his letter Jim mentioned that Ken Whiteley was in hospital; let us hope he is fully mended by the time this comes to be read—best wishes from us all, Ken.

Next we have a letter from a happy amateur station, in the shape of Dr. H. Squance, who is now G180JG and doubtless getting to know and work all the locals in Bangor, Co. Down.

B. T. Mackness (Dagenham) has set himself a target of 1000 prefixes, at which time he intends to go out and buy a beam aerial—one way of stimulating progress when time is at a premium! Brian of course is still up to the eyes in studies, so SWL activity is pretty rare outside of holiday times.

That DX-petition to Haiti was heard by R. Towlson (Nottingham) and queried. Perfectly OK, it was a gang of W’s going to a rare spot with a view of “cleaning out” the winning trophies in the CQ WW DX Contest in the Phone leg.

On to H. M. Graham (Harefield) who is understandably rather pleased to have at last topped the thousand on the HPX Ladder. Maurice is a bit startled, though, at the number of W, K, N and AA calls about, followed on the HPX Ladder. Maurice reckons that the 14 MHz band was not its usual self—most of the savvy chaps had gone HF!

K. Kyezor (Irchester) seems to have had a good month, with some 85 new ones to add to his tally—but we have to deduct one, for a “G17RG”—possibly a leprechaun, but not a properly licensed one!

R. Griffiths (Ventnor, I.o.W.) only writes in when he is on the sick-list, at home with time to spend on SWL: which doesn’t stop him having an AR88D, an Eddystone 840C, a 640 from the same stable, and a Heath “Mohican,” plus VHF converters from T.W. and Microwave Modules, and an NR-56! For 144 MHz the aerials are an eight element Yagi, plus a 4-ele. vertical, and an eight-element broadside array. Bob is also interested in SS-TV the cheap way, having been scared out of his wits by the price of commercial gear! Anyone with some “gen” please pass direct to your scribe; he also has a mild interest in the subject and the same feeling about costs. There is of course the possibility of using a SS/TV adaptor for use with an ordinary scope, but the problem here is that unless it has a tube which is available with a P7 phosphor you can’t get to see the picture, which means you have to improvise a camera on the oscilloscope using black-and-white Polaroid film, developing as you transmit your own tape. With the price of Polaroid film that seems a good way of spending more money, but no doubt one could hook up something which will cut down the cost by using separate segments of one piece of film.

D. W. Waddell (Herne Bay) wants to know how he can do measurements on aerials without a transmitter. This is not too difficult but will always result in some radiation from the aerial. Instead of the usual type of reflectometer or VSWR indicator left in line while transmitting, the SWL has to turn to much more sensitive devices: one useful device is the noise bridge. The recipe is simply to take a Zener diode and work it on the noisiest part of its characteristic; amplify the noise with a transistor or two until you get more than enough noise up to the highest frequency in which you are interested. This noise is then used as the excitation to a bridge of which two arms are the centre-tap to either end of a low-value carbon potentiometer of the best quality you can obtain—a cermet pot would be far better. Of the other two arms, one is provided by a resistor (you may switch two or more ranges) and the fourth by the aerial under test. The sensing device is the station receiver. If you set things up, you will find that the noise will give you an S-meter reading or you might use your ear; just twiddle the pot until the noise dips down, hopefully to almost zero, and there you are. Clearly then, if you have a reasonable stack of metal-oxide or a high-stability (not wirewound) resistors which can be measured, they can be used to provide a series of points for a scale to be drawn around the knob of the pot. The scale should certainly hold good to around 30 MHz or better, the quality of the null being best if there is little or no reactive component. Another such useful device is an “antennascope” as described by W6SAI in his Beam Antenna Handbook, this being usable with a GDO as excitation, provided it is done with care.

Despite all he has said in the past, A. Glass (Plymouth) still has to put in a score—he’s hooked! Seriously, for Bert it was a great pleasure to hear 28 MHz showing up just like it used to—well, nearly! Certainly it is quite a long time since we have heard North Americans active...
There seems to be quite an upsurge in amateur activity in Bangor, Co. Down, as is demonstrated by R. Evans who has a SR-550 receiver which doesn't work on 28 and 21 MHz, although it covers the American 6-metre allocation, and all the lower amateur bands. For an aerial, recourse is made to G3KHC's aerial shown in the January 1977 issue of Short Wave Magazine, but considerably modified: it is found to be much better than the old end-fed 60-footer which was used previously. At the moment SWL Evans is in the R.A.E. class locally, so we wish him the best of luck.

E. W. Robinson (Bury St. Edmunds) found a good 'un in VK1FT in Canberra; his first VK since he started into the SWL game back in 1968. Another one of interest was CT501AL, claiming to be some sort of special prefix but receiving the frozen mitt in answer to his CQ calls. He subsequently disappeared and was not heard again; probably a pirate disappearing to think up a more enticing call!

Enclosed with E. W. Robinson's letter was one from his son, D. A. Robinson (Felixstowe) who has an AR88D, used with an end-fed wire or dipoles at HF, and as the tunable IF for a two-metre converter. The beam rotary is made of the tuning drive out of an 1155, which is turned by a worm-wheel which in its turn is driven by a reversible 110-volt motor; indication is by a linear pot driven from the "works" and having its output fed to a one milliammeter for direction indication. All good stuff and a lot cheaper than a commercial job. Incidentally, reader Robinson's HPX list must be unique in that it includes the call of his employer!

A particularly satisfying time for K. Burch (Plymouth) in that he heard 9L1SL in the CQ WW contest—Ken is one of the smart lads who realise just how many people try for a top award by going to some rare location as a first step. The query about the N callsigns we have already mentioned.

That CT501 call mentioned earlier is also mentioned by Gerard Brazil (Dublin 11) who copied it as CT501AL, and also found a CTOUA. Like us, Gerard also wonders! K. Rogers (Ulliesthorpe) has been listening on 21 and 28 MHz, activity which has caused him to hear his first /AM station, and also to hear Russian stations using the R series of prefixes, RA, RB and so on. Ken finds it a little startling that 28 MHz should be regarded in Russia as part of VHF. A good point, but of course it is true to say the border line between the areas of MF, HF and VHF (3, 30 and 300 MHz respectively are the upper limits) is an arbitrary one: it is also true to say that for most of its time, 28 MHz behaves in a manner more typical of VHF than HF.

Another supporter of the idea that there should be some articles on modifications to the 9R59 series of receivers is H. A. Jones (Dartmouth). Harry is a pensioner and doesn't get about any too well, which means his AR88LF is too heavy for him to pull about for realignment even if he had a signal generator, so he has to stick with his 9R59DS. Harry knows a bit about the practical side of things, having started with his father in the crystal set days, progressing through various kits, and he would like to hear of any interesting articles on this receiver. One of the snags about such a definite request as this is that one has to find someone who knows the receiver, has done some useful mods., and then is game to write it up for everyone's benefit. However, if your scribe might interject a word here (from the point of view of a professional engineer who has spent half a lifetime in the design field), he would strongly advise a mite of caution. For example, an article is recalled in which a change of front-end from a 6BA6 valve to an EF183 was offered: one questions whether such a modification would in fact do more than to significantly down-grade the receiver performance, from even a cursory examination of the characteristics of the two types. Again, the addition of a further IF stage, while practicable, is a good way of making the receiver have a lower performance. The only time when any significant modification to a receiver is justified, is (a) when the IF selectivity is lacking and a crystal or mechanical filter can be found to install without too much pulling-about of the works, and (b) if (and only if!) extreme sensitivity is wanted for copying the Oscar downlink on Ten, to use a low-noise pre-amplifier, provided the band is closed to anything in the nature of a big signal. An outboard front-end attenuator is of help between the ATU and the receiver, stabilisation of the valve heaters and the HT (either crammed into the receiver, or preferably by taking the PSU out to a separate case): and, most important of all with any valve receiver, a few judiciously-placed holes in the bottom of the case, in the chassis and in the top of the case, as an exercise in getting the whole works to stabilise more quickly and at a lower temperature. Just recall that hot air rises, and ask yourself how does the hot air accumulating under the chassis of a receiver get away—it doesn't, it just heats up all the metalwork, which in turn causes all sorts of funny things to happen.

P. Rooney (Chester) seems to have surfaced after his lay-off, starting with a bash at the CQ WW Phone contest, during which he had a ball on Ten on the Sunday morning. KA6KN, heard at 0908 on the Saturday morning, was the only Far East signal and was suffering from a definite "echo" effect while working Europeans. One would guess that the most likely cause of this was that the signal was being heard at a half and then one-and-a-half times round the world; the simultaneous short and long-path reception theory is hardly tenable if only because of the distance; it would be interesting to know...
if someone heard him around this time on a beam, which would prove or disprove the hypothesis.

S. M. Phillips (Dukinfield) enquires whether a PA station heard counts as a new one because he was using the suffix J—presumably a Jamboree-on-the-Air station. Sorry Stuart—that would involve a very definite bending of the rules, and would set a rather hairly precedent.

Another query to do with HPX comes from H. A. Londesborough (Swanland) who opened his copy to find his CW score updated but not the Phone one—shame on us, let’s hope we get it right this time!

On now to K. Kniveton (Brierley Hill) who has been enjoying all the going-on on 28 and 21 MHz; he comments on how useful the Geoff Watts Prefix List is for any keen SWL. We couldn’t agree more—and the layout, which leaves room for additions for a long time to come, means that a copy can be falling to bits before its usefulness is past, if you keep it up to date.

The Old Maestro, S. Foster (Metheringham) and his 9R59 are still at it; when he got back from Leicester (where we never did get round to that natter over a pint we tried to organise!) he spent the next day DXing in the CQ WW Contest, for seven new ones in the day. One small correction Stew points out, is the IK prefix which is being used by any and all the I stations as a special to mark the ARI 50th anniversary between September and December 1977.

A couple of queries from P. Ramsay (Stevenston), of which the first is how to send a QSL to VP8PL—try sending it to VP8PL, Stanley, Falkland Is. The second is the question of a S-meter for the AR88D which will prove or disprove the hypothesis.

Just a last word on Grayham’s letter—“Listening on transmitters RF, and only then to start listening in earnest. The tune-up procedure is always to offer the ATU to the signal source, coupled into the “receiver” terminals of the ATU, and a field strength meter tuned to the proper band. The first check is to see that the F/S meter is tuned to the same frequency of the GDO by bringing it near enough to the GDO coil to get a deflection (and while you’re about it, check that the GDO signal is in the band, somewhere near the middle). Now plug a length of coax into the receiver socket of the ATU, put a one-turn link on it, and couple the link to the GDO; connect aerial and earth to their proper terminals. Next systematically go through the combinations of setting until you begin to see a reading on the F/S meter (and probably a dip in the GDO to a greater or lesser extent). Make a note of the settings which give the best results at the carrier level, and so meters which responded to the AVC line did all that was required of them. With SSb we’ve thrown it away at the carrier and put it back with the BFO—so the S-meter only tells us the strength of the BFO, which isn’t a great deal of help! The answer is to use some form of audio-derived AGC of the “hang” type—a good read through G3VA’s “Amateur Radio Techniques” would provide much food for thought. Perhaps the easiest thing to do would be simply to leave the existing AGC components in place, disconnecting the line from the AVC diode at the switch; then the new AGC circuit could be built up on a tiny bit of Vero-board (if you use npn transistors the “HT supply” could be taken from across the output stage bias) and take the output of the new audio-derived AGC to the place on the switch just rendered vacant.

G. Passmore (Stackpole) built Dr. Squance’s ATU as described in the July issue of the Magazine, but was somewhat surprised to find that “my JR-310 doesn’t like it at all!” Don’t blame the receiver, rather go through a routine of tests to see what happens. Grayham has already done the obvious and checked his wiring and layout, so one is left either with the operator or the aerial in use. It must be said in all fairness that there could well be an aerial length that just won’t perk on one band or another. Ideally in such a situation, you can put a transmitter on it, a reflectometer in the lead to the rig, plus a tuned RF field-strength meter for luck; then you can keep a note of each of the settings. In this case, one can probably attack the problem best by using a GDO as the signal source, coupled into the “receiver” terminals of the ATU, and a field strength meter tuned to the proper band. The first check is to see that the F/S meter is tuned to the same frequency of the GDO by bringing it near enough to the GDO coil to get a deflection (and while you’re about it, check that the GDO signal is in the band, somewhere near the middle). Now plug a length of coax into the receiver socket of the ATU, put a one-turn link on it, and couple the link to the GDO; connect aerial and earth to their proper terminals. Next systematically go through the combinations of setting until you begin to see a reading on the F/S meter (and probably a dip in the GDO to a greater or lesser extent). Make a note of the settings which give the best results at mid-band also at the band-edges, always checking the GDO with the receiver to see that it doesn’t “pull” too far. Repeat for each band. If you aren’t sure, try for the centre of one band, and then check with a receiver. It must not be forgotten that, for instance, the pi-network is essentially a low-pass filter, and so in some cases the ATU may seem a bit “flat” on the LF side of the peak, making it not so easy to tune—which doesn’t detract from its usefulness! J.C. must admit that even though he has the settings all written on the cover of his log, his normal tune-up procedure is always to offer the ATU to the transmitter RF, and only then to start listening in earnest. Just a last word on Grayham’s letter—“Listening on

### HPX Ladder

#### (All-Time Post War)

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<th>SWL</th>
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<td>P. L. Shakespeare</td>
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<td>M. Jackson (Warwick)</td>
<td>450</td>
</tr>
<tr>
<td>N. A. Phillips (Devises)</td>
<td>1395</td>
<td>A. Glass (Plymouth)</td>
<td>1338</td>
</tr>
<tr>
<td>A. J. L. Nordson (Swanland)</td>
<td>1554</td>
<td>H. A. Londesborough</td>
<td>1434</td>
</tr>
<tr>
<td>H. J. Rosling (Bakewell)</td>
<td>1457</td>
<td>A. F. Roberts (Kidderminster)</td>
<td>465</td>
</tr>
<tr>
<td>D. T. Mackness (Dagenham)</td>
<td>1576</td>
<td>P. L. Shakespeare (Foulness)</td>
<td>1378</td>
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<tr>
<td>W. H. Smyth (Hartlepool)</td>
<td>1650</td>
<td>G. M. Smith (Kidderminster)</td>
<td>562</td>
</tr>
<tr>
<td>T. T. Ludlow (Gt. Missenden)</td>
<td>1620</td>
<td>P. Ramsay (Stevenston)</td>
<td>1829</td>
</tr>
</tbody>
</table>

Minimum score for an entry 500 for Phone, 200 for CW. Listings in accordance with HPX Rules and only include recent claims. A “Nil” return is permissible to hold a place.
two-metres is the best incentive to pass the Morse test!"

Our next "newcomer" is ex-G3BVW, QRT since 1948, retired to Okehampton after 37 years in the Royal Air Force; C. P. Townley started as an "untrained Wireless Operator" and ended his time as Flight Lieutenant in the Electrical Engineering Branch. So—he knows a bit about the technical stuff and knows his Morse, we guess! As he has been out of action since 1948, the first move was to drag out the old faithful AR88, and tune around the CW and SSB bands to see what it was all about; lots and lots of CW Russians were found, SSB /M stations of almost unbelievable signal strength, and a range of commercial gear that he finds quite astounding, more so when he thinks back to his old B2 transmitter and CR-100 receiver. Pat is now wondering what to do about a new, first-class, receiver and we would strongly suggest that rather than obtain a general-coverage receiver, he goes for something amateur-bands-only, keeping the AR88 for the general-purpose type of listening—if only because a good AR88D is as good as most modern receivers if it is in good nick and properly driven. A classic design in fact, as can be noted by the very few articles offered on the modification of them.

A. Cuthbert (Jarrow) has a long letter full of questions (and interest too!). He has an Inoue receiver, and seems to have a little trouble in sorting out some snags with it; and we suspect from the way he words his letter that the problem is the old one of how to obtain best results in worst conditions! On the big signals, one can drive it; and we suspect from the way he words his letter that (and interest too!). He has an Inoue receiver, and seems very few articles offered on the modification of them. As most modern receivers if it is in good nick and properly of listening—if only because a good AR88D is as good as most modern receivers if it is in good nick and properly driven. A classic design in fact, as can be noted by the very few articles offered on the modification of them.

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"Curses on postage-stamp gardens!" says Dave Hill, of Crawley, having had to "chat up" some four neighbours in order to get a 132-foot wire out, which he couples through ATU. During the CQ WW Contest, Dave heard various odd prefixes, and he notes how the Russians are using the 4J prefixes for contest entries. It's a good scheme for a contest station to have a "different" call; and while the Americans can fairly easily do this by a trip into the Caribbean or up to FP8, the Russian contest groups haven't anywhere quite so easily accessible, so they opt for a change of prefix plus a shift into one of the less populated parts of their enormous country.

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The Rest

This is where we acknowledge letters which have not been singled out for mention in the piece, or scores sent in without comment—which is not to say that we haven't read them all with interest; we have—as always. So, thanks to J. H. Rosling, Bakewell; L. Stockwell, Grays; B. Shepherd, Staines; M. J. Quintin, Wotton-under-Edge; D. Taylor, Harborne; H. A. Londesborough, Swanland; R. Elwyn Thomas, Corwen; M. Shaw, Huddersfield; M. Law, Chesterfield; N. A. Phelps, Devizes; M. Roberts, Harwood; I. Mackay, Dingwall.

Finale

It will be near to January by the time you come to read this, so your letters for the March "SWL" piece should be well coated with some protective such as Bostik or RTV silicone rubber to prevent this; when it occurs, it manifests itself as an increased noise level in the receiver long before you have mechanical failure. As for the bit up in the air, one is usually stuck with a Marconi-type, which in effect means an overgrown mobile whip, as high as may be, and loaded at around the centre to get it on frequency.

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IN view of the increasing amount of interference to our signals by man-made noise, it will be of interest to readers to note that new legislation covering RF Interference (RFI) will become law by the end of May 1978. The relevant directive is contained in the Official Journal of the European Communities, Vol. 9, No. L336 (76/889/EEC) dated December 4, 1976. Article 1 states that the law will apply to "household appliances, portable tools and similar equipment" while Annex I.1 also adds "office equipment." The relevant BS-800 is understood to be updated, and at this moment your scribe is awaiting the arrival of a copy. We also note that a directive covering industrial, scientific and medical equipment is being considered. Limits are given for conducted interference between 150 kHz and 30 MHz, and also for radiated interference in the range 30-300 MHz. This being so, it is strongly recommended that readers get a look at BS-800 in its revised form and wave it around the local radio, TV, and 'white-goods' dealers, also making quite sure your own neighbours know about it and buy only goods that comply. It might also be added that, if only because he stands to gain so much from it, the licensed amateur would be well advised to look at his own rig with a view to cutting down unwanted radiations, whether it be commercial or homebrew.

The Bands

Like the weather—wintry. On the other hand, the sunspot count is most definitely up, so things are better than they were this time last year, at least on the HF bands.

Let's make a start with Top Band; and of course what better way than by going through W1BB's Bulletin?

"First-Timers" this year should note that the first ten minutes of every DX'er's hour are reserved for the chaps who have not yet "made it" over the Atlantic, in either direction. Europeans 1825-1830 kHz, W's 1800 to 1807 kHz. So—try a call, and then listen on the other side. Slipping sideways to W1WY in this context, Frank's "Contest Calendar" this month asks the writer to request all G's playing in the Transatlantics or, more particularly in the CQWW Top Band affair, to indicate the frequency on which they are listening—nothing so annoying as hearing good DX and not knowing where the chap is listening! Yes, we know, "old hat" to the regulars but in every year there are some more newcomers. To come back to W1BB, we notice that this year the KH6 chaps have 1800-1810 kHz in addition to their lump at the other end of the band. Those who have been on Top Band a while will recall WITX, Roy, who joined the ranks of Silent Keys on July 11. Three weeks before his death from cancer, Roy went up his tree, cleared away some of the branches, and returned to take photographs of his tree aerial—a vertical, using radials at the bottom, and the loading-coil wound on the tree-trunk as a former; with luck we should be able to run the picture and the schematic drawing next time out.

It is of interest, noting W1BB's Bulletin, to read that it is reckoned K1PBW, Ernie, who has given so many G's their first contact, is at this moment probably the possessor of greater DX capability than any other station, taking into account his two phased verticals with many radials, his quiet location, miles away from the man-made noise, and having six Beverage aerials for reception. WA1RFM/VP9 and W4EV/VP9 live within 300 feet of each other, so they have organised themselves a common aerial; a vertical complete with an adequacy of radials, plus coaxial cables to each shack, and suitable relay change-over arrangements, so that either can use the beast while the other is otherwise occupied. A fine idea indeed!

It seems G8PG must have touched a spot with his piece on trees as aerials (October issue); we have already mentioned the WITX effort, and now we have a letter from G3BRL (Chesham), who found the article "rang a bell" and began searching. Eventually he traced the memory down to "The Radio Experimenter's Handbook" published in 1922 by the Wireless Press; where P. R. Coursey—a name so familiar to anyone who has studied the history of our pursuit—writes up some notes on a US Army Signal Corps series of experiments along the same lines as those we mentioned in G8PG's article. And, surprise, surprise!—two pages earlier that same book discusses the germ of the GM3RFR Broomstick antenna (November issue!)

"CDXN" deadlines for the next three months—
February issue—January 5th
March issue—February 2nd
April issue—March 2nd

Please be sure to note these dates!

G2HKU (Sheppey) seems to have been a bit more active than usual on Top Band, despite his other commitments; SB9 yielded the regular sked contacts with PA0PN while CW accounted for OH1VP, DJ2RE, GM4GK, OL9CGL, YU2HDE, OK1BGWP, OH2KA, OK1DDL, DJ6TK, 4U1ITU, GM3PFO, GW3KOR, OK2BUV and OL8CGI.

G4FUP (Horsham) had the domestic receiver die on him, so he was forced to use the Panda Cub plus TCS-12 receiver on the LF Bands; Top Band gave (during one of the contests some fifty stations in five hours) the calls so raised of DJ3ZX, F6CNI, EI2BB, G131VJ, and GM30XX/A.

A report comes in from Colin Squires, G3XCS, who reports that he is handling the QSL's for his old pal Ian Forse, G4DHA, who is Radio Officer on MV Tugela, plying between South Africa and the Seychelles and QRV all bands 160 to 10, and signing ZS5IB/MM. That sounds like "possibilities" in the 160 context.
G8JHK has now successfully turned himself into G4FUU (Addington). For Top Band, the aerial has some eighty feet wrapped around in the loft, plus forty feet outside; the latter being rolled up and hidden away by day, and joined to the garden shack after dark. It has been quite reasonable on Eighty but a couple of days on Top Band resulted in contacts with G3XTZ, G4FGQ, G3TDQ/A, G3YMC, GM3WTA, OK1DDS, DK5PD, DK4FM, OK5TLG, DL0JS, CW from a K.W. Vesper Mark 1 and received on a Yaesu FR-50B. Mole reckons that there must be hope even for people like him who live at the bottom of a valley; and old ‘KFE agrees, in fact the best Top Band sites are almost always places where the ground is damp and the water-table high.

**Eighty**

G3KPO now has an eyrie perched high—300 feet—above Shanklin Bay in the Isle of Wight, and from there he has worked ON4TB who was using one watt for a 589 report: Douglas, however, still has his 100 watts on the HF Bands, although he has QRP on VHF.

G4FUP says it was quite good until some idiot in the government put all the DX an hour earlier! However, the first Transatlantic contacts were made, to VE3AKG, N2DU, VE1DS, K8LX and W3SQ all on fifty watts of CW.

G2HKU seems to have been exhausted by his exertions on Top Band, because he just had enough energy left to dust off the top of the QRP machine and then fire it up for a CW QSO with SM7MS.

G4FUM operated /A during JOTA, for the Ardnavalley Venture Scouts and with some considerable degree of success overall; on Eighty we note SK7CL/MM, PA66SN, PAOVST/JI, HB9BAJ, OK1ONA, N2NT, K3UA and K2EL, all SSB.

Eighty isn’t easy from the Shetlands, opines GM3RFR from his hideaway up at Baltasound, especially with QRP; nonetheless he is within sight of his target of 100 countries confirmed with five watts of SSB, there now being some 84 in the log of which 49 have QSL-ed. During the current period the band wasn’t used much, and so Sam only worked G, GM and LA.

Our next reporter is G2NJ (Peterborough) who seems to be much more active now, using his HW-8 and sticking pretty closely to the noon period, when he worked GM3XNE who was under the double handicap of 500 milliwatts input to an aerial blown down by the gales(!), G2CP, GW5TW who, G2NJ says, is an expert at rigging-up QRP gear from the junk-box, G3URU who now has an improved aerial system, G31V, G3BWX and G4FJF, of whom the latter was the most powerful with five watts input. A QRO station noted was F6DJK, who spent a Sunday afternoon picking off the QRP stations one by one, and giving them much appreciated reports. Prize of the month, one supposes, must go to G2CAS though, out /P again with 100 feet of wire strung out between two trees by the river at Ilkley.

Eighty has picked up after a bad start, says G4DMN, who used his SSB to tangle with CT3AB, EA6BW, FP8DX, JX9WT, HR3JIR, IT9PWV, JA6BSM, J3AG, K5MS, K8UR, LG5LG, M1C, OB40 (an OA in disguise), OHOJN, OHONA, OY2A, PY2ELZ, PY2WAM, PY7BXC/1 (Fernado do Noronha) S1JWL, UF6HE, VE2AUF, VP2VAT, W4EY/VP9, VP2MRJ, W7KW, W0MJ, OE6DK/YK, ZL4AP, ZL4OY, ZL4AV, ZL4QL/A (Campbell Is.), SM4EIG /4U, SH3KG, 8R1AG, 9H1CE and 9Y4NP.

G3CED (Broadstairs) complains that his rig remains unused owing to business QRM—work was ever the curse of the drinking classes!—but he forwarded on the log from G4EVO who appears to have made a recovery from the state in which he was in last month in quite spectacular fashion, and, at 76, he is back happily punching the old key, fighting the QRM, and going after the DX with five watts to a Joystick. One gets the feeling that G4EVO only looks at Eighty these days as a substitute for the better DX to be found on the other bands—and if the log says what it seems to, he has tried all bands from 1-8 right the way through to 21 MHz with some fair amount of gusto. Thus, on 3-5 MHz it was very largely a matter of G’s and Europeans, and a bare handcount at that.

Another one not to have worked-over the seam that is Eighty is G4GIE (Gt. Moulton), but in John’s case it is the very simple fact of working most of the time away from home during the week and finding many domestic chores to be done at the weekend.

**Forty**

7 MHz saw G4FUD getting over to the States on another band, W2QKN being the lucky chap; otherwise the only real activity was knocking off a goodly string during the OK DX Test.

It was SSB all the way for G2HKU, who talked to HPIXYA, and LU501, just to keep his hand in. Ted makes an interesting observation that in ZL the Poltava Thing seems to be a bit different from our home version—the gas-engine pounds away around 14270 kHz, at which it is several S-points higher than around the 14100-14150 area. Odd!

Up there in Unst, GM3RFR used his Broomstick aerial to some effect on Forty, and came up with G, GM, LA, SM, OH, DL, UA and U49 with five watts of SSB.

Having flogged his heart out on Eighty and the HF bands, G4DMN (Wirral) had only a small amount of time or enthusiasm for 7 MHz, so that SSB with HPIXYA and VK5BC were the total contribution.

For G4GIE there wasn’t a lot of interest in the band, but he did spend an hour there on one day, so that three DL types and an F6 were recorded for posterity.

**Contests, Awards and Things**

Don’t forget our CCA Award starts on January 1, 1978; those counties need to be collected, if Top Band is to still be available to us in the years to come. On the matter of the “informations,” SWL Hill felt this to be a retrograde step, as he feels that few amateurs will wish to QSL SWL reports on this band. Of course they will—provided only that the SWL report is good enough to warrant a QSL, which means that having found his man, the SWL must stay with him and note those things of use to the recipient.

The DL AGCW Summer QRP Contest results are with us, from which we note that G3DNF was
fifth, GM3OX, twelfth (but top scorer on 14 MHz), G3UY, 16th, and G3NEO, 22nd (but top scorer on Top Band). The contest attracted the highest-ever number of entrants, with the best geographical distribution around the world to make it all the more interesting. For 1978 the Rules are unchanged, the winter one being slated for January 21-22, and the summer one July 15/16.

We seem to have contrived to miss the ARRL 160m. dates; but January 27-29 are not to be overlooked, this being the weekend for the CQ WW 160 Test, with Rules as last year.

However that one goes, we must now for a moment turn back to the 1977 Bermuda Contest, to note and congratulate G4CNY for being the winning G; VE3KZ was the winner of the VE section, the top W man was K2UR, and VP9IG the Bermudan winner.

Returning to the future and the French DX Contest (which is another to overlap the CQ WW 160) we notice that in the F Contest Rules, their entrants may use CW only and that on a spot frequency of 1825 kHz, so you can keep an ear on that spot during the Top Band contest. If you are in the Top Band affair, the two digits the F's will be sending after their call will indicate the department, of which there are some 95 "home" ones plus the overseas ones and French Territories.

Looking forward a little, we come to the BARTG Spring RTTY contest, from 0200z March 25 to 0200 March 27; this gives the Faithful a chance to drop a line to Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middlesex with an SAE—a big one—for a copy of the detailed Rules.

Ten Metres

First in the lists here is SWL Wittaker, brother of G3IGW and organiser of those ten-metre activity periods which did so much to keep Ten occupied during the sun's low. Looking at the October/November period, we find that the first DX signal to be heard was U18FF, around 0600. 0700 saw VK signals both in October and November, though oddly enough 0800 showed none; but U18, U17, UG6, VU2DK and OHOAC were all logged. By 0900 the VK's were back, joined by a UF6 in October and KH61AA in November. 1000 saw SU, an OE signing /VK in October (while December adds AP2P and D4CBS). The going was then fast and furious until 1700, when we see 9G1JX, 8P6FV, CX4FG, 9Y4NP and HK3AXT in October but nothing of interest in November, while the next couple of hours was North/South contacts in October but nothing in November. It sums up as: all continents heard in October and November, and some 114 countries in 1977 using just the end-fed bit of wire.

G2ADZ (Chessington) monitored down at the CW end and found that during November Ten settled to a fairly consistent pattern, opening around 0900 and closing again around 1500 and, since Bill has dealt firmly with his gremlin he can work them again: W1-5, VE1CD, ZS6ME, U49's, UI8JCQ, UM8NMM, UL7AAA, 4L6M, HC2SL, ZS1W, ZE1CB, VK's, EL2ET, VU2LO, C5AT, and varied Gotaways. Bill wants to know how to QSL C5AT, and it looks as though the correct route is to send them to OH2BFJ. Only at week-ends has G3NOF, D4DMN was not able to try things during the week, but the week-ends offered A2CZV, K5DUT, KSOVC, OD5AQ, VK5NIT, VP8PC, VP8PM and 5B4EI.

G3MRIF managed Europeans plus ZS6 and PY, from his spot up in Shetland—and of course those of us down South should always remember the difference in the time of sunrise and sunset, which are a handicap, quite apart from the QRPer.

During JOTA, G14FUM managed to find ZS6BNO on the first day, plus DL and YU; and from the home QTH there were contacts with WD5EEL, W5DU, W4JQN, KP4EFP, Z51KZ, YU3TPM, I30BO and HB9BEI.

21 MHz

There has been over the past few months quite a flight from Twenty, some to Ten but most to Fifteen; and of course activity begins activity, making the band sound even livelier.

G14FUM found short-skip on the first day of JOTA, G3AYO/A, G3SAD/A, G5YC, G6HH and GW4AC5/A; on the second day there were DJ6VM, OK3CFS, OZ2NBY/A, ZC4AJ, UA6LAX and IK5HTM. When the short-skip allowed G14FUM/A picked out W1GG, W2AG, W3I, K4MSU, W5IO, WD9AEX, YBOACP (apparently off the back of the beam), KZBSA (The Boy Scouts of America Hq. station in Nashville, Tennessee), H18JAF, 9Y4NP, VP2JMD, VE1MMM, VE3DFH, VO2WL, ZS1's ZS3BOY, ZS4KSA, 9J2WR, and C5ABAB. From home HR3JJR, N8RA, HC1RE, ZF1SW, VP2M, VP2VDH, 9H4L, 9J31WR and KZ5AS—all on SSB.
GM3RFR has a phased vertical two-element array on this band, the feedpoint being some eight feet above ground, plus a 10 ft-wavelength vee-beam: so, disregarding the Europeans, there were VE4J, WJ-4, VP2M, YV, LU, ZP, EA8, 4Z4, JY, TR8, UA9.

Although it's not been quite as good as it was during the autumnal peak, it has still offered openings in the afternoons to the American West Coast. Thus G4DMN, who mentions contacts with HR3JR, KG6JHW, PY8BXC/O, TJ1BB, VK5NIT (the N stands for Novice, incidentally), VK6HK and 4S7TE.

The band opens about 0830 with long-path JA and VK, turning round to the short path at about 0930 until noon. The Americans start about 1130 and continue till the band closes just after dark: VU's were noted among the later VK's, and a few Africans were noted in the mornings. Contacts were made to J3AH, JA1FRE, JA4MCS, K5ECJ, N6VF, UK0AA8, VK2NAQ, VK2NHS, VK3NAC, VK3NBJ, VK3NCF, W00EV (Colorado), W0OUX (N. Dakota), WA2UNO/MM, W5MLT and 4X4JU.

Now on to G4EVO, who seems to have had quite a time on the HF bands; it is amusing to note how the contesters nowadays never give any report other than 599—

Twenty

We may as well stay with G2CP at this point, to note that Henry used the same rig as already described on 14 MHz, where VE7UBC and W6UA demonstrated the worth of the little rig.

G3RCA (Wigan) seems to have been a mite out of luck; the month before last he was QRT for aerial repairs, and this time a week was lost due to a damaged balun up in the eye of the beam, which has duly been mended. For the rest of the time, Tom found it "long-path season," with quite a few knocked off thus. CW found mornings ZL1YL / Kermadec, KG6SW, JT1KAA, VK9NJ (Norfolk Is.) to go with breakfast, followed by HL9KL, P29CC, TT8HV, for morning coffee. At Lunch-time there was CE0ZE, while afternoons saw QSO's with FB8WE, 3D6AC, EA9FK, VS5XU, J28AP, XE1AK, YB1ADL, L12B/Y1 (this one is our old friend from the "Kon-Tiki") and "Ra" off on his travels again), FR7B, FB8ZL, VU2BEJ, and J28BA. Turning to the "after work" period we see HH5HR,
Readers of the many popular electronics magazines cannot have failed to have noticed the interest aroused recently by the microprocessor and its applications in everyday life. A complete description of the technical features of a microprocessor is neither possible nor appropriate here but, in essence, it is a digital integrated circuit which by reference to pre-encoded instructions can perform logical and arithmetic functions and, in addition, communicate with the outside world.

The uses of these devices are many and varied and they are now creeping into every home in many disguises; these include washing machines, television games and even sewing machines. The microprocessor is now also finding applications in the "shack" and these are limited only by the imagination of the user and can make operating much more enjoyable by relieving the operator of some of the more mundane tasks. This article deals with one application which would benefit all of amateur radio community; namely the "Microprocessor Controlled Beacon."

Firstly, it should be stated that the idea of a microprocessor performing control functions of a beacon is not really revolutionary: the new OScars carry an on-board processor to control the telemetry, codestore etc. Beacons at present serve several functions; since they are active 24 hours per day, they act as a useful signal for aligning receivers, as a calibration point and serve as a guide to propagation conditions. However, they simply radiate a carrier with the callsign in FSK every n seconds. This has now become a waste of resources and it is not now difficult to enable the beacon to carry useful information as well as providing a signal source.

General Principles

The overall design, together with the present design for comparison is shown in Fig. 1. Clearly, the only difference between the two is that the electronic keyer has been replaced by a microprocessor system—that is the microprocessor itself, memory and input/output interfaces. This latter could quite conceivably have a lower component count than the keyer. The nature of the input ports are determined by the application of the beacon; of this more later.

Weather

Of particular interest to the VHF/UHF orientated amateur are the prevailing weather conditions. These can be measured without great difficulty in electrical terms and can be converted into digital signals acceptable by the microprocessor's input ports. The system could then, for instance, measure the barometric pressure and transmit this for the benefit of those amateurs interested in working DX on the VHF/UHF bands. Also of use would be temperature and humidity, which can both be measured without too much difficulty.

Output Format

In its simplest form, the output would consist of Morse, modulating the carrier as at present, with the data being presented in plain language as far as possible, but because of the restriction on the time available the format would have to be fairly compact. Since the object of the beacon is to be of maximum possible use to the greatest number of people, and since extra facilities can be added at practically the cost of the memory used to contain the required programme (i.e. very little), the beacon could send the data in RTTY (Murray Code); and also perhaps in the recently permitted ASCII (American Standard Code for Information Interchange—an 8-bit code without the shift characters of Murray).

There is no reason why the output format should not be exactly the same as on Morse, the appropriate carriage control characters being inserted at the end of each line. Thus a typical print-out might be:

```
GB3MPU GB3MPU GB3MPU
GB3MPU ON 144.95
QTH WROTHAM
QRA ZZ11A
NGR TQ111111
TEMP 17C
BARO 1030 MB
HUMIDITY 32 PER CENT
DE GB3MPU GB3MPU GB3MPU.
```

If this line of thought is continued, there is no reason why other, more exotic modes of transmission should not be sent, SSTV for instance. The format of the picture and the generation of synchronous pulses would present no problem to the microprocessor, especially if the picture sent were restricted to the callsign of the beacon. If the number of stations equipped to receive it justified its inclusion, facsimile could similarly be sent. Since these facilities would inevitably be used less than those of CW and RTTY, transmission would best be restricted to a fairly infrequent basis, perhaps every 30 minutes. This service would enable amateurs to align equipment without the use of test-tapes and the attendant problems of speed variations etc.
THE 1977 "MAGAZINE" CLUB CONTEST
THIRTY-SECOND ANNUAL EVENT

By "Club Secretary"

MCC again: this time your scribe is not just an invigilator and making horse laughs, but doing the sorting and donkey-work. Thus the thirty-second MCC report may look a bit different from those of previous years; don't shoot the pianist, he's doing his best!

Now, it will be recalled that we ran MCC late last year, and as a result of the protests we moved it back to November; but still the number of entries dropped, as anyone who had been monitoring the band over the last years could have expected. Rather odd, then, that the winners Guernsey in fact managed a higher score than last year's top-dog; and what's more they created what must be the record DX for any MCC when they hooked 3B8DT! The rig was a Trio TS-820, driving a folded dipole at eighty feet and running E-W, so that it was laying down (and receiving!) a fat signal all over the U.K. They say it was their first effort at a CW-only contest; and as for the QRM, how about a loud firework display going on just a few yards away—one can just imagine the tense looks outside every now and again to see whether the aerial was still in its accustomed place!

That conditions were a little odd was noted by many contestors, and said if we disqualified him please use it as a check log. Needless to say, we accepted this entry! One minor contre-temps occurred when we noted the first page of one station's log was missing—it followed up a day or two later it was almost entirely transceivers, some of them used in conjunction with transverters to get them on to the band; one particularly neat idea was used by the Cheltenham association—just two days old as a club in its own right!—in that the receive part of their transverter had a Q-Multiplier built in to sharpen things up a bit. The power supplies, the transverter and all the gubbins are fitted in the Heath loudspeaker-cabinet to match all the rest of the station; as the photograph shows, a nicely-built and contrived machine but what a pity they were only able to get in 1 1/2 hours of operating on the Saturday due to visitors, and none on Sunday. A couple of stations used the traditional gear, with Clifton using a 6AG7 PA valve and CR-100, Yeovil and Yaesu FR-50B. One station with an FT-401 went as far as to keep a power meter in the line all the time, and certify it as never going "over the top," while another station with an FT-401 took the alternative path of using it into an outboard PA stage.

The standard of the logs was very high indeed, with the exception of just one—and he was most apologetic and said if we disqualified him please use it as a check log. Needless to say, we accepted this entry! One minor contre-temps occurred when we noted the first page of one station's log was missing—it followed up a day or two later it was almost entirely transceivers, some of them used in conjunction with transverters to get them on to the band; one particularly neat idea was used by the Cheltenham association—just two days old as a club in its own right!—in that the receive part of their transverter had a Q-Multiplier built in to sharpen things up a bit. The power supplies, the transverter and all the gubbins are fitted in the Heath loudspeaker-cabinet to match all the rest of the station; as the photograph shows, a nicely-built and contrived machine but what a pity they were only able to get in 1 1/2 hours of operating on the Saturday due to visitors, and none on Sunday. A couple of stations used the traditional gear, with Clifton using a 6AG7 PA valve and CR-100, Yeovil and Yaesu FR-50B. One station with an FT-401 went as far as to keep a power meter in the line all the time, and certify it as never going "over the top," while another station with an FT-401 took the alternative path of using it into an outboard PA stage.

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so later and worried the office no end. This being said, all of them were good, and some quite outstanding in their presentation.

Although some groups were of the opinion that the Saturday conditions were poorer than the Sunday, the logs show differently in looking at the overall picture. Perhaps also on the Sunday there was some deterioration in the Westerly direction, as the Leprechauns at EI4LRC swapped reports a couple of S-points down both ways with Plymouth on the Sunday as compared with the Saturday.

Signals generally were of pretty good quality, with very few drifters or key-clicks to annoy, despite the likelihood that at least some stations almost certainly were operating under reduced mains-voltage conditions. While, as we have indicated, the numbers of logs were down, it would seem quite likely that some clubs went to 144 MHz (one was heard there after the contest, who was a “regular” in previous years) and of course for the tough guys who really know the contesting game 7 MHz had its attractions—but almost everyone said we will run it again next year. Let us answer that one right now and say “of course we will, have no fear.”

Beefs: for all practical purposes, none. One group did moan about non-club stations not stopping to give their locations, and singled-out G3BMY in particular; but frankly we can’t believe Tom Cashmore as unlikely to “know the form” as far as Top Band or MCC are concerned.

Log Comments

Some of the humour was deliberate, some of it accidental—for instance: “Overall sore, 19747” (Guernsey) . . . “Band was very poor on the Saturday night” (Dundee Kingsway Technical College) . . . “Contest rules seemed biased against the G’s” (Kirkcaldy) . . . “An enjoyable contest though the QSO rate at times was low; our first attempt at the 160 metre contest” (Lisnas-harragh High School) . . . “The 3B8 was a great surprise—it remains to be seen whether he is genuine or not. He gave name as Joe and QSL to DLI1IZ” (White Rose) . . . “Maybe Guy Fawkes has blown up MCC 1977!” (IRTS Region One “B”) . . . “First night fairly flat and with heavy QRN; second night excellent” (Plymouth) . . . “Things just didn’t go the way we planned.” (Maidstone Y) . . . “Please keep one contest on Top Band, and over two legs” (Sutton & Cheam A) . . . “Nearly couldn’t enter because of damage to antenna coils. Remedied by sawing out the bent piece of tubing and piecing it out, only to find the whole issue resonant on about 2 MHz; added a ten-turn loading-coil about an hour out, only to find the whole issue resonant on about 1835 kHz. Phew!” (Torbay) . . . “Several periods of rain static on Saturday, up to 29 + 25dB.” (Edgware) . . . “Plenty of Fun and beer!” (North Staffs) . . . “We lost our aerial in the wind between 2000 and 2100 on Saturday—wondered why the band was so flat!” (Surrey) . . . “We thought our first T9c report was C for Club—then someone thought they make it plain it meant C for Chirp!” (Ed. note: Creditably, they went QRT for 30 minutes to sort it out.) (South Manchester) . . . “Conditions were very peculiar at times; however, enjoyed by all those taking part.” (Acton, Brentford & Chiswick) . . . “I think GM4AAF had trouble with his receiver at times; he gave us RST 529!” (STC Paignton).

Summary

Quite a few stations were worried about the question of repeating QSO’s on the second leg. The intention was quite clear in our minds that one could work a particular station once on each night—but we have to admit that the rules weren’t clear and a note has been made to that effect. The question of “standard abbreviations” has been made before and we stick to our opinion that since so many clubs use MCC as a forcing-ground for the bigger contests, we should stick to our existing system and make the novices pin their ears back!

There is a widespread feeling that the contest is not fair to the G’s—and in fact this comment has been made by one club or another every year since your scribe has had anything to do with MCC, no matter how the Rules were “adjusted.” In fact, if one considers it all rather carefully, the main method of “adjusting” things for fairness is in essence either the starting time, or the date. The reason is this: the chaps in GM, GI, EI, and so on, haven’t got many “locals” in the way of three or six-pointers to work, only the single-point stations and none too many of them, until the band starts to open to elsewhere. Meanwhile the G stations, which are largely grouped together in or near the massive conurbations (horrible word, isn’t it!) are harvesting their locals at a massive rate of knots, and at the half-way mark have usually quite a good lead which is whittled away by the DX’y station later on in the evening. Thus, a switch to December is not very desirable as it gives too much of the edge to the DX, and a look at the 1978 contest calendar shows the first two weekends of November as already pre-empted by the RSGB 7 MHz and 1.8 MHz respectively. It would seem a bit much to have another Top Band shindig just a week after the RSGB one, and the last week of November would bias things too much, we feel, in favour of the GM’s. So, provisionally for the moment, we are setting MCC to the last weekend in October, which should be enough to “bias the PA” against the DX just a little more. That gives us then October 28-29, 1978 for the next MCC. See you there!
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